

# **Code of Practice Environmental Risk Assessment for Unregulated Waste Disposal Sites**

## **Tier 1 Study**

### **Conceptual Site Model, Risk Screening & Prioritisation**

#### **For**

<b>Landfill Site:</b>	<b>Clonakilty Landfill</b>
<b>Site Reference:</b>	<b>02/W</b>
<b>Division:</b>	<b>West Cork</b>
<b>Area Office:</b>	<b>Clonakilty</b>

**TIER 1 RISK RATING**

**HIGH**

**Report by:** Kieran Coffey  
Environment Directorate  
Cork County Council  
September 2007

Area A is currently being used as a GAA training grounds with a GAA pitch directly to the East. This land has recently been bought as development land. Planning permission was granted on 9<sup>th</sup> August for a mixed use development (Condition 24 of the permission outlines site investigation work that should be undertaken on the old training pitch dump site before commencement of the development).

Area B is the site of Clonakilty STP and Area C is the site where most of the waste was moved during the construction of the STP. The Model Railway Village is situated on top of this area. The site is bounded to the South and South West by a minor road with agricultural land on the opposite side of this road. The site is bounded to the North, East and South East by Clonakilty Bay and Feagle River.

### **Walkover Survey**

During the walkover survey there was evidence of cloudy water coming through parts of the bank around Area C. During this study it was not confirmed if there are any private bore holes in use in the immediate vicinity of the old landfill. There is one house to the south within 120m of the site with a second house within 160m. Other housing to the north in Clonakilty town is within 150m of the old landfill site.

Clonakilty Bay is identified as a Special Protected Area, a Natural Heritage Area and a Special Area of Conservation. The landfill site is bounded to the North, West and South West by these areas.

### **Geology/ Hydrogeology:**

The site is located in a region of made ground and is adjacent to Sandstone and shales till area. It is located on a High-Low area on a ground water vulnerability map (i.e. this area has yet to be fully rated for vulnerability). It is 210m from an Extreme vulnerability area (E) and is located over an area of a Locally Important Aquifer (LI).

During the Tier 1 risk screening this site has been identified as having a High (70%) risk rating for leachate migration because of its direct connection to an adjacent surface water body and its proximity to Protected Areas.

**Risk Rating: HIGH**

### **Recommendations:**

Proceed to Tier 2 – Site Investigation and Testing. Particular attention during Tier 2 investigations should focus on proving/disproving that there is on-going pollution being caused by leachate migration to the adjacent river Feagle/ Special Area of Conservation. The investigations should also focus on the gas migration potential to the existing human receptors as well as the migration potential to the future development on the GAA grounds.

**References:**

1. Waste Plan/Report produced by Clonakilty Environmental Services Office in 1984. Author- Jerome O'Sullivan.
2. Report produced by Geotech including borehole logs as part of planning application for development on GAA grounds.

