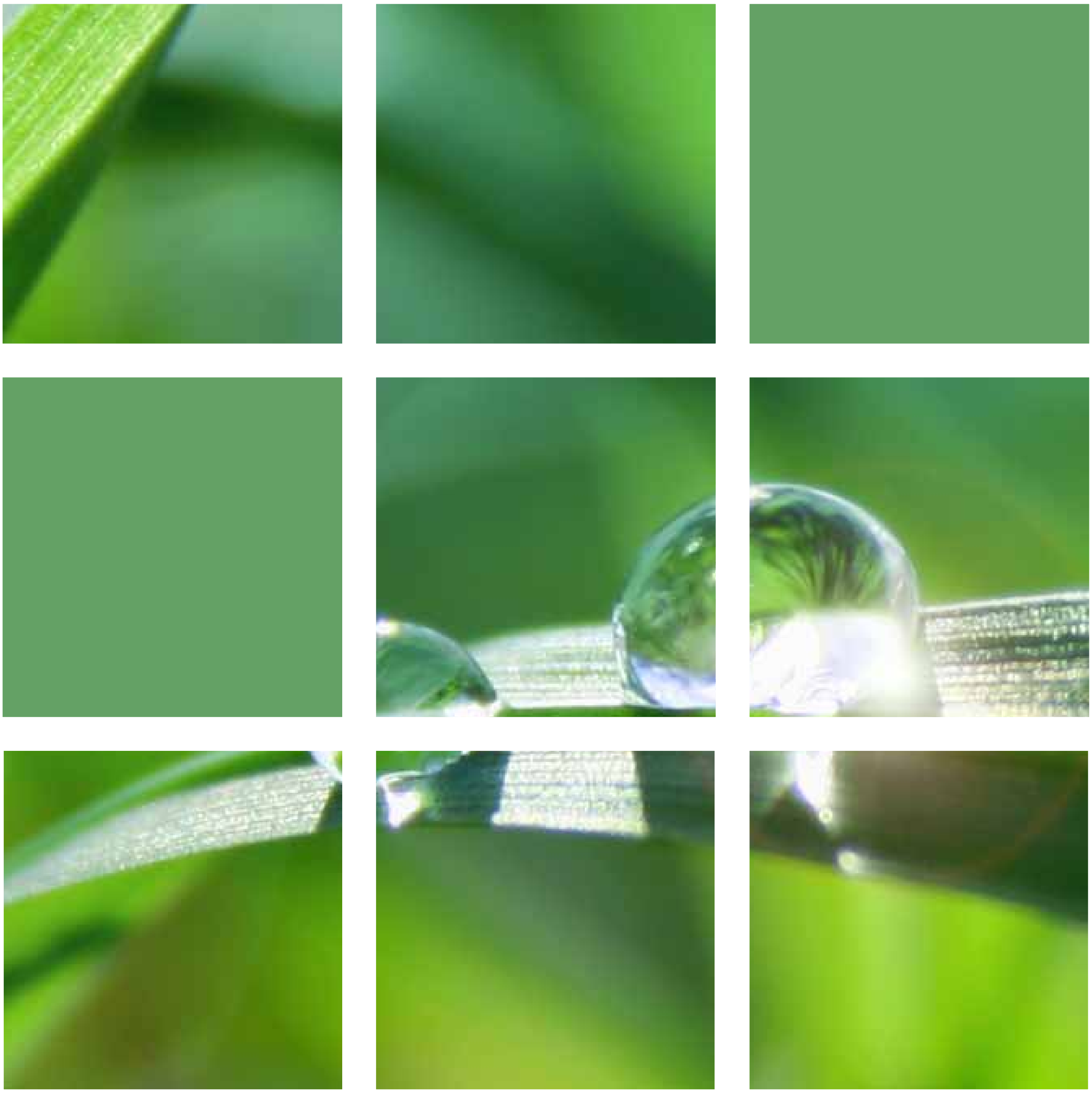
Comhairle Contae
Átha Cliath Theas
South Dublin County Council

Grange Castle Golf Course

Environmental Risk Assessment



May 2011

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Grange Castle Golf Course

Environmental Risk Assessment

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

Appendix 1	Walkover Survey Checklist
Appendix 2	Tier 1 Assessment Matrix
Appendix 3	Stockpile Photographs
Appendix 4	Stockpile Logs
Appendix 5	Trial Pit Photographs
Appendix 6	Trial Pit Logs
Appendix 7	Sampling Plan
Appendix 8	Trial Pit Analytical Results
Appendix 9	Stockpile Analytical Results
Appendix 10	Groundwater Analytical Results
Appendix 11	Surface Water Analytical Results
Appendix 12	Characterisation Survey Results
Appendix 13	Characterisation Survey Photographs
Appendix 14	Asbestos Results
Appendix 15	Revised Tier 1 Assessment Matrix

EXECUTIVE SUMMARY

RPS was commissioned by South Dublin County Council to undertake an Environmental Risk Assessment (ERA) at Grange Castle Golf Course. The golf course was originally opened in April 1998 and was later extended with the addition of Phase 1 known as the '8 holes' which was completed in June 2006 and which now forms part of the active course. Further works commenced within the areas termed the '5 holes' (Phase 2) and 'holes 14 & 15' (Phase 3) in October 2007 and February 2008 respectively with works in these areas being later placed on hold. An exploratory investigation was completed on Phases 1 to 3 of the course between January and February 2011 in response to correspondence received by South Dublin County Council (SDCC) from the Environmental Protection Agency (EPA).

The principle objectives of the ERA are to:

- Determine the nature and extent of the material imported to Phases 1 to 3,
- Assess any potential risks to human or environmental receptors associated with the presence of the infill material; and
- Provide recommendations in relation to the management of the site.

The Tier 1 assessment identified the site as a Class C low risk site. A Tier 2 exploratory investigation was subsequently completed to verify the low risk categorisation and confirm the site does not pose a risk to human health or the environment. This investigation involved trial pitting, soil and water sampling and chemical analysis, material characterisation and comprised targeted and non-targeted investigations

The interpreted lithology of the site comprises topsoil, overlying reworked clay containing minor amounts of waste material with an average thickness of 2.3m. Soft to firm brown to red/ brown slightly gravelly clay with a maximum depth >4.7m underlies the reworked clays. Bedrock was not encountered during the exploratory investigation.

The volume of infill material within the '5 holes' (Phase 2) and 'holes 14 & 15' (Phase 3) was calculated following a review of historic (1998) and current (2009) topographic surveys which provided information on pre and post filling levels. The volume of infill material was calculated at 90,230m^3 for Phase 2 and 126,726m^3 for Phase 3.

No leachate or shallow groundwater was encountered during the exploratory investigation. The river Liffey is located approximately 4km to the north of the site and regional groundwater flow in the direction of the Liffey is expected. Groundwater monitoring at the nearby Wyeth Medica site concluded that local groundwater flow was to the north and northwest.

The targeted investigation was conducted within distinct stockpiled material containing material other than soil and stones. Sampling focused on obtaining sufficient information to characterise the material and provide information to assess available options to remove this material off site for recovery or disposal. A total of twenty samples were collected from the stockpiled material and analysed for a broad range of analysis including Waste Acceptance Criteria (WAC) for inert landfills in accordance with Council Decision 2003/33/EC with resulting data indicating that the material is acceptable for disposal at an inert landfill with the exception of fluoride exceedances in two samples.

The non targeted investigation involved the collection of 39 soil samples from the infill material. Soil analytical data indicates that the infill material contains low level hydrocarbons and heavy metals such as antimony, barium, cadmium and molybdenum across the site which are not considered to pose a risk to Human Health or the Environment.

The contaminants identified in groundwater samples collected from both on-site and off-site monitoring wells were limited to arsenic and chloride. Elevated levels of arsenic were recorded at the monitoring location at Castle Bagot House (Figure 14). Elevated levels of arsenic were not recorded in the soil bulk or leachate analysis on the site, which suggests the detection may be attributable to off site sources.

Elevated levels of chloride were detected at two groundwater monitoring locations however chloride was not recorded in the soil bulk or leachate analysis, which suggests it may originate from off site sources or is naturally occuring. Chloride does not pose a risk to human health however it does affect palatability.

The contaminants identified in surface water samples collected from the site were limited to manganese at one location and chloride and suspended solids at a second location. Elevated levels of manganese and chloride were not recorded in the soil bulk and leachate analysis which suggests these contaminants may originate from off-site sources.

Material characterisation was conducted on 39 soil samples as part of the non targeted investigative works. The results of the survey indicated that the samples primarily comprised soil (<20mm) (72%) and soil and stones (>20mm) (26%) with these two categories accounting for 98% of the total volume of material sampled. Some natural wood found in the form of branches and biodegradable waste from garden and park comprising rootlets and grass were also found. Other waste elements accounting for 2% found in the samples were wood – timber, tar, ceramics, bricks, concrete; metals; plastics; textiles and composites. No hazardous or food waste was found in the samples.

Based on the soil analytical data, the potential risk to site users associated with contaminants within the infill material is considered to be low.

At this stage no specific remedial requirements are considered necessary with regard to the infill material and the potential risk to human health and controlled water receptors is considered low.

1 INTRODUCTION

RPS was appointed by South Dublin County Council (SDCC) to carry out an Environmental Risk Assessment (ERA) at Grange Castle Golf Course, Nangor Road, Clondalkin, Dublin 22 (see Figure 1 for site location). This report has been completed to provide the required response to correspondence received by SDCC from the Environmental Protection Agency (EPA) dated 28th of October 2010 and 30th of November 2010 in relation to Grange Castle Golf Course (GCGC).

The importation of material into GCGC for the further development of the course was the subject of an initial complaint to the Environmental Protection Agency (EPA), with the core of the complaint relating to the requirement for waste authorisation. Following receipt of information from SDCC the EPA issued a decision indicating that the activity was not subject to waste authorisation. Following this decision, two additional complaints were received in September 2010. The EPA completed a site inspection in October 2010 and subsequently issued a site inspection report whereby they advised they were rescinding their previous declaration and considered the infill material to be a waste.

1.1 BACKGROUND

Development of the initial golf course commenced in the Autumn of 1995 with the golf course opening in April 1998. The course was later extended with the addition of Phase 1 known as '8 holes' which commenced in June 2003 and which was completed in June 2006 and now forms part of the active course.

Further works commenced within the areas termed the '5 holes' (Phase 2) and 'holes 14 & 15' (Phase 3). Works on the '5 holes', which is located adjacent to the Outer Ring Road, commenced in October 2007 and were placed on hold in Spring 2008 on account of access restrictions due to poor ground conditions.

Works commenced within 'Holes 14 & 15' (Phase 3), located to the south of Phase 1, in February 2008 but were subsequently placed on hold in May 2009.

The material which was imported to the areas defined as the '5 holes' (Phase 2) and 'holes 14 & 15' (Phase 3) of GCGC during the period October 2007 and May 2009 was brought to site in order to;

- Provide mounding around the perimeter of the course and between fairways to enhance safety and prevent stray balls leaving the course or injuring players on the adjacent hole.

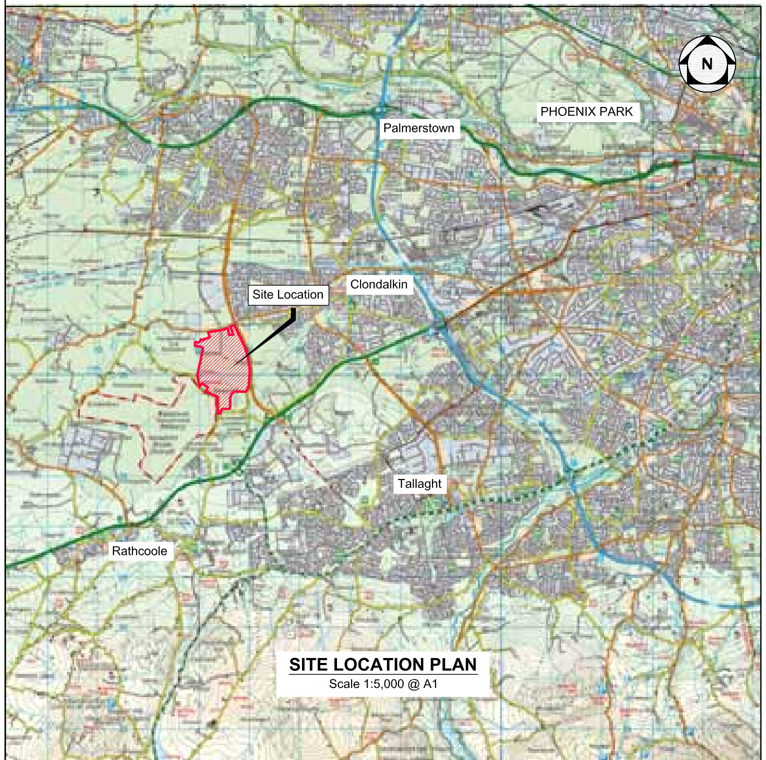
- Create a challenging and interesting course.

The material is reported to have been imported from a range of different development sites within the Dublin Region.

1.2 OBJECTIVES

The principle objectives of the ERA are to:

- Determine the nature and extent of the material imported to Phases 1 to 3;
- Assess any potential risks to human or environmental receptors associated with the presence of the infill material; and,
- Provide recommendations in relation to the management of the site.



SITE LOCATION PLAN

Scale 1:5,000 @ A1

SITE LAYOUT PLAN

Scale 1:5,000 @ A1

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Project: Grange Castle Golf Club ERA Proposal

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Title: SITE LOCATION AND SITE LAYOUT

1.3 OVERALL METHODOLOGY

In order to achieve the above objectives the following scope of work was undertaken:

- Desk based survey and site walkover including collation of information from relevant authorities;
- Development and subsequent refinement of a Conceptual Site Model (CSM) based on available information;
- Design and implementation of an exploratory soil and water site investigation in accordance with BS 10175:2001 and BS5930:1999.
- Characterisation of the infill material from selected trial pits;
- Assessment of risks to human and environmental receptors in accordance with the Environmental Protection Agency (EPA) Code of Practice for the Environmental Risk Assessment for Unregulated Waste Disposal Sites, 2007; and,
- Preparation of a report as per Chapter 8 “Reporting Requirements” in the EPA Code of Practice for Environmental Risk Assessment for Unregulated Waste Disposal Sites, 2007.

1.4 ASSESSMENT APPROACH

As part of the Tier 2 Assessment the exploratory investigation identified the nature and extent of infill material across the site. Consequently, the assessment has been carried out in accordance with the EPA Code of Practice for the Environmental Risk Assessment for Unregulated Waste Disposal Sites, 2007 (EPA Code of Practice).

The consideration of the impact of the site on the environment is based on a risk assessment on the ‘Source – Pathway – Receptor’ model where the probability of damage occurring is considered in the context of the severity of consequence of that event actually happening. The S-P-R approach underpins the EPA Code of Practice.

The assessment looks at the relationship of possible contamination on the environment (*i.e.* the surroundings and habitats) and on a range of receptors (such as humans, flora, fauna, groundwater and ecological systems) to develop a conceptual understanding of what is occurring. The relevant components of the system are determined in conjunction with how they are potentially connected or linked. Aspects of the source material and impacts on the receptors are identified and measured as part of a characterisation process. This in turn facilitates the development of environmental engineering design controls to manage, mitigate, protect, and/or remediate the situation.

The primary environmental system which is exposed is the hydrogeological and hydrological system (surface water flow, interflow and subsurface and groundwater flow). A factor that makes this process difficult is that many of the processes in hydrology and hydrogeology are unseen, so there is a need for conceptualisation – shaping a structure of the situation to aid understanding and development of a system model against which measurement can take place.

In this case, the relationship between the discrete **source** of the contamination (*i.e.* infill material) and the receiving environment known as the **receptor** (*i.e.* the water systems, for example: groundwater bodies, soil matrix) is considered. The connecting route, known as the **pathway** (groundwater flow, drainage systems and soil systems) and the driving force in the form of a fluid (*i.e.* liquid in the form of rainfall and leachate) can induce contamination to move through the system. Thus the system can be summarised by the following:

Source $\longrightarrow$ Pathway $\longrightarrow$ Receptor

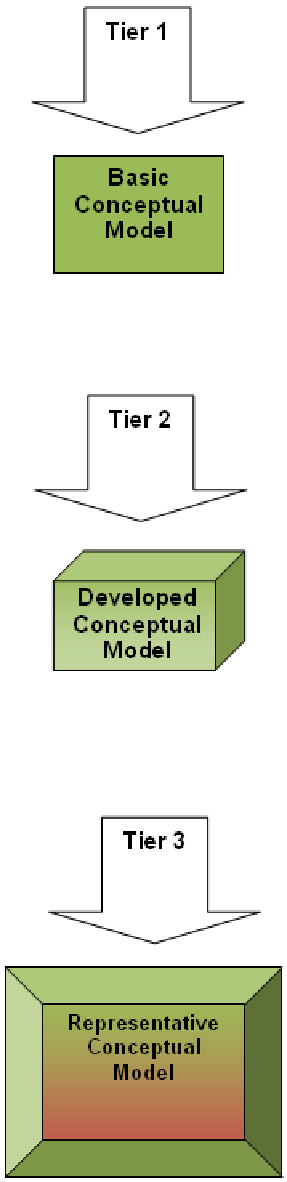
Source: Substance or material that has the potential to cause harm to the environment or human health by virtue of its physical or chemical characteristics.

Receptor: A human or environmental entity which has the potential to be harmed through direct or indirect exposure to the source.

Pathway: Mechanism by which the receptor can be exposed to the source.

In the EPA Code of Practice “Source-Pathway-Receptor” (SPR) approach to risk assessment, all three elements have to be present and linked in order for a risk to be present. If any of these components is absent there is, by definition, no risk.

The Code of Practice utilises a structured phased approach to identify the S-P-R components and conduct a risk assessment of the linkages between the elements. The process involves preliminary site investigations and initial screening to indicate the range of high to low risk factors. Areas requiring further investigation are identified, and finally the model is fine-tuned. At each stage the information and risks are reviewed and assessed before progressing to the next phase. The Code of Practice tiered methodology is as follows:



CoP Chapter 2	Preliminary Investigation (desk study and walkover), Development of Conceptual Site Model, Risk Screening and Prioritisation.
CoP Chapter 3	Detailed Intrusive Investigation and Testing.
CoP Chapter 4	Refinement of Conceptual Model, Quantitative Risk Assessment.

1.5 ASSUMPTIONS

Assumptions and uncertainties in the development of a conceptual model must be identified and clearly expressed to ensure that the degree of representation is understood before evaluation can meaningfully take place. The tiered technique of risk assessment within the Code of Practice seeks to minimise gaps in characterising each of the components within the S-P-R framework, so that at each stage the conceptual model is 'fine tuned' and uncertainties are reduced. Accordingly, the extent of information and data available at each stage of the model development is incorporated within each individual section of the assessment for individual Tiers.

1.6 CONSULTATIONS

On the 28th of October 2010 the EPA requested SDCC to submit a proposal of works for the completion of an Environmental Risk Assessment (ERA) for the site at GCGC.

SDCC issued a scope of works for completion of an ERA to the EPA on the 18th of November 2010 following which the EPA requested additional information on the 30th November 2010.

A revised scope of works for the completion of the ERA was submitted to the EPA by SDCC on the 14th of December 2010 and EPA approval of such was subsequently received on the 17th of December 2010.

2 TIER 1 – PRELIMINARY INVESTIGATION & RISK SCREENING

2.1 INFORMATION SOURCES

In accordance with the EPA Code of Practice a comprehensive desk study review of the available existing data for the site and the surrounding area is required to complete a Tier 1 Assessment including a gap analysis and collation of necessary outstanding information from relevant authorities (*i.e*. EPA, OSI, NPWS, OPW, Teagasc, South Dublin County Council).

2.1.1 Public Information

The following sources of publicly available information were consulted as part of the desk study:

- Ordnance Survey of Ireland (OSI) Discovery Series, Sheet 50;
- OSI Aerial Photography;
- Geology of South Dublin, Geological Survey of Ireland (GSI) (1:100,000), Sheet 16;
- GSI On-line Groundwater database. Aquifer Classification, Aquifer Vulnerability, Teagasc Subsoils Data, Bedrock Data http://spatial.dcenr.gov.ie/imf/imf.jsp?site=Groundwater
- GSI On-line Geotechnical Map Viewer database; http://spatial.dcenr.gov.ie/GSIGeotech/Default.aspx
- National Parks and Wildlife Service (NPWS) online maps and data . Database of Special Areas of Conservation, National Heritage Areas, National Parks, Special Protection Areas including site synopsis reports;
- Environmental Impact Statement for Profile Park
- Environmental Impact Statement for IDA Ireland at Grange Castle Business Park
- Consultation with South Dublin County Council.

2.2 SITE DESCRIPTION

2.2.1 Site Location & Setting

Grange Castle Golf Course is located just off the N7 in Clondalkin, Dublin 22 (See Figure 1 for site location). The site is bounded by the R136 Outer Ring Road to the east and the Nangor Road to the north. A number of industrial units are located immediately north of the main entrance off the Nangor Road. Corkagh Park is located immediately to the east with Casement Aerodrome situated to the south west. An industrial unit and football pitch are located to the south. High density housing developments are located to the north east. 125 acres of lands to the east were developed in 2007 for Profile Park Business Park however to date only one unit has been developed within the business park. The surrounding landscape is made up of a patchwork of pasture and arable fields, with grassland being the dominant land cover. The field system is separated by clumps of mixed woodland and sparse hedgerow networks. Dense patches of mixed woodland, playing pitches and landscaped areas dominate the southern part of the area in Corkagh Park. The predominant landscape character type is flat urban fringe farmland.

GCGC was established in April 1998 as an undertaking by SDCC Parks Department. The 18 hole Championship Course was designed by Patrick F Merrigan. The course is located within a parkland setting with 7 lakes and a number of streams.

Work commenced on Phase 1 (8 holes) in June 2003 following receipt of Part 8 planning permission in 2002 and were completed with the area open for play in June 2006. Further work commenced on Phase 2 (5 holes) in October 2007 following receipt of Part 8 planning permissions in 2002 and 2006 and were indefinitely placed on hold in Spring 2008 due to bad weather conditions and access difficulties. Phase 3 (holes 14 & 15) received Part 8 planning permission in 2006 and in February 2008 work commenced within this area due to ease of access however these development works were also placed on hold in May 2009.

The areas of GCGC which are the subject of this investigation comprise Phase 1 (8 Holes) which is located within the active area of the course and is delineated by blue in Figure 2 below; Phase 2 (5 holes) delineated in yellow; Phase 3 (holes 14 & 15) delineated in red and the haul road connecting the ‘5 holes’ to ’holes 14 & 15’.

2.2.2 Initial Site Inspection

RPS carried out an initial site inspection on 15th November 2010. This was undertaken by a chartered waste manager and a chartered civil engineer, both with over 11 years experience in the waste industry including landfill and environmental risk assessment. The walkover survey checklist was completed and is included in Appendix 1. No significant impacts were uncovered in this initial walkover. An understanding of the delineation of and the location of imported material was obtained and an opinion on the composition of the surface visible material was established. During the initial site inspection there was no evidence of landfill gas, vegetation die back or leachate seepage emanating from the material.

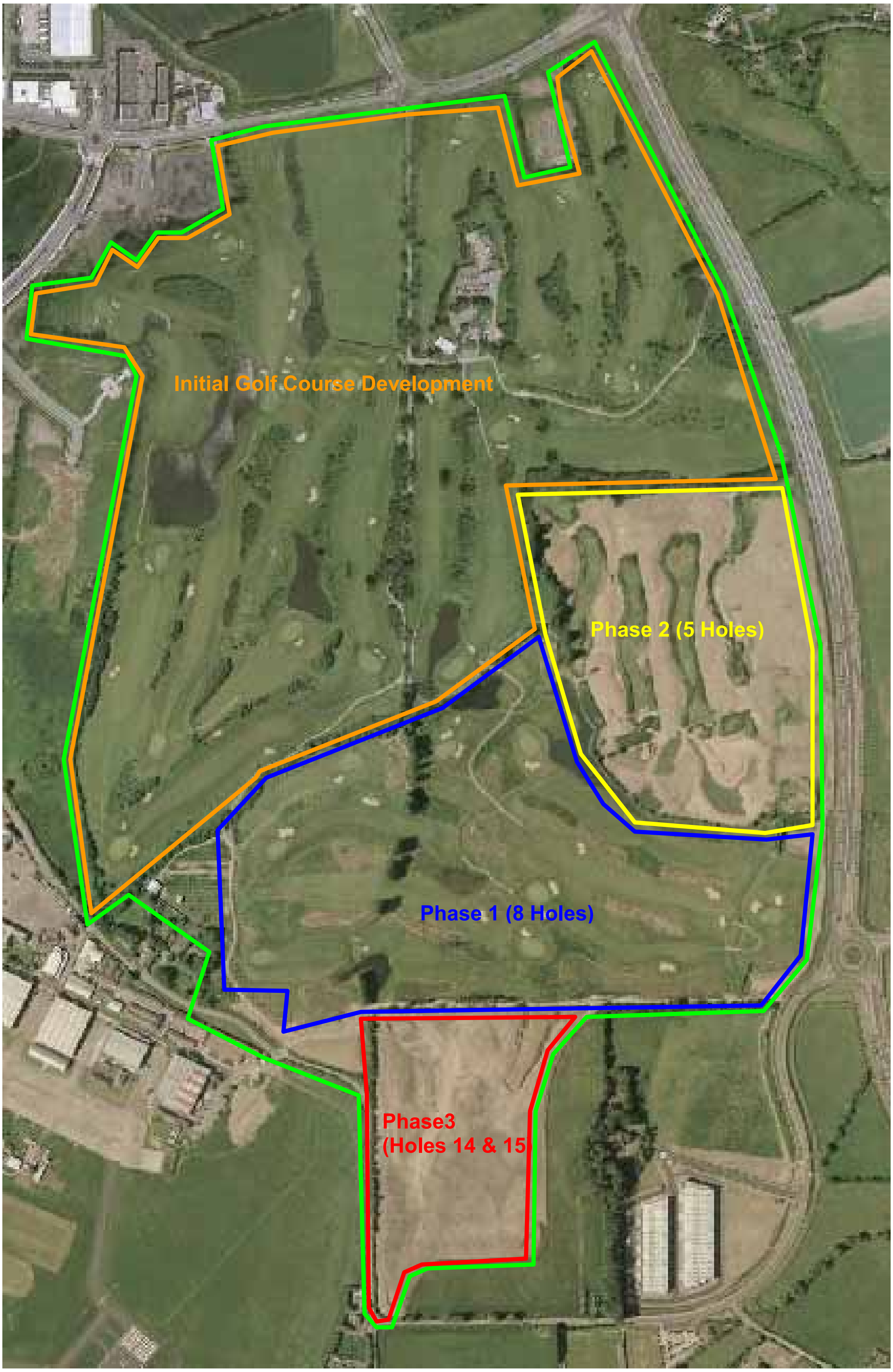


Figure 2: Aerial Photograph of GCGC delineating individual sites

2.2.3 Aerial Photographs

The following Ordnance Survey aerial photographs from 2000 to 2009 (Figures 3 to 5) highlight the development phases of GCGC.

Figure 3: Ordnance Survey 2000 Aerial Photography

Figure 4: Ordnance Survey 2007 Aerial Photography

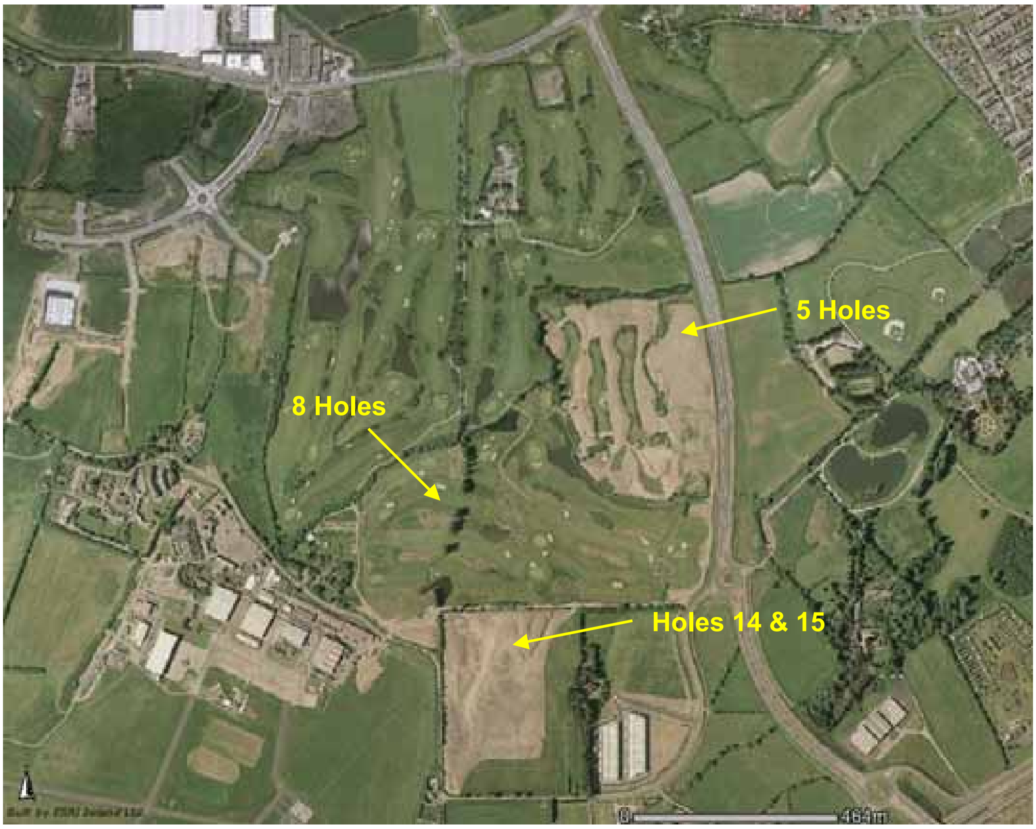


Figure 5: Ordnance Survey 2009 Aerial Photography

2.2.4 Historical Land Use

The entire site, active and inactive areas are within SDCC ownership. Prior to the development of Phases 1 to 3 the historical land use was primarily agricultural as detailed in the aerial photography presented in Figure 3 above. Part of Phase 2 (5 holes) was used a construction compound during the construction of the R136 Outer Ring Road. No other activities are known to have taken place on these lands prior to their development by SDCC.

2.2.5 Local Sensitive Sites

The site is fully within the boundary of lands owned by SDCC. The majority of the site comprises the active golf course consisting of an 18 hole Championship Course. The areas to which the investigation relates are both active and non active areas of the course. Phase 1 (8 holes) is an active area of the course located southeast and north of Phase 2 (5 holes) and Phase 3 (holes 14 & 15) respectively. The general public has no access to the inactive areas of Phases 2 and 3.

The site is not in an area of special interest, within or adjacent to wetlands, nor is it within a Natural Heritage Area (NHA), a candidate Special Area of Conservation (cSAC) or Special Protection Area (SPA).

Following a review of the National Parks and Wildlife Service (NPWS) website there are four proposed Natural Heritage Areas (pNHAs) within approximately 10km of the site (001212 Lugmore Glen; 000211 Slade of Saggart and Crooksling Glen; 001209 Glenasmole Valley and 002104 Grand Canal). There is also one Special Area of Conservation located within 10 kilometres of the site; 001209 Glenasmole Valley located to the south of the site.

2.2.6 Geology

2.2.6.1 Regional Bedrock Geology

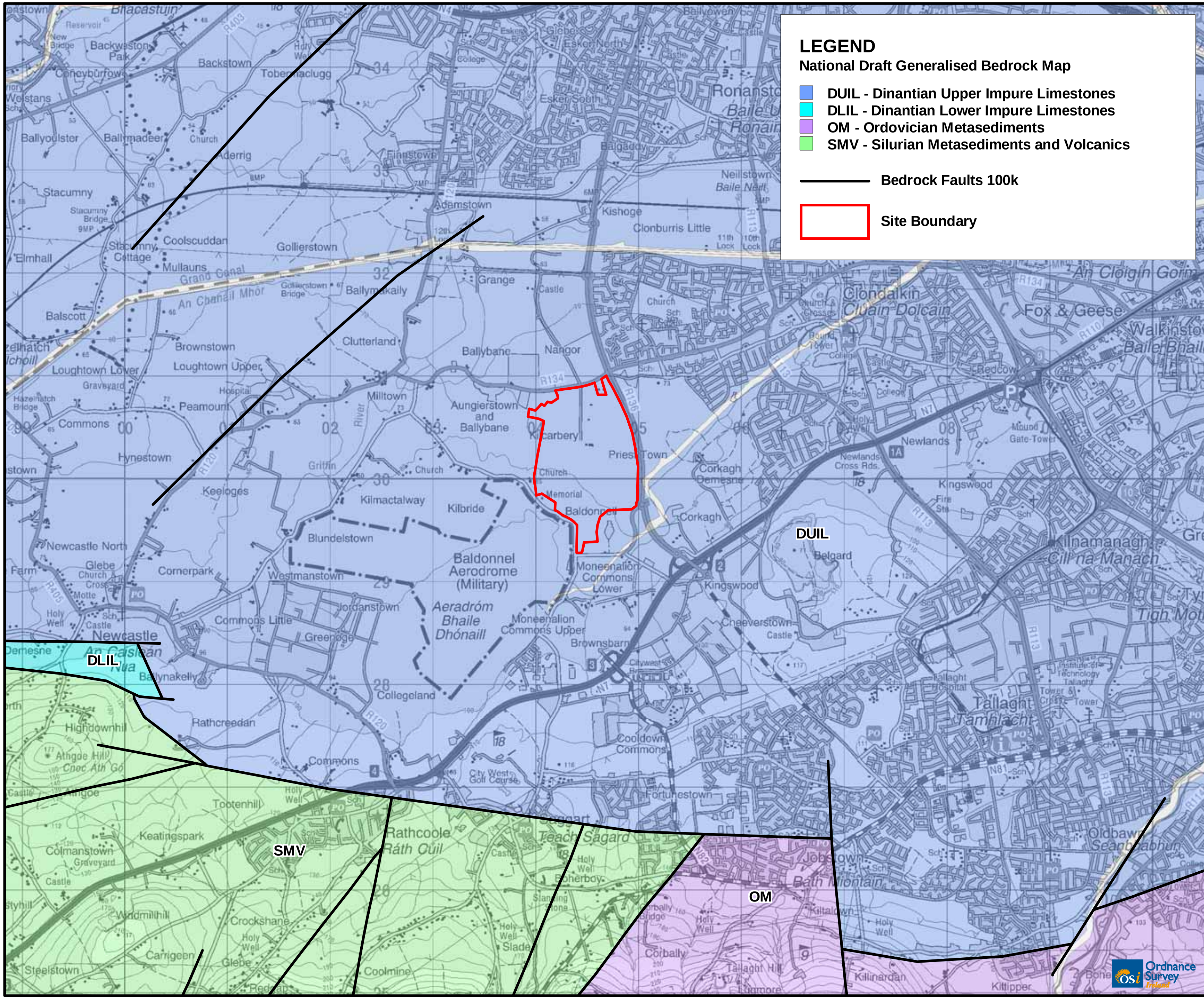
The Geology of Kildare – Wicklow 1:100,000 map (GSI Sheet 16) which includes the area under consideration shows the site is underlain by Calp Limestone which comprises varied dark grey to black basinal limestone in several different formations, mainly undifferentiated. The Calp ranges in age from Chadian to Brigantian.

The site is located within the Dublin Basin which is both depositional and structural. The southern margin of the basin is largely fault controlled e.g. along the line of the Rathcoole Fault located to the south and southwest of the site.

The GSI online bedrock map of Ireland classifies the bedrock underlying the site as Dinantian Upper Impure Limestone (see Figure 6).

2.2.6.2 Local Conditions

A review of the GSI On-line Geotechnical Map Viewer database revealed investigative data from two schemes located within 2.5km of GCGC; North Eastern Gas Pipeline (NEP1) (report ref: 717) and Corkagh Technical Park (report ref: 2262). NEP1 trial pit, rotary open hole coring and cable percussion (shell and auger) investigations revealed depth to bedrock ranging from 0.6m to >10m bgl. Corkagh Park trial pit investigations revealed depth to bedrock ranging from 0.2m to 2.1m bgl.



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Project: Grange Castle Infill Assessment

Title: **Bedrock Geology**

Figure 6

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16 No. trial pits were excavated during site investigation works carried out as part of the EIS for Grange Castle International Business Park, located to the north of the site, where limestone bedrock was encountered between 0.8 and 1.5m bgl. The bedrock geology encountered in the area comprised dark grey limestone which was typically weathered and fractured. Weaker mudstone layers were also encountered in places. Fractures and white calcite veins were encountered at greater depth within the limestone bedrock.

2.2.6.3 Regional Quaternary Geology

According to the GSI/Teagasc online subsoil map of Ireland, the site and surrounding area is expected to be underlain by tills derived chiefly from limestones.

A review of existing NEP1 and Corkagh Technical Park intrusive investigations, as highlighted in Section 2.2.6.2 above, also indicated that geological conditions underlying the area comprised dry brown boulder clays ranging in depth between 0.1 and 0.5m bgl. Thickness of this clay material ranged between 0.15 and 10 metres.

2.2.6.4 Local Conditions

From the initial site inspection infill material within Phase 2 (5 holes) and Phase 3 (holes 14 & 15) appeared to comprise light brown slightly gravelly clay with some cobbles. Previous investigations from the area recorded topsoil comprising light grey to brown, soft clay with subsoils comprising firm to stiff grey brown silty gravelly clay.

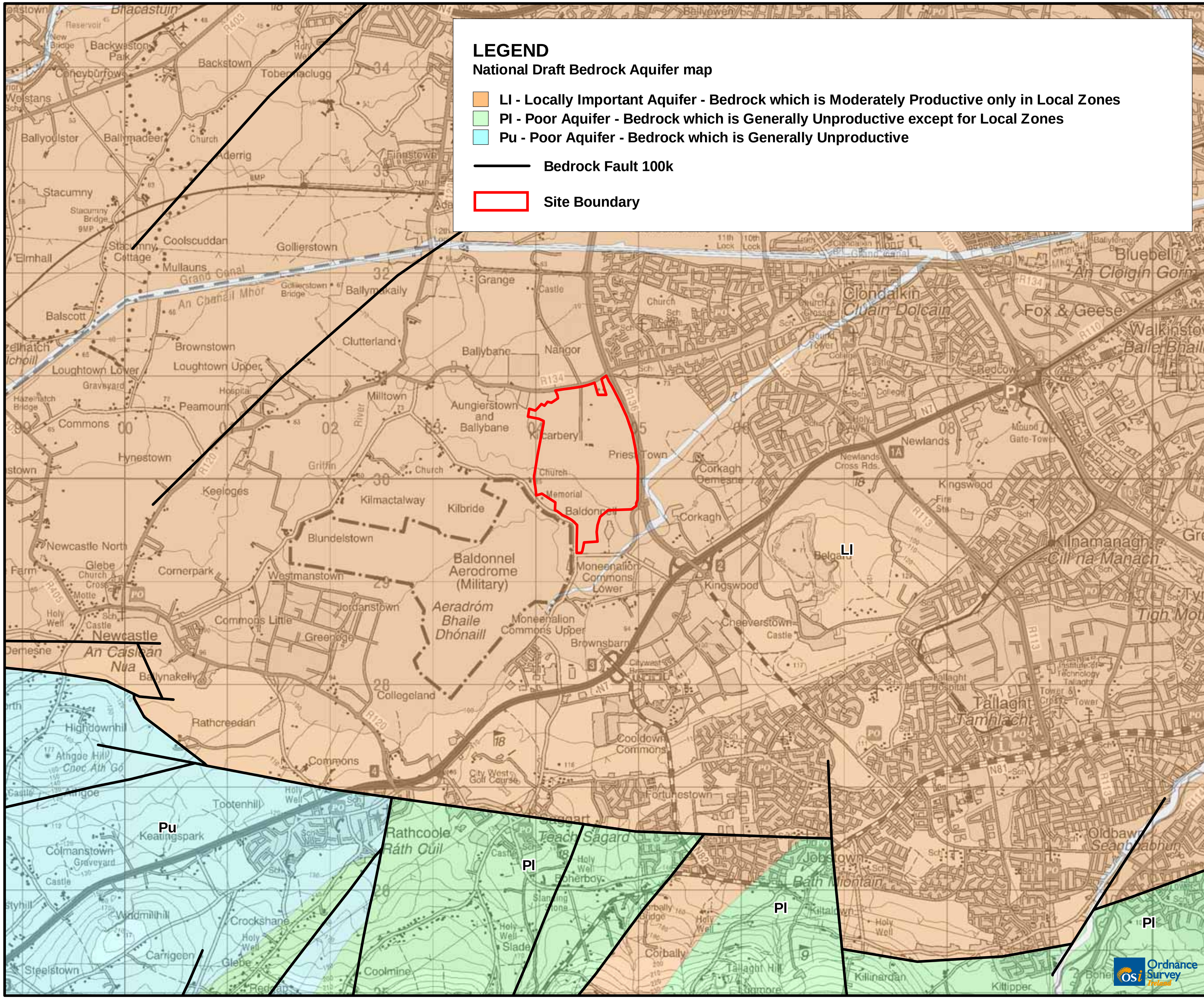
Phase 1 (8 holes) comprises part of the active golf course and is therefore covered in established grass. Works on Phases 2 (5 holes) and 3 (holes 14 &15) were suspended in 2008 and 2009 respectively. Since this period the infill material has remained undisturbed. The infill material within these areas generally comprises stiff clays with wild vegetation beginning to establish across the exposed surface.

2.2.7 Hydrogeology & Hydrology

2.2.7.1 Aquifer Classification

The GSI online bedrock map of Ireland, classifies the limestone bedrock underlying the site as a locally important (LI) aquifer (i.e. bedrock which is Moderately Productive only in Local Zones (see Figure 7). The Glacial Deposits are not classified as an aquifer by the GSI.

The groundwater within the bedrock has been classified as high vulnerability for the majority of the site with a portion of Phase 1 (8 holes) and Phase 3 (holes 14 & 15) classified as extreme vulnerability. This indicates that the underlying aquifer is predominantly highly vulnerable with limited areas of the site considered to be extremely vulnerable to contamination (See Figure 8).



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Project: **Grange Castle Infill Assessment**

Title: **Aquifer Map**

Figure 7

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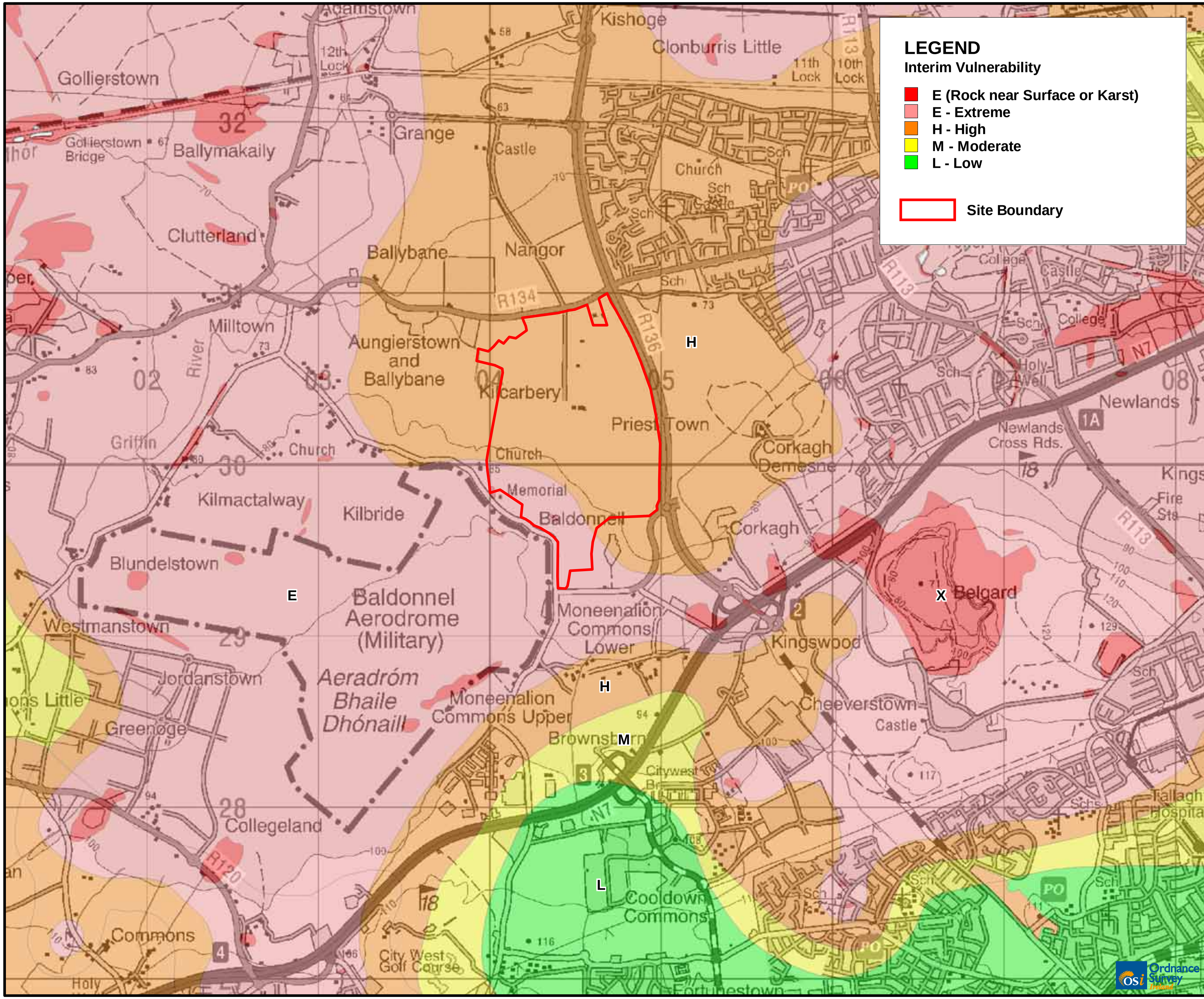

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South Dublin County Council

Project
Grange Castle Infill Assessment

Title
Aquifer Vulnerability

Figure 8

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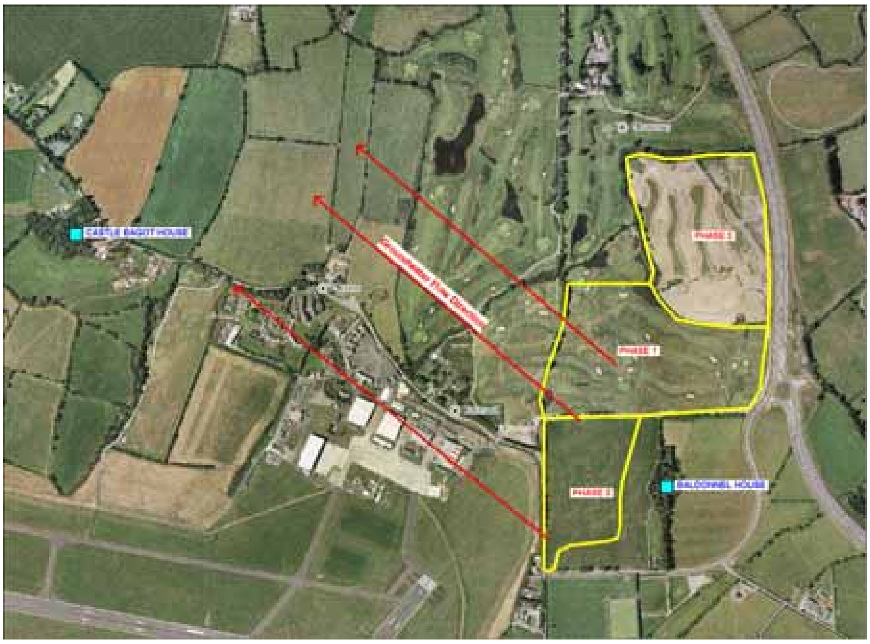
2.2.7.2 Groundwater Flow



The EIS for IDA Ireland at Grange Castle Business Park indicated that site investigations conducted at the Wyeth Medica and Takaeda Pharma developments located to the north of GCGC involved the drilling of boreholes. Groundwater was encountered in weathered bedrock at depths varying between 1.05 and 1.49 m below top of casing.

The EIS further states that groundwater flow generally follows the topographic variation of the site and was expected to flow from southeast to west and northwest towards the Griffeen River. The river Liffey is located approximately 4km to the north of the site and regional groundwater flow in the direction of the Liffey is expected. Groundwater monitoring at the Wyeth Medica site concluded that local groundwater flow was to the north and northwest.

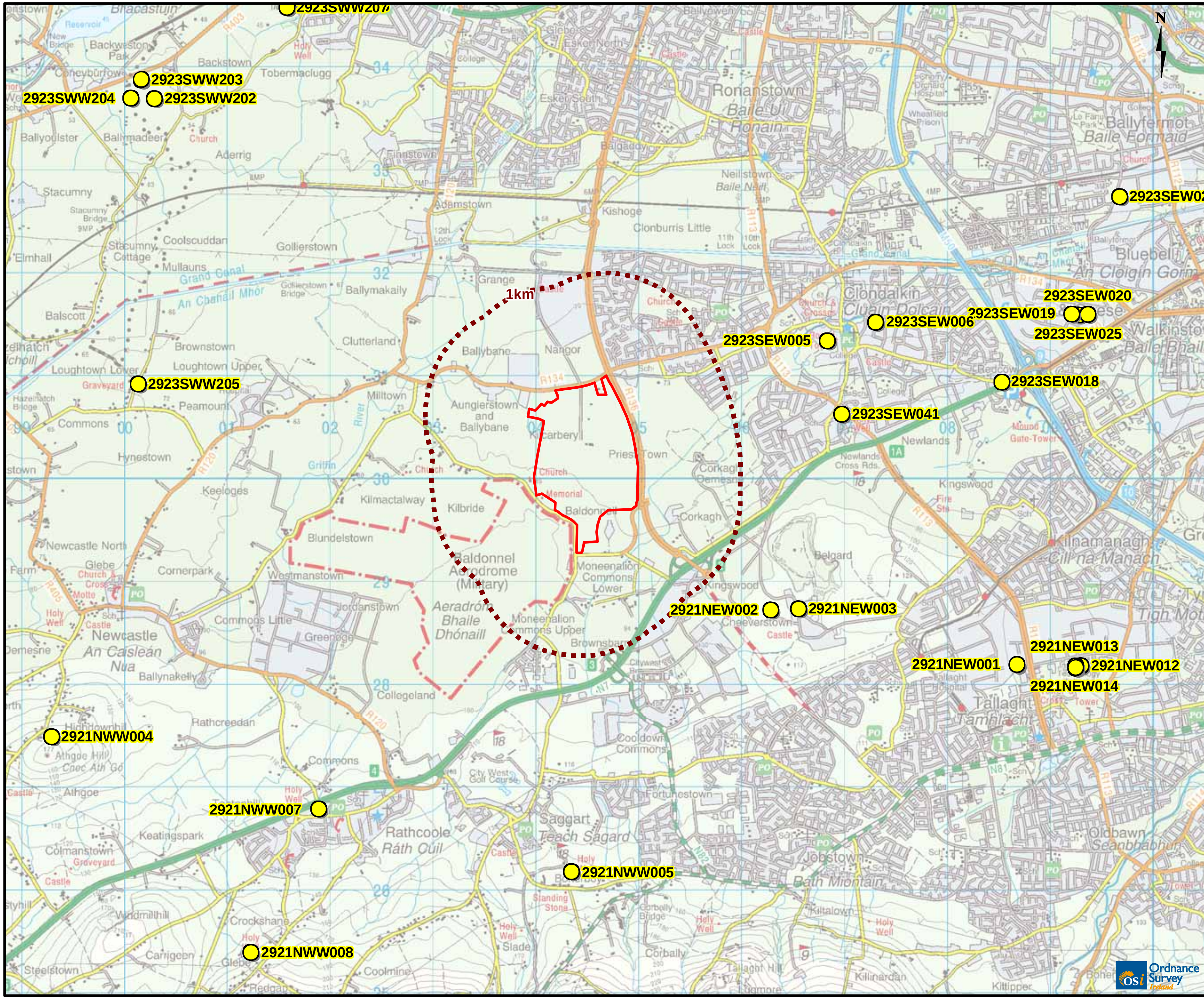
2.2.7.3 Groundwater Users

During the initial site inspection it was ascertained that there are two groundwater wells located on the site which are used for irrigation purposes only.

Following a review of SDCC water records it was determined that there are two potential groundwater users within the vicinity of the site; Castle Bagot House and Baldonnel House. Baldonnel House is located upgradient of the site.

GSI records have no boreholes recorded within 1km of GCGC (See Figure 9). The following are a sample of boreholes which were recorded by the GSI in the vicinity of the site:

- GSI well reference number 2921NEW002 is located approximately 1.7km to the south east of the site. The depth of borehole is 24.4m bgl and the depth to rock is 2.1m bgl. The well use is unknown and the yield class is “good” and estimated at 109.1m^3/d.
- GSI well reference number 2921NEW003 is located approximately 2km south east of the site. Well depth and depth to bedrock are unavailable. The well use is industrial and the yield class is “excellent” and estimated at 654m^3/d.
- GSI well reference number 2923SEW005 is located approximately 2km north east of the site. The borehole is 72.8m bgl and the depth to rock is 1.2m bgl. The well use is industrial and the yield class is ”good” and estimated at 185m^3/d.
- GSI well reference number 2923SEW006 is located approximately 2.5km north east of the site in Clondalkin. The borehole is 53.3m bgl and the depth to rock is 3m bgl. The well use is industrial and the yield class is “good” and estimated at 157.1m^3/d.



LEGEND

- GSI Well
- 1 km Buffer
- Site Boundary

Data Source:
Geological Survey of Ireland
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Client

Comhairle Contae Átha Cliath Theas
South Dublin County Council

Project
Grange Castle Infill Assessment

Title
GSI Wells

Figure 9

RPS

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Issue Details

Drawn by: S. Khan		Project No. MDR0813	
Checked by: L. Dowdall		File Ref. MDR0813Mi0004F01	
Approved by: C. Connery			
Scale: 1:50,000		Drawing No. 0004	Rev. F01
Date: 10/05/2011			

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2.2.7.4 Surface Water

GCGC has several artificial ponds which are connected via a series of interconnecting drains. The site's internal drainage network discharges to the Griffeen and Cammock Rivers. Both the Griffeen and Cammock River catchments discharge to the River Liffey.

For each of the artificial ponds (Sites) the inflows and outflows were identified, preliminary flow rates identified and general ecological condition described. See Figure 10 for a drainage map of GCGC. The blue arrows indicate the direction of the surface water flow from the fairways and surrounding lands.

Site 1

In the north east section of GCGC is a small artificial pond which discharges to a small stream that forms part of the Griffeen River catchment. The pond has a depth of 3-4m at its deepest point, with a substrate comprised of gravel/sand/silt. There is a gentle inflow to the pond from the larger pond (Site 2) to the south east.

The pond is surrounded by emergent macrophytes and contains a community of submerged macrophytes. No algal blooms were observed during the mapping exercise or were previously noted for this pond.

Site 2

Site 2 is located to the south east of Site 1 and discharges to Site 1 via a combination of a below ground interconnecting drain and an open channel. Part of the GCGC surface drainage is directly into this open channel and pond. This pond has a depth of 3-4m at its lowest point, with a substrate comprised of gravel/sand/silt. There is a gentle inflow to this pond from another interconnected pond (Site 3) to the south east.

The pond is surrounded by emergent macrophytes and contains a community of submerged macrophytes. Algal blooms were not observed during the mapping exercise but have been previously recorded in this pond.

Site 3

Site 3 is located adjacent to holes nine and one and discharges to Site 2 via a combination of a below ground interconnecting drain and an open channel. Part of the GCGC surface drainage is directly into this pond. This pond has a depth of 3-4m at its lowest point, with a substrate comprised of gravel/sand/silt. There is a gentle inflow to this pond from another interconnected pond (Site 5) to the east.

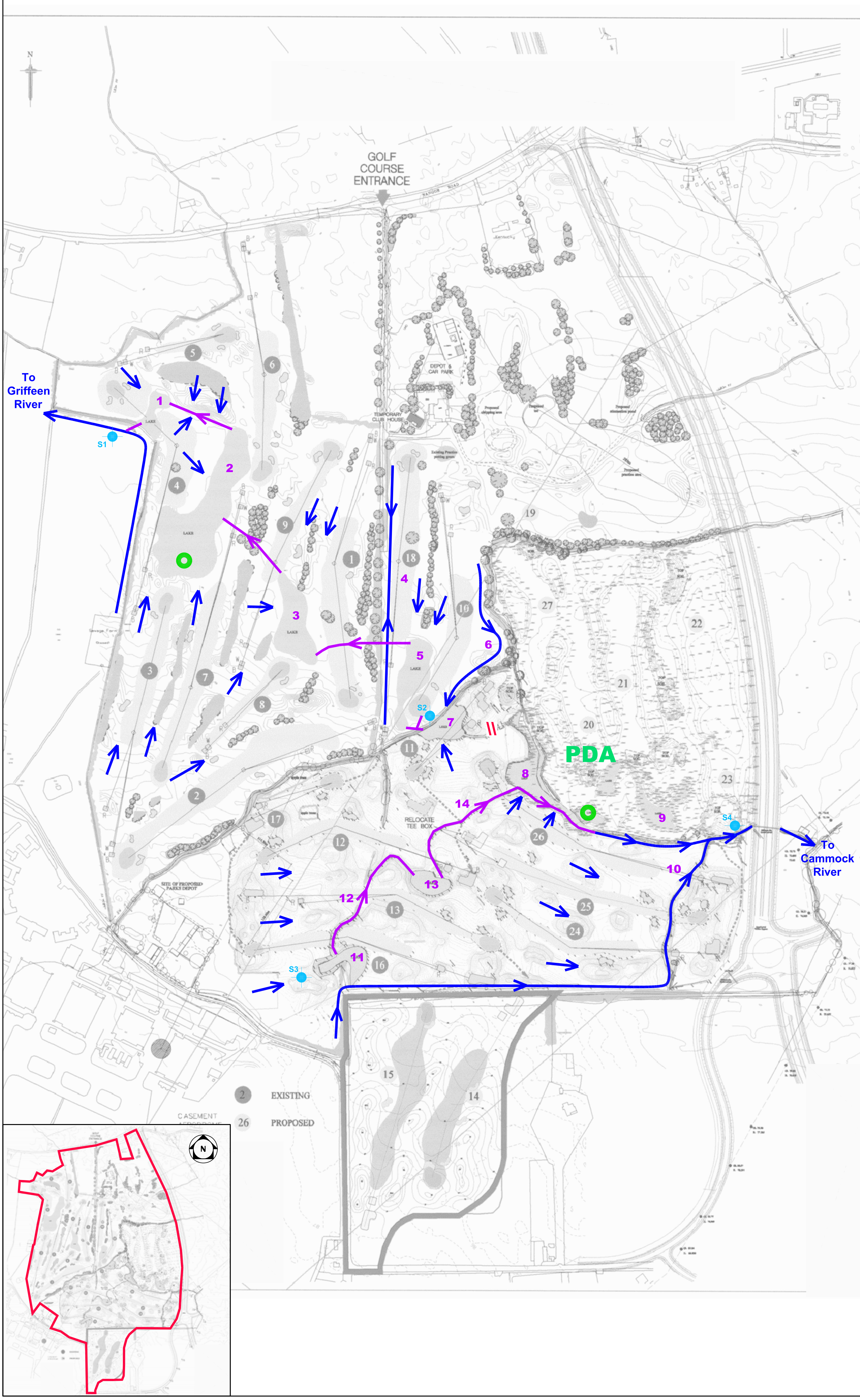
The pond is surrounded by emergent macrophytes and contains a community of submerged macrophytes. No algal blooms were observed during the mapping exercise or were previously noted for this pond.

Site 4

Site 4 is an ephemeral open drainage ditch adjacent to the eighteenth hole. It does not discharge to any other watercourse and only contains water following heavy precipitation.

Site 5

Site 5 is located adjacent to the tenth hole and discharges to Site 3 via a below ground interconnecting drain. Part of the GCGC surface drainage is directly into this pond. This pond has a depth of 3-4m at its lowest point, with a substrate comprised of gravel/sand/silt. There is a gentle inflow to this pond from another interconnected pond (Site 7) to the south east.



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LEGEND

- Algal Blooms
- Interconnecting Drain
- Drainage Ditch
- S1 Surface Water Sample
- Change in Flow Direction
- PDA Partially Developed Area
- 1 Artificial Ponds
- Site Boundary

No.	Date		Amendment / Issue	App
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A01	April '11	RH LD	Issue for Approval	CC

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Project

Grange Castle Golf Club
ERA Proposal

Title

DRAINAGE
LAYOUT

Drawing Status	Sheet Size	Drawing Scale
Final	A1	NTS

Drawing Number	Rev
MDR0813/Figure 10	F01

Drawn By	Checked By	Approved By	Date
RH	LD	CC	Apr. 2011

The pond is surrounded by emergent macrophytes and contains a community of submerged macrophytes. There is evidence of eutrophication/nutrient enrichment at the inlet location from Site 7.

Site 6

Site 6 is a stagnant open drainage ditch adjacent to the tenth hole, which discharges to the artificial pond, Site 7. There is strong evidence of eutrophication/nutrient enrichment within this ditch, with anoxic sediments. The water appears to be dark blue/grey in colour and there is a strong smell of hydrogen sulphide from the watercourse.

Site 7

Site 7 is located adjacent to the eleventh green and discharges to Site 5 via a belowground interconnecting drain. Part of the GCGC surface drainage is directly into this pond. This pond has a depth of 2m at its lowest point, with a substrate comprised of gravel/sand/silt. There is a gentle inflow to this pond from a stagnant drainage ditch (Site 6) to the north.

The pond is surrounded by emergent macrophytes and contains a community of submerged macrophytes. There is evidence of eutrophication/nutrient enrichment within this watercourse.

There is a channel connecting Site 7 to Site 8, however, there is no flow between these two water bodies. The flow from Site 8 appears to change direction towards the Cammock River to the south east of GCGC.

Site 8

Site 8 is located adjacent to the twenty sixth hole (area of ‘8 holes’) as shown on Figure 10 and discharges to the Cammock catchment via a drainage ditch. Part of the GCGC surface drainage is directly into this pond. This pond has a depth of 2m at its lowest point, with a substrate comprised of gravel/sand/silt. There is surface water inflow to this pond from the partially developed area (PDA) on Figure 10.

There is a gentle inflow to this pond from a stagnant drainage ditch (Site 6) to the north.

The pond is surrounded by emergent macrophytes along its south western banks but is devoid of macrophytes along its banks with the PDA. Algal blooms and sewage fungus are present. The water appears to be dark blue/grey in colour and there is a strong smell of hydrogen sulphide from the watercourse.

Site 9

Site 9 is located within the partially developed area (PDA) adjacent to the twenty sixth hole as shown on Figure 10 and does not appear to discharge to the Cammock catchment via a drainage ditch. This pond has a depth of 2m at its lowest point, with a substrate comprised of gravel/sand/silt. There is surface water inflow to this pond from the PDA. The water appears to be dark blue/grey in colour and is devoid of any aquatic macrophytes and riparian vegetation.

Site 10

Site 10 is an open drainage ditch along the south eastern portion of the GCGC, which appears to drain this portion, and discharges to the Cammock catchment via a drainage ditch. There is no riparian plant species or emergent macrophytes present, but there is some evidence of eutrophication/nutrient enrichment within this drainage ditch.

Site 11

Site 11 is located adjacent to the sixteenth hole and discharges to Site 13 via an open channel. Part of the GCGC surface drainage is directly into this pond. This pond has a depth of 2m at its deepest point, with a substrate comprised of gravel/sand/silt.

The pond is surrounded by emergent macrophytes and contains a community of submerged macrophytes. There is evidence of eutrophication/nutrient enrichment at the outlet location to Site 12.

Site 12

Site 12 is an open channel connecting Site 11 to Site 13. There is evidence of eutrophication/nutrient enrichment within this channel, with sewage fungus present.

Site 13

Site 13 is located adjacent to the twelfth and thirteenth holes and discharges to Site 8 via an open channel. Part of the GCGC surface drainage is directly into this pond. This pond has a depth of 2m at its lowest point, with a substrate comprised of gravel/sand/silt.

The pond is surrounded by emergent macrophytes and contains a community of submerged macrophytes. There is evidence of eutrophication/nutrient enrichment with algal blooms and sewage fungus present.

Site 14

Site 14 is an open channel connecting Site 13 to Site 8. There is evidence of eutrophication/nutrient enrichment within this channel, with algal blooms and sewage fungus present.

2.2.7.5 Summary of Surface Waters

A total of 14 individual artificial ponds (Sites) were observed as part of the drainage mapping exercise completed for the Tier 1 investigation.

Evidence of eutrophication/ nutrient enrichment was found in sites 5, 6, 10, 12, 13 and 14 with algal blooms and sewage fungus also evident in sites 6, 8, 12, 13 and 14. Algal blooms were not observed at Site 2 during the mapping exercise but have been previously recorded in this pond.

2.2.7.6 Services

No services were identified to date.

2.2.7.7 Potential Sources of Contamination

There are no known potential sources of contamination on site. There is industrial land to the north of the site, dense residential land use to the north east and east and Casement Aerodrome located to the south west of the site. The EIS for Profile Park located to the west of the GCGC recorded an area of waste within the eastern margin of the Profile Park site.

2.3 TIER 1 – CONCEPTUAL MODEL

From background information, a conceptual model was developed in accordance with the EPA Code of Practice document.

2.4 TIER 1 - RISK SCREENING

The EPA Code of Practice identifies eleven SPR linkages that should be considered within the conceptual model and assessed as part of the Tier 1 Assessment. Each of these linkages can be scored using the scheme provided in the EPA Code of Practice in order to provide an overall risk categorisation for the site.

An initial conceptual model was developed based on the information given above with consideration given to the eleven Source-Pathway-Receptor (SPR) linkages identified in the EPA Code of Practice. At Tier 1 each aspect of each SPR linkage can be assessed according to particular criteria as defined within the EPA Code of Practice. The Code of Practice uses a separate scoring matrix for each aspect of each SPR linkage and these are defined within Tables 1a to 3f of the Code of Practice. Where an individual aspect is not present or not relevant within the context of the conceptual model it is given a score of 0.

The score for each linkage is normalised with respect to 100 by dividing the score for each linkage by the maximum available points for that linkage to give a percentage. The overall score for the site is taken as the maximum of the individual normalised scores. The site can then be placed in a prioritisation category depending upon the potential level of risk identified. Sites with a higher score represent those with either a higher level of risk, which may require remediation, or a high level of uncertainty, which requires further intrusive investigation. If a high score is due to a high level of uncertainty then the assessment should proceed to Tier 2.

The conceptual site model and risk scoring is presented in Tables 1 and 2 below. The full assessment is presented in Appendix 2. The risk category bands relating to site scores as defined in the EPA Code of Practice are presented in Table 1.

Table 1: Risk Category and Prioritisation Class

Score	Priority Class	Risk Category	Definition
> 70%	A	High	High risk/high uncertainty sites. Further investigation required to confirm status. Presents potentially high risk to environment in current condition. Remediation / mitigation will be necessary. Highest priority with Regulating Authority.
40% to 70%	B	Moderate	Moderate risk/moderate uncertainty sites. Further investigation required to confirm status. Presents potentially moderate risk to environment in current condition. Remediation / mitigation may be required.
< 40%	C	Low	Low risk sites. Not considered to present risk to environment in current condition however further investigation may be required in case of change of land use.

Table 2: Tier 1 Conceptual Model & Risk Scoring

Source	Pathway	Receptor	% Score	Risk Classification
(1a) Leachate	(2a,b&c) Groundwater and Surface Water migration	(3e) Surface Water body	3	Low
		(3b) Protected Area (Surface Water dependent terrestrial ecosystem)	3	Low
	(2a&b) Groundwater Migration	(3a) Private Well	5	Low
		(3b) Protected Area (Groundwater dependent terrestrial ecosystem)	2.5	Low
		(3c) Aquifer	4.5	Low
		(3d) Public Water Supply	0	No Linkage
		(3e) Surface Water body	2.5	Low
	(2c) Surface Water Migration	(3e) Surface Water body	5	Low
		(3b) Protected Area (Surface Water dependent terrestrial ecosystem)	5	Low
(1b) Landfill Gas	(2d) Lateral migration in subsoil	(3f) Human Presence (Buildings, enclosed spaces)	1	Low
	(2e) Vertical Migration in subsoil		0	No Linkage

Matrix 1 – Guidance for preliminary & exploratory investigations for all unregulated waste disposal sites, under the heading *Tier 1; Preliminary investigation* recommends the mandatory completion of a desk study, walkover survey and the development of a conceptual site model (CSM). All of these have been completed for Grange Castle Golf Course. A copy of Matrix 1 is also provided in Appendix 2.

The pollutant linkage with the highest individual score was identified as 5%. There are 3 linkages with this score, the migration of leachate to groundwater (5%), leachate to surface water (5%) and groundwater to surface water (5%),

The overall score for the site is therefore 5% which classifies it as a Class C low risk site. Although the risk is deemed low, a reappraisal assessment of the risk is proposed following the completion of the Tier 2 exploratory site investigation and testing programme in order to further confirm that the site does not pose a risk to human health or the environment.

3 TIER 2 – SITE INVESTIGATION & TESTING

3.1 INTRODUCTION & OBJECTIVES

The Tier 1 assessment identified the site as a Class C low risk site. The Tier 1 assessment identified the following potential low risks in relation to the infill material:

- Low risk to human health from the abstraction of groundwater for private use.
- Low risk to water bodies from the migration of leachate within shallow groundwater, and
- Low risk to protected areas from the migration of leachate within surface water

The following exploratory investigative programme was developed to provide sufficient information to verify the low risk site categorisation and confirm that the site does not pose a risk to the environment or human health while also allowing recommendations to be made on follow up actions should they be required.

The overall objective of the site investigation was to confirm the site characterisation determined by the Tier 1 assessment by obtaining information on:

- The nature of the infill material;
- The lateral and vertical extent of the infill material;
- The material characterisation of any waste encountered within the infilled areas;
- The potential for leachate generation;
- Surface water quality; and
- Water quality within the limestone aquifer.

3.2 TIER 2 METHODOLOGY

3.2.1 Approach

The exploratory investigation involved trial pitting, groundwater sampling, surface water sampling, soil sampling, and material characterisation.

The investigations were carried out in accordance with;

- BS 10175:2001 Investigation of Potentially Contaminated Sites – Code of Practice
- BS 5930 Code of Practice for Site Investigation

- Applicable CEN and ISO Standards for Analysis and Sampling

- All relevant Health and Safety Regulations and Guidance (including the Health, Safety and Welfare at Work Act 2005 and the Construction Regulations (2006).

- EPA Code of Practice Environmental Risk Assessment for Unregulated Waste Disposal Sites, 2007.

- European Standard EN14899, Characterisation of Waste – *sampling of waste materials – framework for the preparation and application of a sampling plan*.

The exploratory investigation comprised a targeted and non targeted investigation which is described in further detail below.

3.2.2 Targeted Investigation

From the initial site walkover it was evident that there were distinct stockpiles, primarily located at the entrance to Phase 2 (5 holes) and Phase 3 (holes 14 & 15) which contained material other than soil and stones. Bricks, concrete, plastics tiles and tyres were identified within these stockpiles, and therefore, a targeted investigation and sampling regime was conducted within these areas. The sampling focused on obtaining sufficient information to characterise the material and provide information to assess the available options to remove this material off-site for onward recovery or disposal should it be a requirement.

Trial pits were excavated within the stockpiled material at regular intervals in order to obtain a comprehensive representation of the material in question.

Analysis following targeted sampling was carried out in accordance with the Waste Acceptance Criteria (WAC) for inert landfills as set out in Council Decision 2003/33/EC. The resultant soil samples were chemically analysed by Severn Trent Analytical Services (a UKAS/MCERT accredited independent laboratory). An untested portion of each sample will be retained for a minimum of 6 months in sufficient quantity to enable one further round of compositional and leachate testing should it be required.

Each trial pit was supervised and logged by an appropriately qualified person who noted the following:

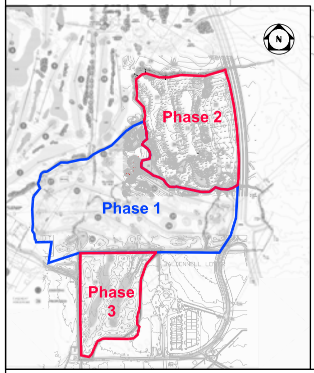
- Type of material encountered;
- Notable odours if detected; and
- All other requirements in accordance with BS5930:1999.

A total of 10 No. individual stockpiles were investigated (SP01 to SP10) with a number of trial pits excavated within each stockpile dependant on the volume of material encountered and identification of any stratification. See Figure 11 for the location of all trial pits excavated within the stockpiled areas.

A total of 18 individual trial pits were excavated within the stockpiled material. The largest stockpiled area (SP06) was located within the north eastern corner of Phase 3 (holes 14 & 15) where 6 trial pits (SP06-01 to SP06-06) were excavated in order to obtain a representative characterisation of the material.

The trial pit photographs and logs for the targeted investigation of stockpiled material are presented in Appendix 3 and 4 respectively.

Stockpile ID	X Coordinate	Y Coordinate
SP01-1	304321	229652
SP02-1	304330	229654
SP02-2	304346	229654
SP03-1	304366	229665
SP04-1	304378	229659
SP05-1	304589	229601
SP05-2	304599	229628
SP05-3	304609	229654
SP06-1	304636	229639
SP06-2	304631	229627
SP06-3	304624	229614
SP06-4	304619	229601
SP06-5	304612	229589
SP06-6	304605	224598
SP07-1	304882	230376
SP08-1	304882	229993
SP09-1	304861	230012
SP10-1	304713	230036



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Client: Comhairle Contae Átha Cliath Theas / South Dublin County Council

Drawn By	Checked By	Approved By	Date
RH	LD	CC	Feb. 2011

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Project: Grange Castle Golf Club ERA Proposal

Drawing Status	Scale / Sheet Size	
Final	1:2500 @ A1	1:5000 @ A3

Drawing Number: MDR0813/Figure 11

Rev: F01

Title: STOCKPILE LOCATIONS

3.2.3 Non-Targeted Investigation

3.2.3.1 Phase 1

Phase 1 (8 holes) comprises a completed and active area of GCGC and in light of this all investigative works were completed within untrafficked areas such as access areas and boundary locations in order to minimise disturbance within this area. As the fairways within Phase 1 are natural ground, investigative works concentrated on the fill/contoured areas which were generally located within the rough. A total of 7 No trial pits were excavated within this area (see Figure 12) as agreed in advance with the EPA.

The trial pit photographs and logs for the non targeted investigation are presented in Appendix 5 and 6 respectively.

3.2.3.2 Phase 2 and 3 and the Haul Road

The majority of Phase 2 (5 holes) and Phase 3 (holes 14 & 15) contain large areas of mounded material which have been contoured and appeared on the surface to contain soil and stones with minimal contamination with other materials including waste. On this basis and having considered BS10175:2001 *Investigation of Potentially Contaminated Sites – Code of Practice,* a non-targeted sampling regime was conducted. BS10175:2001 recommends typical densities of sampling grids of between 50m and 100m for 'exploratory investigations' therefore a grid spacing of 75m was adopted for intrusive investigations within Phases 2 & 3. The 75m grid is presented in Figure 13.

The area termed the haul road connects Phase 2 (5 holes) and Phase 3 (holes 14 & 15) (see Figure 12) and 7 No. additional trial pits were excavated within this area.

3.2.3.3 Non-Targeted Trial Pits

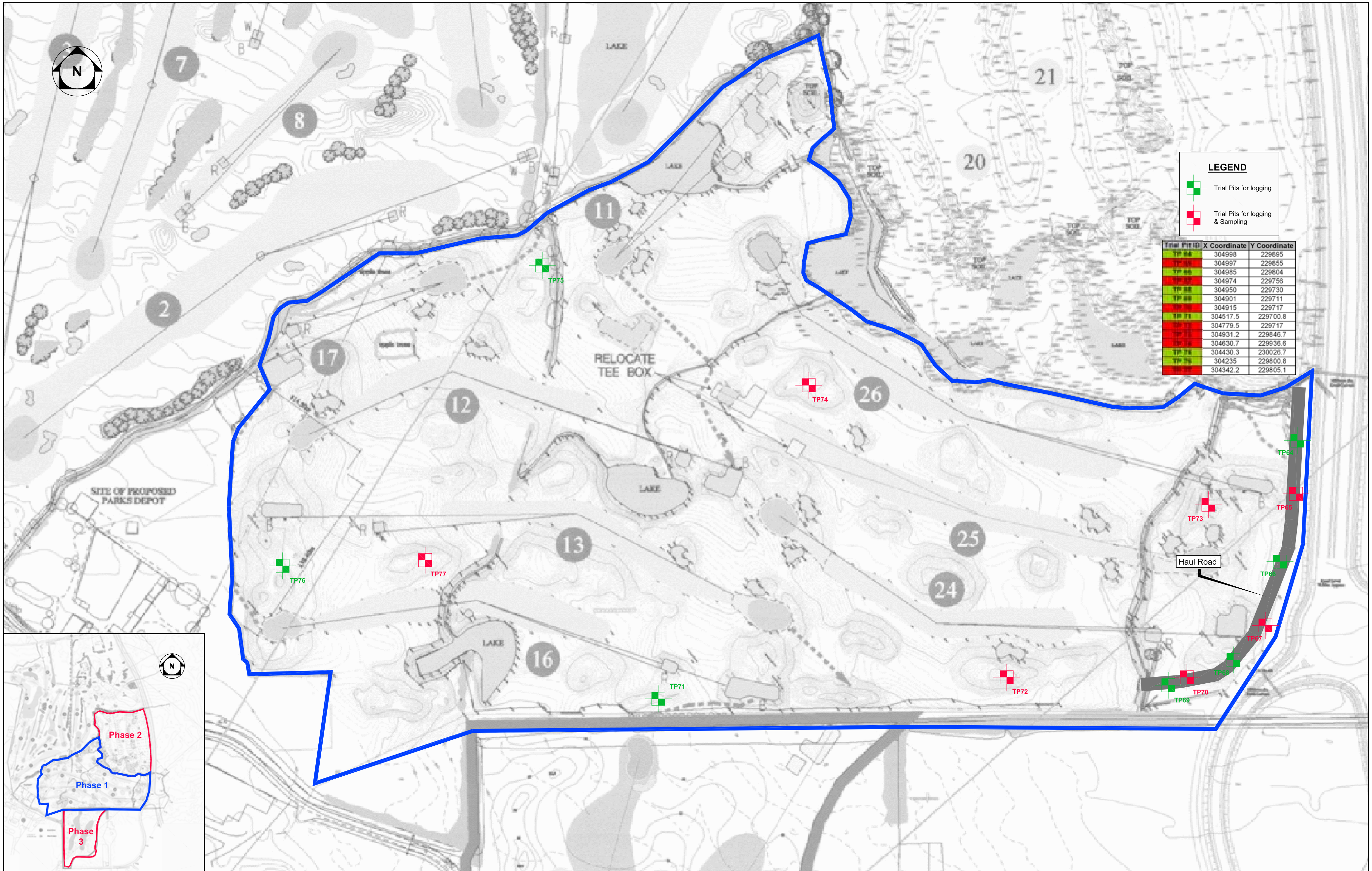
The trial pits were excavated by Breffni Plant Hire using 2 No 20 tonne mechanical excavators for Phases 2 and 3 and a mini digger for Phase 1. All trial pits were excavated to the base of the infill material with natural ground identified. All trial pits were back filled on completion by replacing material in the order in which it was excavated.

Each trial pit was supervised, photographed and logged by an appropriately qualified person with the following noted:

- Type of material encountered;
- % of contamination, if encountered;
- Constituents of contamination;
- Notable odours if detected;
- Water strikes if encountered; and
- All other requirements in accordance with BS5930:1999.