**Site Photos**

**Locations from which photos were taken**



**1. Model Railway Village – Landfill Area C**



**3. Model Railway Village & Sewage Treatment Plant Entrance (Area B & C)**

3. Training Pitch (behind trees) – Area A



4. View of Area C along Foreshore





**5. View of Area C along Foreshore**



**6. Cloudy water at edge of Area C dyke**



**7. View of Sewage Treatment Plant (Area B) from North side of Bay**



**8. View of Area C from North side of Bay**

# Conceptual Site Model

**Landfill: Clonakilty**

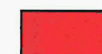
**Site Ref: 02/W**

**Division: West Cork**

**Area: Clonakilty**

## Sources:

**Waste Body**



## Receptors:

**Groundwater**



**Foreshore**



**Sewage Plant**



**Model Railway**



**GAA Grounds**



**STP control house  
And Model Railway  
Reception building**

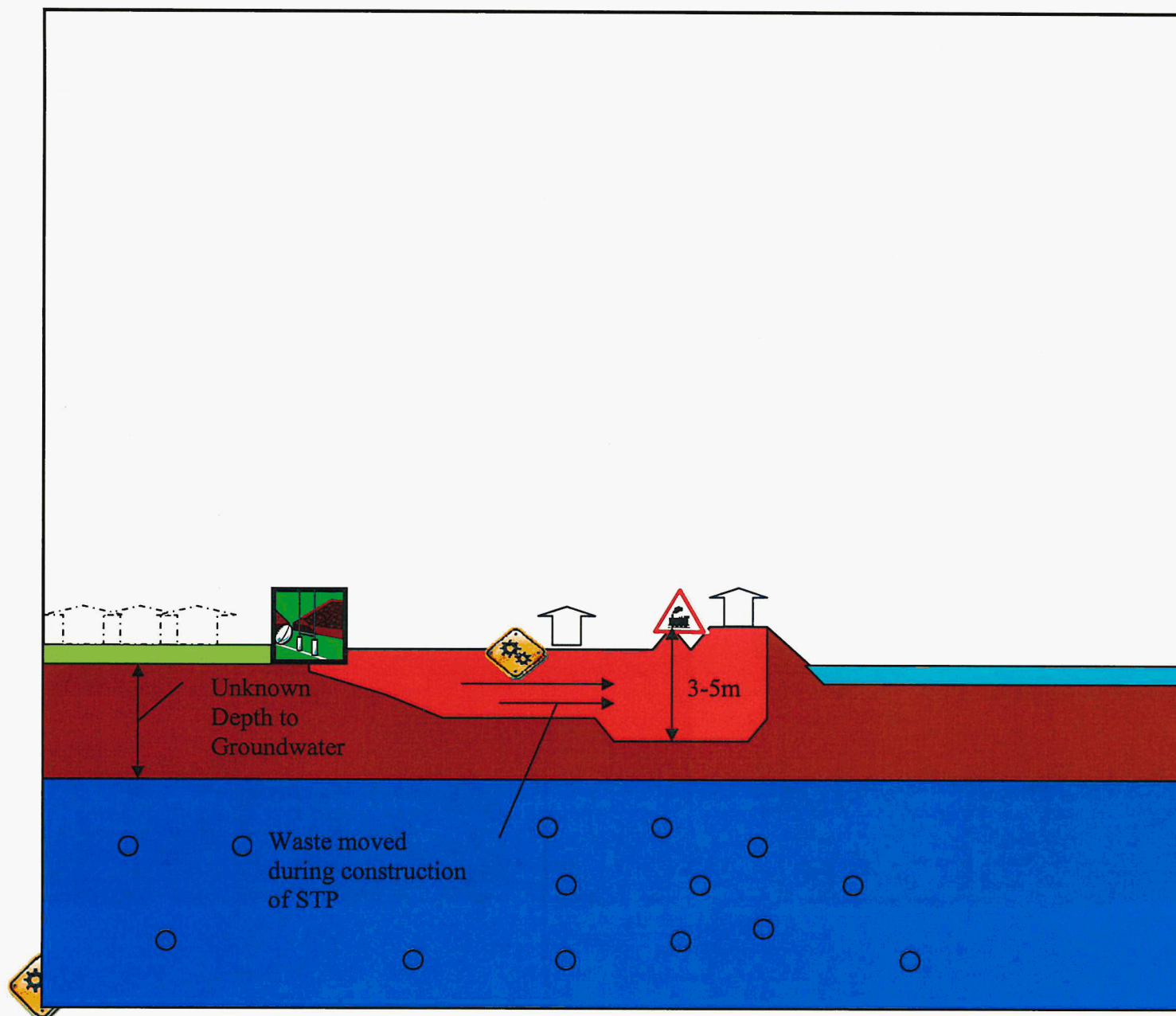
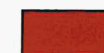


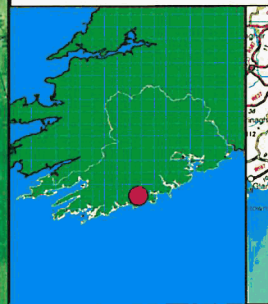
**Future Development**



## Geology:

**Sandstone & Shale  
Till**





Project  
**Environmental  
Assessment for  
Waste disposal**  
**Tier 1 Investment**