A total of 77 No. trial pits (TP1-TP77) were excavated to depths ranging between 0.55m and 4.70m bgl (metres below ground level) between January and February 2011.

- **Phase 1 (8 Holes**): 7 Trial Pits
- **Phase 2 (5 Holes):** 40 Trial Pits
- **Phase 3 (holes 14 & 15):** 23 Trial Pits
- **The Haul Road:** 7 Trial Pits



Trial Pit ID	X Coordinate	Y Coordinate
[illegible]	304998	229895
[illegible]	304997	229855
[illegible]	304985	229804
[illegible]	304974	229756
[illegible]	304950	229730
[illegible]	304901	229711
[illegible]	304915	229717
[illegible]	304517.5	229700.8
[illegible]	304779.5	229717
[illegible]	304931.2	229846.7
[illegible]	304630.7	229936.6
[illegible]	304430.3	230026.7
[illegible]	304235	229800.8
[illegible]	304342.2	229805.1

Boundary of 8 holes area

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A01	Apr.'11	RH LD	Issue for Approval	CC

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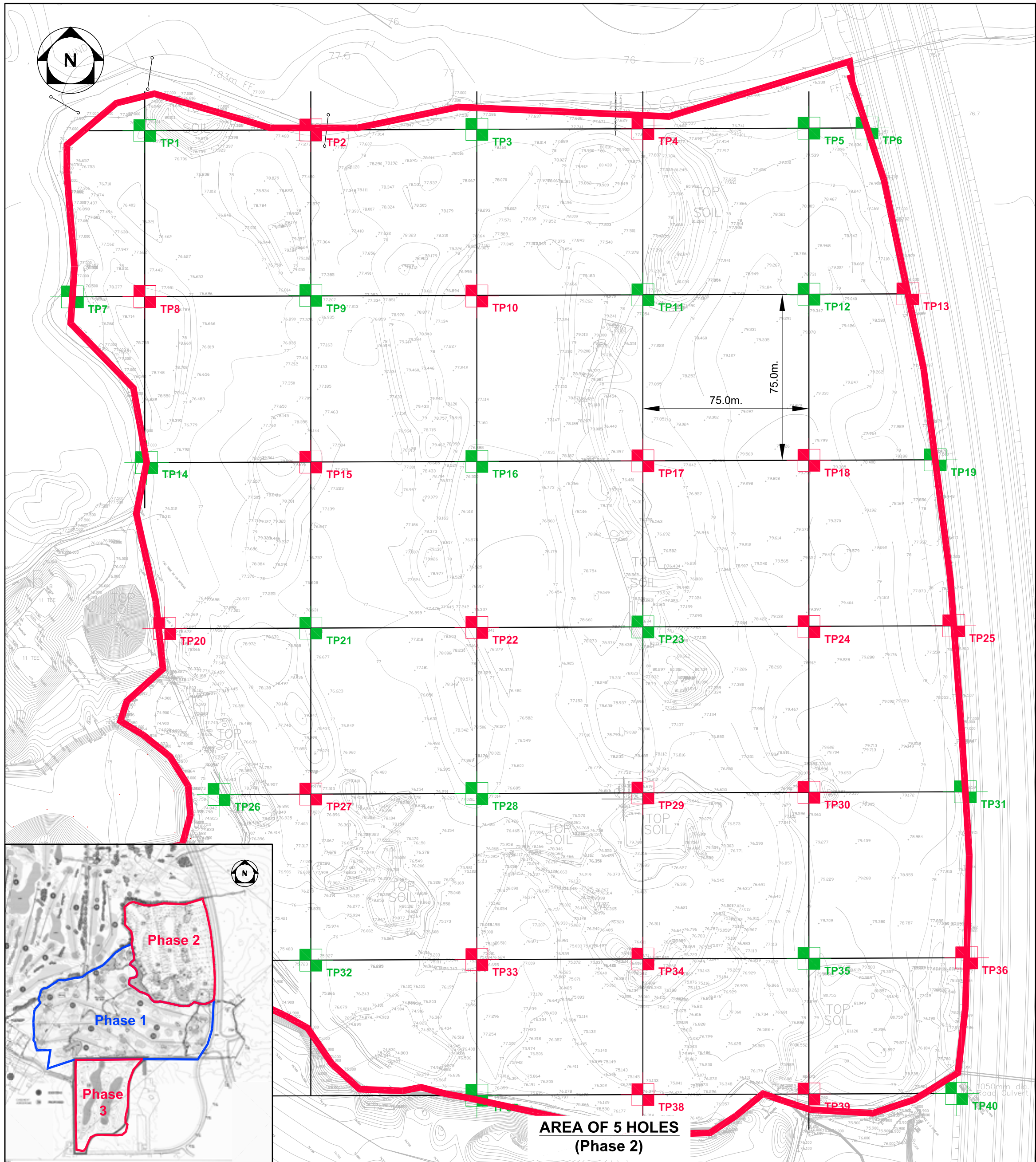
Project: Grange Castle Golf Club ERA Proposal

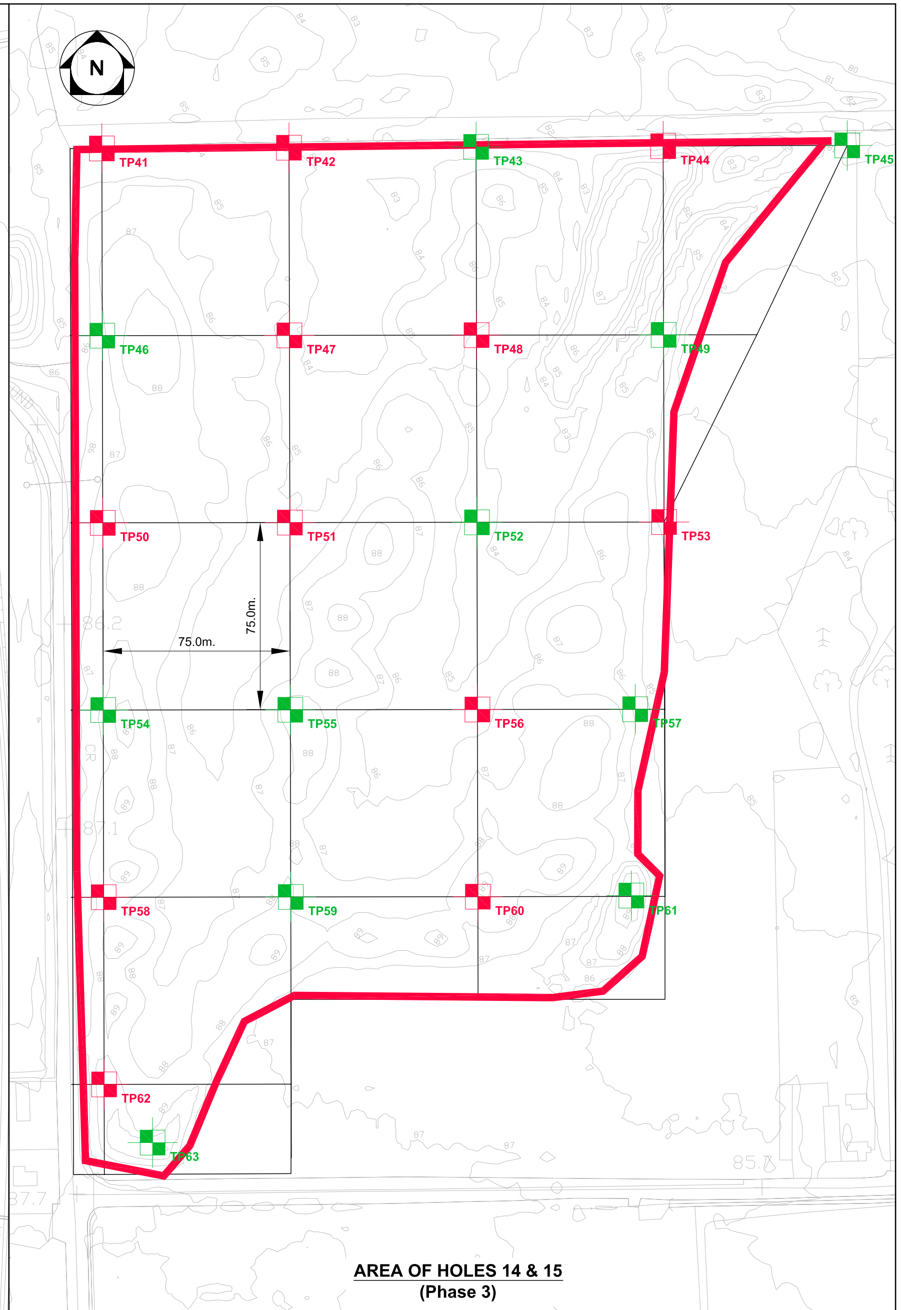
Drawing Status: Final
Scale / Sheet Size: NTS @ A1 | NTS @ A3

Drawing Number: MDR0813/Figure 12
Rev: F01

Title: PROPOSED TRIAL PIT LOCATIONS IN 8-HOLE AREA



AREA OF 5 HOLES
(Phase 2)



AREA OF HOLES 14 & 15
(Phase 3)

Trial Pits for logging

Trial Pits for logging & Sampling

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Drawing Number: MDR0813/Figure 13

Rev: F01

Project: Grange Castle Golf Club ERA Proposal

Title: PROPOSED TRIAL PIT LOCATIONS

Drawing Status	Scale / Sheet Size	
Final	1:1000 @ A1	1:2000 @ A3

Trial pit photographs and logs are presented in Appendix 5 and 6 respectively.

A Photo-Ionisation Detector (PID) with a lamp size 10.6 eV was used on samples taken from the excavated spoil to determine the presence of vapours. A sample from the trial pit was placed in a plastic bag. The probe of the PID was placed in the bag with the sample and the bag was sealed. Readings of 5.3 – 100 ppm were recorded across the site. However 2 trial pits recorded results in excess of this, TP43 (400ppm) and TP60 (316ppm), the elevated results may indicate the presence of hydrocarbon vapours due to the presence of tarmac.

3.2.3.4 Material Characterisation

Material encountered during investigative works was characterised with the amount of soil, stone and extraneous material (e.g. concrete, tarmac, plastic, metal, fabric) quantified. This characterisation followed a sampling plan prepared in accordance with the European Standard EN14899, *Characterisation of Waste – Sampling of Waste Material – Framework for the Preparation and Application of a Sampling Plan.* A copy of the Sampling Plan is provided in Appendix 7. Material characterisation sampling locations are identified on Figure 13.

A total of 39 No. samples were characterised from the 77 trial pits excavated. Material characterisation was completed on 4 of the 7 trial pits excavated within Phase 1 (8 holes), 32 of the 63 trial pits excavated within Phase 2 (5 holes) and Phase 3 (holes 14 & 15) with a further 3 completed within the 7 trial pits excavated along the Haul Road.

3.2.4 Sampling

Samples of soil and stockpiled material were obtained during the intrusive investigation in addition to groundwater and surface water samples as outlined in Table 3 below.

Table 3: Summary of Investigative Sampling

Stockpile (targeted)	20 samples (18 trial pits)
Soil (non targeted)	39
Surface Water	4
Groundwater	3

3.2.4.1 Soil

Material characterisation and soil sampling was conducted on 39 of the 77 trial pits excavated as part of the non targeted investigation. On completion of the trial pit designated for sampling, the excavated spoil was mixed by the excavator and a composite sample of approximately 500kg retrieved. As no obvious layering or stratification of material was identified one composite sample was taken from the excavated spoil. The 500kg sample comprised samples from four quarters of the excavated spoil. The 500kg sample was loaded into a mini-dumper and transported to a designated area where waste characterisation testing was conducted.

The sample was placed in a designated area underlain by a heavy duty plastic sheet and any extraneous material was extracted and sorted into a variety of containers including, timber, plastic, concrete, tar, tiles, rubber etc. The remaining soil and stone fraction was sieved through a purpose built table with a 20mm tray mesh. Each individual constituent was weighed and recorded and compositional % derived from the total sample obtained.

Representative composite soil samples were taken from the remaining soils fraction for laboratory analysis as outlined in Section 3.2.5 below (i.e. <20mm fraction) using the 'nine point sample' as described in Annex D of BS 10175:2001 – Investigation of Potentially Contaminated Sites – Code of Practice.

3.2.4.2 Groundwater

There are two boreholes located on site which are currently used for irrigation purposes (see Figure 14 for location). As part of the exploratory investigation samples were taken (GW 1 and GW2) from the on site boreholes for analyses as outlined in Section 3.2.5 below. GW1 is located within the compound to the rear of GCGC clubhouse. GW2 is located at the south west corner of GCGC adjacent to Phase 1 (8 holes). Table 4 below provides well details for GW1 and GW2.

Table 4: Well Details (GW1 and GW2)

	GW1	GW2
Depth	14.30m bgl	14.63m bgl
Standing Water Level	2.61m bgl	2.52m bgl
Use	Irrigation for Golf Course	Irrigation for Golf Course

Following a review of SDCC water records it was determined that there are two potential groundwater users within the vicinity of the site; Castle Bagot House and Baldonnel House (see Figure 14). The groundwater well at Castle Bagot House was surveyed on the 28th of March 2011. The well is currently in use for general domestic purposes as the premises is not connected to the water mains and also supplies the Junior Genius Childcare facility located on the grounds. Well details are presented in Table 5 below. No access was granted to Baldonnel House therefore no sample or well details were obtained.

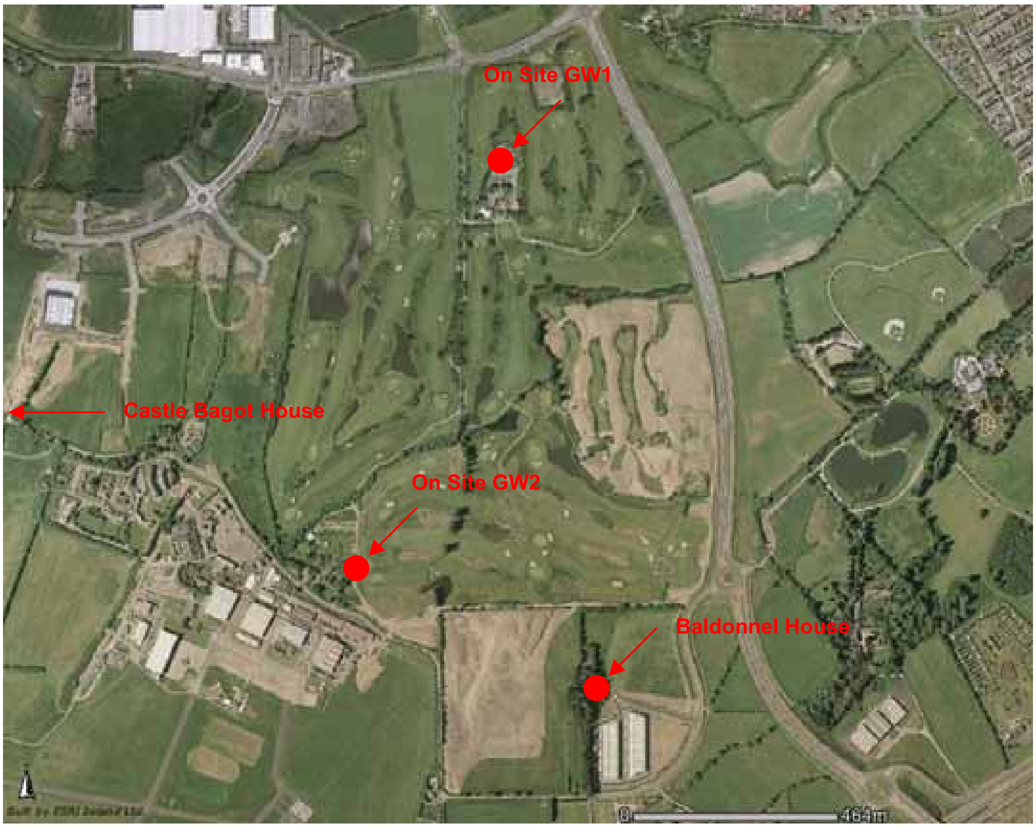


Figure 14 Groundwater Monitoring Locations

Table 5: Well Details (Castle Bagot House)

Depth	34.57m
Standing Water Level	1.86m
Use	Used for general domestic purposes and supply to on site childcare facility.
Age	Unknown
Volume Purged	60L
pH	8.0 (@10L); 7.75(@ 30L); 7.77 (@50L)
Conductivity	668µS/cm (@10L); 653µS/cm (@30L) 661µS/cm (@50L)
Temperature	11.6°C(@10L); 9.7°C (@30L); 9.8°C (@50L)
	

All groundwater sampling was undertaken in accordance with:

- BS 10175:2001 Investigation of Potentially contaminated Sites – Code of Practice
- BS 1SO 5667 – 18:2001 – Water Quality Sampling – Part 18: Guidance on sampling of groundwater at Contaminated Sites; and
- EPA Landfill Manual, landfill monitoring, 2nd ed. 2003.

Groundwater sampling equipment was dedicated to each well to prevent cross contamination during sampling rounds.

3.2.4.3 Surface Water

Following the completion of a mapping exercise of the surface water drainage regime within GCGC, surface water samples were taken in upstream and downstream locations along the drainage systems flowing to both the Griffen and Cammock Rivers. A total of 4 No. surface water samples were collected (See Figure 10) for analyses as outlined in Section 3.2.5 below.

All surface water sampling undertaken at the site were undertaken in accordance with:

- BS 10175:2001 Investigation of Potentially Contaminated Sites – Code of Practice; and
- EPA Landfill Manual, Landfill Monitoring, 2nd ed. 2003.

3.2.5 Laboratory Analysis

Soil and water samples were analysed for a range of parameters. All analysis was undertaken by Severn Trent Analytical Services. Table 6 identifies the parameters and suite of analysis completed as part of the investigative works at GCGC:

Table 6: Summary of Laboratory Analysis

Soil	Stockpiles	Groundwater	Surface Water
Bulk Soil Compositional Analysis ▪ Heavy Metals (Arsenic, Barium, Cadmium, Chromium, Copper, Mercury, Molybdenum, Nickel, Lead, Antimony Selenium and Zinc) ▪ Total Organic Carbon (TOC), pH, Nitrate, Nitrite, Phosphate, Sulphate ▪ BTEX, 16 Polycyclic Aromatic Compounds (PAHs)[1], Mineral Oil (C10-C40), 7 Polychlorinated Biphenyls (PCBs)[2] ▪ Volatile and Semi Volatile Organic Compounds (VOCs and SVOCs) **Leachate Soil Testing (CEN 10:1)** ▪ Dissolved Heavy Metals (Arsenic, Barium, Cadmium, Chromium, Copper, Mercury, Molybdenum, Nickel, Lead, Antimony, Selenium and Zinc) ▪ Nitrate, Nitrite, Phosphate, Sulphate, Chloride, Fluoride, ▪ Phenol Index, Dissolved Organic Carbon, Total Dissolved Solids	**Bulk Soil Compositional Analysis** ▪ Heavy Metals (Arsenic, Barium, Cadmium, Chromium, Copper, Mercury, Molybdenum, Nickel, Lead, Antimony Selenium and Zinc) ▪ Total Organic Carbon (TOC), pH, Nitrate, Nitrite, Phosphate, Sulphate ▪ BTEX, 17 Polycyclic Aromatic Compounds (PAHs)[3], Mineral Oil (C10-C40), 7 Polychlorinated Biphenyls (PCBs) [4] ▪ Volatile and Semi Volatile Organic Compounds (VOCs and SVOCs) **WAC** Waste Acceptance Criteria (WAC) eluate analysis for inert landfills as set out in Council Decision 2003/33/EC	▪ Dissolved Heavy Metals (Arsenic, Barium, Cadmium, Chromium, Copper, Mercury, Molybdenum, Nickel, Lead, Antimony, Selenium and Zinc) ▪ Nitrate, Nitrite, Phosphate, Sulphate, Chloride, Fluoride, ▪ Phenol Index, Dissolved Organic Carbon, Total Dissolved Solids.	▪ Table C.2, of Appendix C of the EPA Landfill Monitoring Manual (2003)

[1] Napthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h.i)perylene, Benzo(a)pyrene, Chrysene,, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indenol(1,2,3-c,d)pyrene, Phenanthrene and Pyrene (PAH 16)

[2] PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

[3] Napthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h.i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indenol(1,2,3-c,d)pyrene, Phenanthrene and Pyrene (PAH 17)

[4] PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

3.3 OBSERVED GROUND CONDITIONS

3.3.1 Made Ground

3.3.1.1 Topsoil

Topsoil was encountered in a number of locations to depths of between 0.1m to 0.5m. Topsoil was recorded in the following Trial Pits TP1, TP5, TP6, TP13, TP16, TP19, TP20, TP21, TP28, TP29, TP71, TP73, TP75, TP76, TP77. The topsoil typically comprised soft medium brown to dark brown sandy clay with occasional rootlets. There was no visual or olfactory evidence of contamination in the topsoil.

3.3.1.2 Reworked Clays/Infill Material

The depth of infill material varied from 0m to 4.6 mbgl. The maximum observed depth of infill material was recorded in TP67 (4.6m), located along the haul road in the south eastern region of the site. The base of the infill material was confirmed in all trial pits by excavation to natural ground.

The infill material typically comprised a grey/ brown gravelly clay matrix with a minor waste component comprising materials such as plastic, tarmac, textiles, timber, brick, concrete and metals.

The volume of infill material within the '5 holes' (Phase 2) and 'holes 14 & 15' (Phase 3) was calculated following a review of historic (1998) and current (2009) topographic surveys which provided information on pre and post filling levels. The volume of infill material was calculated at 90,230m^3 for Phase 2 and 126,726m^3 for Phase 3.

3.3.2 Natural Ground

3.3.2.1 Glacial Till

Undisturbed natural ground was encountered in all trial pits across the site. For the trial pits listed in 3.3.1.1 (excluding TP73, TP76 and TP77), natural ground was encountered below a layer of topsoil. For all other trial pits natural ground was encountered underlying the infill material. The material generally comprised soft to firm brown to red/ brown slightly gravelly clay.

3.3.2.2 Bedrock

No bedrock was encountered during the excavation of trial pits at GCGC.

3.3.3 Groundwater Observations

No groundwater observations were noted during the intrusive investigation as all exploratory works were located within fill material above natural grade.

3.3.4 Summary of Ground Conditions

The general sequence of soil conditions encountered during the intrusive investigations at GCGC is presented in Table 7.

Table 7: Summary of Ground Conditions

Strata	Average Thickness (m)	Description
Topsoil	0.3	Soft medium brown to dark brown sandy clay with occasional rootlets
Reworked Clay/Infill Clay	2.3	Grey/ brown gravelly clay matrix with a minor waste component comprising materials such as plastic, tarmac, textiles, timber, brick, concrete and metals
Strata	**Maximum Depth (m)**	**Description**
Glacial Till	>4.6	Soft to firm brown to red/ brown slightly gravelly clay
Bedrock	-	Not proven

3.4 SOIL CHEMICAL RESULTS

Thirty nine (39) soil samples were sent for laboratory testing from the 77 trial pits excavated during the exploratory investigation. Samples taken from the infill material were analysed for the broad suite of parameters for compositional and leachate testing as listed in Table 6. The results are summarised in Appendix 8.

3.4.1 Bulk Soil

With regard to Human Health there are no Irish soil criteria available, therefore Generic Assessment Criteria (GACs) have been selected from the following:

DEFRA in the UK have stated that the new CLEA 1.06 model is currently the preferred for the production of risk assessment values for human health protection. Revised Soil Guideline Values (SGV) have been published by DEFRA in this model which have been used as GAC's in this instance. As this site is a golf course and is not used for residential or commercial purposes the SGVs for '*allotments (without lifetime exposure)*' are considered to be the most appropriate in this instance. The exposure pathways of 'residential' or 'commercial' were not used as these are not as representative of the use of a golf course as a general amenity.

As SGVs are only available for a limited number of substances, additional criteria have been sourced from current Dutch Government guidance and from criteria published by LQM/CIEH using the old CLEA model that was used to derive historical SGVs. The Dutch guidance Target Values (DTVs) have been used to represent 'minimal or no risk' levels of contamination. LQM/CIEH values are used in the same way as SGVs (Soil Generic Assessment Criteria for Human Health Risk Assessment, LQM/CIEH (2007))

In summary, where a commercial SGV is available for a substance, this is used as the GAC. Where this is not available the DTV or LQM/CIEH criteria is used as the appropriate GAC.

3.4.2 Bulk Soil Analysis

The results of the bulk soils analysis recorded low levels of hydrocarbons across the site with the following results noted;

- C5 – C44, Total Aliphatic; the results ranged from below the laboratory Limit of Detection (LoD) to 140mg/kg (TP18).
- C5 – C44, Total Aromatic; the results ranged from below laboratory LoD to 220mg/kg (TP18).
- C5 – C44, Total Hydrocarbons; the results ranged from below laboratory LoD to 360mg/kg (TP18)

It should be noted that the above maximum hydrocarbon concentrations is likely to be attributable to the presence of tarmac in TP18.

Results for Polycyclic Aromatic Hydrocarbons (PAHs) (speciated) ranged from below laboratory LoD to 17mg/kg (TP 44) are considered low and not likely to pose a risk to Human Health or to the Environment.

There were no detections of Methyl tertiary butyl ether (MTBE) or BTEX (benzene, toluene, ethylbenzene, and xylene) across the site.

Low levels of polychlorinated biphenyls (PCBs) were recorded at TP 74 and TP 77 with values of 1.1µg/l recorded for PCB 153 which is slightly above the laboratory LoD (<1.0µg/l). PCBs were below the laboratory LoD in all remaining trial pits across the site.

The following range of heavy metals were analysed for all trial pits across the site; arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony selenium and zinc.

- Antimony slightly exceeded the Dutch Target Value (DTV) of (3mg/kg) in TP4 (3.1mg/kg), TP13 (5.5mg/kg) and TP17 (7.6mg/kg) however all of the above were considerably below the Dutch Intervention Value (DIV) of 15mg/kg.
- Barium slightly exceeded the DTV of (160mg/kg) in TP4 (190mg/kg), TP22 (190mg/kg) and TP72 (170mg/kg) however all of the above were considerably below the DIV of 625mg/kg.
- Cadmium slightly exceeded the SGV of (1.8mg/kg) in eleven trial pits ranging from 1.9mg/kg (TPs 34, 50, 58 & 67) to 4mg/kg (TP10).
- Molybdenum slightly exceeded the DTV of (3mg/kg) in TP13 (7.6mg/kg) and TP58 (3.1mg/kg) however all of the above were considerably below the DIV of 200mg/kg.

No volatile or semi volatile organic compounds (VOCs and SVOCs) were detected across the site.

3.4.3 Soil Leachate (CEN 10:1)

Soil leachate concentrations have been compared to the Interim Guideline Values (IGV) for Groundwater as presented in EPA interim report "Towards Setting Guideline Values for the Protection of Groundwater in Ireland" 2002. The Dutch Guidance Target Values (DTVs) which represent 'minimal or no risk' levels of contamination have also been used for comparative purposes.

There are currently no published generic assessment criteria for groundwater derived specifically to be protective of human health via direct contact. However it can be assumed that if water is considered safe for human consumption then there are no risks from direct contact.

3.4.4 Soil Leachate Analysis

The results indicated nitrite as NO_2 was slightly elevated above the IGV (0.1mg/l) in TP25 (1.26mg/l), TP36 (0.73mg/l), TP67 (0.61mg/l), TP70 (0.51mg/l) and TP74 (0.64mg/l).

Molybdenum was slightly elevated above the DTV of 0.005mg/l for shallow soils at TP65 (0.02mg/l) and TP70 (0.006mg/l).

No other exceedances above guideline values were noted.

3.5 STOCKPILE CHEMICAL RESULTS

3.5.1 Bulk Compositional Analysis

As part of the exploratory investigation twenty samples were taken from stockpiles located at the site (see Appendix 9 for chemical results).

The results were analysed against Soil Guideline Values (SGVs) published by DEFRA. As this site is a golf course and is not used for residential or commercial purposes the SGVs for '*allotments (without lifetime exposure)*' are considered to be most appropriate in this instance.

As SGVs are only available for a limited number of substances additional criteria have been sourced from criteria published by LQM/ CIEH and current Dutch Government Guidance. Where the Dutch guidance Target Values (DTVs) are used, these represent 'minimal or no risk' levels of contamination. LQM/ CIEH values are be used in the same way as SGVs (Soil Generic Assessment Criteria for Health Risk assessment, LQM/ CIEH (2007))

The results indicate that all sample results were below the relevant SGV/DTV for heavy metals with the exception of the following;

- Antimony slightly exceeded the DTV (3mg/lkg) at SP7-1 (3.1 mg/kg), however this is below the Dutch Intervention Value (DIV) (15mg/kg).

- Cadmium exceeded the SGV (1.8mg/kg) at SP7-1 (1.9mg/kg) and SP5-1 (5mg/kg) however remained below the DIV (12mg/kg).

- Molybdenum slightly exceeded the DTV (3mg/kg) at SP7-1 with a result of 3.2mg/kg however this remains well below the DIV (200mg/kg).

- Mineral Oils are below the DIV and BTEX and below the SGV with the exception of Benzene where the SGV is below the laboratory LoD. All results for Benzene are below the laboratory LoD.

Results for Total Polycyclic Aromatic Hydrocarbons (PAHs) exceeded the laboratory LoD in eleven samples ranging in value from 3.2mg/kg (SP6-4(2)) to 14mg/kg (SP4-1) which are considered low and not likely to pose a risk to Human Health or the Environment. Phenanthrene, fluoranthene, pyrene and benzo(a)pyrene are the predominant PAH's recorded within the eleven samples.

3.5.2 Waste Acceptance Criteria

As part of the exploratory investigation all samples from the stockpiled material were tested for Waste Acceptance Criteria (WAC) (Murphy Suite) to give an initial indication of the likely waste classification of the material. The results are presented in Appendix 9.

The testing was conducted in order to provide information to assess available options to remove this material off site for recovery/disposal if required.

The results were compared to the WAC for inert landfills as set out in Council Decision 2003/33/EC.

The results indicate the concentration of Fluoride at SP2-1 and SP2-2 slightly exceeded the criteria for inert waste (10mg/kg) at 11mg/kg and 26mg/kg respectively, however they are below the limit values for non hazardous waste.

Phenol concentrations recorded were below the laboratory limit of detection (LoD) in all samples.

Table 8 provides definitions relating to waste acceptance criteria.

Table 8: Definition of Waste Relating to Waste Acceptance Criteria

Inert Waste	Waste is inert if: (a) it does not undergo any significant physical, chemical or biological transformations; (b) it does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health; and, (c) its total leachability and pollutant content and the eco-toxicity of its leachate are insignificant and, in particular, do not endanger the quality of any surface water or groundwater.
Non-Hazardous Waste	Non-hazardous waste is waste which is stable and non-reactive, which means that the leaching behaviour of the waste will not change adversely in the long-term, under landfill design conditions or foreseeable accidents: (a) in the waste alone (for example, by biodegradation); (b) under the impact of long-term ambient conditions (for example, water, air, temperature, mechanical constraints), and, (c) by the impact of other wastes (including waste products such as leachate and gas).
Hazardous Waste	Hazardous waste is waste which possesses one or more of the following hazardous properties: explosive, oxidizing, flammable, irritant, harmful, toxic, carcinogenic, corrosive, infection, toxic for reproduction, mutagenic, releases toxic gases in contact with air, water or acid and ecotoxic.
Putrescible Waste	Putrescible waste is any waste which is subject to biological and chemical decomposition or decay.
International Swill	Catering waste containing products of animal origin generated from means of transport operating internationally.

3.5.3 Asbestos

Trial Pit SP5-3 excavated a concrete pipe which displayed asbestos characteristics therefore a sample was taken and analysed at RPS' Warrington laboratory, a UKAS accredited laboratory. The results confirmed that the pipe contained Chrysotile asbestos fibers. See Appendix 14 for certificate of analysis and Table 9 below for details of concrete pipe.

Table 9: Asbestos: Concrete pipe details

Location	SP5-3 (see figure 11)
Description	Concrete pipe approximately 0.15 m diameter, 0.8m long
Photo	

3.6 GROUNDWATER CHEMICAL RESULTS

3.6.1 Introduction

Groundwater samples were taken from boreholes G1 and G2 located on site and a private well located at Castle Bagot House. The samples were analysed for a broad suite of parameters listed in Table 6 and results are presented in Appendix 10.

Borehole G1 is located to the rear of the clubhouse situated to the north of the infill material and borehole G2 is located to the south west of the infill material. The results indicate the depth to groundwater in each borehole was approximately 2.6 metres and 2.5 metres below ground level respectively.

The private well located at Castle Bagot House is >1km west of the infill material and the depth to groundwater is approximately 1.86 meters below ground level.

Groundwater concentrations have been compared to the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) and the Interim Guideline Values (IGV) for Groundwater as presented in EPA interim report "Towards Setting Guideline Values for the Protection of Groundwater in Ireland" 2002.

There are currently no published generic assessment criteria for groundwater derived specifically to be protective of human health via direct contact. However it can be assumed that if water is considered safe for human consumption then there are no risks from direct contact.

3.6.2 Groundwater Properties

The concentrations of chloride detected in G1 and G2 was 37.6 mg/l and 25.5 mg/l respectively. This is slightly elevated above the lower threshold value of 24mg/l set out in the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), however it is considerably below the higher threshold value of 187.5mg/l. G1 also exceeds the EPA Interim Guideline Value (IGV) of 30mg/l. Sources of chloride may include natural soil and rock formations, farmyard runoff, landspreading of organic wastes, leachate, sewage and industrial effluent. Chloride does not pose a risk to human health however it does affect palatability.

The concentration of nitrite (N) detected in G1, G2 and Castle Bagot House was <0.0006mg/l, <0.0006mg/l and 0.0008mg/l respectively. However no threshold limits are provided for Nitrite as N in the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), the 2003 EPA IGV's for the protection of groundwater or the Dutch target/intervention limits. The limit specified for nitrite as NO_2 in the 2010 Groundwater Regulations is 0.375mg/l. All the results for nitrite as N are below the limit of 0.375mg/l for NO_2. Nitrate levels from all groundwater samples are below the relevant standard within the 2010 Groundwater Regulations (37.5mg/l). The presence of nitrite may be attributable to the use of fertilisers within the area.

The concentration of antimony detected at Castle Bagot House was slightly elevated at 0.0028mg/l but did not exceed the DIV (0.02mg/l).

Slightly elevated levels of arsenic were recorded at the private well at Castle Bagot House (0.0134mg/l) which slightly exceeds the threshold limits specified in the 2010 Groundwater Regulations (0.0075mg/l) and the EPA IGV's (0.01mg/l). It should be noted that arsenic was below the threshold limits at the two on-site groundwater monitoring locations (G1 and G2). Elevated levels of arsenic were not recorded in the on-site soil bulk or leachate analysis therefore the exceedance at Castle Bagot House may be attributable to off site sources.

The concentration of phosphate (P) recorded at monitoring location G1, G2 and Castle Bagot House was 0.222mg/l, 0.015mg/l and 0.866mg/l respectively.

3.7 SURFACE WATER CHEMICAL RESULTS

3.7.1 Introduction

GCGC has seven artificial ponds which are connected via a series of interconnecting drains. The site's internal drainage network discharges to the Griffeen and Cammock Rivers. Both the Griffeen and Cammock River catchments discharge to the River Liffey.

Surface water samples were collected from four locations within the site boundary (see Figure 10). The samples were analysed for the suite of parameters as outlined in Table C.2, of Appendix C of the EPA Landfill Monitoring Manual (2003).

Location S1 – Downstream of Griffeen River

Location S2 – Upstream of Griffeen River

Location S3 – Upstream Cammock River

Location S4 – Downstream Cammock River

Surface Water concentrations have been compared to the Minimum Reporting Value for Clean Waters (MRV's), the European Communities Environmental Objectives (Surface Water) Regulations 2009 and the IGVs. Detailed results are presented in Appendix 11.

3.7.2 Surface Water Properties

Concentrations of calcium, magnesium, manganese, sodium, chloride, sulphate, conductivity and alkalinity recorded at all four monitoring locations (upstream and downstream) were above the minimum reporting value (MRV) for clean water as specified in the EPA Landfill Monitoring Manual, 2003. No threshold limits are listed in the 2009 Surface Water Regulations for these parameters. However, the concentration of calcium, magnesium, sodium, sulphate, conductivity and alkalinity recorded at all four monitoring locations are below the Interim Guideline Values for groundwater (IGV).

Manganese was slightly elevated above the IGV (0.05mg/l) at S4 (0.128mg/l). Chloride was slightly elevated above the IGV (30mg/l) at monitoring location SW3 (38.3mg/l). It should be noted that elevated levels of manganese and chloride were not recorded in the soil bulk and leachate analysis.

Concentrations of suspended solids were recorded above the MRV for clean water (5mg/l) at S3 (16mg/l) and S4 (6mg/l), these levels are considered to be low. No threshold limits are listed in the Surface Waters Regulations 2009 or the IGVs for suspended solids.

Concentrations of potassium above the MRV for clean waters were recorded at monitoring locations S1 (1.95mg/l), S2 (1.59mg/l) and S3 (3.42 mg/l), however concentrations at all locations are below the relevant IGV (5mg/l).

Cadmium concentrations recorded at all monitoring locations are below the maximum allowable concentration (MAC) EQS of 0.0015mg/l as reported in the Surface Waters Regulations 2009 and the IGV at all locations.

Furthermore, fluoride concentrations recorded at all monitoring locations are below the annual allowable (AA) EQS of 0.5mg/l as reported in the Surface Waters Regulations 2009 and the IGV.

Concentrations of all remaining parameters at all locations were below the threshold limits specified in the MRV for clean water, as specified in the EPA Landfill Monitoring Manual, 2003, the Surface Waters Regulations 2009 and the IGV where applicable.

3.8 CHARACTERISATION SURVEY RESULTS

In accordance with the EPA's correspondence dated 28th of October 2010 material characterisation was conducted on 39 of the 77 trial pits excavated as part of the non targeted investigation. On completion of each trial pit designated for sampling, the excavated spoil was mixed by the excavator and a composite sample of approximately 500kg retrieved.

Extraneous material was extracted and sorted into a variety of containers including, timber, plastic, concrete, tar, tiles, rubber etc. The remaining soil and stone fraction was sieved through a purpose built table with a 20mm tray mesh. Each individual constituent, listed below, was weighed, recorded and compositional % derived from the total sample obtained.

- Biodegradable waste from garden & park
- Papers & Cardboard
- Composites
- Textiles
- Plastics
- Glass
- Metals
- Wood
- Stones/rocks (>20mm)
- Soils and Stones (<20mm)
- Concrete
- Bricks
- Wire
- Rope
- Natural Wood
- Timber
- Man Made Wood
- Ceramic
- Tar

A summary of the characterisation results for each of the areas investigated are outlined below in Table 10 with detailed analyses presented in Appendix 12.

The samples primarily comprised soil (<20mm) (71.79%) and soil and stones (>20mm) (25.59%) with these two categories accounting for 97.38% of the total volume of material sampled.

Some Natural Wood found in the form of branches (0.04%) and Biodegradable Waste from Garden and Park comprising rootlets and grass (0.27%) were also found.

Other waste elements accounting for 2.31% found in the samples were Wood – Timber (0.07%), Tar (0.48%), Ceramics (0.01%), Bricks (0.17%), Concrete (1.26%); Metals (0.03%); Plastics (0.04%); Textiles (0.04%) and Composites (0.20%).

No hazardous or food waste was found in the samples.

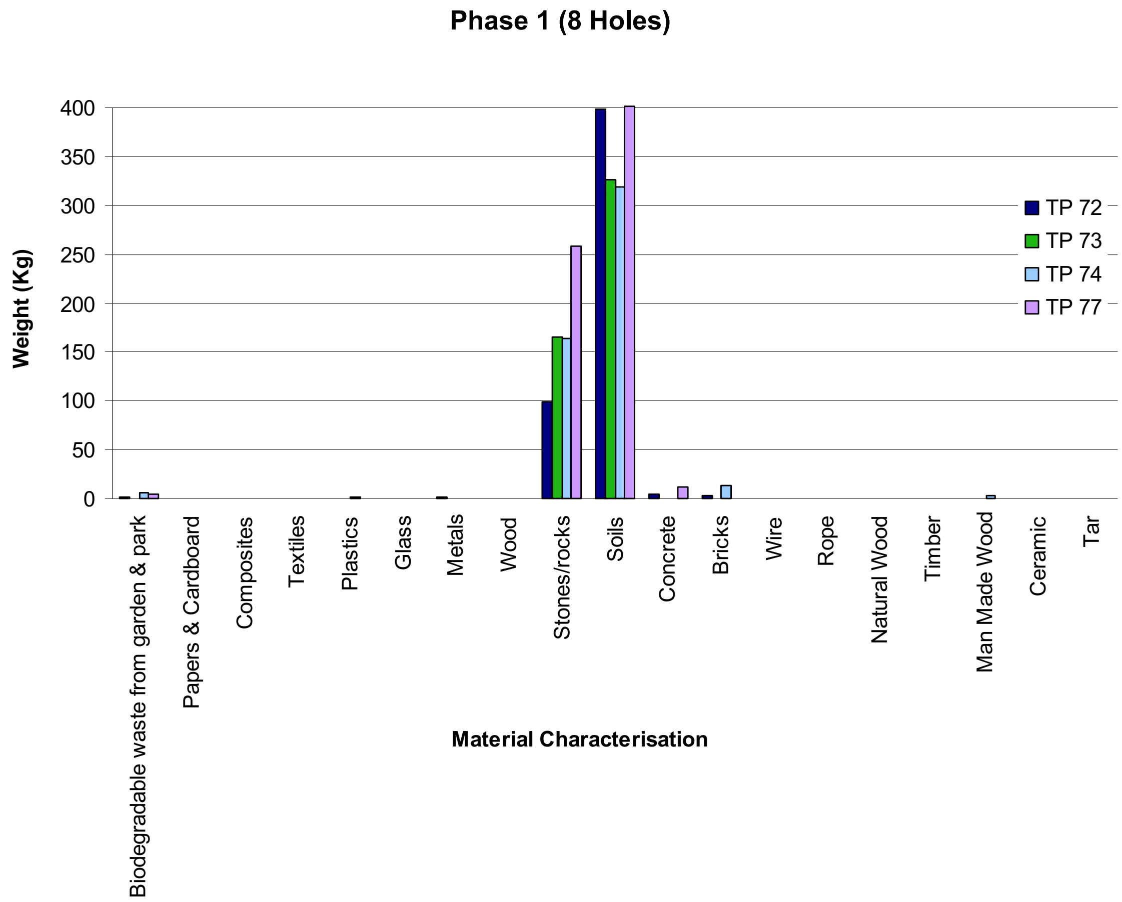
The category **Soil** was made up of all the elements that passed through the 20mm round mesh. The concentration of soil in the samples ranged from 38.4% in Trial Pit 42 (Phase 3) to 97.2% in Trial Pit 34 (Phase 2).

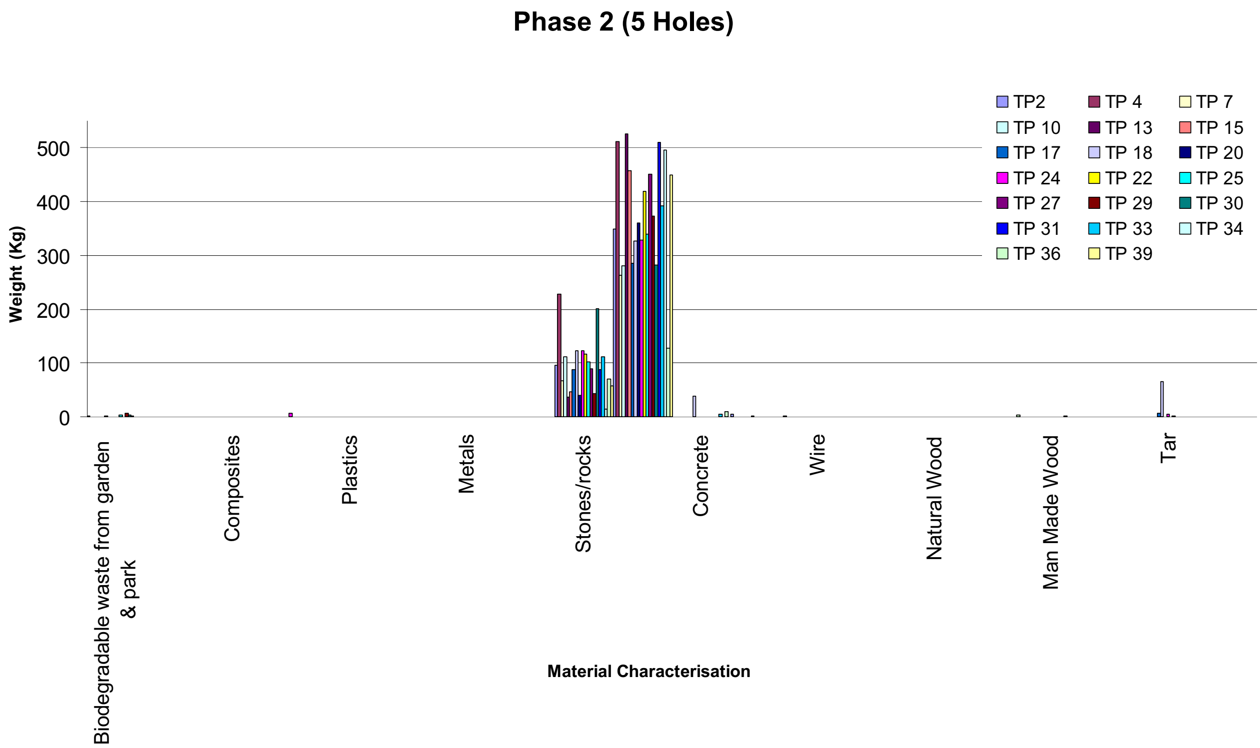
Typically, soil due to its sticky nature would also be found in the other categories. This would affect the true weight found in those categories leading to an overestimation of their quantities.

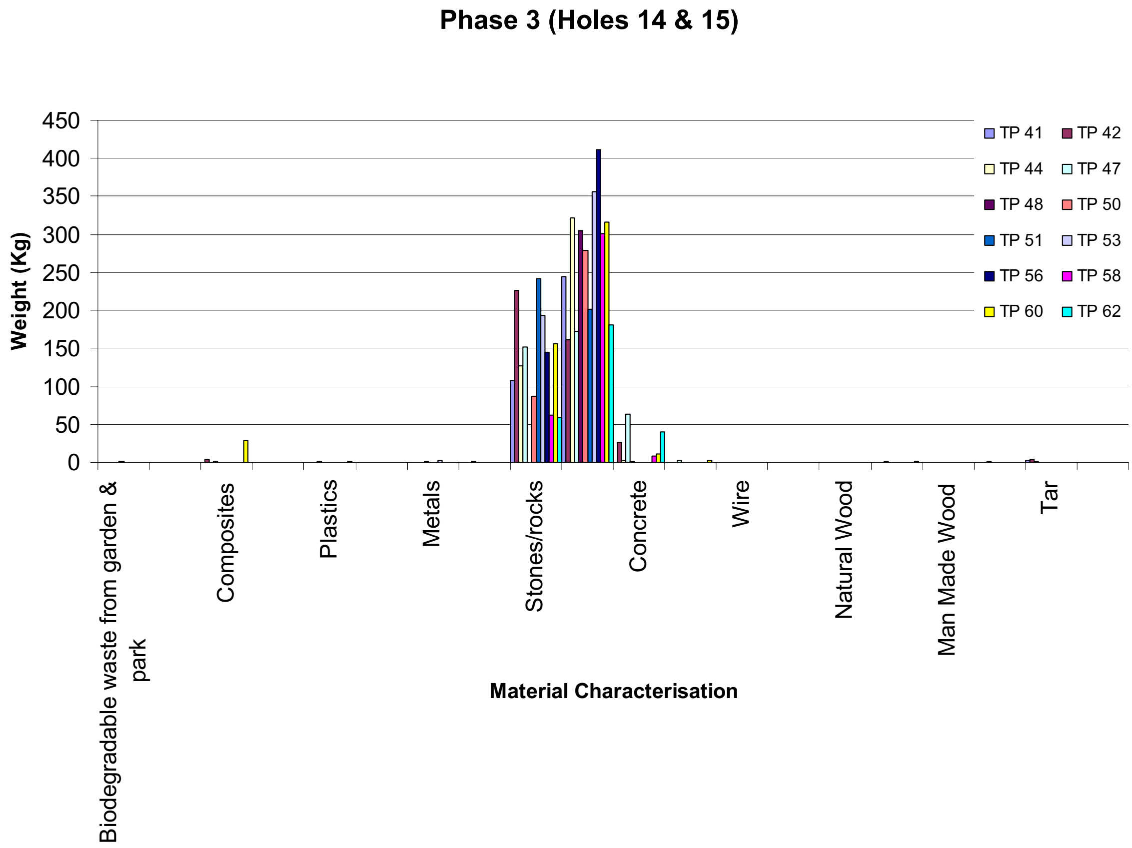
Table 10: Summary of characterisation results

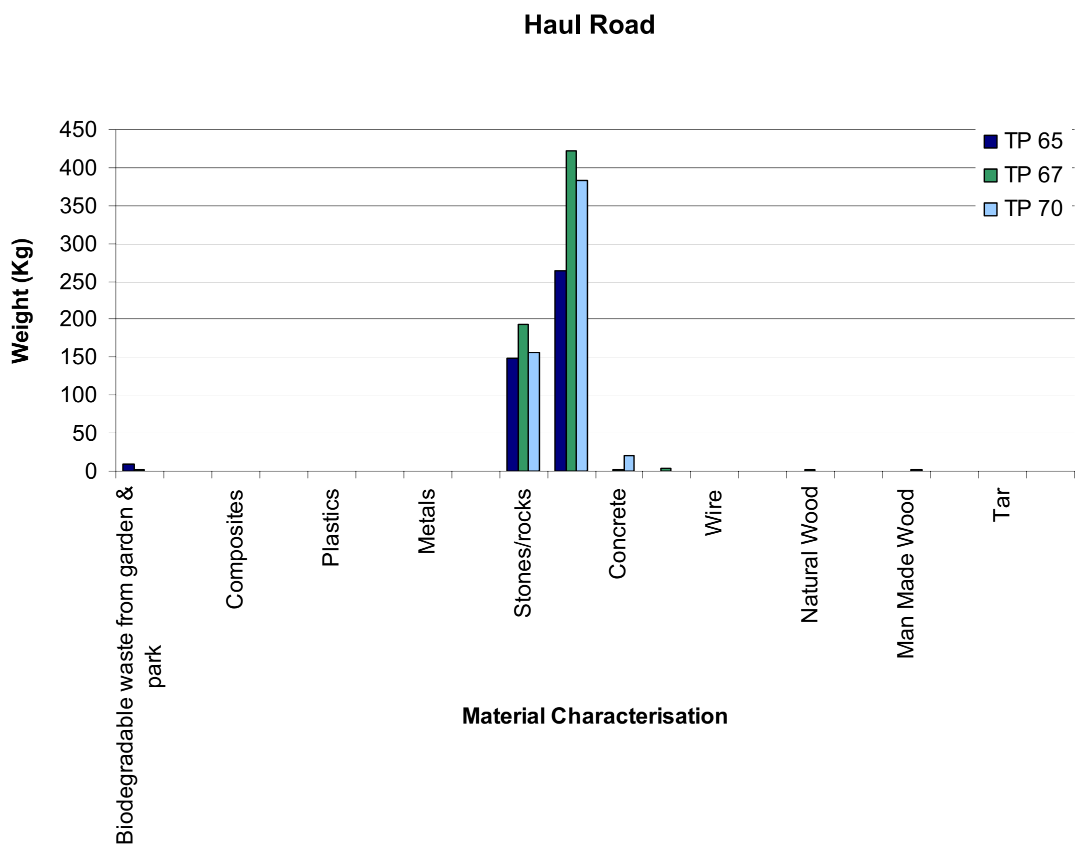
Constituent	Description
Soil and Stones (>20mm)	Ranged from 2.8% in Trial Pit 34 (Phase 2) to 54.6% in Trial Pit 51 (Phase 3).
Tar	Ranged from 0.1% in Trial Pits 30 (Phase 2), 56 & 60 (Phase 3) to 11.9% in Trial Pit 18 (Phase 1). It should be noted that tar was either not present or recorded low weights amounting to 0% of the total sample weight in a total of 25 of the 39 samples characterised.
Ceramics	Ranged from 0.1% at Trial Pit 25 (Phase 2) to 0.3% at Trial Pit 47 (Phase 3). Ceramics recorded during characterisation accounted for 0% of total sample weights in 16 trial pits and were not registered in a further 21 of the total 39 samples characterised.
Bricks	Ranged from 0.1% in Trial Pits 10, 17 (Phase 2) and 70 (Haul Road) to 2.6% in Trial Pit 74 (Phase 1). Bricks recorded during characterisation accounted for 0% of total sample weights in 14 trial pits and were not registered in a further 14 of the total 39 samples characterised.
Concrete	Ranged from 0.1% in Trial Pits 17, 27 and 39 (Phase 2) to 16% TP47 (Phase 3). Concrete accounted for 0% of total sample weights in 5 trial pits and was not registered in a further 17 of the total 39 samples characterised.
Metals	Generally comprised pipes and wires with some nails, cans and a bathroom tap in Trial Pit 65 (see Appendix 13 for photographs). The concentration of metallic materials in the samples characterised ranged from 0.1% in Trial Pit 47 (Phase 3) to 0.4% in Trial P 53 (Phase 3). Metals were not recorded nor did they exceed 0% of the total sample weight in 33 of 39 trial pits characterised.
Plastic	Materials encountered principally comprised light plastic packaging with a plastic bottle (TP 41) and plastic piping (TP 51) also noted. The concentration of plastic materials in the samples ranged from 0.1% in Trial Pit 72 (Phase 1), Trial Pits 17, 18, 25, 30 and 33 (Phase 2) and Trial Pits 44 and 62 (Phase 3) to 0.3% in Trial Pit 47 (Phase 3). It is likely that the weights of the plastic materials are over-estimated due to cross-contamination with soil. Plastic was either not present or recorded low weights amounting to 0% of the total sample weight in 27 of 39 trial pits characterised.
Textile	Materials were mainly made up of a cloth fragments. The concentration of textile material in the samples ranged from 0.1% in Trial Pits 7 and 33 in Phase 2 and Trail Pit 62 in Phase 3 to 1.3% in Trial Pit 24 (Phase 2). It is likely that the weights of the textile materials are overestimated due to cross-contamination with soil. Textiles were either not present or recorded low weights amounting to 0% of the total sample weight in 35 of 39 trial pits characterised.
Composites	Were defined as a fraction in which the sample comprised a combination of individual constituents e.g. metal wiring with plastic coating. The concentration of composite materials in the samples characterised ranged from 0.1% in Trial Pit 74 (Phase 1), Trial Pits 4 & 17 (Phase 2) and Trial Pit 62 (Phase 3) to 5.7% in Trial P 60 (Phase 3). Composites were either not present or recored low weights amounting to 0% of the total sample weight in 33 of 39 trial pits
Man made **Wood and Timber**	Recorded within a number of the trial pits excavated and sampled. Man made Wood ranged from 0.2% in Trial Pit 30 (Phase 2) and Trial Pit 70 (Haul Road) to 0.7% in Trial Pit 74 (Phase 1). Timber ranged from 0.1% in Trial Pit 25 (Phase 2) to 0.3% in Trial Pit 47 (Phase 3). Man made Wood and Timber were either not present or recorded low weights amounting to 0% of the total sample weight in 33 of 39 trial pits characterised.
Food or Kitchen waste	None was found in any of the samples.
Hazardous materials	None were found in the samples.

These results are presented graphically below.


Phase 1 (8 Holes)
Weight (Kg)
400
350
300
250
200
150
100
50
0
TP 72
TP 73
TP 74
TP 77
Biodegradable waste from garden & park
Papers & Cardboard
Composites
Textiles
Plastics
Glass
Metals
Wood
Stones/rocks
Soils
Concrete
Bricks
Wire
Rope
Natural Wood
Timber
Man Made Wood
Ceramic
Tar
Material Characterisation


Phase 2 (5 Holes)
Weight (Kg)
500
400
300
200
100
0
TP2
TP 4
TP 7
TP 10
TP 13
TP 15
TP 17
TP 18
TP 20
TP 24
TP 22
TP 25
TP 27
TP 29
TP 30
TP 31
TP 33
TP 34
TP 36
TP 39
Biodegradable waste from garden & park
Composites
Plastics
Metals
Stones/rocks
Concrete
Wire
Natural Wood
Man Made Wood
Tar
Material Characterisation


Phase 3 (Holes 14 & 15)
Weight (Kg)
450
400
350
300
250
200
150
100
50
0
TP 41
TP 42
TP 44
TP 47
TP 48
TP 50
TP 51
TP 53
TP 56
TP 58
TP 60
TP 62
Biodegradable waste from garden & park
Composites
Plastics
Metals
Stones/rocks
Concrete
Wire
Natural Wood
Man Made Wood
Tar
Material Characterisation


Haul Road
Weight (Kg)
450
400
350
300
250
200
150
100
50
0
TP 65
TP 67
TP 70
Biodegradable waste from garden & park
Composites
Plastics
Metals
Stones/rocks
Concrete
Wire
Natural Wood
Man Made Wood
Tar
Material Characterisation

3.8.1 Waste Characterisation Summary

The samples primarily comprised soil (<20mm) (71.79%) and soil and stones (>20mm) (25.59%) with these two categories accounting for 97.38% of the total volume of material sampled.

It should be noted the EIS for Profile Park located to the west of GCGC recorded waste material within its eastern margin ranging in thickness from 2.5 to 3.75m. A waste characterisation assessment was also completed within this area with the results indicating the 79.7% comprised stones, concrete and soil with 16.8% comprising elements >20mm. Wood accounted for 3.4% and was considered to pose a risk in terms of methane generation.

3.9 CONCLUSION OF TIER 2 SITE INVESTIGATIONS

The findings of the Tier 2 intrusive exploratory investigations and testing has provided the following conclusions:

- The interpreted lithology of the site comprises topsoil, overlying reworked clay containing minor amounts of waste material with an average thickness of 2.3m. Soft to firm brown to red/ brown slightly gravelly clay with a maximum depth >4.7m underlies the reworked clays. Bedrock was not encountered during the exploratory investigation, however GSI records indicate the site is underlain by Calp Limestone.

- Following a review of GSI mapping, the limestone bedrock underlying the site is classified as a locally important aquifer. The underlying aquifer is predominantly highly vulnerable with limited areas of the site considered to be extremely vulnerable to contamination. Local groundwater flow is to the northwest.

- The waste characterisation study found the >97% of the infill material consisted of soil (<20mm) and soil and stones (>20mm).

- The soil analytical data indicates that the infill material contains low level hydrocarbons and heavy metals such as antimony, barium, cadmium and molybdenum across the site which are not likely to pose a risk to Human Health or the Environment.

- Flouride was the only parameter to exceed the WAC limits for the acceptance of waste at inert landfills. Slightly elevated levels were detected in two of the twenty samples. As all remaining samples were below the threshold limits for inert waste, the majority of this material is suitable for acceptance at suitably licenced inert landfills should off site disposal be required.

- The contaminants identified in groundwater samples were limited to arsenic and chloride. Elevated levels of arsenic were recorded at the monitoring location at Castle Bagot House. While elevated levels of arsenic are of concern, elevated levels of arsenic were not recorded from on site monitoring locations or within the soil bulk or leachate analysis, which suggests it may originate from off site sources.

- Elevated levels of chloride were detected at two groundwater monitoring locations, however as above chloride was not recorded in the soil bulk or leachate analysis, which suggests it may also originate from off site/alternative sources or is naturally occuring. Chloride does not pose a health hazard to humans. The principal consideration is in relation to palatability.

- The contaminants identified in surface water samples collected from the site were limited to manganese at one location and chloride and suspended solids at a second location. Elevated levels of manganese, chloride and suspended solid were not recorded in the soils bulk and leachate analysis which suggests these contaminants may originate from off-site sources.

4 REFINEMENT OF CONCEPTUAL MODEL

4.1 REFINED CONCEPTUAL SITE MODEL

The conceptual model, initially developed at Tier 1 stage (refer to Section 2.3 above) has been refined based upon the findings of the site investigation. The Source-Pathway-Receptor Linkages identified at Tier 1 have been considered in more detail to take account of site specific conditions. The refined conceptual model is discussed in detail below and presented in Figure 15.

4.1.1 Source

The primary source of contamination identified at the Tier 1 stage is the infill material. This material has been characterised as part of this investigation and following a review of the findings no substances that may be harmful to human or environmental receptors have been recorded at detectable concentrations within the soil matrix, groundwater or surface water therefore no contaminants of concern (CoC) with respect to human health and environmental receptors were identified during the site investigation.

The Tier 1 assessment identified the site as a Class C low risk site. The Tier 1 assessment also identified the following potential low risks in relation to the infill material:

- Low risk to human health from the abstraction of groundwater for private use.
- Low risk to water bodies from the migration of leachate within shallow groundwater, and
- Low risk to protected areas from the migration of leachate within surface water

4.2 REVISED RISK SCREENING

The risk screening exercise was repeated in order to confirm the initial risk ranking assigned in the Tier 1 Conceptual Site Model, Risk Screening and Prioritisation.

The conceptual site model and risk scoring is presented in Table 11 below. The full assessment is presented in Appendix 15.

SOURCES

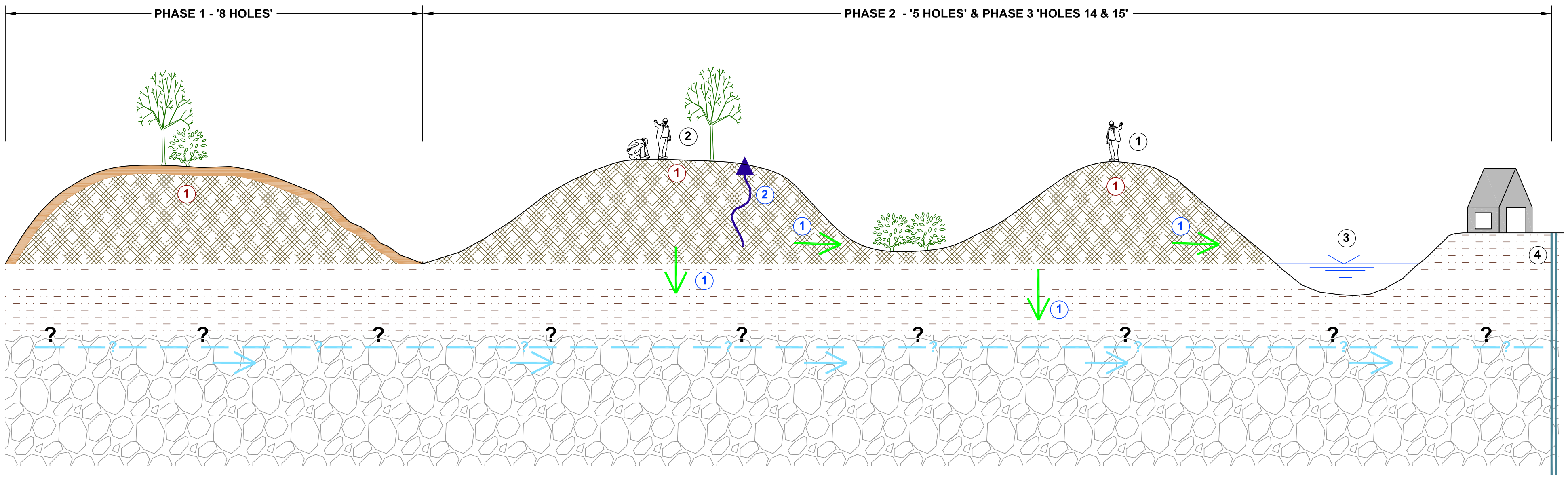
1. Contaminated Infill Material

PATHWAYS

1. Migration of leachate through groundwater and surface water
2. Landfill Gas Migration

RECEPTORS

1. Current site users
2. Future site workers
3. Drainage network (Griffeen and Cammock Rivers)
4. Private Well Extraction



CONCEPTUAL SITE MODEL

(not to scale)

NOTES

1. This drawing is the property of RPS , it is a confidential document and must not be copied, used, or its content divulged without prior written consent.
2. All Levels refer to Ordnance Survey Datum, Malin Head.
3. DO NOT SCALE, use figured dimensions only, if in doubt ask.

No.	Date	Drn. / Chk.	Amendment / Issue	App
I01	May '11	HF / LD	For Information Only	CC

Client: Comhairle Contae Átha Cliath Theas / South Dublin County Council

Drawn By	Checked By	Approved By	Date
HF	LD	CC	May 2011

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Drawing Number: MDR0813/Figure 15 — Rev: I01

Project: GRANGE CASTLE GOLF CLUB ERA PROPOSAL

Title: CONCEPTUAL SITE MODEL

Drawing Status: Information — Scale / Sheet Size: NTS @ A1 — NTS @ A3

Table 11: Revised Conceptual Model & Risk Scoring

Source	Pathway	Receptor	% Score	Risk Classification
(1a) Leachate	(2a,b&c) Groundwater and Surface Water migration	(3e) Surface Water body	6	Low
		(3b) Protected Area (Surface Water dependent terrestrial ecosystem)	0	No Linkage
	(2a&b) Groundwater Migration	(3a) Private Well	2.5	
		(3b) Protected Area (Groundwater dependent terrestrial ecosystem)	0	No Linkage
		(3c) Aquifer	4.5	Low
		(3d) Public Water Supply	0	No Linkage
		(3e) Surface Water body	5	Low
	(2c) Surface Water Migration	(3e) Surface Water body	10	Low
		(3b) Protected Area (Surface Water dependent terrestrial ecosystem)	0	No Linkage
(1b) Landfill Gas	(2d) Lateral migration in subsoil	(3f) Human Presence (Buildings, enclosed spaces)	5	Low
	(2e) Vertical Migration in subsoil		0	No Linkage

Following the review of the conceptual model and risk scoring the pollutant linkage with the highest individual score was identified as leachate to surface water (10%).

The overall score for the site is therefore 10% which reconfirms the classification of the site as a Class C low risk site.

- Low risks to surface water bodies from migration of leachate through groundwater and surface water;
- Low risk to human health from the abstraction of groundwater for private use;
- Low risks to water quality in the underlying aquifer; and
- Low risks to humans and buildings in proximity to the site from migration of landfill gas.

The potential risk to human health, surface water and groundwater are further discussed below.

4.3 RISKS TO HUMAN HEALTH

4.3.1 Soil Source

The findings of the Tier 2 investigation indicated that low level hydrocarbons were present in soils across the site which may be attributable to the presence of minor amounts of tarmac and are not considered likely to pose a risk to human health.

Slightly elevated levels of the following heavy metals were recorded within the soils analysis; antimony, barium cadmium and molybdenum recorded concentrations in excess of their respective guideline concentrations however all were considerably below their applicable DIV.

Soil leachate results were compared to the EPA Interim Guideline Values (IGVs) and Dutch Target (DTV) and Intervention (DIV). The results of the soils leachate analysis indicated the presence of slightly elevated nitrite and molybdenum at two discrete locations across the site. No other concentrations above guideline values were noted.

The soil analytical results from the infilled areas of the site indicate there are low risks to human health. The completion of the development will result in the placement of topsoil across the infill material and grassing the site with this surface cover acting as a physical barrier. Therefore, there is considered to be no risk to future site users.

Should dry/windy conditions prevail during recommencement of development works at the site there is the potential that soil dust may become airborne. Dust suppression measures should be adopted as necessary in order to control the risk to off-site receptors associated with airborne soil dust.

4.3.2 Leachate Source

Risks to human health from leachate will be driven by direct contact. No leachate generation was observed during investigative works. Based on the soil leachate analytical data it is not considered to present a risk to human health to current or future site users.

4.3.3 Gas Source

No biodegradable waste was encountered during the Tier 2 exploratory investigative works and no buildings are currently in existence or proposed within the areas in question therefore the risk is considered to be low.

If the future site use were to change to include buildings directly above the infill material then additional gas monitoring may need to be considered.

4.4 RISKS TO GROUNDWATER

4.4.1 Leachate Source

Risks to groundwater from leachate will be driven by downward percolation of leachate into the groundwater aquifer. No leachate generation was observed during investigative works.

Soil leachate results were compared to the EPA Interim Guideline Values (IGVs) and Dutch Target (DTV) and Intervention Values (DIV). The results of the soils leachate analysis indicated the presence of slightly elevated nitrite and molybdenum at two discrete locations across the site. No other concentrations above guideline values were noted.

Given the general absence of other contaminants in the soils leachate analysis, the low levels of nitrite recorded at discrete locations and the relatively low sensitivity of the aquifer, the risk to groundwater is considered to be low.

4.5 RISK TO SURFACE WATER

4.5.1 Leachate Source

Risks to surface water from leachate will be driven by the potential mobilisation of leachable contaminants to the underlying shallow/overburden aquifer which is likely to be in direct hydraulic continuity with the Cammock and Griffen Rivers.

As previously outlined above the results of the soils leachate analysis indicated the presence of slightly elevated nitrite and molybdenum at two discrete locations across the site. No other concentrations above guideline values were noted.

Given the general absence of other contaminants in the soils leachate analysis, the low levels of nitrite recorded at discrete locations and the low risk to groundwater outlined above, the risk to surface water is considered to be low.

5 CONCLUSIONS

An environmental risk assessment has been carried out with respect to infill material at Grange Castle Golf Course. The assessment was carried out in accordance with the EPA Code of Practice for Environmental Risk Assessment of Unregulated Waste Disposal Sites, 2007, and comprised Tier 1 Preliminary Assessment and Screening and Tier 2 Site investigation and Testing.

The assessment has concluded the following:

The interpreted lithology of the site comprises topsoil, overlying reworked clay containing minor amounts of waste material with an average thickness of 2.3m. Soft to firm brown to red/ brown slightly gravelly clay with a maximum depth >4.7m underlies the reworked clays. Bedrock was not encountered during the exploratory investigation.

Following a review of GSI mapping, the limestone bedrock underlying the site is classified as a locally important aquifer. The underlying aquifer is predominantly highly vulnerable with limited areas of the site considered to be extremely vulnerable to contamination.

The volume of infill material within the ‘5 holes’ (Phase 2) and ‘holes 14 & 15’ (Phase 3) was calculated following a review of historic (1998) and current (2009) topographic surveys which provided information on pre and post filling levels. The volume of infill material was calculated at 90,230m^3 for Phase 2 and 126,726m^3 for Phase 3.

Material characterisation indicated that the samples primarily comprised soil (<20mm) (72%) and soil and stones (>20mm) (26%) with these two categories accounting for 98% of the total volume of material sampled. Some Natural Wood found in the form of branches and Biodegradable Waste from Garden and Park comprising rootlets and grass were also found. Other waste elements accounting for 2% found in the samples were Wood – Timber, Tar, Ceramics, Bricks, Concrete; Metals; Plastics; Textiles and Composites. No hazardous or food waste was found in the samples.

Samples were collected from the stockpiled material and analysed for a broad range of analysis including Waste Acceptance Criteria (WAC) for inert landfills with resulting data indicating that the material is acceptable for disposal at an inert landfill with the exception of fluoride exceedances in two samples.

Soil analytical data indicates that the infill material contains low level hydrocarbons and heavy metals such as antimony, barium, cadmium and molybdenum across the site which are not likely to pose a risk to Human Health or the Environment.

The contaminants identified in groundwater samples were limited to arsenic and chloride. Elevated levels of arsenic were recorded at the private well at Castle Bagot House. Elevated levels of arsenic was not recorded in either the on site groundwater sampling locations or the soil bulk or leachate analysis on the site, which suggests it may be attributable to off site sources.

Elevated levels of chloride were detected at two groundwater monitoring locations however chloride was not recorded in the soil bulk and leachate analysis, which suggests it may originate from off site sources, or is naturally occuring. Chloride does not pose a risk to human health however it does affect palatability.

The contaminants identified in surface water samples collected from the site were limited to manganese at one location and chloride and suspended solids at a second location. Elevated levels of manganese and chloride were not recorded in the soils bulk and leachate analysis which suggests these contaminants may originate from off-site sources.

Based on the soil analytical data, the potential risk to site users associated with contaminants within the infill material is considered to be low.

6 RECOMMENDATIONS

At this stage no specific remedial requirements are considered necessary with regard to the infill material as the potential risk to human health and the environment is considered low. However the following recommendations are made:

- Should dry/windy conditions prevail during recommencement of development works on the site there is the potential that soil dust may become airborne. Dust suppression measures should be adopted as necessary in order to control the risk to off-site receptors associated with airborne soil dust.

- Should it be necessary to dispose of materials other than the stockpiled material from the site, WAC testing of all material will be required.

Walkover Survey Checklist

Appendix 1

Walkover Survey Checklist		
Information	**Checked**	**Comment**
1. What is current Land Use?	√	Golf Course with additional holes under development (extension works on hold at time of survey)
2. What are the neighbouring Land Uses?	√	The site is bounded by the R136 Outer Ring Road to the east and the Nangor Road to the north. A number of industrial units are located immediately north of the main entrance off the Nangor Road. Corkagh Park is located immediately to the east with Casement Aerodrome situated to the south west. High density housing developments are located to the north east. 125 acres of lands to the east were developed in 2007 for Profile Park Business Park however to date only one unit has been developed within the business park. The surrounding landscape is made up of a patchwork of pasture and arable fields, with grassland being the dominant land cover. The field system is separated by clumps of mixed woodland and sparse hedgerow networks. Dense patches of mixed woodland, playing pitches and landscaped areas dominate the southern part of the area in Corkagh Park. The predominant landscape character type is flat urban fringe farmland.
3. What is the size of the site?	√	5 holes is 150,141m^2 and 14&15 is 88,665m^2
4. What is the topography?	√	The topography is generally gently undulating with man made features to accommodate golf course requirements.
5. Are there potential receptors (if yes, give details)?	√	See Below
Houses	√	High density housing was noted to the north east with ribbon development noted to the west
Surface water features (if yes, distance and direction of flow)	√	It was noted that drainage from the site is to the Griffeen and Cammock rivers. On site drainage consists of a complex networks of man made drainage systems incorporating 7 artificial lakes with an interconnected drainage system
Any wetland or protected areas	√	No details regarding protected areas or wetlands noted during site walkover
Public Water Supplies	√	It was assumed during the site walkover that the high density housing located to the north east and ribbon housing development located to the west were on public mains
Private Wells	√	No private wells noted during walkover with the exception of 2 No on site wells used for irrigation purposes
Services	√	No services noted during walkover
Other buildings	√	A number of industrial units are located to the north of the golf course on the Nangor Road
Other		
6. Are there any potential sources of contamination (if yes, give details)?	√	See below
Surface waste (if yes, what type?)	√	Surface inspection noted some fragments of plastic, metal, brick and tarmac on the surface of the infill material within the 5 holes and holes 14&15. Stockpiles of concrete, tarmac and brick were noted at the entrance to holes 14& 15 and between the 5 holes and 14 & 15
Surface ponding of leachate	√	No surface ponding of leachate was noted
Leachate seepage	√	No leachate seepage was noted
Landfill gas odours	√	No landfill gas odours were noted
7. Are there any outfalls to surface water? (If yes, are there discharges and what is the nature of the discharge?)	√	No outfalls to surface water were noted
8. Are there any signs of impact on the environment? (If yes, take photographic evidence)	√	See below
Vegetation die off, bare ground	√	No vegetation die off was noted during the site walkover
Leachate seepages	√	No leachate seepage was noted during the site walkover
Odours	√	No odour was noted during the site walkover
Litter	√	Fragments of plastic, metal, concrete and brick were noted on the surface of the infill material within the 5 holes and holes 14&15
Gas bubbling through water	√	No gas bubbling through water was noted during the site walkover
Signs of settlement, subsidence, water logged areas	√	No settlement or subsidence issues were noted during the site walkover
Drainage or hydraulic issues	√	No drainage or hydraulic issues were noted during the site walkover
Downstream water quality appears poorer than upstream water quality	√	Downstream water quality did not appear poorer than upstream water quality
9. Are there any indications of remedial measures? (Provide details)	√	No remedial measures
Capping		N/A
Landfill gas collection		N/A
Leachate collection		N/A
10. Describe fences and security features (if any)		
Any other relevant information?		N/A

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Tier 1 Assessment Matrix

Appendix 2

Source Assessment	Score Matrix	Score	Max	Notes/ Justification
Leachate	1a	1.5	10	> 5ha
Gas	1b	1	10	> 5ha
Leachate Migration Pathway Assessment	**Score Matrix**	**Score**	**Max**	**Notes/ Justification**
Vertical Pathway (Aquifer Vulnerability)	2a	3	3	Holes 14 & 15 (E) 5 Holes (H) (from GSI website)
Horizontal Pathway (Groundwater Flow Regime)	2b	1	5	LI (Locally Important Aquifer)
Surface Water Pathway	2c	2	2	Yes
Gas Migration Pathway Assessment	**Score Matrix**	**Score**	**Max**	**Notes/ Justification**
Assuming lateral migration (assuming receptor within 250m of source))	2d	3	3	Sand and Gravel, Made Ground
Vertical migration (assuming receptor located above source)	2e	N/A	5	N/A
Receptor Assessment	**Score Matrix**	**Score**	**Max**	**Notes/ Justification**
Residential dwellings with potential for private water supply	3a	2	3	Potentially.Greater than 50m but less than 250m of the waste body
Protected Areas	3b	1	3	Greater than 250m but less than 1km of waste body
Aquifer	3c	3	5	LI (Locally Important Aquifer)
Public Water Supplies	3d	0	7	Greater than 1km (no karst aquifer)
Surface Water Bodies	3e	1	3	Greater than 250m but less than 1km
Buildings and enclosed spaces used by humans or livestock	3f	0.5	5	Greater than 250m

Source	Pathway	Receptor	% Score	Risk Classification
(1a) Leachate	(2a,b&c) Groundwater and Surface Water migration	(3e) Surface Water body	3	Low
		(3b) Protected Area (Surface Water dependent terrestrial ecosystem)	3	Low
	(2a&b) Groundwater Migration	(3a) Private Well	5	
		(3b) Protected Area (Groundwater dependent terrestrial ecosystem)	2.5	Low
		(3c) Aquifer	4.5	Low
		(3d) Public Water Supply	0	No Linkage
		(3e) Surface Water body	2.5	Low
	(2c) Surface Water Migration	(3e) Surface Water body	5	Low
		(3b) Protected Area (Surface Water dependent terrestrial ecosystem)	5	Low
(1b) Landfill Gas	(2d) Lateral migration in subsoil	(3f) Human Presence (Buildings, enclosed spaces)	1	Low
	(2e) Vertical Migration in subsoil		0	No Linkage

MATRIX 1 - GUIDANCE FOR PRELIMINARY & EXPLORATORY INVESTIGATIONS FOR ALL UNREGULATED WASTE DISPOSAL SITES

IMPORTANT NOTE: THIS INITIAL PHASE OF WORK IS MANDATORY FOR ALL SITES AND SHOULD AIM TO COMPLETE A TIER 1, THE FINDING OF WHICH WILL BE CONFIRMED BY THE INITIAL TIER 2 WORKS. EACH PHASE OF ASSESSMENT WILL DEVELOP THE CONCEPTUAL SITE MODEL (CSM) AND SHOULD GUIDE THE DESIGN OF THE NEXT PHASE OF SITE INVESTIGATION (SI) . THE APPLICATION OF THE SI PROCESS AND METHODOLOGIES SHOULD BE COMPLETED IN ACCORDANCE WITH THE RELEVANT STANDARDS/EPA GUIDANCE DOCUMENTS AND UNDERTAKEN BY EXPERIENCED PRACTITIONERS.