Drawing Description:  
**Plan to accommodate  
Conceptual Site**

Landfill Name & Reference Number  
**Clonakilty**

Division:  
**West Cork**

Area Office:  
**Clonakilty**

### **Legend**

Landfill Area  
Area A - Pre  
Area B - Se  
Area C - Waste  
site

Roads Legend  
Line

Rail Legend  
Line

Issue Details  
Drawn: KC | File R

### Risk Screening/ Prioritisation

Table 1a LEACHATE: SOURC/HAZARD SCORING MATRIX			
WASTE TYPE	Waste FOOTPRINT (ha)		
	≤ 1ha	> 1 ≤ 5 ha	> 5ha
C&D	0.5	1	1.5
Municipal	5	7	10
Industrial	5	7	10
Pre 1977 sites	1	2	3

**1a =**

**7**

Table 1b LANDFILL GAS: SOURC/HAZARD SCORING MATRIX			
WASTE TYPE	Waste FOOTPRINT (ha)		
	≤ 1ha	> 1 ≤ 5 ha	> 5ha
C&D	0.5	0.75	1
Municipal	5	7	10
Industrial	3	5	7
Pre 1977 sites	0.5	0.75	1

**1b =**

**7**

Table 2a : LEACHATE MIGRATION: PATHWAYS	
GROUNDWATER VULNERABILITY (Vertical Pathway)	Points
Extreme Vulnerability	3
High Vulnerability	2
Moderate Vulnerability	1
Low Vulnerability	0.5
High - Low Vulnerability (use where vulnerability not on GIS)	2

**2a =**

**2**

Table 2b : LEACHATE MIGRATION: PATHWAYS	
GROUNDWATER FLOW REGIME (Horizontal Pathway)	Points
Karstified Groundwater Bodies (Rk)	5
Productive Fissured Bedrock Groundwater Bodies (Rf & Lm)	3
Gravel Groundwater Bodies (Rg and Lg)	2
Poorly Productive Bedrock Groundwater Bodies (LI, PI, Pu)	1

**2b =**

**1**

### Risk Screening/ Prioritisation

Table 2c : LEACHATE MIGRATION: PATHWAYS	
SURFACE WATER DRAINAGE (Surface water pathway)	Points
Is there a direct connection between drainage ditches associated with the waste body and adjacent surface water body? Yes	2
If no direct connection	0

<b>2c =</b>	<b>2</b>
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Table 2d : LANDFILL GAS: PATHWAY	
LANDFILL GAS LATERAL MIGRATION POTENTIAL	Points
Sand and Gravel, Made ground, urban, karst	3
Bedrock	2
All other Tills (including limestone, sandstone etc - moderate permeability)	1.5
All Namurian or Irish Sea Tills (low permeability)	1
Clay, Alluvium, Peat	1

<b>2d =</b>	<b>3</b>
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Table 2e : LANDFILL GAS: PATHWAY (assuming receptor located above source)	
LANDFILL GAS LATERAL MIGRATION POTENTIAL	Points
Sand and Gravel, Made ground, urban, karst	5
Bedrock	3
All other Tills (including limestone, sandstone etc - moderate permeability)	2
All Namurian or Irish Sea Tills (low permeability)	1
Clay, Alluvium, Peat	1

<b>2e =</b>	<b>5</b>
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Table 3a : LEACHATE MIGRATION: RECEPTORS	
HUMAN PRESENCE (presence of a house indicates potential private wells)	Points
On or within 50m of the waste body	3
Greater than 50m but less than 250m	2
Greater than 250m but less than 1km from waste body	1
Greater than 1km from the waste body	0

<b>3a =</b>	<b>3</b>
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### Risk Screening/ Prioritisation