AFTER TIER 1 INVESTIGATION, DEVELOP CONCEPTUAL SITE MODEL, DETERMINE RISK CLASSIFICATION & SCOPE EXPLORATORY INVESTIGATION

AFTER TIER 2 EXPLORATORY INVESTIGATION, REFINE CONCEPTUAL SITE MODEL, CONFIRM RISK CLASSIFICATION & SCOPE MAIN SITE INVESTIGATION AS REQUIRED. IF SITE IS LOW RISK THEN NO FURTHER INVESTIGATION NEEDED - MOVE TO REMEDIATION PLAN.

				TIER 1: PRELIMINARY INVESTIGATION			**TIER 2: EXPLORATORY INVESTIGATION & SAMPLING**						
				DESK STUDY	**WALKOVER SURVEY**	**CONCEPTUAL SITE MODEL (CSM)**	**TRIAL PITS & TRENCHES**	**WASTE TYPE**	**WASTE SAMPLING**	**LEACHATE SAMPLING**	**SOIL SAMPLING**	**Surface or Groundwater Sampling**	**Topographic & GPS SURVEY**
SPR LINKAGE	**SOURCE**	**PATHWAY**	**RECEPTOR**	Critical mandatory element of the SI process - includes gathering baseline site and local area data, history of landfill, waste types, volumes, age, presence and distance to potential receptors, etc	Very important element of the SI process. Confirms physical conditions on site, desk study findings and examines access issues, visual assessment of pathways/receptors allows initial SPR linkage potential.	The development of the CSM is a critical aspect of the risk assessment and defining SPR linkages and therefore SI requirements	JCB or tracked excavator - waste type assessment & classification - leachate/gas potential, limited depth, good bulk samples & visual assessment. Allows for sampling and possibly temporary standpipes (not best practice). Accurate logs and photographs important. Where cap exists plan for full re-instatement and on-site material management.	Assessment of waste type in terms of content and determining composition of C&D, Municipal, Industrial, Pre 1977 sites. Should confirm reported waste types deposited as identified in Tier 1.	Waste Sampling, typically of contaminated soil matrix that waste is contained in. Dry soils analysis to assess the potential impact on human health and to enable leachability testing if risk of leachate emanating from waste exists.	Liquid samples of leachate recovered for List 1 & List 2 substances contamination - Parameters to be considered as per Table C.2 of EPA Landfill Monitoring Manual 2003.	Principle purpose of soil sampling at this stage is to assess permeability potential of surrounding materials (pathway assessment), composition of any cap and potential for local material to be used for remediation/capping. In some cases contamination assessment may be required.	Any obvious receptors should be considered for initial indicator parameter screening. Surface waters and/or existing boreholes can be sampled at this stage. Gas monitoring with hand held equipment can be completed. Parameters to be considered as per Table C.2 of EPA Landfill Monitoring Manual 2003. No new boreholes are proposed at this stage.	Topographic survey of landfill area and immediate surrounds will enable assessment of waste extent & area calculations, location of sampling points, surface drains/features. Topographic data & Well datum for flow direction mapping. GPS system will determine grid ref for SI works. Could be important for remediation/capping design.
SPR 1	LEACHATE	Vertical & Horizontal Groundwater to Surface Water Drainage/Runoff	Surface Water Body	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 2	LEACHATE	Vertical & Horizontal Groundwater to Surface Water Drainage/Runoff	Surface Water Body Protected Area (SWDTE)	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 3	LEACHATE	Vertical & Horizontal Groundwater Migration	Human Presence (Private Well)	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 4	LEACHATE	Vertical & Horizontal Groundwater Migration	Groundwater Protected area (GWDTE)	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 5	LEACHATE	Vertical & Horizontal Groundwater Migration	Aquifer Category	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 6	LEACHATE	Vertical & Horizontal Groundwater Migration	Public Supply (Well) (includes Group Water Schemes)	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 7	LEACHATE	Vertical & Horizontal Groundwater Migration	Surface Water Body	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 8	LEACHATE	Surface Water Drainage/Runoff	Surface Water Body	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 9	LEACHATE	Surface Water Drainage/Runoff	Surface Water Body Protected Area (SWDTE)	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 10	LANDFILL GAS	Lateral Migration (Subsoil)	Human Presence	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
SPR 11	LANDFILL GAS	Vertical Migration (Subsoil)	Human Presence	**M**	**M**	**M**	**M**	**M**	**R**	**R**	**R**	**R/S**	**R/S**
Source & Pathway & Receptor Parameters Targeted for CSM & Risk Screening				Research of all available published site information - Site history, waste type, extent and volumes, possible historic sources, local receptors, infrastructure etc. Interviews with previous site staff should be considered.	Walkover should confirm desk study data and investigate Source Pathway Receptor scenarios being considered.	The CSM should graphically represent the relationship's between the waste body and potential receptor's developed on the basis of hazard identification and refined during subsequent phases of assessment.	Waste type/composition, footprint, volume, depth & groundwater vulnerability, leachate & gas source & migration potential. Should assess nature and depth of any cap or undersoils, if encountered.	waste type, general composition and extent within the landfill area, leachate and gas source & migration potential.	waste type, dry soils quality and leachate potential	waste type, leachate concentrations and leachate potential	ground vulnerability, horizontal or vertical pathway assessment & material use in remediation of site.	surface water or groundwater receptor and potential horizontal pathway information.	waste area & volume estimate using trial pit data, site topography, layout/setting, access roads, surface features, accurate SI points, levels for groundwater flow direction, etc
General comments & COP Section Reference - Note: the development of the CSM and design of the site investigation should involve an experienced SI practitioner.				Critical first step in site and waste characterisation, all potential data sources should be considered. Note Section 3.2 of COP	allows visual assessment of site and local environs, important that walkover confirms findings of desk study and allows accurate CSM to be developed. Note Section 3.4 of COP	This is a fundamental part of the Risk Assessment exercise - the CSM information should be clearly documented and accessible in the form of text, figures and tables. Note section 3 of COP and reporting requirements in Chapter 8.	Trial pits and trenching is a very important phase of work to enable the potential sources and types of leachate & gas to be determined. Detailed logs and photographic records important. Note Section 5.5.2 of COP.	characterises waste type and contamination potential. Note Section 4.3.1 of COP & Table 1a & Table 1b of Scoring Matrix.	Characterises waste type, age and contamination potential. Note Section 4.3.1 of COP & Table 1a & Table 1b of Scoring Matrix. Dry soils analysis for comparison and screening against accepted Target Screening Values (TSVs) such as the UK CLEA model and compared to parameters in EPA Landfill Design Document 2000 - Sections 7.1 & 7.2	characterises waste type, age and contamination potential, samples can be acquired during trial pitting or from existing borehole infrastructure, if present. Leachate characteristics can be compared to parameters in EPA Landfill Design Document 2000 - Sections 7.1 & 7.2	Characterises geology type, material strength and permeability	Full suites should be completed at least once. Should be completed as per best practice and relevant guidelines. Refer to COP 5.3.2 and EPA Landfill Monitoring Guidelines, 2nd Edition 2003, especially Sections 4 and 5.	topographic surveys give base map for site layout, investigation points, sample and water level depths, groundwater flow direction etc. recommended.
Provisional Guidance on Extent of Testing/Sampling - This will ultimately depend on the type of risk identified, size of site, extent & volume of waste, ground conditions, variability of the waste material, etc..				Office based assessment using all available existing site data that is vital in assessing the initial risk level and conceptual model for the site. Sites may have GIS data available. Note: Section E of EPA Certificate of Authorisation requires ecological Appropriate Assessment Habitat Screening to be completed for waste sites so any designated protection areas should be identified at this stage.	Locations and access issues for sampling and site suitability should be assessed at this stage. Presence of potential sensitive ecological habitats requiring Appropriate Assessment Screening to be noted.	A good conceptual site model will facilitate an initial risk classification for the site and guide future works.	Typically 7 to 10 trial pits are completed to 3 to 5m per day. Depending on size of site one to two days of trial pitting should be undertaken on and around the waste body to confirm extent and composition. Initial gas monitoring can be by hand held gas and volatile monitors & based on physical observations. Further Trial Pits & Trenching can be completed as part of the Main SI if required and boreholes may be necessary to achieve greater depths.	Each trial pit should be logged as per BS 5930:1999 or ISO 14688-2 (2006) and nature of waste and composition recorded. Photographic records important. Potential to cause source of contamination to be assessed. physical evidence of contamination such as visual discolouration, presence of leachate, odours etc to be recorded.	Leachability testing of waste should be completed to allow comparison to the European Waste Acceptance Criteria (WAC) analysis, as per the BS 12457 testing standard. A minimum of two samples should be acquired for the test for the trial pit phase of work. Results should be used as a preliminary screening tool to assess the potential level of contamination that the historical waste may pose.	Will depend on nature and composition of the waste and number of investigation points. Initially one to three samples should be taken with one full screen as per Table C.2 of EPA Landfill Monitoring Manual 2003, and at other locations to do indicator parameters such as pH Conductivity, Temp, BOD, Ammonia, Chloride, Sulphate, Sodium and Potassium.	Will depend on nature and variability of soil material around waste body and number of investigation points. Initially three disturbed samples should be taken and assessed for soil type, particle size analysis, and if possible permeability and strength, refer to BS 5930 standard.	Adjacent or nearest accessible down gradient locations should be considered for exploratory sampling. Survey of springs if required. Basic indicator parameters such as pH, Conductivity, Temp, BOD, Ammonia, Chloride, Sulphate, Sodium and Potassium should be completed as a minimum. All surface water bodies/drains/streams/ditches should be considered, as per Water Framework Directive.	A topographical survey should be considered for the site area and immediate environs of low risk sites and is recommended for all moderate and high risk sites. GPS survey locations as required.

M = Mandatory and should be completed as thoroughly as possible for each site.

R = Recommended technique assuming site conditions allow.

S = Should be considered but is dependent on site suitability for that methodology.

DATE: March 2011

Prepared by White Young Green on behalf of the OEE

Stockpile Photographs

Appendix 3

Grange Castle - Stockpiles

SP01-1-Pic 1

SP01-1-Pic 2

SP01-1-Pic 3

SP01-1-Pic 4

SP01-1-Pic 5

SP01-1-Pic 6

Grange Castle - Stockpiles

SP01-1-Pic 7

SP02-1-Pic 1

SP02-1-Pic 10

SP02-1-Pic 11

SP02-1-Pic 12

SP02-1-Pic 13

Grange Castle - Stockpiles

SP02-1-Pic 2

SP02-1-Pic 3

SP02-1-Pic 4

SP02-1-Pic 5

SP02-1-Pic 6

SP02-1-Pic 7

Grange Castle - Stockpiles

SP02-1-Pic 8

SP02-1-Pic 9

SP02-2-Pic 1

SP02-2-Pic 10

SP02-2-Pic 2

SP02-2-Pic 3

Grange Castle - Stockpiles

SP02-2-Pic 4

SP02-2-Pic 5

SP02-2-Pic 6

SP02-2-Pic 7

SP02-2-Pic 8

SP02-2-Pic 9

Grange Castle - Stockpiles

SP03-1-Pic 1

SP03-1-Pic 2

SP03-1-Pic 3

SP03-1-Pic 4

SP03-1-Pic 5

SP03-1-Pic 6

Grange Castle - Stockpiles

SP03-1-Pic 7

SP03-1-Pic 8

SP04-1-Pic 1

SP04-1-Pic 2

SP04-1-Pic 3

SP04-1-Pic 4

Grange Castle - Stockpiles

SP04-1-Pic 5

SP04-1-Pic 6

SP04-1-Pic 7

SP04-1-Pic 8

SP05-1-Pic 1

SP05-1-Pic 10

Grange Castle - Stockpiles

SP05-1-Pic 11

SP05-1-Pic 12

SP05-1-Pic 2

SP05-1-Pic 3

SP05-1-Pic 4

SP05-1-Pic 5

Grange Castle - Stockpiles

SP05-1-Pic 6

SP05-1-Pic 7

SP05-1-Pic 8

SP05-1-Pic 9

SP05-2-Pic 1

SP05-2-Pic 2

Grange Castle - Stockpiles

SP05-2-Pic 3

SP05-2-Pic 4

SP05-2-Pic 5

SP05-2-Pic 6

SP05-2-Pic 7

SP05-2-Pic 8

Grange Castle - Stockpiles

SP05-2-Pic 9

SP05-3-Pic 1

SP05-3-Pic 2

SP05-3-Pic 3

SP05-3-Pic 4

SP05-3-Pic 5

Grange Castle - Stockpiles

SP05-3-Pic 6

SP05-3-Pic 7

SP05-3-Pic 8

Grange Castle - Stockpiles

SP06-1-Pic 1

SP06-1-Pic 2

SP06-1-Pic 3

SP06-1-Pic 4

SP06-1-Pic 5

SP06-1-Pic 6

Grange Castle - Stockpiles

SP06-1-Pic 7

SP06-2-Pic 1

SP06-2-Pic 2

SP06-2-Pic 3

SP06-2-Pic 4

SP06-2-Pic 5

Grange Castle - Stockpiles

SP06-2-Pic 6

SP06-2-Pic 7

SP06-2-Pic 8

SP06-3-Pic 1

SP06-3-Pic 2

SP06-3-Pic 3

Grange Castle - Stockpiles

SP06-3-Pic 4

SP06-3-Pic 5

SP06-3-Pic 6

SP06-3-Pic 7

SP06-3-Pic 8

SP06-4-Pic 1

Grange Castle - Stockpiles

SP06-4-Pic 10

SP06-4-Pic 11

SP06-4-Pic 12

SP06-4-Pic 13

SP06-4-Pic 14

SP06-4-Pic 15

Grange Castle - Stockpiles

SP06-4-Pic 2

SP06-4-Pic 3

SP06-4-Pic 4

SP06-4-Pic 5

SP06-4-Pic 6

SP06-4-Pic 7

Grange Castle - Stockpiles

SP06-4-Pic 8

SP06-4-Pic 9

SP06-5-Pic 1

SP06-5-Pic 2

SP06-5-Pic 3

SP06-5-Pic 4

Grange Castle - Stockpiles

SP06-5-Pic 5

SP06-5-Pic 6

SP06-6-Pic 1

SP06-6-Pic 2

SP06-6-Pic 3

SP06-6-Pic 4

Grange Castle - Stockpiles

SP06-6-Pic 5

SP06-6-Pic 6

SP06-6-Pic 7

SP07-1-Pic 1

SP07-1-Pic 2

SP07-1-Pic 3

Grange Castle - Stockpiles

SP07-1-Pic 4

SP08-1-Pic 1

SP08-1-Pic 2

SP08-1-Pic 3

SP08-1-Pic 4

SP08-1-Pic 5

Grange Castle - Stockpiles

SP08-1-Pic 6

SP08-1-Pic 7

SP08-1-Pic 8

SP09-1-Pic 1

SP09-1-Pic 10

SP09-1-Pic 11

Grange Castle - Stockpiles

SP09-1-Pic 12

SP09-1-Pic 2

SP09-1-Pic 3

SP09-1-Pic 4

SP09-1-Pic 5

SP09-1-Pic 6

Grange Castle - Stockpiles

SP09-1-Pic 7

SP09-1-Pic 8

SP09-1-Pic 9

SP10-1-Pic 1

SP10-1-Pic 2

SP10-1-Pic 3

Grange Castle - Stockpiles

SP10-1-Pic 4

Stockpile Logs

Appendix 4

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Fax: 01 2835676

TRIAL PIT

Project	Hole No
Grange Castle Infill Assessment	SP01-1

Job No	Date	Ground Level (m)	Co-Ordinates ()
MDR0813	26-01-11 26-01-11		E 304,321.0 N 229,652.0

Contractor	Sheet
Breffni Plant Hire	1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.75) 0.75	Made Ground; Clayey GRAVEL with some cobbles (<1% waste on surface; tarmac, tin can)	

GENERAL REMARKS

Stockpile 1 located near entrace to holes 14 and 15 (near tent)
GPS co-ordinates located using handheld GPS unit
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Co. Dublin
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Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP02-1
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,330.0 N 229,654.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(2.00) 2.00	Made Ground; brown very gravelly CLAY with occasional cobbles and boulders (2% waste; wood, plastic, concrete, building block, plastic pipe, metal) Layer of light brown/ orange clay (possibly ashes) from approx. 0.7-1.1m Tiny amount of charred wood, plastic wrapping	

GENERAL REMARKS

Stockpile 2 located near the entrance to Holes 14 and 15 (near tent)
GPS co-ordinates located using handheld GPS unit
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Co. Dublin
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Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP02-2
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,346.0 N 229,654.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.10	Made Ground; brown very gravelly CLAY with occasional cobbles and boulders (2% waste: metal, wood, plastic band)	
						(1.80) 1.90	Made Ground; light brown/ orange CLAY (possibly ashes or brick dust) (<2% waste; brick, wood, metal)	

GENERAL REMARKS

Stockpile 2 located near the entrance to Holes 14 and 15 (near tent)
GPS co-ordinates located using handheld GPS unit
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**SP03-1**
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,366.0 N 229,665.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.30) 1.30	Made Ground; large concrete pieces up to 1m x 0.7m intermixed with gravelly CLAY brick. tarmac, rebar, plastic, cavity blocks, wire Of the material in the stockpile approximately half of the material is larger then 0.3m pieces	

GENERAL REMARKS

Stockpile 3 located near the entrance to Holes 14 and 15 (near tent)
GPS co-ordinates located using handheld GPS unit
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP04-1
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,378.0 N 229,659.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.20) 1.20	Made Ground; brown slightly gravelly CLAY with occasional boulders (2% waste; wood, large tractor tyre, metal rope, clay pipe, brick, concrete, blocks, plastic bag, drinks can, textiles)	

GENERAL REMARKS

Stockpile 4 located near the entrance to Holes 14 and 15 (near tent)
GPS co-ordinates located using handheld GPS unit
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP05-1
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,589.0 N 229,601.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(1.60) 1.60	Made Ground; dark brown slightly gravelly CLAY (1% waste; bricks, concrete (up to 1m x 1m), rebar, tiles, plastic, blocks. large tractor tyre to one side, wire, wood, aluminium sheeting, plastic sheeting)	

GENERAL REMARKS

Stockpile 5 located near haul road at Holes 14 and 15
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP05-2
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,599.0 N 229,628.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.60) 1.60	Made Ground; dark brown gravelly CLAY (1% waste; wood, concrete, brick, plastic pipe, plastic, tarmac, steel)	

GENERAL REMARKS

Stockpile 5 located near haul road at Holes 14 and 15
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP05-3
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,609.0 N 229,654.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.08) 1.08	Made Ground; dark brown slightly gravelly CLAY with some organics	
						(0.52) 1.60	Made Ground; dark brown/ grey slightly gravelly CLAY (<1% waste; wood, plastic, brick, rubber, water pipe) water pipe is suspected of containing asbestos	

GENERAL REMARKS

Stockpile 5 located near haul road at Holes 14 and 15
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP06-1
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,636.0 N 229,639.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.38) 0.38	Made Ground; brown sandy gravelly CLAY with occasional cobbles and rootlets (<1% waste; wood, plastic, tarmac, concrete, brick, wire)	
						(0.38) 0.76	Made Ground; grey sandy gravelly CLAY with occasional cobbles and rootlets (<1% waste; wood, plastic, tarmac, concrete, brick, wire)	
						0.90	Made Ground; brown gravelly CLAY with occasional angular cobbles (<1% waste; wood, plastic, tarmac, concrete, brick, wire)	

GENERAL REMARKS

Stockpile 6 located near haul road at Holes 14 and 15
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP06-2
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,631.0 N 229,627.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.60) 1.60	Made Ground; brown gravelly CLAY with occasional boulders (<5% waste; wire, nylon rope, wood, concrete, plastic, brick, metal sheeting, rebar)	

GENERAL REMARKS

Stockpile 6 located near haul road at Holes 14 and 15
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**SP06-3**
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,624.0 N 229,614.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.80) 2.80	Made Ground; brown gravelly CLAY with occasional cobbles (2% waste; plastic bottle, plastic petrol container, textile, wood, bricks, sweet wrapper, plastic pipe, tree stump, clay pipe, concrete, tarmac) layer of brown grey (not continuous around the trial pit Hydrocarbon (petrol) smell - no obvious sign of source	

GENERAL REMARKS

Stockpile 6 located near haul road at Holes 14 and 15
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP06-4
Job No: MDR0813	Date: 27-01-11 / 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,619.0 N 229,601.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.10) 2.10	Made Ground; brown slightly gravelly CLAY with occasional cobbles (<2% waste; concrete, textiles, plastic pipe, wood, slate, wire, plastic banding, tarmac mat, cavity block, clay pipe) Intermittent black staining	
						(1.30) 3.40	Made Ground; brown/ grey slightly gravelly CLAY with occasional cobbles intermittent black staining (<5% waste; cushion foam, wood, plastic bottles, clay blocks, tarmac, wooven sack) Water at base of stockpile. Slight localised inflow of water. No sheen. No staining. Slight smell of petrol.	

GENERAL REMARKS

Stockpile 6 located near haul road at Holes 14 and 15
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

RPS Consulting Engineers
West Pier Business Campus
Dun Laoghaire
Co. Dublin
Telephone: 01 4882900
Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**SP06-5**
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,612.0 N 229,589.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.70) 1.70	Made Ground; brown slightly gravelly CLAY with occasional cobbles (<2% waste: tiles, wood, concrete block, circular metal blade, textile, wooven sack)	
						(0.50) 2.20	Made Ground; dark grey isolated layer of clayey gravelly SAND with occasional cobbles. (<2% waste; wood, clay brick, blue plastic bag, plastic ties, reminants of spray can) Smell of petrol	
						(1.40) 3.60	Made Ground; brown slightly gravelly CLAY with occasional cobbles (<2% waste: tiles, wood, concrete block, circular metal blade, textile, wooven sack)	

GENERAL REMARKS

Stockpile 6 located near haul road at Holes 14 and 15
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Dun Laoghaire
Co. Dublin
Telephone: 01 4882900
Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP06-6
Job No: MDR0813	Date: 28-01-11 28-01-11	Ground Level (m)	Co-Ordinates (): E 304,605.0 N 224,598.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(2.80) 2.80	Made Ground; brown with localised lighter brown and black inclusions, slightly gravelly CLAY with occasional cobbles (<1% waste; plastic, brick, concrete, wood, textile, rebar)	
						2.85	light brown gravelly CLAY	

GENERAL REMARKS

Stockpile 6 located near haul road at Holes 14 and 15
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**SP07-1**
Job No: MDR0813	Date: 02-02-11 02-02-11	Ground Level (m)	Co-Ordinates (): E 304,882.0 N 230,376.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.95) 1.95	Made Ground; soft light brown gravelly CLAY with occasional cobbles and 1 boulder	
						2.20	Made Ground; dark brown/ grey gravelly CLAY with occasional cobbles	
						2.30	soft brown slightly gravelly CLAY	

GENERAL REMARKS

Stockpile 7 located in the area of 5 holes near TP4
GPS co-ordinates located using handheld GPS unit
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Dun Laoghaire
Co. Dublin
Telephone: 01 4882900
Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**SP08-1**
Job No: MDR0813	Date: 03-02-11 03-02-11	Ground Level (m)	Co-Ordinates (): E 304,882.0 N 229,993.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.20) 1.20	Made Ground; soft brown slightly gravelly slightly sandy CLAY with occasional cobbles. material very loose.	
						1.40	brown slightly gravelly CLAY	

GENERAL REMARKS

Stockpile 8 located in the area of 5 holes near TP34
GPS co-ordinates located using handheld GPS unit
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Co. Dublin
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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**SP09-1**
Job No: MDR0813	Date: 03-02-11 03-02-11	Ground Level (m)	Co-Ordinates (): E 304,861.0 N 230,012.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.80) 0.80	Made Ground: brown slightly gravelly CLAY with occasional cobbles	
						(2.00) 2.80	Made Ground: soft dark brown CLAY with occasional cobbles (some isolated areas of white coating on clay)	
						3.00	brown CLAY	

GENERAL REMARKS

Stockpile 9 located in the area of 5 holes near TP34
GPS co-ordinates located using handheld GPS unit
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Dun Laoghaire
Co. Dublin
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Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				SP10-1
Job No: MDR0813	Date: 04-02-11 04-02-11	Ground Level (m)	Co-Ordinates (): E 304,713.0 N 230,036.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(0.80) 0.80	Made Ground: soft brown slightly gravelly CLAY with occasional angular-sub-angular cobbles. No waste	

GENERAL REMARKS

Stockpile 10 located in the area of 5 holes near TP27
GPS co-ordinates located using handheld GPS unit
Trial pit was dug from the top to the base of the stockpile

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

Trial Pit Photographs

Appendix 5

Grange Castle Trial Pits - Area of 5 Holes

TP01-Pic 1

TP01-Pic 2

TP02-Pic 1

TP02-Pic 2

TP02-Pic 3

TP02-Pic 4

Grange Castle Trial Pits - Area of 5 Holes

TP02-Pic 5

TP03-Pic 1

TP03-Pic 2

TP03-Pic 3

TP03-Pic 4

TP03-Pic 5

Grange Castle Trial Pits - Area of 5 Holes

TP04-Pic 1

TP04-Pic 2

TP04-Pic 3

TP04-Pic 4

TP04-Pic 5

TP05-Pic 1

Grange Castle Trial Pits - Area of 5 Holes

TP05-Pic 2

TP05-Pic 3

TP06-Pic 1

TP06-Pic 2

TP06-Pic 3

TP07-Pic 1

Grange Castle Trial Pits - Area of 5 Holes

TP07-Pic 2

TP07-Pic 3

TP07-Pic 4

TP07-Pic 5

TP08-Pic8

TP08-Pic 1

Grange Castle Trial Pits - Area of 5 Holes

TP08-Pic 2

TP08-Pic 3

TP08-Pic 4

TP08-Pic 5

TP08-Pic 6

TP08-Pic 7

Grange Castle Trial Pits - Area of 5 Holes

TP09-Pic 1

TP09-Pic 2

TP09-Pic 3

TP09-Pic 4

TP09-Pic 5

TP09-Pic 6

Grange Castle Trial Pits - Area of 5 Holes

TP09-Pic 7

TP09-Pic 8

Tp10-Pic 1

Tp10-Pic 2

Tp10-Pic 3

Tp10-Pic 4

Grange Castle Trial Pits - Area of 5 Holes

Tp10-Pic 5

Tp10-Pic 6

TP11-Pic 1

TP11-Pic 2

TP11-Pic 3

TP11-Pic 4

Grange Castle Trial Pits - Area of 5 Holes

TP11-Pic 5

TP11-Pic 6

TP11-Pic 7

TP12-Pic 1

TP12-Pic 2

TP12-Pic 3

Grange Castle Trial Pits - Area of 5 Holes

TP12-Pic 4

TP12-Pic 5

TP13-Pic 1

TP13-Pic 2

TP13-Pic 3

TP14-Pic 1

Grange Castle Trial Pits - Area of 5 Holes

TP14-Pic 2

TP14-Pic 3

TP14-Pic 4

TP14-Pic 5

TP15-Pic 1

TP15-Pic 2

Grange Castle Trial Pits - Area of 5 Holes

TP15-Pic 3

TP15-Pic 4

TP15-Pic 5

TP16-Pic 1

TP16-Pic 2

TP16-Pic 3

Grange Castle Trial Pits - Area of 5 Holes

TP17-Pic 1

TP17-Pic 2

TP17-Pic 3

TP17-Pic 4

TP17-Pic 5

TP17-Pic 6

Grange Castle Trial Pits - Area of 5 Holes

TP17-Pic 7

TP17-Pic 8

TP17-Pic 9

TP18-Pic 1

TP18-Pic 2

TP18-Pic 3

Grange Castle Trial Pits - Area of 5 Holes

TP18-Pic 4

TP18-Pic 5

TP18-Pic 6

TP18-Pic 7

TP18-Pic 8

TP18-Pic 9

Grange Castle Trial Pits - Area of 5 Holes

TP18-Pic 10

TP18-Pic 11

TP19-Pic 1

TP19-Pic 2

TP19-Pic 3

TP19-Pic 4

Grange Castle Trial Pits - Area of 5 Holes

TP19-Pic 5

Grange Castle Trial Pits - Area of 5 Holes

TP20-Pic 1

TP20-Pic 2

TP20-Pic 3

TP21-Pic 1

TP21-Pic 2

TP21-Pic 3

Grange Castle Trial Pits - Area of 5 Holes

TP21-Pic 4

TP22-Pic 1

TP22-Pic 2

TP22-Pic 3

TP23-Pic 1

TP23-Pic 2

Grange Castle Trial Pits - Area of 5 Holes

TP23-Pic 3

TP23-Pic 4

TP23-Pic 5

TP23-Pic 6

TP24-Pic 1

TP24-Pic 2

Grange Castle Trial Pits - Area of 5 Holes

TP24-Pic 3

TP24-Pic 4

TP24-Pic 5

TP24-Pic 6

TP24-Pic 7

TP24-Pic 8

Grange Castle Trial Pits - Area of 5 Holes

TP24-Pic 9

TP25-Pic 1

TP25-Pic 2

TP25-Pic 3

TP25-Pic 4

TP25-Pic 5

Grange Castle Trial Pits - Area of 5 Holes

TP25-Pic 6

TP26-Pic 1

TP26-Pic 2

TP26-Pic 3

TP26-Pic 4

TP26-Pic 5

Grange Castle Trial Pits - Area of 5 Holes

TP27-Pic 1

TP27-Pic 2

TP27-Pic 3

TP27-Pic 4

TP27-Pic 5

TP28-Pic 1

Grange Castle Trial Pits - Area of 5 Holes

TP28-Pic 2

TP28-Pic 3

TP28-Pic 4

TP29-Pic 1

TP29-Pic 2

TP29-Pic 3

Grange Castle Trial Pits - Area of 5 Holes

TP29-Pic 4

TP29-Pic 5

TP30-Pic 1

TP30-Pic 10

TP30-Pic 11

TP30-Pic 12

Grange Castle Trial Pits - Area of 5 Holes

TP30-Pic 2

TP30-Pic 3

TP30-Pic 4

TP30-Pic 5

TP30-Pic 6

TP30-Pic 7

Grange Castle Trial Pits - Area of 5 Holes

TP30-Pic 8

TP30-Pic 9

TP31-Pic 1

TP31-Pic 10

TP31-Pic 11

TP31-Pic 12

Grange Castle Trial Pits - Area of 5 Holes

TP31-Pic 13

TP31-Pic 14

TP31-Pic 2

TP31-Pic 3

TP31-Pic 4

TP31-Pic 5

Grange Castle Trial Pits - Area of 5 Holes

TP31-Pic 6

TP31-Pic 7

TP31-Pic 8

TP31-Pic 9

TP32-Pic 1

TP32-Pic 2

Grange Castle Trial Pits - Area of 5 Holes

TP32-Pic 3

TP32-Pic 4

TP32-Pic 5

TP33-Pic 1

TP33-Pic 2

TP33-Pic 3

Grange Castle Trial Pits - Area of 5 Holes

TP33-Pic 4

TP33-Pic 5

TP33-Pic 6

TP34-Pic 1

TP34-Pic 2

TP34-Pic 3

Grange Castle Trial Pits - Area of 5 Holes

TP34-Pic 4

TP34-Pic 5

TP35-Pic 1

TP35-Pic 2

TP35-Pic 3

TP35-Pic 4

Grange Castle Trial Pits - Area of 5 Holes

TP35-Pic 5

TP35-Pic 6

TP36-Pic 1

TP36-Pic 2

TP36-Pic 3

TP36-Pic 4

Grange Castle Trial Pits - Area of 5 Holes

TP37-Pic 1

TP37-Pic 2

TP37-Pic 3

TP37-Pic 4

TP37-Pic 5

TP37-Pic 6

Grange Castle Trial Pits - Area of 5 Holes

TP38-Pic 1

TP38-Pic 2

TP38-Pic 3

TP38-Pic 4

TP38-Pic 5

TP38-Pic 6

Grange Castle Trial Pits - Area of 5 Holes

TP39-Pic 1

TP39-Pic 2

TP39-Pic 3

TP39-Pic 4

TP39-Pic 5

TP40-Pic 1

Grange Castle Trial Pits - Area of 5 Holes

TP40-Pic 2

TP40-Pic 3

TP40-Pic 4

TP40-Pic 5

TP40-Pic 6

TP40-Pic 7

Grange Castle Trial Pits - Area of 5 Holes

TP40-Pic 8

Grange Castle Trial Pits - Area of Holes 14 & 15

TP41-Pic 1

TP41-Pic 2

TP41-Pic 3

TP41-Pic 4

TP41-Pic 5

TP42-Pic 1

Grange Castle Trial Pits - Area of Holes 14 & 15

TP42-Pic 2

TP42-Pic 3

TP42-Pic 4

TP42-Pic 5

TP42-Pic 6

TP42-Pic 7

Grange Castle Trial Pits - Area of Holes 14 & 15

TP42-Pic 8

TP42-Pic 9

TP43-Pic 1

TP43-Pic 2

TP43-Pic 3

TP43-Pic 4

Grange Castle Trial Pits - Area of Holes 14 & 15

TP43-Pic 5

TP43-Pic 6

TP43-Pic 7

TP44-Pic 1

TP44-Pic 2

TP44-Pic 3

Grange Castle Trial Pits - Area of Holes 14 & 15

TP44-Pic 4

TP44-Pic 5

TP44-Pic 6

TP45-Pic 1

TP45-Pic 2

TP45-Pic 3

Grange Castle Trial Pits - Area of Holes 14 & 15

TP45-Pic 4

TP45-Pic 5

TP45-Pic 6

TP46-Pic 1

TP46-Pic 2

TP46-Pic 3

Grange Castle Trial Pits - Area of Holes 14 & 15


TP46-Pic 4


TP46-Pic 5


TP47-Pic 1


TP47-Pic 10


TP47-Pic 2


TP47-Pic 3

Grange Castle Trial Pits - Area of Holes 14 & 15

TP47-Pic 4

TP47-Pic 5

TP47-Pic 6

TP47-Pic 7

TP47-Pic 8

TP47-Pic 9

Grange Castle Trial Pits - Area of Holes 14 & 15

TP48-Pic 1

TP48-Pic 2

TP48-Pic 3

TP48-Pic 4

TP48-Pic 5

TP48-Pic 6

Grange Castle Trial Pits - Area of Holes 14 & 15

TP48-Pic 7

TP48-Pic 8

TP49-Pic 1

TP49-Pic 2

TP49-Pic 3

TP49-Pic 4

Grange Castle Trial Pits - Area of Holes 14 & 15

TP49-Pic 5

TP49-Pic 6

TP50-Pic 1

TP50-Pic 2

TP50-Pic 3

TP50-Pic 4

Grange Castle Trial Pits - Area of Holes 14 & 15

TP50-Pic 5

TP51-Pic 1

TP51-Pic 2

TP51-Pic 3

TP51-Pic 4

TP51-Pic 5

Grange Castle Trial Pits - Area of Holes 14 & 15

TP52-Pic 1

TP52-Pic 10

TP52-Pic 11

TP52-Pic 2

TP52-Pic 3

TP52-Pic 4

Grange Castle Trial Pits - Area of Holes 14 & 15

TP52-Pic 5

TP52-Pic 6

TP52-Pic 7

TP52-Pic 8

TP52-Pic 9

TP53-Pic 1

Grange Castle Trial Pits - Area of Holes 14 & 15

TP53-Pic 2

TP53-Pic 3

TP53-Pic 4

TP53-Pic 5

TP54-Pic 1

TP54-Pic 2

Grange Castle Trial Pits - Area of Holes 14 & 15

TP54-Pic 3

TP54-Pic 4

TP54-Pic 5

TP54-Pic 6

TP54-Pic 7

TP55-Pic 1

Grange Castle Trial Pits - Area of Holes 14 & 15

TP55-Pic 2

TP55-Pic 3

TP55-Pic 4

TP55-Pic 5

TP55-Pic 6

TP55-Pic 7

Grange Castle Trial Pits - Area of Holes 14 & 15

TP55-Pic 8

TP56-Pic 1

TP56-Pic 2

TP56-Pic 3

TP56-Pic 4

TP56-Pic 5

Grange Castle Trial Pits - Area of Holes 14 & 15

TP56-Pic 6

TP56-Pic 7

TP57-Pic 1

TP57-Pic 2

TP57-Pic 3

TP57-Pic 4

Grange Castle Trial Pits - Area of Holes 14 & 15

TP57-Pic 5

TP57-Pic 6

TP57-Pic 7

TP57-Pic 8

TP58-Pic 1

TP58-Pic 2

Grange Castle Trial Pits - Area of Holes 14 & 15

TP58-Pic 3

TP58-Pic 4

TP58-Pic 5

TP59-Pic 1

TP59-Pic 10

TP59-Pic 11

Grange Castle Trial Pits - Area of Holes 14 & 15

TP59-Pic 12

TP59-Pic 13

TP59-Pic 14

TP59-Pic 2

TP59-Pic 3

TP59-Pic 4

Grange Castle Trial Pits - Area of Holes 14 & 15

TP59-Pic 5

TP59-Pic 6

TP59-Pic 7

TP59-Pic 8

TP59-Pic 9

Grange Castle Trial Pits - Area of Holes 14 & 15

TP60-Pic 1

TP60-Pic 2

TP60-Pic 3

TP60-Pic 4

TP60-Pic 5

TP60-Pic 6

Grange Castle Trial Pits - Area of Holes 14 & 15

TP60-Pic 7

TP61-Pic 1

TP61-Pic 2

TP61-Pic 3

TP61-Pic 4

TP61-Pic 5

Grange Castle Trial Pits - Area of Holes 14 & 15

TP61-Pic 6

TP62-Pic 1

TP62-Pic 2

TP62-Pic 3

TP62-Pic 4

TP62-Pic 5

Grange Castle Trial Pits - Area of Holes 14 & 15

TP62-Pic 6

TP62-Pic 7

TP63-Pic 1

TP63-Pic 2

TP63-Pic 3

TP63-Pic 4

Grange Castle Trial Pits - Area of Holes 14 & 15

TP63-Pic 5

TP63-Pic 6

TP63-Pic 7

Grange Castle Trial Pits - Haul Road

TP64-Pic 1

TP64-Pic 2

TP64-Pic 3

TP64-Pic 4

TP64-Pic 5

TP64-Pic 6

Grange Castle Trial Pits - Haul Road

TP64-Pic 7

TP64-Pic 8

TP64-Pic 9

TP65-Pic 1

TP65-Pic 2

TP65-Pic 3

Grange Castle Trial Pits - Haul Road

TP65-Pic 4

TP65-Pic 5

TP65-Pic 6

TP65-Pic 7

TP65-Pic 8

TP66-Pic 1

Grange Castle Trial Pits - Haul Road

TP66-Pic 2

TP66-Pic 3

TP66-Pic 4

TP66-Pic 5

TP66-Pic 6

TP66-Pic 7

Grange Castle Trial Pits - Haul Road

TP66-Pic 8

TP66-Pic 9

TP67-Pic 1

TP67-Pic 2

TP67-Pic 3

TP67-Pic 4

Grange Castle Trial Pits - Haul Road

TP67-Pic 5

TP67-Pic 6

TP67-Pic 7

TP67-Pic 8

TP68-Pic 1

TP68-Pic 10

Grange Castle Trial Pits - Haul Road

TP68-Pic 11

TP68-Pic 2

TP68-Pic 3

TP68-Pic 4

TP68-Pic 5

TP68-Pic 6

Grange Castle Trial Pits - Haul Road

TP68-Pic 7

TP68-Pic 8

TP68-Pic 9

TP69-Pic 1

TP69-Pic 2

TP69-Pic 3

Grange Castle Trial Pits - Haul Road

TP69-Pic 4

TP69-Pic 5

TP69-Pic 6

TP69-Pic 7

TP69-Pic 8

TP69-Pic 9

Grange Castle Trial Pits - Haul Road

TP70-Pic 1

TP70-Pic 10

TP70-Pic 2

TP70-Pic 3

TP70-Pic 4

TP70-Pic 5

Grange Castle Trial Pits - Haul Road

TP70-Pic 6

TP70-Pic 7

TP70-Pic 8

TP70-Pic 9

Grange Castle Trial Pits - Area of 8 Holes

TP71-Pic 1

TP71-Pic 2

TP71-Pic 3

TP71-Pic 4

TP72-Pic 1

TP72-Pic 2

Grange Castle Trial Pits - Area of 8 Holes

TP72-Pic 3

TP72-Pic 4

TP72-Pic 5

TP72-Pic 6

TP72-Pic 7

TP72-Pic 8

Grange Castle Trial Pits - Area of 8 Holes

TP73-Pic 1

TP73-Pic 2

TP73-Pic 3

TP73-Pic 4

TP73-Pic 5

TP73-Pic 6

Grange Castle Trial Pits - Area of 8 Holes

TP74-Pic 1

TP74-Pic 10

TP74-Pic 2

TP74-Pic 3

TP74-Pic 4

TP74-Pic 5

Grange Castle Trial Pits - Area of 8 Holes

TP74-Pic 6

TP74-Pic 7

TP74-Pic 8

TP74-Pic 9

TP75-Pic 1

TP75-Pic 2

Grange Castle Trial Pits - Area of 8 Holes

TP75-Pic 3

TP75-Pic 4

TP75-Pic 5

TP75-Pic 6

TP75-Pic 7

TP75-Pic 8

Grange Castle Trial Pits - Area of 8 Holes

TP75-Pic 9

TP76-Pic 1

TP76-Pic 2

TP76-Pic 3

TP76-Pic 4

TP77-Pic 1

Grange Castle Trial Pits - Area of 8 Holes

TP77-Pic 2

TP77-Pic 3

TP77-Pic 4

TP77-Pic 5

TP77-Pic 6

RPS

Trial Pit Logs

Appendix 6

RPS Consulting Engineers
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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP01
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,649.0 N 230,364.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.30	Topsoil	
						(0.90) 1.20	Soft brown/grey gravelly CLAY with occasional cobbles. No waste	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

RPS

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP02**
Job No: MDR0813	Date: 02-02-11 02-02-11	Ground Level (m)	Co-Ordinates (): E 304,710.0 N 230,355.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(0.55) 0.55	Made Ground; Soft light brown gravelly CLAY with occasional cobbles No waste	
						(0.38) 0.93	Made Ground; Soft dark brown grey gravelly CLAY with occasional cobbles (angular) (<1% waste; plastic, polystyrene, brick)	
						0.94	Soft brown slightly gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP03**
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,791.0 N 230,371.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.75) 1.75	Made Ground; Soft brown slightly gravelly CLAY with frequent cobbles and boulders. <1% waste (bricks)	
						(0.50) 2.25	Firm brown/red slightly gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP04
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,826.0 N 230,380.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.20) 1.20	Made Ground; Soft grey gravelly CLAY. <1% waste (cable, iron bar)	
						(0.80) 2.00	Soft brown slightly gravelly CLAY with rootlets	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP05
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,932.0 N 230,373.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.20	Topsoil	
						0.55	Brown slightly gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project: Grange Castle Infill Assessment				Hole No: **TP06**
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,956.0 N 230,374.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.20	Topsoil	
						(0.55) 0.75	Brown very slightly gravelly CLAY (firm)	

GENERAL REMARKS	
GPS Co-ordinates entered from handheld GPS unit	

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP07
Job No: MDR0813	Date: 04-02-11 04-02-11	Ground Level (m)	Co-Ordinates (): E 304,609.0 N 230,297.7	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(0.60) 0.60	Made Ground; Soft brown slightly gravelly CLAY with rootlets and occasional cobbles	
						(0.50) 1.10	Made Ground; Soft dark brown slightly gravelly CLAY with rootlets and occasional cobbles (<1% waste; tarmac, tile)	
						1.30	Made Ground; Soft dark brown/ grey slightly gravelly CLAY with rootlets and occasional cobbles (<1% waste; tarmac, tile)	
						1.35	Soft brown CLAY	

GENERAL REMARKS

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP08
Job No: MDR0813	Date: 24-01-11 / 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,631.0 N 230,305.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.20	Made Ground; Soft brown CLAY with occasional cobbles	
						(1.30) 1.50	Made Ground; Stiff black boulder CLAY with occasional cobbles and boulders.	
						(1.50) 3.00	Made Ground; Stiff black boulder CLAY with occasional cobbles and boulders. 5% waste (plastic, metal, brick, timber,tarmac)	
						(0.50) 3.50	Brown gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP09
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,734.0 N 230,319.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.00) 1.00	Made Ground; Soft brown slightly gravelly CLAY with occasional cobbles and boulders	
						(0.40) 1.40	Made Ground; Soft grey gravelly CLAY. 5% waste (plastic, brick, timber, metal)	
						(0.50) 1.90	Firm brown Clay with frequent angular cobbles and boulders	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

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TRIAL PIT

Project	Hole No
Grange Castle Infill Assessment	**TP10**

Job No	Date	Ground Level (m)	Co-Ordinates ()
MDR0813	07-02-11 07-02-11		E 304,781.0 N 230,303.0

Contractor	Sheet
Breffni Plant Hire	1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.20) 1.20	Made Ground; Soft brown slightly gravelly CLAY with occasional cobbles and boulders (<1% waste; concrete blocks, brick, clay pipe)	
						1.40	light brown CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP11
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,872.0 N 230,336.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.20) 1.20	Made Ground; Soft brown gravelly clay with occasional cobbles and boulders. <1% waste (tarmac, plastic)	
						1.40	Made Ground; Black very sandy CLAY with large fragments of tarmac	
						(0.60) 2.00	Firm brown/grey gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Water ingress at 1.2m.

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP12
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,936.0 N 230,333.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(0.55) 0.55	Made Ground; Brown gravelly CLAY with occasional boulders (<1% waste; wood, plastic, wire, brick)	
						(1.20) 1.75	grey brown firm slightly gravelly CLAY with rootlets	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP13
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,983.0 N 230,320.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.20	Topsoil	
						(0.60) 0.80	brown slightly gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

RPS TRIAL PIT MDR0813_GI0001_TP LOGS.GPJ AGS 3_1.GDT 8/4/11

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP14**
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,652.0 N 230,241.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.20) 2.20	Made Ground; Firm brown slightly gravelly CLAY with occasional cobbles and boulders	
						2.30	Brown slightly gravelly CLAY	

GENERAL REMARKS

No waste

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP15
Job No: MDR0813	Date: 04-02-11 04-02-11	Ground Level (m)	Co-Ordinates (): E 304,716.7 N 230,223.1	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.20) 2.20	Made Ground; Soft light brown slightly gravelly CLAY, locally darker with occasional cobbles and 1 large boulder (<1% waste; plastic, wood)	
						2.40	soft brown slightly gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project	Hole No
Grange Castle Infill Assessment	TP16

Job No	Date	Ground Level (m)	Co-Ordinates ()
MDR0813	24-01-11 24-01-11		E 304,836.0 N 230,277.0

Contractor	Sheet
Breffni Plant Hire	1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.50) 0.50	Topsoil	
						(1.10) 1.60	Soft gravelly CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP17
Job No: MDR0813	Date: 31-01-11 31-01-11	Ground Level (m)	Co-Ordinates (): E 304,866.7 N 230,223.6	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(1.10) 1.10	Made Ground; grey gravelly CLAY with occasional cobbles (1% waste; brick, tile, car mirror, wood, plastic, metal pipe, concrete block, organics)	
						(0.40) 1.50	Made Ground; Dark grey gravelly CLAY with occasional cobbles (1% waste; brick, tile, car mirror, wood, plastic, metal pipe, concrete block, organics)	
						1.70	brown gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP18
Job No: MDR0813	Date: 31-01-11 31-01-11	Ground Level (m)	Co-Ordinates (): E 304,941.7 N 230,223.9	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.20) 2.20	Made Ground; brown gravelly CLAY with some cobbles (<5% waste; cavilty blocks, brick, wood, plastic, twine, steel wire)	
						(0.40) 2.60	Made Ground; sandy gravelly CLAY (80% waste; tarmac) Smell of tar.	
						2.80	gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP19(a)
Job No MDR0813	Date 24-01-11 21-01-11	Ground Level (m)	Co-Ordinates () E 304,988.0 N 230,279.0	
Contractor Breffni Plant Hire				Sheet 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.10	Topsoil on half	
						(0.54) 0.64	Brown slightly gravelly CLAY	
						0.90	Light brown firm CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP19(b)
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,988.0 N 230,279.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						0.35	Made Ground; Brown gravelly CLAY. (<1% waste; clay pipe, plastic)	
						0.63	Made Ground; Brown gravelly CLAY. (<1% waste; clay pipe, plastic)	
						0.94	light brown firm CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP20
Job No: MDR0813	Date: 04-03-11 04-03-11	Ground Level (m)	Co-Ordinates (): E 304,650.6 N 230,147.8	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(0.40) 0.40	Topsoil	
						(0.50) 0.90	lighter brown CLAY No waste	

GENERAL REMARKS	

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP21**
Job No: MDR0813	Date: 25-01-11 25-01-11	Ground Level (m)	Co-Ordinates (): E 304,716.7 N 230,148.1	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.40) 0.40	Topsoil	
						(1.00) 1.40	Soft grey/brown slightly gravelly CLAY with frequent angular cobbles	

GENERAL REMARKS

No waste

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP22**
Job No: MDR0813	Date: 04-02-11 04-02-11	Ground Level (m)	Co-Ordinates (): E 304,791.7 N 230,148.3	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.10) 2.10	Made Ground; soft dark brown gravelly CLAY with some cobbles. Locally dark. No waste	
						2.15	soft light brown CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP23
Job No: MDR0813	Date: 25-01-11 25-01-11	Ground Level (m)	Co-Ordinates (): E 304,894.0 N 230,206.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.50) 0.50	Made Ground; Soft brown slightly gravelly CLAY with occasional cobbles	
						(0.90) 1.40	Made Ground; Firm grey/brown gravelly CLAY. 5% waste (concrete slab 2mx1mx0.1m, plastic, timber, brick)	
						(0.90) 2.30	Firm brown gravelly CLAY with occasional boulders and cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP24
Job No: MDR0813	Date: 31-01-11 31-01-11	Ground Level (m)	Co-Ordinates (): E 304,941.7 N 230,148.7	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(3.10) 3.10	Made Ground; brown locally dark brown/ grey gravelly CLAY with occasional cobbles (<1% waste; carpet, nylon rope, organics, brick, plastic, 'steel' wire, green hose pipe)	
						(0.40) 3.50	brown slightly gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP25
Job No: MDR0813	Date: 31-01-11 31-01-11	Ground Level (m)	Co-Ordinates (): E 305,007.1 N 230,149.1	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.20) 1.20	Made Ground; brown slightly gravelly CLAY with occasional cobbles (<1% waste; wood, concrete, tiles, organics, plastic, glass) Localised black staining probably due to organics but no odour	
						1.40	slightly gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP26
Job No: MDR0813	Date: 25-01-11 25-01-11	Ground Level (m)	Co-Ordinates (): E 304,699.0 N 230,120.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(1.20) 1.20	Made Ground; Soft brown gravelly CLAY with occasional cobbles and boulders	
						(0.80) 2.00	Firm grey/brown slightly gravelly CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
No waste

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP27
Job No: MDR0813	Date: 04-02-11 04-02-11	Ground Level (m)	Co-Ordinates (): E 304,705.0 N 230,118.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.40) 2.40	Made Ground; soft light brown gravelly CLAY with some cobbles and occasional boulders No waste	
						2.50	dark brown/ grey gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP28
Job No: MDR0813	Date: 25-01-11 25-01-11	Ground Level (m):	Co-Ordinates (): E 304,791.7 N 230,073.3	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.30	Topsoil	
						(1.50) 1.80	Soft brown slightly gravelly CLAY with occasional cobbles	

GENERAL REMARKS

No waste

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project	Hole No
Grange Castle Infill Assessment	TP29

Job No	Date	Ground Level (m)	Co-Ordinates ()
MDR0813	07-02-11 07-02-11		E 304,866.7 N 230,073.6

Contractor	Sheet
Breffni Plant Hire	1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.30	Topsoil	
						(0.50) 0.80	soft brown slightly gravelly CLAY with rootlets	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client	South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP30
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,937.0 N 230,117.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(2.90) 2.90	Made Ground; brown gravelly CLAY with cobbles and boulders. (2% waste; tar, plastic, textiles, concrete, sack	
						3.20	brown slightly gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP31
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 305,003.0 N 230,105.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.22) 1.22	Made Ground; brown slightly gravelly CLAY (2% waste; bricks, steel, ceramic, plastic, rebar, wire, steel band, hub cap) Note: water infill from sides	
						1.57	Made Ground; grey-brown slightly gravelly CLAY with occasional angular cobbles and boulders (15% waste; chicken wire, concrete, glass, ceramics, tile, wood (at base of second layer)) Black staining (mat of fibres) Rapid inflow of water	
						(0.83) 2.40	brown slightly sandy slightly gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit
Water inflow between 1.25-1.5 in lower waste layer.
No sheen. brown discolouration from soil.

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP32
Job No: MDR0813	Date: 25-01-11 25-01-11	Ground Level (m)	Co-Ordinates (): E 304,716.0 N 230,005.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.30	Made Ground; Soft grey slightly gravelly CLAY with frequent angular cobbles	
						(1.10) 1.40	Made Ground; Soft brown slightly gravelly CLAY with occasional cobbles	
						1.70	Firm grey slightly gravelly CLAY with frequent cobbles and boulders	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
No waste

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP33
Job No: MDR0813	Date: 04-02-11 04-02-11	Ground Level (m)	Co-Ordinates (): E 304,776.0 N 230,055.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.30) 1.30	Made Ground; soft brown gravelly CLAY with occasional cobbles. Slight water inflow at base. <2% waste; plastic, tarmac, wood	
						1.50	dark brown/ grey slightly gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP34
Job No: MDR0813	Date: 02-02-11 02-02-11	Ground Level (m)	Co-Ordinates (): E 304,866.7 N 229,998.6	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(1.00) 1.00	soft brown slightly gravelly CLAY No waste	

GENERAL REMARKS	

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP35
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 304,961.0 N 230,049.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.30) 1.30	Made Ground; brown gravelly CLAY with cobbles (<1% waste occasional plastic)	
						(0.70) 2.00	Made Ground; Damp soft grey gravelly CLAY with cobbles and boulders (<2% waste; plastic, metal, wood, metal appliance cover)	
						(1.00) 3.00	Wet grey gravelly CLAY with natural wood. Occasional trickle of water evident	
						3.20	brown gravelly CLAY	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

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TRIAL PIT

Project			Hole No
Grange Castle Infill Assessment			TP36
Job No: MDR0813	Date: 31-01-11 31-01-11	Ground Level (m):	Co-Ordinates (): E 305,012.9 N 229,999.1
Contractor: Breffni Plant Hire			Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.80) 1.80	Made Ground; brown slightly gravelly CLAY with occasional cobbles (<1% waste; brick, steel band, organics)	
						2.00	brown sandy gravelly CLAY	

GENERAL REMARKS

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP37
Job No: MDR0813	Date: 25-01-11 25-01-11	Ground Level (m)	Co-Ordinates (): E 304,802.0 N 229,956.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(0.70) 0.70	Made Ground; Soft grey/brown slightly gravelly CLAY with occasional cobbles and boulders	
						(1.20) 1.90	Firm brown very slightly gravelly CLAY with very occasional cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
No waste

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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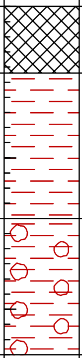
TRIAL PIT

Project	Job No	Date	Ground Level (m)	Co-Ordinates ()	Hole No
Grange Castle Infill Assessment	MDR0813	03-02-11 03-02-11		E 304,866.7 N 229,937.3	TP38
Contractor: Breffni Plant Hire					Sheet 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.44) 0.44	Made Ground; brown slightly gravelly CLAY with occasional cobbles (occasional white patches within clay) No waste	
						(0.96) 1.40	soft light brown CLAY	
						(0.90) 2.30	dark brown/ black CLAY with occasional cobbles and 1 large boulder	



GENERAL REMARKS

No waste

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TRIAL PIT

Project	Hole No
Grange Castle Infill Assessment	TP39

Job No	Date	Ground Level (m)	Co-Ordinates ()
MDR0813	31-01-11 31-01-11		E 304,941.7 N 229,937.6

Contractor	Sheet
Breffni Plant Hire	1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.10	Made Ground; Brown CLAY No waste	
						(0.40) 0.50	slightly gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP40**
Job No: MDR0813	Date: 24-01-11 24-01-11	Ground Level (m)	Co-Ordinates (): E 305,008.0 N 229,967.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.20	Made Ground; Brown gravelly CLAY with cobbles	
						(2.40) 2.60	Grey gravelly CLAY with occasional cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit
No waste material

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP41
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,395.7 N 229,675.9	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.30) 2.30	Made Ground; Firm brown/grey gravelly CLAY with frequent cobbles and boulders. <1% waste (timber, wire, plastic, metal)	
						2.60	Stiff, black (boulder) slightly gravelly CLAY with frequent boulders	

GENERAL REMARKS

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP42**
Job No: MDR0813	Date: 27-01-11 / 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,470.7 N 229,676.2	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(1.70) 1.70	Made Ground; Soft brown very gravelly CLAY with frequent cobbles and occasional boulders. 1% waste (tar fragments, brick, timber)	
						1.90	Firm reddish/brown slightly gravelly CLAY with frequent angular cobbles.	

GENERAL REMARKS

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP43**
Job No: MDR0813	Date: 28-01-11 28-01-11	Ground Level (m)	Co-Ordinates (): E 304,545.7 N 229,676.5	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(1.60) 1.60	Made Ground; Soft grey/brown gravelly CLAY with occasional cobbles and boulders. <1% waste (brick, tar fragments)	
						1.80	Soft reddish brown gravelly CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS	

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP44
Job No: MDR0813	Date: 28-01-11 28-01-11	Ground Level (m)	Co-Ordinates (): E 304,580.0 N 229,666.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.80) 2.80	Made Ground; Soft grey/brown gravelly CLAY with occasional cobbles and boulders. <1% waste (tar fragments)	
						3.10	Soft reddish brown gravelly CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP45
Job No: MDR0813	Date: 28-01-11 28-01-11	Ground Level (m)	Co-Ordinates (): E 304,689.0 N 229,679.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(1.60) 1.60	Made Ground; Soft red/brown very slightly gravelly CLAY with frequent cobbles	
						1.80	Firm brown CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Trickle of water at 1.7. No waste.

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP46**
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,395.9 N 229,600.9	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.50) 0.50	Made Ground; Soft brown gravelly CLAY with frequent cobbles and boulders	
						(0.70) 1.20	Made Ground; Soft grey gravelly CLAY with frequent cobbles. <0.5% waste (timber, plastic)	
						(1.90) 3.10	Firm brown slightly gravelly CLAY with occasional cobbles and boulders	

SAMPLES & TESTS / STRATA

GENERAL REMARKS

Trickle of water at 3m bgl

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP47
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,470.9 N 229,601.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(0.60) 0.60	Made Ground; Soft brown gravelly CLAY with occasional cobbles. 1% waste (timber, metal)	
						(1.40) 2.00	Made Ground; Soft brown/grey gravelly CLAY with cobbles. 5% waste (timber, concrete blocks, brick, metal, plastic)	
						2.30	Firm brown, very gravelly CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP48**
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,545.9 N 229,601.1	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(3.00) 3.00	Made Ground; Soft brown gravelly CLAY with frequent cobbles and boulders. 1% waste (concrete blocks, tarmac, plastic, brick)	
						3.30	Firm brown very gravelly CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP49
Job No: MDR0813	Date: 28-01-11 28-01-11	Ground Level (m)	Co-Ordinates (): E 304,292.0 N 229,549.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.50) 1.50	Made Ground; Soft grey/brown gravelly CLAY with frequent cobbles.	
						1.80	Firm grey/brown gravelly CLAY with frequent angular cobbles.	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Trickle of water at 1.7.
No waste.

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP50
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,396.0 N 229,525.9	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.30) 2.30	Made Ground; Soft brown very slightly gravelly CLAY with occasional cobbles. <0.5% waste (plastic, aluminium can)	
						2.50	Stiff black (boulder) CLAY with frequent angular cobbles and boulders.	

SAMPLES & TESTS | STRATA

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP51
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,471.0 N 229,526.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.50) 0.50	Made Ground; Soft brown gravelly CLAY with occasional cobbles and boulders	
						(1.20) 1.70	Soft brown/grey very gravelly CLAY with very frequent angular cobbles and boulders	

GENERAL REMARKS

No waste

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP52
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,546.0 N 229,526.1	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.20) 2.20	Made Ground; Soft grey gravelly CLAY with frequent cobbles and boulders. 1% waste (tar slabs, plastic piping, brick)	
						2.40	Firm red/brown gravelly CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP53
Job No: MDR0813	Date: 28-01-11 28-01-11	Ground Level (m)	Co-Ordinates (): E 304,621.0 N 229,526.2	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(1.70) 1.70	Made Ground; brown to dark brown slightly gravelly CLAY with occasional cobbles (<1% waste; wood, plastic, roots)	
						1.90	Brown slightly gravelly CLAY	

GENERAL REMARKS

Damp at base of hole, base of waste
Hole complete at 1.7m due to natural ground

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project	Hole No
Grange Castle Infill Assessment	**TP54**

Job No	Date	Ground Level (m)	Co-Ordinates ()
MDR0813	26-01-11 26-01-11		E 304,396.2 N 229,450.9

Contractor	Sheet
Breffni Plant Hire	1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.70) 1.70	Made Ground; Soft grey/brown slightly gravelly CLAY with occasional cobbles and frequent boulders. 5% waste (concrete slab 0.5x0.5x0.2m)	
						(0.50) 2.20	Firm brown/reddish gravelly CLAY with frequent angular cobbles	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP55
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,471.2 N 229,451.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.80) 0.80	Made Ground; Soft brown gravelly CLAY with occasional cobbles and boulders	
						(1.80) 2.60	Made Ground; Firm brown/grey very slightly gravelly CLAY with frequent cobbles. <5% waste (concrete blocks, fragments of concrete manhole rings, timber, plastic, wire)	
						2.80	Reddish brown very slightly gravelly CLAY with frequent angular cobbles	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP56
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,546.2 N 229,451.1	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.30) 1.30	Made Ground; Soft brown very slightly gravelly CLAY with frequent cobbles and boulders. <1% waste (lead pipe, brick)	
						1.50	Firm red/brown gravelly CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP57
Job No: MDR0813	Date: 28-01-11 28-01-11	Ground Level (m)	Co-Ordinates (): E 304,609.5 N 229,451.2	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(2.60) 2.60	Made Ground; brown gravelly CLAY with occasional cobbles and boulders with inclusions of dark brown/ black associated with organics (<1% waste; wood, organics, tyre, rubber, concrete, metal pipe, aluminium drinks can, rebar, plastic)	
						2.70	Brown gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project	Hole No
Grange Castle Infill Assessment	TP58

Job No	Date	Ground Level (m)	Co-Ordinates ()
MDR0813	26-01-11 26-01-11		E 304,396.4 N 229,375.9

Contractor	Sheet
Breffni Plant Hire	1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.90) 0.90	Made Ground; Soft brown gravelly CLAY with frequent cobbles	
						1.20	Made Ground; Firm black (boulder) CLAY with rootlets and occasional cobbles and boulders. 1% waste (brick, plastic)	
						(0.40) 1.60	Firm grey/brown gravelly CLAY with frequent angular cobbles and boulders	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client	South Dublin County Council	Method/ Plant Used		Logged By	

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP59
Job No: MDR0813	Date: 27-01-11 27-01-11	Ground Level (m)	Co-Ordinates (): E 304,471.4 N 229,376.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.50) 1.50	Made Ground; Soft brown very slightly gravelly CLAY with frequent cobbles and occasional boulders. 1% waste (timber, plastic, concrete blocks)	
						(1.10) 2.60	Made Ground; Firm grey/brown very slightly gravelly CLAY with occasional cobbles and boulders. 5-10% waste (concrete slabs, timber, rubber mini-digger track, cable, wire, motorbike/car battery)	
						2.90	Reddish brown very slightly gravelly CLAY with frequent angular cobbles	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Dun Laoghaire
Co. Dublin
Telephone: 01 4882900
Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP60
Job No: MDR0813	Date: 28-01-11 28-01-11	Ground Level (m)	Co-Ordinates (): E 304,546.4 N 229,376.1	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(1.10) 1.10	Made Ground; brown slightly gravelly CLAY with occasional cobbles and angular boulders (<1% waste; metal wire, wood, concrete, organics, plastic, tile)	
						(0.60) 1.70	Made Ground; grey slightly gravelly CLAY (<1% waste; metal wire, wood, organics, plastic, tile)	
						(1.10) 2.80	Light brown slightly gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

RPS Consulting Engineers
West Pier Business Campus
Dun Laoghaire
Co. Dublin
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Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP61
Job No: MDR0813	Date: 07-02-11 07-02-11	Ground Level (m)	Co-Ordinates (): E 304,607.9 N 229,376.5	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.15) 2.15	Made Ground; soft brown/ grey gravelly CLAY with occasional cobbles (<1% waste; concrete blocks, plastic pipe, plastic, wire rope, tarmac, metal)	
						2.20	soft gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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West Pier Business Campus
Dun Laoghaire
Co. Dublin
Telephone: 01 4882900
Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP62
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,396.6 N 229,300.6	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.80) 2.80	Made Ground; Soft brown very slightly gravelly CLAY with frequent cobbles and occasional boulders. <1% waste (concrete blocks, textile, timber)	
						3.00	Reddish brown very slightly gravelly CLAY with frequent angular cobbles	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Co. Dublin
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Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP63
Job No: MDR0813	Date: 26-01-11 26-01-11	Ground Level (m)	Co-Ordinates (): E 304,416.0 N 229,277.6	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(3.20) 3.20	Made Ground; Soft brown/grey gravelly CLAY with frequent cobbles and boulders. 5% waste (timber, cable, concrete blocks, plastic)	
						3.50	Reddish brown very slightly gravelly CLAY with frequent angular cobbles.	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP64
Job No: MDR0813	Date: 02-02-11 02-02-11	Ground Level (m)	Co-Ordinates (): E 304,998.0 N 229,895.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(3.50) 3.50	Made Ground; Firm brown very slightly gravelly CLAY with occasional cobbles. (1% waste (gas mask, plastic pipe, electrical cable, brick, concrete fragments)	
						3.60	Firm reddish brown gravelly CLAY with frequent angular cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Trickle of water at 1.7.

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project	Hole No
Grange Castle Infill Assessment	TP65

Job No	Date	Ground Level (m)	Co-Ordinates ()
MDR0813	02-02-11 02-02-11		E 304,997.0 N 229,855.0

Contractor	Sheet
Breffni Plant Hire	1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(3.80) 3.80	Made Ground; Firm brown very slightly gravelly CLAY with occasional cobbles and boulders. <1% waste (brick, concrete fragments, a tap)	
						3.90	Firm brown slightly gravelly CLAY with frequent angular cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Trickle of water at 1.7.

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project	Job No	Date	Ground Level (m)	Co-Ordinates ()	Contractor	Hole No	Sheet
Grange Castle Infill Assessment	MDR0813	02-02-11 02-02-11		E 304,985.0 N 229,804.0	Breffni Plant Hire	TP66	1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(3.20) 3.20	Made Ground; Firm dark brown CLAY with occasional cobbles and boulders. <1% waste (plastic pipe, timber, metal, blocks of tarmac)	
						3.40	Firm brown slightly gravelly CLAY with frequent angular cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Trickle of water at 1.7.

All dimensions in metres Scale 1:50	Client	Method/ Plant Used	Logged By
	South Dublin County Council		

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Co. Dublin
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Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP67
Job No: MDR0813	Date: 02-02-11 02-02-11	Ground Level (m)	Co-Ordinates (): E 304,974.0 N 229,756.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(4.60) 4.60	Made Ground; Soft dark brown/black gravelly CLAY with frequent cobbles and boulders. <1% waste (plastic pipe, plastic bag, concrete slabs, brick, plastic flower pot)	
						4.70	Soft sandy gravelly CLAY with frequent angular cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Trickle of water at 1.7.

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Co. Dublin
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Fax: 01 2835676

TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP68**
Job No: MDR0813	Date: 02-02-11 02-02-11	Ground Level (m)	Co-Ordinates (): E 304,950.0 N 229,730.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(3.30) 3.30	Made Ground; Soft dark brown very slightly gravelly CLAY with occasional cobbles and boulders. 5% waste ("city west" duct box cover, timber, plastic pipe, brick, piece of copper pipe, part of a concrete manhole cover, chicken wire, steel bar)	
						3.50	Firm brown sandy CLAY with frequent angular cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Trickle of water at 1.7.

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP69
Job No: MDR0813	Date: 02-02-11 02-02-11	Ground Level (m)	Co-Ordinates (): E 304,901.0 N 229,711.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.90)	Made Ground; Firm dark brown very slightly gravelly CLAY with occasional cobbles. <5% waste (concrete slabs, glass bottle, aluminium can)	
						2.90		
						3.00	Firm brown sandy CLAY with frequent angular cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Trickle of water at 1.7.

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Co. Dublin
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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP70**
Job No: MDR0813	Date: 02-02-11 02-02-11	Ground Level (m)	Co-Ordinates (): E 304,915.0 N 229,717.0	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS / STRATA

Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(3.20) 3.20	Made Ground; Soft dark brown gravelly CLAY with occasional cobbles. <5% waste (tyre, timber, plastic, textile, concrete, brick, tile, metal)	
						3.30	Firm brown sandy CLAY with frequent angular cobbles	

GENERAL REMARKS

GPS Co-ordinates entered from handheld GPS unit.
Trickle of water at 1.7.

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Co. Dublin
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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP71
Job No: MDR0813	Date: 03-02-11 03-02-11	Ground Level (m)	Co-Ordinates (): E 304,517.5 N 229,700.8	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.20	Topsoil	
						(1.30) 1.50	Soft grey very gravelly CLAY with frequent cobbles and occasional boulders	

GENERAL REMARKS

No waste

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Dun Laoghaire
Co. Dublin
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TRIAL PIT

Project	Hole No
Grange Castle Infill Assessment	TP72

Job No	Date	Ground Level (m)	Co-Ordinates ()
MDR0813	04-02-11 04-02-11		E 304,779.5 N 229,717.0

Contractor	Sheet
Breffni Plant Hire	1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	backfill
						(2.40) 2.40	Made Ground; Firm grey/brown very slighly gravelly CLAY with occasional cobbles. 5% waste (metal, plastic, tile, brick, concrete blocks).	
						2.50	Reddish/brown CLAY with frequent angular cobbles	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client	South Dublin County Council	Method/ Plant Used		Logged By

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				**TP73**
Job No: MDR0813	Date: 04-02-11 04-02-11	Ground Level (m)	Co-Ordinates (): E 304,931.2 N 229,846.7	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.30	Topsoil	
						(2.70) 3.00	Made Ground; Soft grey/brown slightly gravelly CLAY with frequent angular cobbles	
						3.10	Reddish/brown very slightly gravelly clay	

GENERAL REMARKS

No waste.Slight seepage of water into hole at 3m

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Co. Dublin
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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP74
Job No: MDR0813	Date: 04-02-11 04-02-11	Ground Level (m)	Co-Ordinates (): E 304,630.7 N 229,936.6	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(2.60) 2.60	Made Ground; Soft grey/brown slightly gravelly CLAY with occasional boulders. <5% waste (timber, brick fragments, plywood, concrete blocks, coal shovel, tar fragments)	
						2.70	Brown gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

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Co. Dublin
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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP75
Job No: MDR0813	Date: 03-02-11 03-02-11	Ground Level (m)	Co-Ordinates (): E 304,430.3 N 230,026.7	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.50) 0.50	Topsoil	
						(1.70) 2.20	Soft brown very slightly gravelly CLAY	

GENERAL REMARKS

No waste

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

RPS TRIAL PIT MDR0813_GI0001_TP LOGS.GPJ AGS 3_1.GDT 8/4/11

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP76
Job No: MDR0813	Date: 03-02-11 03-02-11	Ground Level (m)	Co-Ordinates (): E 304,235.0 N 229,800.8	
Contractor: Breffni Plant Hire				Sheet: 1 of 1

SAMPLES & TESTS				STRATA				
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						(0.50) 0.50	Topsoil	
						(2.40) 2.90	Made Ground; Soft brown/grey very slightly gravelly CLAY with occasional cobbles. <0.5% waste (fabric)	
						3.10	Soft brown very slightly gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client: South Dublin County Council	Method/ Plant Used	Logged By

RPS

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TRIAL PIT

Project				Hole No
Grange Castle Infill Assessment				TP77
Job No MDR0813	Date 04-02-11 04-02-11	Ground Level (m)	Co-Ordinates () E 304,342.2 N 229,805.1	
Contractor Breffni Plant Hire				Sheet 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Sample Name	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	backfill
						0.30	Topsoil	
						(2.30) 2.60	Made Ground; Soft brown slightly gravelly CLAY with occasional cobbles and boulders. 1% waste (fragments of tarmac)	
						2.70	soft brown very slightly gravelly CLAY	

GENERAL REMARKS

All dimensions in metres Scale 1:50	Client South Dublin County Council	Method/ Plant Used	Logged By

RPS

Sampling Plan

Appendix 7

<table>
<tr><td colspan="2">SAMPLING PLAN</td></tr>
<tr><td colspan="2">GENERAL INFORMATION</td></tr>
<tr><td>Sampling Plan completed by: RPS</td><td>On behalf of: South Dublin County Council</td></tr>
<tr><td>Client: South Dublin County Council</td><td rowspan="2">Material Producer: material was originally sourced from a number of construction sites</td></tr>
<tr><td>Contact: David Fennell</td></tr>
<tr><td colspan="2">Other involved parties: Environmental Protection Agency, contact Stephen McCarthy</td></tr>
<tr><td>Sampling to be carried out by: RPS</td><td>Specify name of sampler: Isidore McCormack.</td></tr>
<tr><td colspan="2">SAMPLING OBJECTIVE:
To determine the characteristics of imported material on site at Grange Castle Golf Club present within two distinct areas of the site, named ‘the 5 holes’ and ‘holes 14 and 15’.</td></tr>
<tr><td colspan="2">SAMPLING APPROACH:
Sampling is to be carried out from approximately 40 no. of trial pits. As the trial pits are dug, the excavator driver will side cast excavated material to a designated area, adjacent to the trial pit. On completion of the trial pit the material within the designated area will be mixed by the excavator and a composite sample of approximately 500kg retrieved. The 500kg sample will be made up of samples from four quarters of the material within the designated area. The 500kg sample will be loaded onto a mini-dumper and brought to an on-site cabin where waste characterization equipment will be set up and an appropriately qualified RPS staff member will carry out the testing.
On receipt of the material at the cabin, the material will be off loaded into a designated area underlain by a heavy duty plastic sheet.
The material will then be picked for any extraneous material which will be sorted into a variety of containers including, timber, plastic, concrete, tar, tiles, rubber etc. The remaining soil and stone will be sieved through a purpose built table with a tray of 20mm round mesh holes and the constituents obtained weighed and compositional % derived.
Approximately two samples will be analysed per day.
Representative composite soil samples will be taken from the remaining soils fraction for laboratory analysis (i.e. <20mm fraction) using the ‘nine point sample’ as described in Annex D of BS 10175:2001 – Investigation of Potentially Contaminated Sites – Code of Practice.</td></tr>
<tr><td colspan="2">MATERIAL</td></tr>
<tr><td>Type of material: Imported Stone and Soil with the possibility of contamination from C&D waste.</td><td>Location: Grange Castle Golf Club</td></tr>
<tr><td colspan="2">Source and origin of the material (e.g. form and nature of arising):
The material was imported with the purpose of creating new holes at the golf course. The material is believed to be primarily sourced from green field construction sites.</td></tr>
<tr><td colspan="2">Process/activity producing the material: land reclamation.</td></tr>
<tr><td colspan="2">Identify access problems that may affect sampling programme:
Plant delays, sampling equipment failure.</td></tr>
</table>

SAMPLING METHODOLOGY	
Specify detailed sampling location: Sampling is to be carried out from the trial pits	
Define sub-population or consignment to be sampled: A circa 500kg sample of material will be separated from the excavated material.	
Define place and point of sampling: On-site cabin	
Specify date and time(s) of sampling: from 24^{th} of January 2011	
Specify persons to be present : Isidore McCormack and support staff	
Identify sampling technique : '9 point sample' as described in Annex d of BS 10175:2001 Investigation of Potentially Contaminated Sites – Code of Practice to be used for laboratory samples following characterisation of sample.	
Identify equipment: Spade, 3 large heavy-duty plastic sheeting sections, a scoop, weighing scales, containers for different waste constituents, sampling table, PPE gear. Excavator, mini dumper.	
Specify no. of samples to be collected : 1 for characterisation testing and 1 for laboratory analysis	
Specify sample size : approximately 500kg for characterization.	
Detail requirements for on-site determinations: None	
Identify sample coding methodology: n/a	
Identify safety precautions: Gloves and protection suits to be worn during sampling. Specific Health and Safety protocol to be developed and all staff informed of content.	
SUB-SAMPLING	
N / A at this stage	
PACKAGING, PRESERVATION, STORAGE AND TRANSPORT REQUIREMENTS	
Packaging: As per STS requirements	
Preservation: As per STS requirements	
Storage: As per STS requirements	
Transport: As per STS requirements	
ANALYTICAL LABORATORY	
Company details: STS	
Contact: N / A	**Delivery date:** from 24/01/2011

RPS

Trial Pit Analytical Results

Appendix 8

Bulk Soil Results

Sample Ref								TP2	TP4	TP7	TP10	TP13	TP15	TP17	TP18	TP20	TP22	TP24	TP25	TP27	TP29	TP30	TP31	TP33	TP34	TP36
Analyte	Units	LOD	SGVs[1]	RPS GAC[2]	LQM/CIEH[3]	DTV[4]	DIV[5]																			
EN 12457-3 Leachate																										
Antimony as Sb, dry weight	mg/kg	1				3	15	2.6	3.1	2	2.3	5.5	2	7.6	2.3	2.4	2.1	2.1	2.1	1.7	2.9	2.7	1.8	2	2.3	1.8
Arsenic as As, dry weight	mg/kg	1	43					16	24	22	16	19	28	20	14	16	25	21	19	25	14	11	9.8	11	18	22
Barium as Ba, dry weight	mg/kg	5				160	625	79	190	110	84	58	150	120	73	80	190	120	100	89	73	94	68	68	94	86
Cadmium as Cd, dry weight	mg/kg	0.2	1.8					1.2	1.7	2.1	4	3.5	1.4	1.6	1.4	2.3	1.6	1.2	1.4	1.8	2.8	1.7	1.6	1.4	1.9	1.1
Chromium as Cr, dry weight	mg/kg	1			34600			15	16	20	18	21	27	18	15	22	18	16	14	20	15	12	9.8	8.5	19	14
Copper as Cu, dry weight	mg/kg	5			524			34	26	31	35	45	36	38	30	31	27	25	31	25	39	27	20	26	32	21
Lead as Pb, dry weight	mg/kg	2		530				37	65	42	44	23	53	54	15	33	54	43	41	35	20	33	13	10	36	22
Mercury as Hg, dry weight	mg/kg	0.35						<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
Molybdenum as Mo, dry weight	mg/kg	0.5				3	200	1.5	1.8	1.5	1.4	7.6	0.59	0.96	0.62	2.8	<0.50	<0.50	<0.50	1	2.1	2.3	0.82	0.59	0.68	<0.50
Nickel as Ni, dry weight	mg/kg	1	230					36	35	46	53	86	50	43	42	43	37	35	39	40	63	33	30	37	44	31
Phosphate as PO4, dry weight	mg/kg	25						2600	2100	2200	2100	1600	1900	2600	3000	2500	2000	2200	2300	2000	1900	2200	2300	2300	2800	2100
Selenium as Se, dry weight	mg/kg	0.35	120					1.2	1.5	0.71	0.71	2.1	0.47	0.9	0.51	0.84	1.2	1.1	2.1	0.63	0.62	0.85	0.94	0.59	0.77	0.5
Zinc as Zn, dry weight	mg/kg	5			618			93	130	120	140	170	120	150	87	98	120	100	100	98	95	83	56	70	130	77
Moisture Content Ratio at 105C	% ratio	0.1						5.52	0.7	6.68	0.69	30.35	18.33	7.22	3.4	8.5	2.09	2.48	9.25	3.04	8.02	2.24	5.25	4.47	5.33	
Moisture at 105C	%	0.1						5.2	0.7	6.3	0.68	23	15	6.7	3.3	7.8	2	2.4	8.5	2.9	7.4	2.2	5	4.3	5.1	
Sulphate, Total as SO4 dw	mg/kg	240						<240	340	<240	<240	<240	<240	<240	320	<240	<240	<240	340	<240	<240	680	<240	260	<240	<240
TOC by Ignition in O2	%	0.1						0.71	1.5	0.53	0.85	0.43	<0.10	0.79	1.4	0.84	0.39	1.1	1.5	<0.10	0.94	1.6	1.8	1.2	1.5	1.3
pH	pH units	2						8.1	8.3	8.3	8.3	8	8	8	8.1	8.2	8.3	8.2	8	8.3	8.4	8.2	8.2	8.1	8.4	8.1
Nitrate as NO3, Water Sol dw	mg/kg	4.5						20	11	28	35	21	44	12	17	54	31	9.4	8.6	25	39	17	15	15	19	13
Nitrite as NO2, Water Sol dw	mg/kg	0.2						0.89	0.46	0.9	0.88	0.95	0.29	0.87	1.4	2.5	<0.20	0.78	2.2	0.31	2.2	1.1	0.55	0.51	0.46	1.9
7 PCBs																										
PCB 28	ug/kg	1				0.69		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 52	ug/kg	1				0.28		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 101	ug/kg	1				0.61		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 118	ug/kg	1				1.9		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 138	ug/kg	1				0.32		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 153	ug/kg	1				0.46		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 180	ug/kg	1				0.17		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MTBE (Methyl-tert-Butyl Ether)	mg/kg	0.01				-	100	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
BTEX																										
Benzene	mg/kg	0.01	0.07					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Toluene	mg/kg	0.01	120					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.01	90					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
m&p-Xylene	mg/kg	0.01	160					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
o-Xylene	mg/kg	0.01	160					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Mineral Oils																										
VPH >C5 - C6, aliphatic	mg/kg	0.1			1700			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
VPH >C6 - C8, aliphatic	mg/kg	0.1			5600			<0.10	<0.10	<0.10	<0.10	0.16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.22	<0.10	<0.10	<0.10	<0.10
VPH >C8 - C10, aliphatic	mg/kg	0.1			770			<0.10	<0.10	<0.10	<0.10	0.16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.29	<0.10	<0.10	<0.10	<0.10
EPH >C10 - C12, aliphatic	mg/kg	1			4400			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C12 - C16, aliphatic	mg/kg	1			13000			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C16 - C35, aliphatic	mg/kg	1			270000			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	22	72	<1.0	<1.0	50	<1.0	<1.0	<1.0	8.6	<1.0	<1.0	16	<1.0
EPH >C35 - C44, aliphatic	mg/kg	1			270000			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	8.4	67	<1.0	<1.0	14	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.3	<1.0
EPH >C5 - C44, Total aliphatic	mg/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	31	140	<5.0	<5.0	64	<5.0	<5.0	<5.0	9.1	<5.0	<5.0	22	<5.0
VPH >C5- C7, aromatic	mg/kg	0.01			27			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
VPH >C7 - C8, aromatic	mg/kg	0.01			51			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
VPH >C8 - C10, aromatic	mg/kg	0.1			21			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
EPH >C10 - C12, aromatic	mg/kg	1			31			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C12 - C16, aromatic	mg/kg	1			57			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C16 - C21, aromatic	mg/kg	1			110			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C21 - C35, aromatic	mg/kg	1			820			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	14	86	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C35 - C44, aromatic	mg/kg	1			2100			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	12	120	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C5 - C44, Total aromatic	mg/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	26	220	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
EPH >C5 - C44, Total	mg/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	56	360	<5.0	<5.0	64	<5.0	<5.0	<5.0	9.1	<5.0	<5.0	22	<5.0
Naphthalene	mg/kg	0.01			9.9			0.048	0.014	0.012	<0.010	<0.010	<0.010	0.019	0.12	0.01	<0.010	0.027	0.028	<0.010	<0.010	0.014	0.011	0.017	0.025	0.02
Acenaphthylene	mg/kg	0.01			69			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.016
Acenaphthene	mg/kg	0.01			85			0.012	<0.010	0.019	0.011	<0.010	<0.010	<0.010	0.051	0.04	<0.010	<0.010	0.018	<0.010	0.026	<0.010	<0.010	<0.010	<0.010	<0.010
Fluorene	mg/kg	0.01			67			0.012	<0.010	0.014	<0.010	<0.010	<0.010	0.01	0.063	0.058	<0.010	0.01	0.017	<0.010	0.021	<0.010	<0.010	<0.010	<0.010	0.02
Phenanthrene	mg/kg	0.01			38			0.076	0.035	0.14	0.094	0.01	<0.010	0.059	0.29	0.52	0.011	0.082	0.21	0.028	0.24	0.049	0.02	0.034	0.06	0.17
Anthracene	mg/kg	0.01			950			0.021	<0.010	0.025	0.018	<0.010	<0.010	0.017	0.099	0.033	<0.010	0.02	0.061	0.012	0.053	0.01	<0.010	<0.010	<0.010	0.035
Fluoranthene	mg/kg	0.01			130			0.16	0.038	0.21	0.13	0.014	<0.010	0.13	0.35	0.56	<0.010	0.11	0.69	0.034	0.33	0.091	0.022	0.039	0.1	0.18
Pyrene	mg/kg	0.01			270			0.14	0.038	0.2	0.11	0.014	<0.010	0.12	0.32	0.3	<0.010	0.1	0.58	0.028	0.3	0.089	0.018	0.034	0.058	0.16
Benzo(a)anthracene	mg/kg	0.01			5.5			0.078	0.015	0.087	0.048	<0.010	<0.010	0.068	0.16	0.03	<0.010	0.049	0.29	0.014	0.14	0.043	<0.010	0.013	<0.010	0.073
Chrysene	mg/kg	0.01			5.8			0.067	0.018	0.085	0.051	<0.010	<0.010	0.06	0.13	0.026	<0.010	0.051	0.24	0.013	0.12	0.042	<0.010	0.012	<0.010	0.061
Benzo(b)fluoranthene	mg/kg	0.01			7.4			0.11	0.031	0.12	0.072	0.011	<0.010	0.093	0.19	0.036	<0.010	0.08	0.38	0.014	0.15	0.063	0.011	0.022	<0.010	0.1
Benzo(k)fluoranthene	mg/kg	0.01			14			0.037	<0.010	0.045	0.028	<0.010	<0.010	0.033	0.072	0.012	<0.010	0.026	0.15	<0.010	0.049	0.023	<0.010	<0.010	<0.010	0.034
Benzo(a)pyrene	mg/kg	0.01			1.2			0.081	0.016	0.09	0.051	<0.010	<0.010	0.062	0.15	0.027	<0.010	0.05	0.26	0.01	0.11	0.049	<0.010	0.014	<0.010	0.069
Indeno(1,2,3-c,d)pyrene	mg/kg	0.01			3.8			0.071	0.011	0.061	0.034	<0.010	<0.010	0.05	0.11	0.02	<0.010	0.036	0.18	<0.010	0.075	0.036	<0.010	0.011	<0.010	0.044
Dibenz(a,h)anthracene	mg/kg	0.01			1.5			0.015	<0.010	0.016	<0.010	<0.010	<0.010	0.011	0.022	<0.010	<0.010	<0.010	0.034	<0.010	0.018	<0.010	<0.010	<0.010	<0.010	0.011
Benzo(g,h,i)perylene	mg/kg	0.01			120			0.07	0.014	0.07	0.038	<0.010	<0.010	0.054	0.11	0.02	<0.010	0.04	0.17	<0.010	0.076	0.042	<0.010	0.014	<0.010	0.047
PAH, Total of 16 EPA	mg/kg	0.1						1	0.23	1.2	0.68	<0.10	<0.10	0.78	2.2	1.7	<0.10	0.68	3.3	0.15	1.7	0.55	<0.10	0.21	0.24	1
Dry Ratio (BSEN 12457)	%							94.77	99.3	93.74	99.32	76.72	84.51	93.27	96.71	92.17	97.95	97.58	91.53	97.05	93.74	97.81	95.01	95.72	94.94	
SVOC																										
2-Picoline	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Toluidine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bis-(2-Chloroethyl)-ether	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzyl Alcohol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Bulk Soil Results

Sample Ref								TP39	TP41	TP42	TP44	TP47	TP48	TP50	TP51	TP53	TP56	TP58	TP60	TP62	TP65	TP67	TP70	TP72	TP73	TP74	TP77
Analyte	**Units**	**LOD**	**SGVs[1]**	**RPS GAC[2]**	**LQM/CIEH[3]**	**DTV[4]**	**DIV[5]**																				
EN 12457-3 Leachate																											
Antimony as Sb, dry weight	mg/kg	1				3	15	2.3	1.9	1.3	2	1.5	1.6	2.5	1.6	2	1.8	2.7	1.9	1.6	1.9	2.2	1.8	3	1.8	1.7	1.7
Arsenic as As, dry weight	mg/kg	1	43					17	16	23	17	15	18	12	17	21	11	18	16	22	15	19	14	16	14	16	16
Barium as Ba, dry weight	mg/kg	5				160	625	150	55	62	86	81	94	61	68	52	70	92	68	99	96	110	85	170	58	76	76
Cadmium as Cd, dry weight	mg/kg	0.2	1.8					2	1.1	0.77	1.1	1.2	1.1	1.9	1.5	0.95	1.3	1.9	1	1.2	1.5	1.9	1.4	2.3	1.6	0.83	0.83
Chromium as Cr, dry weight	mg/kg	1			34600			14	16	17	13	15	13	13	17	12	12	19	13	15	12	16	12	15	9.3	12	12
Copper as Cu, dry weight	mg/kg	5			524			32	33	23	25	23	86	29	26	24	25	56	25	37	44	41	25	33	26	23	23
Lead as Pb, dry weight	mg/kg	2		530				20	26	19	19	28	48	23	28	22	18	31	39	55	47	47	15	58	21	32	32
Mercury as Hg, dry weight	mg/kg	0.35						<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
Molybdenum as Mo, dry weight	mg/kg	0.5				3	200	0.87	0.93	0.69	<0.50	1.5	1.4	1.7	1.3	<0.50	<0.50	3.1	<0.50	1.1	1.3	1.9	0.64	2.3	1.5	<0.50	<0.50
Nickel as Ni, dry weight	mg/kg	1	230					42	40	31	30	35	38	43	40	33	31	53	30	38	32	38	37	39	34	28	28
Phosphate as PO4, dry weight	mg/kg	25						2800	2100	2100	2000	2000	2300	2400	2100	2100	2000	1800	2100	2400	2400	2500	2000	3100	2200	2300	2300
Selenium as Se, dry weight	mg/kg	0.35	120					0.88	0.5	<0.35	0.83	0.37	<0.35	<0.35	0.43	0.56	1	0.98	0.51	<0.35	0.65	0.85	0.85	1	1.3	0.92	0.92
Zinc as Zn, dry weight	mg/kg	5			618			89	91	76	76	85	96	86	120	73	100	120	86	100	91	100	70	120	72	68	68
Moisture Content Ratio at 105C	% ratio	0.1						12.39	3.89	0.78	3.46	1.81	1.83	4.5	1.2	3.58	1.82	8.22	4.41	3.09	5.75	7.97	7.36	6.99	6.7	6.86	4.11
Moisture at 105C	%	0.1						11	3.7	0.78	3.3	1.8	1.8	4.3	1.2	3.5	1.8	7.6	4.2	3	5.4	7.4	6.9	6.5	6.3	6.4	4
Sulphate, Total as SO4 dw	mg/kg	240						<240	<240	<240	360	<240	610	<240	<240	<240	350	<240	360	<240	240	600	660	440	340	610	610
TOC by Ignition in O2	%	0.1						1.2	2.1	0.9	1.3	1.3	2	1.8	1.8	1.7	2	0.68	1.2	1	1.9	1.9	1.8	2.1	1.6	1.1	1.1
pH	pH units	2						8.1	8.6	8.6	8.3	8.3	8.4	8.3	8.4	8.2	8.8	8.1	8.3	8.3	8.2	8.2	8.2	7.9	7.9	8.1	8.1
Nitrate as NO3, Water Sol dw	mg/kg	4.5						18	15	9.6	14	15	15	21	13	9.9	15	17	23	12	17	13	23	20	25	17	17
Nitrite as NO2, Water Sol dw	mg/kg	0.2						1.5	0.79	0.55	0.72	1.5	1	2.8	0.79	0.6	0.5	0.45	0.89	0.66	1.4	1.4	3.6	2.7	1.3	1.1	1.1
7 PCBs																											
PCB 28	ug/kg	1				0.69		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 52	ug/kg	1				0.28		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 101	ug/kg	1				0.61		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 118	ug/kg	1				1.9		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 138	ug/kg	1				0.32		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
PCB 153	ug/kg	1				0.46		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	1.1
PCB 180	ug/kg	1				0.17		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MTBE (Methyl-tert-Butyl Ether)	mg/kg	0.01				-	100	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
BTEX																											
Benzene	mg/kg	0.01	0.07					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Toluene	mg/kg	0.01	120					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010
Ethylbenzene	mg/kg	0.01	90					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
m&p-Xylene	mg/kg	0.01	160					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
o-Xylene	mg/kg	0.01	160					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Mineral Oils																											
VPH >C5 - C6, aliphatic	mg/kg	0.1			1700			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
VPH >C6 - C8, aliphatic	mg/kg	0.1			5600			<0.10	<0.10	0.12	<0.10	0.16	0.15	<0.10	<0.10	<0.10	<0.10	0.14	<0.10	<0.10	0.1	0.1	<0.10	<0.10	<0.10	<0.10	<0.10
VPH >C8 - C10, aliphatic	mg/kg	0.1			770			<0.10	<0.10	0.11	<0.10	0.2	0.16	<0.10	<0.10	<0.10	<0.10	0.13	<0.10	<0.10	0.11	0.12	0.12	<0.10	<0.10	<0.10	<0.10
EPH >C10 - C12, aliphatic	mg/kg	1			4400			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C12 - C16, aliphatic	mg/kg	1			13000			<1.0	<1.0	<1.0	<1.0	<1.0	6.1	<1.0	<1.0	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0	5.6	<1.0	<1.0	<1.0	<1.0
EPH >C16 - C35, aliphatic	mg/kg	1			270000			<1.0	<1.0	15	50	15	29	<1.0	<1.0	43	<1.0	34	38	11	27	37	61	<1.0	<1.0	31	31
EPH >C35 - C44, aliphatic	mg/kg	1			270000			<1.0	<1.0	12	17	<1.0	<1.0	<1.0	<1.0	10	<1.0	<1.0	11	5.5	17	9.4	28	<1.0	<1.0	23	23
EPH >C5 - C44, Total aliphatic	mg/kg	5						<5.0	<5.0	27	67	16	35	<5.0	<5.0	53	<5.0	44	49	17	44	47	95	<5.0	<5.0	54	54
VPH >C5- C7, aromatic	mg/kg	0.01			27			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
VPH >C7 - C8, aromatic	mg/kg	0.01			51			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	<0.010	<0.010	<0.010
VPH >C8 - C10, aromatic	mg/kg	0.1			21			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
EPH >C10 - C12, aromatic	mg/kg	1			31			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C12 - C16, aromatic	mg/kg	1			57			<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
EPH >C16 - C21, aromatic	mg/kg	1			110			<1.0	<1.0	<1.0	10	<1.0	6.8	<1.0	5.1	<1.0	<1.0	15	<1.0	<1.0	<1.0	<1.0	22	<1.0	<1.0	<1.0	<1.0
EPH >C21 - C35, aromatic	mg/kg	1			820			<1.0	17	40	62	19	23	<1.0	21	<1.0	45	42	22	22	37	31	110	<1.0	<1.0	28	28
EPH >C35 - C44, aromatic	mg/kg	1			2100			<1.0	9.3	41	45	9.7	8.7	<1.0	16	<1.0	21	11	20	24	36	23	58	<1.0	<1.0	38	38
EPH >C5 - C44, Total aromatic	mg/kg	5						<5.0	27	80	120	28	39	<5.0	43	<5.0	66	67	42	46	73	54	190	<5.0	<5.0	66	66
EPH >C5 - C44, Total	mg/kg	5						<5.0	27	110	180	44	74	<5.0	43	53	66	110	91	62	120	100	280	<5.0	<5.0	120	120
Naphthalene	mg/kg	0.01			9.9			0.026	0.037	0.13	1	0.024	0.023	<0.010	0.028	0.022	0.036	<0.010	0.045	0.011	0.063	0.051	0.15	0.023	0.032	0.026	0.026
Acenaphthylene	mg/kg	0.01			69			<0.010	0.012	0.013	0.02	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.07	0.016	0.023	<0.010	<0.010	<0.010	<0.010
Acenaphthene	mg/kg	0.01			85			<0.010	0.091	0.12	0.42	0.015	0.015	<0.010	0.039	<0.010	0.013	<0.010	0.016	<0.010	0.043	0.049	0.12	<0.010	0.024	0.013	0.013
Fluorene	mg/kg	0.01			67			<0.010	0.14	0.1	0.45	0.016	0.019	<0.010	0.036	0.014	0.016	<0.010	0.018	<0.010	0.073	0.051	0.11	0.01	0.016	0.015	0.015
Phenanthrene	mg/kg	0.01			38			0.031	0.78	0.36	1.8	0.077	0.1	0.016	0.28	0.065	0.11	0.1	0.13	0.053	0.64	0.42	0.67	0.092	0.12	0.094	0.094
Anthracene	mg/kg	0.01			950			<0.010	0.27	0.14	0.62	0.02	0.031	<0.010	0.12	0.019	0.026	0.026	0.031	0.011	0.25	0.11	0.2	0.018	0.011	0.015	0.015
Fluoranthene	mg/kg	0.01			130			0.048	1.1	0.79	2.7	0.13	0.15	0.04	0.86	0.09	0.14	0.18	0.21	0.091	1.6	0.63	1.2	0.15	0.092	0.11	0.11
Pyrene	mg/kg	0.01			270			0.045	0.88	0.67	2.3	0.12	0.15	0.048	0.74	0.083	0.12	0.17	0.18	0.091	1.4	0.57	1.1	0.13	0.073	0.083	0.083
Benzo(a)anthracene	mg/kg	0.01			5.5			0.02	0.44	0.33	1.2	0.063	0.081	0.02	0.37	0.046	0.062	0.083	0.1	0.047	0.9	0.31	0.64	0.072	0.023	0.032	0.032
Chrysene	mg/kg	0.01			5.8			0.021	0.33	0.28	0.88	0.057	0.076	0.021	0.31	0.041	0.059	0.085	0.094	0.044	0.73	0.26	0.5	0.066	0.024	0.033	0.033
Benzo(b)fluoranthene	mg/kg	0.01			7.4			0.03	0.49	0.43	1.7	0.09	0.12	0.032	0.43	0.069	0.09	0.094	0.16	0.073	0.87	0.38	0.72	0.11	0.033	0.048	0.048
Benzo(k)fluoranthene	mg/kg	0.01			14			<0.010	0.17	0.17	0.63	0.034	0.044	0.013	0.16	0.026	0.033	0.038	0.057	0.025	0.33	0.14	0.27	0.034	0.01	0.018	0.018
Benzo(a)pyrene	mg/kg	0.01			1.2			0.02	0.36	0.33	1.2	0.065	0.095	0.023	0.32	0.048	0.058	0.07	0.11	0.05	0.65	0.28	0.54	0.072	0.02	0.033	0.033
Indeno(1,2,3-c,d)pyrene	mg/kg	0.01			3.8			0.015	0.25	0.26	0.85	0.049	0.076	0.015	0.22	0.038	0.041	0.04	0.082	0.035	0.47	0.23	0.4	0.063	0.014	0.027	0.027
Dibenz(a,h)anthracene	mg/kg	0.01			1.5			<0.010	0.048	0.048	0.15	0.011	0.019	<0.010	0.045	<0.010	<0.010	0.01	0.018	<0.010	0.099	0.052	0.078	0.013	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	mg/kg	0.01			120			0.018	0.23	0.25	0.76	0.05	0.087	0.018	0.2	0.035	0.042	0.045	0.078	0.04	0.42	0.25	0.38	0.065	0.017	0.029	0.029
PAH, Total of 16 EPA	mg/kg	0.1						0.27	5.6	4.4	17	0.82	1.1	0.25	4.2	0.6	0.85	0.94	1.3	0.57	8.6	3.8	7.1	0.92	0.51	0.57	0.57
Dry Ratio (BSEN 12457)	%							88.98	96.25	99.22	96.65	98.22	98.2	95.69	98.82	96.54	98.21	92.4	95.78	97	94.56	92.62	93.15	93.47	93.72	93.58	96.05
SVOC																											
2-Picoline	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o-Toluidine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bis-(2-Chloroethyl)-ether	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzyl Alcohol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Bulk Soil Results

Sample Ref								TP2	TP4	TP7	TP10	TP13	TP15	TP17	TP18	TP20	TP22	TP24	TP25	TP27	TP29	TP30	TP31	TP33	TP34	TP36
Analyte	**Units**	**LOD**	**SGVs[1]**	**RPS GAC[2]**	**LQM/CIEH[3]**	**DTV[4]**	**DIV[5]**																			
2-Methylphenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3&4-Methylphenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenzofuran	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bis-(2-Chloroisopropyl)-ether	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
n-Nitroso-di-n-propylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachloroethane	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Isophorone	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acetophenone	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Nitrophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bis-(2-Chloroethoxy)-methane	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dinitrophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachlorobutadiene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylnaphthalene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,6-Trichlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
n-Nitrosopiperidine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-Trichlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloronaphthalene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dimethyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dinitrotoluene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzoic Acid	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dinitrotoluene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Diethyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Nitrophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Chlorophenyl Phenyl Ether	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbazole	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Bromophenyl Phenyl Ether	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dichlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Di-n-butyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.3	<1.0
Fluoranthene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
n-Nitrosodibutylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Butyl Benzyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)anthracene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4,5-Tetrachlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bis-(2-Ethylhexyl)-phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Di-n-octyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachlorocyclopentadiene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Indeno(1,2,3-c,d)pyrene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Nitroaniline	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3-Nitroaniline	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Diphenylhydrazine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1-Naphthylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Naphthylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,3,4,6-Tetrachlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Nitroaniline	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methyl-4,6-dinitrophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
diphenylamine&diphenylnitrosam	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenacetin	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Aminobiphenyl	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzidine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dimethylaminoazobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
n-Nitrosodimethylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3,3-Dichlorobenzidine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7,12-Dimethylbenz(a)anthracene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3-Methylcholanthrene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
VOC																										
Dichlorodifluoromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Bulk Soil Results

Sample Ref								TP39	TP41	TP42	TP44	TP47	TP48	TP50	TP51	TP53	TP56	TP58	TP60	TP62	TP65	TP67	TP70	TP72	TP73	TP74	TP77
Analyte	**Units**	**LOD**	**SGVs[1]**	**RPS GAC[2]**	**LQM/CIEH[3]**	**DTV[4]**	**DIV[5]**																				
2-Methylphenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3&4-Methylphenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenzofuran	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bis-(2-Chloroisopropyl)-ether	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
n-Nitroso-di-n-propylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachloroethane	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nitrobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Isophorone	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acetophenone	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Nitrophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bis-(2-Chloroethoxy)-methane	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dinitrophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Naphthalene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachlorobutadiene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylnaphthalene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,6-Trichlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
n-Nitrosopiperidine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4,5-Trichlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloronaphthalene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dimethyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dinitrotoluene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzoic Acid	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,4-Dinitrotoluene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Diethyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Nitrophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Chlorophenyl Phenyl Ether	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbazole	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Bromophenyl Phenyl Ether	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,6-Dichlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	mg/kg	1						<1.0	<1.0	<1.0	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Di-n-butyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	mg/kg	1						<1.0	<1.0	<1.0	1.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
n-Nitrosodibutylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	mg/kg	1						<1.0	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Butyl Benzyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)anthracene	mg/kg	1						<1.0	<1.0	<1.0	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4,5-Tetrachlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
bis-(2-Ethylhexyl)-phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Di-n-octyl Phthalate	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachlorocyclopentadiene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Indeno(1,2,3-c,d)pyrene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Nitroaniline	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3-Nitroaniline	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Diphenylhydrazine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1-Naphthylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Naphthylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2,3,4,6-Tetrachlorophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Nitroaniline	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methyl-4,6-dinitrophenol	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
diphenylamine&diphenylnitrosam	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Phenacetin	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Aminobiphenyl	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzidine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dimethylaminoazobenzene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
n-Nitrosodimethylamine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3,3-Dichlorobenzidine	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
7,12-Dimethylbenz(a)anthracene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3-Methylcholanthrene	mg/kg	1						<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
VOC																											
Dichlorodifluoromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Bulk Soil Results

Sample Ref								TP2	TP4	TP7	TP10	TP13	TP15	TP17	TP18	TP20	TP22	TP24	TP25	TP27	TP29	TP30	TP31	TP33	TP34	TP36
Analyte	**Units**	**LOD**	**SGVs[1]**	**RPS GAC[2]**	**LQM/CIEH[3]**	**DTV[4]**	**DIV[5]**																			
Dichloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2,2-Dichloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroform	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromochloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloropropene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromomethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	ug/kg	5						<5.0	-	<5.0	<5.0	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0	<5.0
Toluene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl Chloride	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromochloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dibromoethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1,2-Tetrachloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
m&p-Xylene	ug/kg	10						<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
o-Xylene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Styrene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromoform	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
iso-Propylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Propylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2-Chlorotoluene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4-Chlorotoluene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
tert-Butylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
sec-Butylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
p-Isopropyltoluene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Butylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dibromo-3-chloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,4-Trichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hexachlorobutadiene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Naphthalene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

[1] Revised Soil Guideline Value (SGV) published by Defra
[2] RPS Generic Assessment Criteria
[3] The LQM/ CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition)
[4] Dutch Target Value
[5] Dutch Intervention Value

Bulk Soil Results

Sample Ref								TP39	TP41	TP42	TP44	TP47	TP48	TP50	TP51	TP53	TP56	TP58	TP60	TP62	TP65	TP67	TP70	TP72	TP73	TP74	TP77
Analyte	**Units**	**LOD**	**SGVs[1]**	**RPS GAC[2]**	**LQM/CIEH[3]**	**DTV[4]**	**DIV[5]**																				
Dichloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2,2-Dichloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroform	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromochloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloropropene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromomethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	ug/kg	5						<5.0	-	-	-	-	-	-	-	<5.0	<5.0	-	<5.0	-	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl Chloride	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromochloromethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dibromoethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1,2-Tetrachloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
m&p-Xylene	ug/kg	10						<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
o-Xylene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Styrene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromoform	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
iso-Propylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Propylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2-Chlorotoluene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3,5-Trimethylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4-Chlorotoluene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
tert-Butylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
sec-Butylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
p-Isopropyltoluene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Butylbenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dibromo-3-chloropropane	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,4-Trichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hexachlorobutadiene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Naphthalene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichlorobenzene	ug/kg	5						<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

[1] *Revised Soil Guideline Value (SGV) published by Defra*

[2] *RPS Generic Assessment Criteria*

[3] *The LQM/ CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition)*

[4] *Dutch Target Value*

[5] *Dutch Intervention Value*

Soil Leachate Results

Sample Ref						TP2	TP4	TP7	TP10	TP13	TP15	TP17	TP18	TP20	TP22	TP24	TP25	TP27	TP29	TP30	TP31	TP33	TP34	TP36
Analyte	**Units**	**LOD**	**IGV[1]**	**DTV[2]**	**DIV[3]**																			
Leachate BSEN 10:1 extract																								
Molybdenum, Soluble WAC	mg/l	0.002		0.005(s) 0.0036 (d)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.002	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	0.005	<0.0020	<0.0020	<0.0020	<0.0020
Antimony, Soluble WAC	mg/l	0.006		0.00015(d)	0.02	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Arsenic, Soluble WAC	mg/l	0.005	0.01			<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Barium, Soluble WAC	mg/l	0.01	0.1			<0.010	0.053	<0.010	<0.010	<0.010	<0.010	0.018	0.01	<0.010	0.02	0.027	0.032	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, Soluble WAC	mg/l	0.0001	0.005			<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Chromium, Soluble WAC	mg/l	0.0025	0.03			<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Copper, Soluble WAC	mg/l	0.01	0.03			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead, Soluble WAC	mg/l	0.01	0.01			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Mercury, Soluble WAC	mg/l	0.0005	0.001			<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Nickel, Soluble WAC	mg/l	0.02	0.02			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Selenium, Soluble WAC	mg/l	0.01	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc, Soluble WAC	mg/l	0.025	0.1			<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Chloride as Cl	mg/l	0.9	30			<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	1.1	<0.9	<0.9	1.2	<0.9	<0.9	<0.9	<0.9	1.2	<0.9	1.2
Nitrate as NO3	mg/l	1.3	25			2.6	<1.3	<1.3	<1.3	1.9	<1.3	<1.3	1.9	3.3	<1.3	3.5	4	<1.3	1.8	1.5	<1.3	<1.3	<1.3	3.7
Nitrite as N	mg/l	0.006				0.015	0.009	<0.006	0.024	0.008	0.009	0.043	0.044	0.043	<0.006	0.1	0.255	<0.006	0.011	0.037	<0.006	<0.006	<0.006	0.148
Sulphate as SO4	mg/l	1	200			8.4	24.9	1.5	3.9	2.6	3.7	21.7	21.4	2.8	15	12.5	44.6	<1.0	1	74.3	2.8	7.8	3.2	16.5
Solids, Tot Dissolved 180 DegC	mg/l	12	1000			70	64	45	66	74	47	105	81	66	34	64	166	24	47	168	34	43	41	98
TOC (Filtered)	mg/l	0.7	No abnormal change			3.69	1.33	1.46	3.22	1.78	2.61	3.42	4.44	4.78	1.05	5.17	6.35	1.59	2.91	3.52	1.91	2.19	2.19	5.82
Phenols Mono (Phenol Index)	mg/l	0.15	0.0005	0.0002	2	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Fluoride as F	mg/l	0.2				0.4	0.3	0.7	0.8	0.5	0.5	0.4	0.4	0.7	0.3	0.5	0.4	0.4	0.6	0.6	0.6	0.6	0.8	0.5
Nitrite as $N0_2$	mg/l	0	0.1			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.26	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.73
Phosphate as P, Soluble	mg/l	0.011				<0.011	<0.019	<0.011	<0.011	<0.019	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.019	<0.011	<0.011	<0.011	<0.011

[1] *Interim Guideline Values*
[2] *Dutch Guidance Target Values*
[3] *Dutch Intervention Values*

Soil Leachate Results

Sample Ref						TP39	TP41	TP42	TP44	TP47	TP48	TP50	TP51	TP53
Analyte	**Units**	**LOD**	**IGV[1]**	**DTV[2]**	**DIV[3]**									
Leachate BSEN 10:1 extract														
Molybdenum, Soluble WAC	mg/l	0.002		0.005(s) 0.0036 (d)		<0.0020	<0.0020	<0.0020	0.002	0.003	0.003	0.002	0.002	<0.0020
Antimony, Soluble WAC	mg/l	0.006		0.00015(d)	0.02	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Arsenic, Soluble WAC	mg/l	0.005	0.01			<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Barium, Soluble WAC	mg/l	0.01	0.1			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, Soluble WAC	mg/l	0.0001	0.005			<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Chromium, Soluble WAC	mg/l	0.0025	0.03			<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Copper, Soluble WAC	mg/l	0.01	0.03			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead, Soluble WAC	mg/l	0.01	0.01			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Mercury, Soluble WAC	mg/l	0.0005	0.001			<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Nickel, Soluble WAC	mg/l	0.02	0.02			<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Selenium, Soluble WAC	mg/l	0.01	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc, Soluble WAC	mg/l	0.025	0.1			<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Chloride as Cl	mg/l	0.9	30			<0.9	<0.9	<0.9	1.6	<0.9	<0.9	<0.9	<0.9	<0.9
Nitrate as NO3	mg/l	1.3	25			<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	1.9	<1.3	<1.3
Nitrite as N	mg/l	0.006				<0.006	0.021	0.015	<0.006	0.028	0.022	0.033	0.025	0.006
Sulphate as SO4	mg/l	1	200			5.3	8	10	25.2	17.7	25	12	11.8	9.2
Solids, Tot Dissolved 180 DegC	mg/l	12	1000			63	94	84	90	115	125	118	105	59
TOC (Filtered)	mg/l	0.7	No abnormal change			3.24	4.79	3.51	4.15	4.79	7.05	5.71	6.55	3.44
Phenols Mono (Phenol Index)	mg/l	0.15	0.0005	0.0002	2	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Fluoride as F	mg/l	0.2				0.6	0.5	0.4	0.4	0.5	0.4	0.9	0.3	0.4
Nitrite as NO_2	mg/l	0	0.1			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Phosphate as P, Soluble	mg/l	0.011				<0.011	<0.019	0.031	<0.011	0.212	0.035	<0.019	0.026	<0.011

Sample Ref	TP56	TP58	TP60	TP62	TP65	TP67	TP70	TP72	TP73	TP74	TP77
Analyte											
Leachate BSEN 10:1 extract											
Molybdenum, Soluble WAC	0.005	<0.0020	<0.0020	<0.0020	0.02	0.004	0.006	0.002	<0.0020	<0.0020	<0.0020
Antimony, Soluble WAC	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060	<0.0060
Arsenic, Soluble WAC	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Barium, Soluble WAC	<0.010	<0.010	<0.010	<0.010	0.01	0.029	<0.010	0.034	<0.010	0.027	<0.010
Cadmium, Soluble WAC	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Chromium, Soluble WAC	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Copper, Soluble WAC	<0.010	<0.010	<0.010	<0.010	0.015	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead, Soluble WAC	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Mercury, Soluble WAC	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Nickel, Soluble WAC	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Selenium, Soluble WAC	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc, Soluble WAC	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Chloride as Cl	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	2.6	1.5	1.2	<0.9	<0.9
Nitrate as NO3	<1.3	<1.3	2.5	<1.3	2.3	2.1	6	4.6	2.8	2.1	1.7
Nitrite as N	<0.006	0.008	0.009	0.027	0.041	0.124	0.104	0.086	<0.006	0.129	0.007
Sulphate as SO4	8.2	14.5	27.7	12.6	41.4	44.8	40.6	26	26.5	86.9	17.8
Solids, Tot Dissolved 180 DegC	56	111	92	113	153	160	131	112	79	201	86
TOC (Filtered)	2.43	3.11	5.69	3.85	13	9.81	10.5	5.08	3.22	4.86	3.42
Phenols Mono (Phenol Index)	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Fluoride as F	0.4	0.4	0.7	0.4	0.6	0.5	0.7	0.6	0.7	0.5	0.6
Nitrite as NO_2	<0.5	<0.5	<0.5	<0.5	<0.5	0.61	0.51	<0.5	<0.5	0.64	<0.5
Phosphate as P, Soluble	<0.011	<0.019	<0.011	<0.019	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011

[1] *Interim Guideline Values*
[2] *Dutch Guidance Target Values*
[3] *Dutch Intervention Values*

Stockpile Analytical Results

Appendix 9

Bulk Compositional Analysis Results

Sample Reference			STANDARDS				SP1-1	SP2-1	SP2-2	SP3-1	SP4-1	SP5-1	SP5-2	SP5-3	SP6-1	SP6-2	SP6-3	SP6-4(1)	SP6-4(2)	SP6-5(1)	SP6-5(2)	SP6-6	SP7-1	SP8-1	SP9-1	SP10-1
Analyte	**Units**	**LOD**	**SGV[1]**	**LQM/CIEH[2]**	**DTV[3]**	**DIV[4]**																				
EN 12457-3 Leachate																										
Antimony as Sb, dry weight	mg/kg	1			3	15	1.8	<1.0	1.9	1.1	1.9	2	2.3	2.2	1.7	2.3	2.5	1.8	1.8	1.7	1.7	2	3.1	1.5	1.6	1.6
Arsenic as As, dry weight	mg/kg	1	43				16	14	15	21	14	19	17	18	12	14	24	21	16	18	9.9	16	18	12	16	10
Barium as Ba, dry weight	mg/kg	5			160	625	69	36	110	69	61	71	89	53	64	67	78	62	71	58	50	74	48	68	100	57
Cadmium as Cd, dry weight	mg/kg	0.2	1.8	0.53	0.8	12	1.2	0.66	1.6	0.49	1.1	5	1.4	1.3	1.2	1.3	1.1	1.5	1.1	0.85	1.2	1.2	1.9	1.3	1.5	1.6
Chromium as Cr, dry weight	mg/kg	1		34600[5]			17	21	20	14	13	13	14	13	11	14	17	13	11	14	12	13	13	12	12	8.5
Copper as Cu, dry weight	mg/kg	5		524			37	19	34	25	26	27	34	30	20	28	29	25	26	22	19	29	43	28	26	24
Lead as Pb, dry weight	mg/kg	2			85	530	24	6.2	33	37	31	27	38	27	9.7	39	29	27	29	24	22	29	19	12	27	8.9
Mercury as Hg, dry weight	mg/kg	0.35	26[6]				<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35	<0.35
Molybdenum as Mo, dry weight	mg/kg	0.5			3	200	2.5	<0.50	1.4	<0.50	<0.50	0.7	1.7	1.8	1.5	1.8	1.7	1.8	1.7	1.3	1.6	0.99	3.2	0.74	0.51	0.7
Nickel as Ni, dry weight	mg/kg	1	230				39	20	41	22	36	30	35	38	26	34	34	30	32	27	26	35	62	40	37	34
Selenium as Se, dry weight	mg/kg	0.35	120				0.89	<0.35	0.96	0.66	1	0.84	1.7	0.84	0.81	1	0.81	<0.35	0.62	0.53	1.9	1.1	1.8	0.49	0.76	0.58
Zinc as Zn, dry weight	mg/kg	5		618			100	43	160	61	93	410	96	120	63	110	85	78	78	63	64	84	81	68	82	67
Moisture Content Ratio at 105C	% ratio	0.1					0.6	9.03	12.74	1.94	8.22	2.77	2.56	1.86	1.31	1.89	1.92	2.35	2.71	2.04	1.41	2.88	8.7	3.73	2.03	2.13
Moisture at 105C	%	0.1					0.6	8.3	11	1.9	7.6	2.7	2.5	1.8	1.3	1.9	1.9	2.3	2.6	2	1.4	2.8	8	3.6	2	2.1
TOC by Ignition in O2	%	0.1					1.4	<0.10	0.36	2.4	2.3	1.5	1.7	2.5	2.3	1.8	1.6	1.5	2	1.7	2.2	1.5	0.79	1.4	1.3	1.8
PCB, Total of 7 Congeners	mg/kg	0.01					<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Mineral Oils, >C10 - C40 [6]	mg/kg	50			50	5000	<50	54	<50	380	2700	81	81	260	200	76	130	210	290	83	220	<50	<50	<50	<50	<50
PAH (17) WAC[7]																										
Naphthalene	mg/kg	0.1		9.9			<0.10	<0.10	<0.10	0.27	0.53	0.11	0.32	<0.10	<0.10	0.12	0.3	0.23	0.24	0.21	0.45	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthylene	mg/kg	0.1		69			<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthene	mg/kg	0.1		85			<0.10	<0.10	<0.10	0.12	<0.10	<0.10	0.26	0.12	<0.10	<0.10	0.11	<0.10	<0.10	0.11	0.22	<0.10	<0.10	<0.10	<0.10	<0.10
Fluorene	mg/kg	0.1		67			<0.10	<0.10	<0.10	<0.10	0.11	<0.10	0.23	<0.10	<0.10	<0.10	0.18	0.13	0.12	<0.10	0.57	<0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	mg/kg	0.1		38			0.13	<0.10	<0.10	1.2	1	0.25	1.3	0.17	<0.10	0.24	0.66	0.87	0.51	0.47	1.7	0.26	<0.10	<0.10	<0.10	<0.10
Anthracene	mg/kg	0.1		950			<0.10	<0.10	<0.10	0.47	0.35	0.15	0.61	<0.10	<0.10	<0.10	0.26	0.51	0.21	0.31	0.64	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	mg/kg	0.1		130			0.12	<0.10	<0.10	1.7	2.2	0.66	2.5	<0.10	<0.10	0.25	0.61	1.9	0.61	1.2	1.8	0.17	<0.10	<0.10	<0.10	<0.10
Pyrene	mg/kg	0.1		270			0.11	<0.10	<0.10	1.7	2	0.64	2	0.25	<0.10	0.36	0.58	1.7	0.41	1	0.34	0.21	<0.10	<0.10	<0.10	<0.10
Benzo(a)anthracene	mg/kg	0.1		5.5			<0.10	<0.10	<0.10	0.85	1.2	0.36	1	0.17	<0.10	0.2	0.35	0.86	0.2	0.55	0.45	0.11	<0.10	<0.10	<0.10	<0.10
Chrysene	mg/kg	0.1		5.8			<0.10	<0.10	<0.10	0.76	1.2	0.35	0.91	0.17	<0.10	0.18	0.29	0.8	0.17	0.49	0.18	0.12	<0.10	<0.10	<0.10	<0.10
Benzo(b)fluoranthene	mg/kg	0.1		7.4			<0.10	<0.10	<0.10	0.66	1.1	0.33	0.72	0.15	<0.10	0.17	0.26	0.55	0.14	0.32	0.13	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(k)fluoranthene	mg/kg	0.1		14			<0.10	<0.10	<0.10	0.42	0.66	0.2	0.48	<0.10	<0.10	<0.10	0.16	0.37	0.1	0.24	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)pyrene	mg/kg	0.1		1.2			<0.10	<0.10	<0.10	0.85	1.2	0.39	1	0.23	<0.10	0.17	0.28	0.67	0.17	0.42	0.14	<0.10	<0.10	<0.10	<0.10	<0.10
Dibenz(a,h)anthracene	mg/kg	0.1		1.5			<0.10	<0.10	<0.10	<0.10	0.13	<0.10	0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	mg/kg	0.1		120			<0.10	<0.10	<0.10	0.72	0.88	0.34	0.68	0.19	<0.10	0.14	0.22	0.61	0.14	0.37	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1		3.8			<0.10	<0.10	<0.10	0.72	0.84	0.36	0.64	0.18	<0.10	0.11	0.2	0.53	0.15	0.37	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Coronene	mg/kg	0.1					<0.10	<0.10	<0.10	0.12	0.16	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	0.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
PAH, Total of 17 WAC	mg/kg	1					<1.0	<1.0	<1.0	11	14	4.1	13	1.6	<1.0	1.9	4.4	10	3.2	6.1	6.7	<1.0	<1.0	<1.0	<1.0	<1.0
Dry Ratio (BSEN 12457)	%						99.4	91.72	88.7	98.1	92.41	97.3	97.5	98.17	98.71	98.15	98.12	97.71	97.36	98	98.61	97.2	92	96.4	98.01	97.91
BTEX 327 Headspace GCMS mg/kg																										
Benzene [7]	mg/kg	0.1	0.07		0.01	1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Toluene	mg/kg	0.1	120				<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	mg/kg	0.1	90				<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
m&p-Xylene	mg/kg	0.2	160 [7]				<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
o-Xylene	mg/kg	0.1	160				<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

[1] *Soil Guideline Value*

[2] *The LQM/ CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd Edition)*

[3] *Dutch Target Value*

[4] *Dutch Intervention Value*

[5] *Standard for Chromium III used from LQM*

[6] *Value for Elemental Mercury used for SGV*

[7] *Standard for p-xylene used for SGV*

Waste Acceptance Criteria Results

Sample Ref				SP1-1	SP2-1	SP2-2	SP3-1	SP4-1	SP5-1	SP5-2	SP5-3	SP6-1	SP6-2	SP6-3	SP6-4(1)	SP6-4(2)	SP6-5(1)	SP6-5(2)	SP6-6	SP7-1	SP8-1	SP9-1	SP10-1
Analyte	**Units**	**LOD (mg/kg)**	**WAC[1]: Inert 10:1 Conc Leachate mg/kg**																				
Leachate BSEN 10:1 extract																							
Molybdenum, Soluble WAC	mg/kg	0.02	0.5	0.06	0.09	0.23	0.06	<0.02	0.1	0.17	<0.02	0.03	0.08	0.05	0.06	0.08	0.08	0.07	0.17	0.02	0.06	0.08	0.08
Antimony, Soluble WAC	mg/kg	0.06	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Arsenic, Soluble WAC	mg/kg	0.05	0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium, Soluble WAC	mg/kg	0.1	20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	0.12	<0.1	0.12	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium, Soluble WAC	mg/kg	0.001	0.04	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium, Soluble WAC	mg/kg	0.025	0.5	<0.025	<0.025	<0.025	0.03	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Copper, Soluble WAC	mg/kg	0.1	2	<0.1	<0.1	0.13	0.2	<0.1	0.15	0.18	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.14	<0.1
Lead, Soluble WAC	mg/kg	0.1	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mercury, Soluble WAC	mg/kg	0.005	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel, Soluble WAC	mg/kg	0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Selenium, Soluble WAC	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc, Soluble WAC	mg/kg	0.25	4	0.3	0.31	0.33	0.31	<0.25	0.31	0.6	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.26	0.27	0.27	0.28	0.29
Chloride as Cl	mg/kg	9	800	26	15	26	22	17	14	46	43	12	23	<9	<9	37	<9	47	20	21	19	21	12
Sulphate as SO4	mg/kg	10	1000	<10	98	124	313	618	160	201	116	71	170	159	227	842	415	357	307	13	<10	26	11
Solids, Tot Dissolved 180 DegC	mg/kg	120	4000	970	950	1060	1140	1300	780	800	970	450	990	830	920	1760	1470	1450	910	300	480	1250	370
TOC (Filtered)	mg/kg	7	30000	18.3	63.6	82.1	49.8	28.8	69.5	70.8	63.4	26.5	71.3	57.4	66.6	48.6	51.3	48.2	26.9	14.5	16.7	17.8	17.5
Phenols Mono (Phenol Index)	mg/kg	1.5	1	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Fluoride as F	mg/kg	2	10	<2	11	26	3	4	4	4	5	5	5	4	5	4	4	4	4	5	8	6	3

[1] *Waste Aceptance Criteria for inert landfills as set out in Council Decision 2003/33/EC*

RPS

Groundwater Analytical Results

Appendix 10

Groundwater Results

Sample Ref			STANDARDS				G1 Groundwater	G2 Groundwater	Castle Baggot House
Analyte	**Units**	**LOD**	**2010 Regs[1]**	**EQS/ IGV[2]**	**DTV[3]**	**DIV[4]**			
Barium, Filtered as Ba	mg/l	0.0006		0.1			0.084	0.051	0.012
Cadmium, Filtered as Cd	mg/l	0.0006	0.00375	0.005			<0.0006	<0.0006	<0.0006
Chromium, Filtered as Cr	mg/l	0.0007	0.0375	0.03			0.0007	0.0007	<0.0007
Copper, Filtered as Cu	mg/l	0.001	1.5	0.03			0.001	0.001	<0.001
Lead, Filtered as Pb	mg/l	0.005	0.018	0.01			<0.005	<0.005	<0.005
Mercury, Filtered as Hg	mg/l	0.0001	0.00075	0.001			<0.0001	<0.0001	<0.0001
Molybdenum, Filtered as Mo	mg/l	0.002			0.005 (s) 0.0036 (d)	0.3	<0.002	<0.002	<0.002
Nickel, Filtered as Ni	mg/l	0.002	0.015	0.02			<0.002	0.002	<0.002
Zinc, Filtered as Zn	mg/l	0.003		0.1			<0.003	0.031	<0.003
Chloride as Cl	mg/l	0.9	24 - 187.5	30			37.6	25.5	8.9
Nitrate as NO3	mg/l	1.3	37.5	25			<1.3	<1.3	2.1
Nitrite as N	mg/l	0.006	-	-	-	-	<0.006	<0.006	0.008
Sulphate as SO4	mg/l	1	187.5				110	79.3	35.6
Solids, Tot Dissolved 180 DegC	mg/l	12	-	1000	-	-	533	467	358
TOC (Filtered)	mg/l	0.7	-	No abnormal change	-	-	0.98	1.03	1.03
Phenols Mono (Phenol Index)	mg/l	0.15	0.0005		0.0002	2	<0.15	<0.15	<0.15
Fluoride as F	mg/l	0.2	1	1			1	0.7	<0.2
Antimony, Filtered as Sb	mg/l	0.0016			No Value (s) 0.00015 (d)	0.02	<0.0016	<0.0016	0.0028
Arsenic, Filtered as As	mg/l	0.0008	0.0075	0.01	0.01 (s) 0.0072 (d)	0.06	<0.0008	0.0014	0.0134
Nitrite as N02	mg/l	Calc.	0.375	0.1			<0.5	<0.5	<0.5
Selenium, Filtered as Se	mg/l	0.0016			No value (s) 0.00007 (d)	0.16	0.002	0.002	<0.0016
Phosphate as P, Soluble	mg/l	0.011	-	-	-	-	0.222	0.015	0.866

[1] European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) (Schedule 5)

[2] Interim Guideline Values for Groundwater as presented in EPA Interim Report "Towards Setting Guideline Values for the Protection of Groundwater in Ireland, 2002" Tables 3.1, 3.2, 3.3

[3] Dutch Target Values for 'target value shallow' (s) and 'target value deep' (d)

[4] Dutch Intervention Value

RPS

Surface Water Analytical Results

Appendix 11

Surfacewater Results

STS Results Ref							754391	754391	754391	754391
Sample Ref			STANDARDS				S1 Surface	S2 Surface	S3 Surface	S4 Surface
Analyte	Units	LOD	EPA Landfill Monitoring Manual 2003	Surface Water Regulations 2009		IGV's for groundwater 2003	Downstream Griffen River	Upstream Griffen River	Upstream Cammock River	Downstream Cammock River
			MRV 'clean' [1]	AA-EQS Inland surface water[2]	MAC-EQS Inland surface water[3]	IGV's [4]				
Boron, Filtered as B	mg/l	0.12	0.2			1.0	<0.12	<0.12	<0.12	<0.12
Cadmium, Filtered as Cd	mg/l	0.0006	0.0005	0.00025	0.0015	0.005	<0.0006	0.0006	<0.0006	<0.0006
Calcium, Filtered as Ca	mg/l	0.38	1			200	143	173	135	156
Chromium, Filtered as Cr	mg/l	0.0007	0.005			0.03	<0.0007	<0.0007	<0.0007	<0.0007
Copper, Filtered as Cu	mg/l	0.001	0.005	0.03	-	0.03	0.001	<0.001	<0.001	<0.001
Iron, Filtered as Fe	mg/l	0.19	0.05			0.2	<0.19	<0.19	<0.19	<0.19
Lead, Filtered as Pb	mg/l	0.005	0.005	0.0072	n/a	0.01	<0.005	<0.005	<0.005	<0.005
Magnesium, Filtered as Mg	mg/l	0.25	1			50	7.89	8.54	7.49	7.45
Manganese, Filtered as Mn	mg/l	0.004	0.02			0.05	0.026	0.033	0.037	0.128
Mercury, Filtered as Hg	mg/l	0.0001	0.0001	0.00005	0.00007	0.001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel, Filtered as Ni	mg/l	0.002	0.005	0.02	n/a		<0.002	<0.002	<0.002	<0.002
Potassium, Filtered as K	mg/l	0.18	1			5	1.95	1.59	3.42	0.83
Sodium, Filtered as Na	mg/l	0.31	1			150	8.7	10.2	16.9	6.6
Zinc, Filtered as Zn	mg/l	0.003	0.008	0.1	-	0.1	<0.003	<0.003	0.004	0.005
Conductivity- Electrical 20C	uS/cm	30	10			1000	579	682	617	632
Alkalinity as CaCO3	mg/l	2.2	5			no abnormal change	260	307	226	304
Ammoniacal Nitrogen as N	mg/l	0.19	0.05				<0.19	<0.19	<0.19	<0.19
Chloride as Cl	mg/l	0.9	2			30	23.5	27.7	38.3	19.4
Nitrogen, Total Oxidised as N	mg/l	0.29	1				<0.29	<0.29	<0.29	<0.29
Phosphate, Ortho as P	mg/l	0.08					<0.08	<0.08	<0.08	<0.08
Sulphate as SO4	mg/l	1	20			200	52.8	70.8	74.3	45.5
Suspended Solids	mg/l	0.5	5				3	2	16	6
BOD + ATU (5 day)	mg/l	1	2				<1	<1	<1	2
COD (Total)	mg/l	11	10				<11	<11	<11	<11
Cyanide, Total as CN	mg/l	0.009	0.01	0.01	-	0.01	<0.009	<0.009	<0.009	<0.009
Fluoride as F	mg/l	0.2	0.1	0.5	-	1	<0.2	<0.2	<0.2	<0.2
Atrazine	ug/l	0.04	0.1	0.6	2		<0.040	<0.040	<0.040	<0.040
Simazine	ug/l	0.04	0.1	1	4		<0.040	<0.040	<0.040	<0.040
Acenaphthene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Anthracene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Benzo (a) anthracene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Benzo (g,h,i) perylene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Benzo (a) pyrene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Benzo (b) fluoranthene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Benzo (k) fluoranthene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Chrysene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Dibenz (a,h) anthracene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/l	0.01	0.1	0.1	1		<0.01	<0.01	<0.01	<0.01
Fluorene	ug/l	0.01	0.1	-			<0.01	<0.01	<0.01	<0.01
Indeno (1,2,3) cd pyrene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/l	0.01	0.1	2.4	n/a		<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Pyrene	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
PAH, Total	ug/l	0.01	0.1				<0.01	<0.01	<0.01	<0.01
Tributyl Tin	ug/l	0.02					<0.02	<0.02	<0.02	<0.02
Arsenic, Filtered as As	mg/l	0.0008	0.005		-		<0.0008	<0.0008	<0.0008	0.001
SVOC	ug/l						y	y	y	y
Phenol	ug/l	1	0.1	8	46		<1.0	<1.0	<1.0	<1.0
Bis(2-chloroethyl)ether	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	ug/l		0.1				<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2-Methylphenol	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
3&4-Methylphenol	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Dibenzofuran	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Bis(2-chloroisopropyl)ether	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
n-Nitrosodi-n-propylamine	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Hexachloroethane	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Nitrobenzene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Isophorone	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2,4-Dimethylphenol	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2-Nitrophenol	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Bis(2-chloroethoxy)methane	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2,4-Dichlorophenol	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Naphthalene	ug/l	2	0.1				<2.0	<2.0	<2.0	<2.0
Hexachlorobutadiene	ug/l	1	0.1	0.1	0.6		<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2-Methylnaphthalene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2,4,6-Trichlorophenol	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2,4,5-Trichlorophenol	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2-Chloronaphthalene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Dimethylphthalate	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2,6-Dinitrotoluene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Acenaphthylene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Acenaphthene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
2,4-Dinitrotoluene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Diethylphthalate	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
4-Nitrophenol	ug/l	5	0.1				<5.0	<5.0	<5.0	<5.0
4-Chlorophenyl phenyl ether	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Fluorene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Diphenylamine	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
4-Bromophenyl Phenyl Ether	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Hexachlorobenzene	ug/l	1	0.1	0.01	0.05		<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	ug/l	1	0.1	0.4	1		<1.0	<1.0	<1.0	<1.0
Phenanthrene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Anthracene	ug/l	1	0.1	0.1	0.4		<1.0	<1.0	<1.0	<1.0
di-n-Butylphthalate	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Fluoranthene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Pyrene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Benzyl Butyl Phthalate	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Benzo(a)anthracene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Chrysene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Bis(2-ethylhexyl)phthalate	ug/l	5	0.1				<5.0	<5.0	<5.0	<5.0
Di-n-octylphthalate	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
Benzo(b)fluoranthene	ug/l	1	0.1	0.03	n/a		<1.0	<1.0	<1.0	<1.0
Benzo(k)fluoranthene	ug/l	1	0.1		n/a		<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	ug/l	1	0.1	0.05	0.1		<1.0	<1.0	<1.0	<1.0
Indeno(1,2,3-c,d)pyrene	ug/l	1	0.1	0.002	n/a		<1.0	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene	ug/l	1	0.1		n/a		<1.0	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene	ug/l	1	0.1				<1.0	<1.0	<1.0	<1.0
VOC	ug/l						Y	Y	Y	Y
Dichloromethane	ug/l	1	1	10	n/a		<1.0	<1.0	<1.0	<1.0
Toluene	ug/l	1	1	10	-		<1.0	<1.0	<1.0	<1.0
m,p-Xylene	ug/l	1	1	10	-		<1.0	<1.0	<1.0	<1.0
o-Xylene	ug/l	1	1	10	-		<1.0	<1.0	<1.0	<1.0

[1] Minimum Reporting Value for 'clean' ('clean' waters refers to surface waters, groundwaters and drinking waters)
[2] AA-EQS: Annual Average (Environmental Quality Standard)
[3] MAC-EQS: Maximum Allowable Concentration (Environmental Quality Standard)
[4] Interim Guideline Values

Characterisation Survey Results

Appendix 12

	UNIT	TP2	TP 4	TP 7	TP 10	TP 13	TP 15	TP 17	TP 18	TP 20	TP 22	TP 24	TP 25	TP 27	TP 29	TP 30	TP 31	TP 33	TP 34	TP36	TP 39	TP 41
Date Characterised		**02.02.2011**	**25.01.2011**	**04.02.2011**	**07.02.2011**	**24.01.2011**	**04.02.2011**	**01.02.2011**	**31.01.2011**	**04.02.2011**	**07.02.2011**	**31.01.2011**	**31.01.2011**	**04.02.2011**	**07.02.2011**	**25.01.2011**	**03.02.2011**	**04.02.2011**	**03.02.2011**	**31.01.2011**	**01.02.2011**	**26.01.2011**
Sample Weight		**452.680**	**740.750**	**330.035**	**392.970**	**562.150**	**502.525**	**383.065**	**553.390**	**399.425**	**536.490**	**461.665**	**448.935**	**542.260**	**422.390**	**489.375**	**600.220**	**508.955**	**510.990**	**514.140**	**507.765**	**356.640**
Trial Pits Sampled	**39**																					
Biodegradable waste from garden & park	kg	2.110	0.055	0.225	0.310	0.045	0.060	0.940	<0.001	0.070			2.870		6.180	3.795	2.340		0.140	7.135	0.340	
Papers & Cardboard	kg								<0.001							0.040			<0.001			
Composites	kg		0.550					0.480					0.105			0.015						
Textiles	kg			0.170				0.060				5.975	0.085			0.120		0.430				
Plastics	kg	0.110			<0.001			0.305	0.360			0.055	0.270			0.285		0.310		0.110		0.370
Glass	kg		0.035		0.135	<0.001						<0.001	0.190		<0.001	0.060		0.020			0.105	
Metals	kg			0.075				0.100				0.100	0.040								0.115	0.090
Wood	kg								0.010			0.065	0.075									0.125
Stones/rocks	kg	95.680	228.385	67.210	110.920	36.740	45.645	88.010	122.465	39.500	116.930	122.745	102.610	89.790	43.330	200.255	87.070	110.950	14.250	154.125	57.645	108.305
Soils	kg	349.650	511.110	262.355	281.260	525.330	456.820	285.885	326.210	359.670	419.560	327.990	339.555	451.730	372.310	282.415	510.410	392.375	496.580	351.665	449.150	244.810
Concrete	kg	0.045						0.220	37.565				0.035	0.700				4.780			0.280	
Bricks	kg	4.825			0.345		<0.001	0.470	0.860	0.185		0.055	0.015	<0.001		0.140				0.075		0.005
Wire	kg																			<0.001		
Rope	kg											<0.001	0.010			0.050						
Natural Wood	kg	0.115	0.615			0.020		0.100	0.070			0.030	0.520	0.040	0.570	0.220	0.400	0.090	<0.001		0.130	0.210
Timber	kg							0.185					0.605			0.040						
Man Made Wood	kg							0.095			<0.001		0.145			1.205			0.020			0.140
Ceramic	kg	0.145			<0.001	0.015			0.175				0.495	<0.001		0.035				0.005		0.025
Tar	kg							6.215	65.675			4.650	1.310			0.700				1.025		2.560
Sample Size Total		**452.680**	**740.750**	**330.035**	**392.970**	**562.150**	**502.525**	**383.065**	**553.390**	**399.425**	**536.490**	**461.665**	**448.935**	**542.260**	**422.390**	**489.375**	**600.220**	**508.955**	**510.990**	**514.140**	**507.765**	**356.640**

	UNIT	TP 42	TP 44	TP 47	TP 48	TP 50	TP 51	TP 53	TP 56	TP 58	TP 60	TP 62	TP 65	TP 67	TP 70	TP 72	TP 73	TP 74	TP 77	TOTAL	%
Date Characterised		**27.01.2011**	**28.01.2011**	**27.01.2011**	**28.01.2011**	**26.01.2011**	**27.01.2011**	**28.01.2011**	**28.01.2011**	**27.01.2011**	**28.01.2011**	**27.01.2011**	**01.02.2011**	**01.02.2011**	**02.02.2011**	**02.02.2012**	**04.02.2011**	**03.02.2013**	**03.02.2011**		
Sample Weight		**422.405**	**454.810**	**398.745**	**448.343**	**367.545**	**443.770**	**552.805**	**557.770**	**372.455**	**517.620**	**281.225**	**423.820**	**625.220**	**561.087**	**508.430**	**491.885**	**506.250**	**676.010**		
Trial Pits Sampled	**39**																				
Biodegradable waste from garden & park	kg	0.080	0.305	0.190	0.115	1.260	0.285	0.440	0.005	0.060	0.115		8.780	1.480	0.712	1.350	0.095	5.440	3.720	51.047	0.27113705
Papers & Cardboard	kg													<0.001				<0.001		0.040	0.00021246
Composites	kg	3.835		2.045	<0.001				<0.001		29.435	0.175	0.045	0.225				<0.001		36.910	0.19604812
	kg	0.190			0.045						0.175	0.415				0.105				7.770	0.04127049
	kg	0.105	0.270	1.120	0.190	0.100		0.020	0.060	<0.001	0.900	0.175	0.110	0.265	<0.001	0.375		0.990		6.855	0.03641045
	kg		<0.001	<0.001		0.130			0.025	<0.001	0.040				0.060	0.065		0.065		0.930	0.00493971
	kg		<0.001	0.540	0.750	0.180		2.135	<0.001		<0.001		0.695	0.185	0.060	0.825		0.520		6.410	0.03404683
	kg			0.760	<0.001											0.140				1.175	0.00624103
	kg	226.240	127.320	151.160	139.948	87.270	242.160	193.180	145.020	62.570	155.660	59.770	148.235	194.210	156.410	98.630	165.325	163.470	257.780	4816.918	25.585146
	kg	162.050	321.730	173.200	305.420	278.250	201.160	356.665	411.520	300.645	315.950	180.320	264.610	421.455	382.230	398.820	326.380	318.230	401.220	13516.695	71.794167
	kg	25.570	3.275	63.950	1.330			0.110	0.580	8.900	10.935	40.320	<0.001	1.945	19.700	5.110		0.190	12.360	237.900	1.2636101
	kg		<0.001	3.200		<0.001		0.055	0.040	<0.001	2.610	<0.001	0.700	3.265	0.475	2.300		13.210		32.830	0.17437713
Wire	kg				0.105															0.105	0.00055771
Rope	kg																			0.060	0.00031869
Natural Wood	kg	0.585	0.075	0.235	0.235	0.120	0.165	0.120	0.055	0.145	0.075	0.050	0.470	1.955		0.290		0.555	0.175	8.435	0.04480265
Timber	kg		0.025	1.270	<0.001						1.030	<0.001	0.145							3.300	0.01752801
Man Made Wood	kg			0.050	0.205						0.020			0.235	0.995	0.145	0.085	3.440	0.020	6.800	0.03611832
Ceramic	kg			1.025	<0.001				<0.001	0.135	0.135		0.030	<0.001	0.195			0.090		2.505	0.01330535
Tar	kg	3.750	1.810			0.235		0.080	0.465		0.540		<0.001		0.250	0.275		0.050	0.735	90.325	0.47976285
																				0.000	0
Sample Size Total		**422.405**	**454.810**	**398.745**	**448.343**	**367.545**	**443.770**	**552.805**	**557.770**	**372.455**	**517.620**	**281.225**	**423.820**	**625.220**	**561.087**	**508.430**	**491.885**	**506.250**	**676.010**	18827.010	**100**

Characterisation Survey Photographs

Appendix 13

Grange Castle Waste Characterisation Photos

Sample prior to sorting 2
25.01.2011

Sample prior to sorting
25.01.2011

TP02 Biodegradeable Waste

TP02 Brick

TP02 Ceramic

TP02 Concrete

TP02 Natural Wood

TP02 Plastic

TP02 Soil

TP04 Biodegradeable Waste
from Garden and Park

TP04 Composite

TP04 Glass

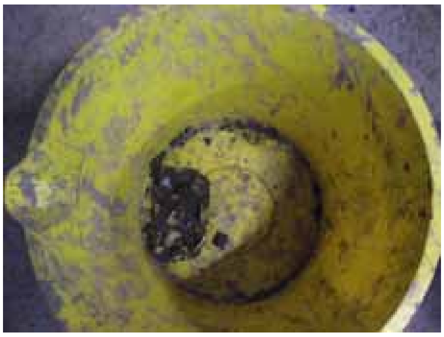
Grange Castle Waste Characterisation Photos

TP04 Natural Wood

TP04 Stones

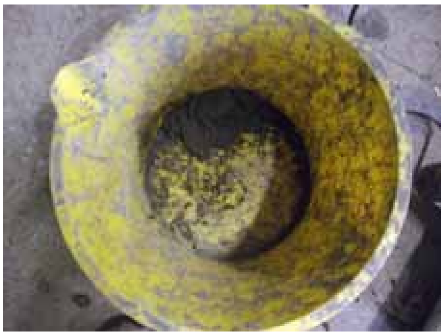
TP07 Biodegradeable Waste

TP07 Initial Sample



TP07 Metals

TP07 Soil



TP07 Textiles

TP10 Biodegradeable waste

TP10 Brick

TP10 Ceramics

TP10 Glass

TP10 Plastic

Grange Castle Waste Characterisation Photos

TP10 Soil

TP13 Soil less than 20mm 24.01.2011

TP15 Biodegradeable Waste

TP15 Brick

TP15 Initial Sample

TP15 Soil

TP17 Biodegradable Waste from Garden

TP17 Brick

TP17 Concrete

TP17 Man Made Wood

TP17 Metals

TP17 Natural Wood

Grange Castle Waste Characterisation Photos

TP17 Other Composite Packaging

TP17 Plastics

TP17 Soil

TP17 Tar

TP17 Textile

TP17 Timber

TP17_Soil

TP18 Biodegradable Waste from Garden

TP18 Brick

TP18 Ceramics

TP18 Concrete

TP18 Natural Wood

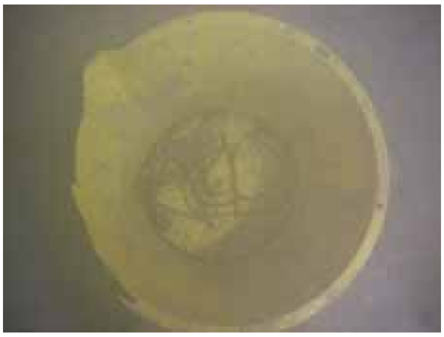
Grange Castle Waste Characterisation Photos

TP18 Papers & Cardboard

TP18 Plastic

TP18 Tar

TP18 Wood



TP20 Biodegradeable Waste

TP20 Brick

TP20 Soil

Grange Castle Waste Characterisation Photos

TP22 Man Made Wood

TP22 Soil

TP24 Brick

TP24 Glass

TP24 Metals

TP24 Natural Wood

TP24 Plastic

TP24 Rope

TP24 Soil

TP24 Tar

TP24 Textile

TP24 Wood

Grange Castle Waste Characterisation Photos

TP24

TP24_

TP24_Soil

TP25 Biodegradable Waste from Garden

TP25 Brick

TP25 Ceramics

TP25 Concrete

TP25 Glass

TP25 Man Made Wood

TP25 Metals

TP25 Natural Wood

TP25 Other Composite Packaging

Grange Castle Waste Characterisation Photos

TP25 Plastic

TP25 Rope

TP25 Soil

TP25 Tar

TP25 Textile

TP25 Timber

TP25 Wood

TP25

TP27 Brick

TP27 Ceramics

TP27 Concrete

TP27 Natural Wood

Grange Castle Waste Characterisation Photos

TP29 Biodegradeable Waste

TP29 Initial Sample

TP29 Natural Wood

TP29 Plastic

TP29 Soil

TP30 Biodegradeable Waste from Garden and Park

TP30 Brick

TP30 Ceramics

TP30 Composites

TP30 Concrete

TP30 Glass

TP30 Man Made Wood

Grange Castle Waste Characterisation Photos

TP30 Natural Wood

TP30 Plastic

TP30 Ropes

TP30 Sample Prior to Sampling 25.01.2011

TP30 Textiles

TP30 Timber

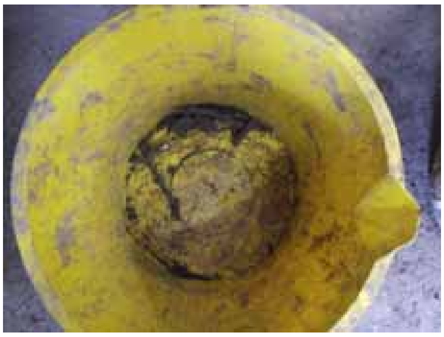
TP30 Unclassified Combustibles

Grange Castle Waste Characterisation Photos

TP33 Concrete

TP33 Glass

TP33 Initial Sample



TP33 Natural Wood

TP33 Plastic

TP33 Soil

TP33 Stones example

TP33 Textile

TP34 Biodegradeable Waste

TP34 Initial Sample

TP34 Natural Wood

TP34 Papers

Grange Castle Waste Characterisation Photos

TP36 Biodegradeable Waste from Garden and Park

TP36 Brick

TP36 Ceramics

TP36 Composites

TP36 Concrete

TP36 Glass

TP36 Metals

TP36 Plastic

TP36 Sample prior to sorting 26.01.2011

TP36 Soil

TP36 Timber

TP39 Biodegradable Waste from Garden

Grange Castle Waste Characterisation Photos

TP39 Concrete

TP39 Glass

TP39 Metals

TP39 Natural Wood

TP39 Soil

TP39

TP41 Brick

TP41 Ceramics

TP41 Man Made Wood

TP41 Metals

TP41 Natural Wood

TP41 Plastic

Grange Castle Waste Characterisation Photos

TP41 Sample prior to characterising 26.01.2011

TP41 Soil less than 20mm

TP41 Tar

TP41 Wood

TP42 Concrete

TP42 Metals

TP47 Biodegradable Waste from Garden

TP47 Concrete

TP47 Natural Wood

TP47 Plastic

TP47 Textile

TP47 Unclassified Incombustables

Grange Castle Waste Characterisation Photos

TP47_Concrete

TP47_Soil

TP50 Biodegradeable Wast
from garden and park

TP50 Brick

TP50 Glass

TP50 Metals

TP50 Natural Wood

TP50 Plastic

TP50 Stones

TP50 Tar

Grange Castle Waste Characterisation Photos

TP51 Biodegradable Waste from Garden

TP51 Brick

TP51 Ceramics

TP51 Concrete

TP51 Man Made Wood

TP51 Metals

TP51 Natural Wood

TP51 Other Composite Packaging

TP51 Plastic

TP51 Timber

TP51 Wood

TP51_Concrete

Grange Castle Waste Characterisation Photos

TP58 Biodegradable Waste from Garden

TP58 Brick

TP58 Ceramic

TP58 Concrete

TP58 Glass

TP58 Natural Wood

TP58 Plastic

TP58 Sample prior to characterisation

TP58 soil

TP62 Ceramics

TP62 Concrete

TP62 Natural Wood

Grange Castle Waste Characterisation Photos

TP62 Plastics

TP62 soil prior to characterisation

TP62 Textile

TP62 Unclassified Combustibles

TP62_Concrete

TP65 Biodegradable Waste from Garden

TP65 Brick

TP65 Ceramics

TP65 Concrete

TP65 Metals

Tp65 Natural Wood

TP65 Other Composite Packaging

Grange Castle Waste Characterisation Photos

TP65 Plastics

TP65 Soil prior to characterisation

TP65 Soil Sample

TP65 Tar

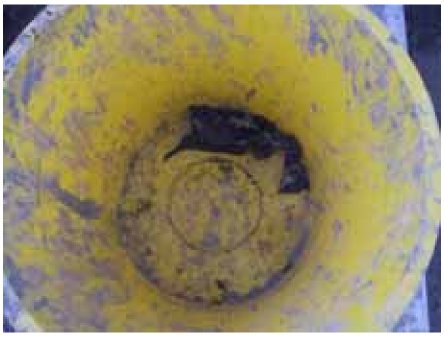
TP67 Biodegradable Waste from Garden

TP67 Brick

TP67 Ceramics

TP67 Concrete

TP67 Glass



TP67 Metals

TP67 Natural Wood

TP67 Other Composite Packaging

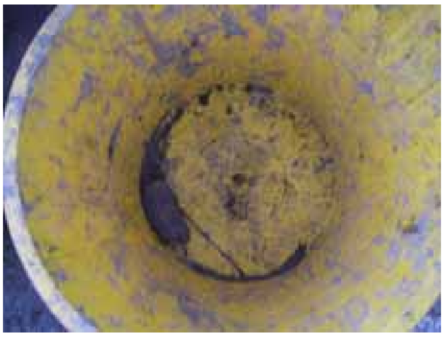
Grange Castle Waste Characterisation Photos

TP67 Papers & Cardboard

TP67 Plastic

TP67 Soil prior to characterisation

TP67 Timber



TP67 Wood

Grange Castle Waste Characterisation Photos

TP70 Biodegradeable Waste

TP70 Brick

TP70 Ceramics

TP70 Concrete

TP70 Glass

TP70 manmade wood

TP70 Metals

TP70 Natural Wood

TP70 Plastic

TP70 Soil

TP70 Tar

TP72 Biodegradable Waste

Grange Castle Waste Characterisation Photos

TP72 Brick

TP72 Concrete

TP72 Glass

TP72 Initial Samples

TP72 Manmade wood

TP72 Metal

TP72 Natural Wood

TP72 Plastic

TP72 Soil

TP72 Tar

TP72 Textiles

TP72 Wood

Grange Castle Waste Characterisation Photos

TP73 Biodegradeable Waste

TP73 Initial Sample

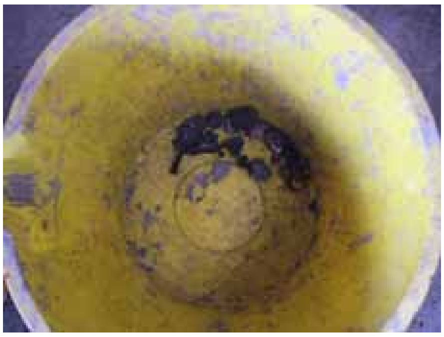
TP73 Man Made Wood

TP73 Soil

TP74 Biodegradeable Waste

TP74 Brick

TP74 Ceramic



TP74 Composite

TP74 Concrete

TP74 Glass

TP74 Initial Samples

TP74 Man Made Wood

Grange Castle Waste Characterisation Photos

TP74 Metal

TP74 Natural Wood

TP74 Papers

TP74 Plastic

TP74 Soil

TP74 Stones example

TP74 Tar

TP77 Biodegradeable Waste

TP77 Concrete

TP77 Initial Sample

TP77 Man Made Wood

TP77 Natural Wood

Grange Castle Waste Characterisation Photos

TP77 Soil

TP77 Tar

RPS

Asbestos Results

Appendix 14

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E rpsanw@rpsgroup.com **W** www.rpsgroup.com

1709

CERTIFICATE OF ASBESTOS ANALYSIS

Analytical Laboratory: Warrington Laboratory Date of issue: 22 Feb 2011

Report Number	:	FYAB0030/ 208
Client	:	RPS Dublin
Address	:	RPS, West Pier Business Campus, Dun Laoghaire, Co Dublin
Number of samples	:	01
Sampling site*	:	Grangecastle Golf Course
Sampling address*	:	Unknown
Submitted by	:	P Lambe

Report

The sample(s) referred to below have been analysed for asbestos content dispersion staining and polarised light microscopy, using UKAS accredited RPS documented in-house test method RPSCA/3, in accordance with the requirements of HSE method HSG 248.

Lab Ref. No.	Date Analysed	Reported Location*	Description*	Asbestos Fibre Type(s)
S210843	22 Feb 11	External cement pipe (WP 000019)	Cement	Chrysotile

*Where samples are supplied by the client, RPS Consultants Ltd can accept no responsibility for the sampling strategies employed and the sampling information supplied. RPS Consultants Ltd can accept no responsibility for any interpretation of the sampling information contained in this report by any parties. The sampling description above is our opinion only and is not covered within the scope of our UKAS accreditation.

Technical Reviewer: Andy Groom Analyst: G Cooper

Signed

UpdatedTier 1 Assessment Matrix

Appendix 15

Source Assessment	Score Matrix	Score	Max	Notes/ Justification
Leachate	1a	1.5	10	> 5ha
Gas	1b	1	10	> 5ha
Leachate Migration Pathway Assessment	**Score Matrix**	**Score**	**Max**	**Notes/ Justification**
Vertical Pathway (Aquifer Vulnerability)	2a	3	3	Holes 14 & 15 (E) 5 Holes (H) (from GSI website)
Horizontal Pathway (Groundwater Flow Regime)	2b	1	5	LI (Locally Important Aquifer)
Surface Water Pathway	2c	2	2	Yes
Gas Migration Pathway Assessment	**Score Matrix**	**Score**	**Max**	**Notes/ Justification**
Assuming lateral migration (assuming receptor within 250m of source))	2d	3	3	Tills underlie infill material
Vertical migration (assuming receptor located above source)	2e	N/A	5	N/A No receptor located above source
Receptor Assessment	**Score Matrix**	**Score**	**Max**	**Notes/ Justification**
Residential dwellings with potential for private water supply	3a	1	3	Greater than 250m but less than 1km (Note houses <50m (Bladonnel House) are upgradient of groundwater flow direction and have been excluded)
Protected Areas	3b	0	3	Greater than 1km of waste body
Aquifer	3c	3	5	LI (Locally Important Aquifer)
Public Water Supplies	3d	0	7	Greater than 1km (no karst aquifer)
Surface Water Bodies	3e	2	3	Greater than 50m but less than 250m
Buildings and enclosed spaces used by humans or livestock	3f	5	5	House within 50m however no biodegradable waste encountered on site

Source	Pathway	Receptor	% Score	Risk Classification
(1a) Leachate	(2a,b&c) Groundwater and Surface Water migration	(3e) Surface Water body	6	Low
		(3b) Protected Area (Surface Water dependent terrestrial ecosystem)	0	No Linkage
	(2a&b) Groundwater Migration	(3a) Private Well	2.5	Low
		(3b) Protected Area (Groundwater dependent terrestrial ecosystem)	0	No Linkage
		(3c) Aquifer	4.5	Low
		(3d) Public Water Supply	0	No Linkage
		(3e) Surface Water body	5	Low
	(2c) Surface Water Migration	(3e) Surface Water body	10	Low
		(3b) Protected Area (Surface Water dependent terrestrial ecosystem)	0	No Linkage
(1b) Landfill Gas	(2d) Lateral migration in subsoil	(3f) Human Presence (Buildings, enclosed spaces)	5	Low
	(2e) Vertical Migration in subsoil		0	No Linkage