<b>Table 3b : LEACHAGE MIGRATION: RECEPTORS PROTECTED AREAS (SWDTE or GWDTE)</b>		
	<b>Points</b>	
Within 50m of waste body	3	
Greater than 50m but less than 250m of the waste body	2	
Greater than 250m but less than 1km from waste body	1	
Greater than 1km of the waste body	0	
Undesignated sites within 50m of waste body	1	
Undesignated sites greater than 50m but less than 250m	0.5	
Undesignated sites greater than 250m of the waste body	0	
<b>3b =</b>		<b>3</b>

<b>Table 3c : LEACHAGE MIGRATION: RECEPTORS</b>	
	<b>Points</b>
<b>AQUIFER CATEGORY (resource potential)</b>	
Regionally Important Aquifers (Rk, Rf, Rg)	5
Locally Important Aquifers (LI, Lm, Lg)	3
Poor Aquifers (PI, Pu)	1

<b>3c =</b>	<b>3</b>
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<b>Table 3d : LEACHAGE MIGRATION: RECEPTORS</b>		
	<b>Points</b>	
<b>PUBLIC WATER SUPPLIES (Other than private wells)</b>		
Within 100m of site boundary	7	
Greater than 100m but less than 300m or with in Inner SPA for GW supplies	5	
Greater than 300m but less than 1km or within Outer SPA (SO) for GW supplies	3	
Greater than 1km (karst aquifer)	3	
Greater than 1km (no karst aquifer)	0	
<b>3d =</b>		<b>0</b>

<b>Table 3e : LEACHAGE MIGRATION: RECEPTORS</b>	
	<b>Points</b>
<b>SURFACE WATER BODIES</b>	
Within 50m of site boundary	3
Greater than 50m but less than 250m	2
Greater than 250m but less than 1km	1
Greater than 1km	0

<b>3e =</b>	<b>3</b>
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### Risk Screening/ Prioritisation

Table 3f : LEACHAGE MIGRATION: <i>RECEPTORS</i>	
HUMAN PRESENCE	Points
On site or within 50m of site boundary	5
Greater than 50m but less than 150m	3
Greater than 150m but less than 250m	1
Greater than 250m	0.5

<b>3f =</b>	<b>5</b>
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Note: The table below represents the Tier 1 risk rating for this site. SPR 1 to 9 represent the leachate risk scores. SPR 10 & 11 represent Landfill Gas risks. The migration pathways are colour coded as follows:

Groundwater & Surface Water	Groundwater only	Surface water only	Lateral & Vertical
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Calculator	SPR Values	Maximum Score	Linkages	Normalised Score
SPR 1 =	105	300	Leachate => surface water	35%
SPR 2 =	105	300	Leachate => SWDTE	35%
SPR 3 =	63	240	Leachate => human presence	26%
SPR 4 =	63	240	Leachate => GWDTE	26%
SPR 5 =	63	400	Leachate => Aquifer	16%
SPR 6 =	0	560	Leachate => Surface Water	0%
SPR 7 =	63	240	Leachate => SWDTE	26%
SPR 8 =	42	60	Leachate => Surface Water	70%
SPR 9 =	42	60	Leachate => SWDTE	70%
SPR 10 =	105	150	Landfill Gas => Human Presence	70%
SPR 11 =	175	250	Landfill Gas => Human Presence	70%

Risk Classification	Range of Risk Scores
Highest Risk (Class A)	Greater than or equal to 70% for any individual SPR linkage
Moderate Risk (Class B)	Between 40-70% for any individual SPR linkage
Lowest Risk (Class C)	Less than or equal to 40% for any individual SPR linkage

<b>OVERALL RISK RATING</b>	<b>HIGH</b>
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Project

Environmental Assessment for Waste disposal

Tier 1 Investigation

Drawing Description:

Protected Area

Landfill Name & Reference Number

Clonakilty Land

Division:

West Cork

Area Office:

Clonakilty

Legend

Landfill Area

Area A - Pre  
Area B - ST  
Area C - Wa  
site

SPA


NHA


SAC

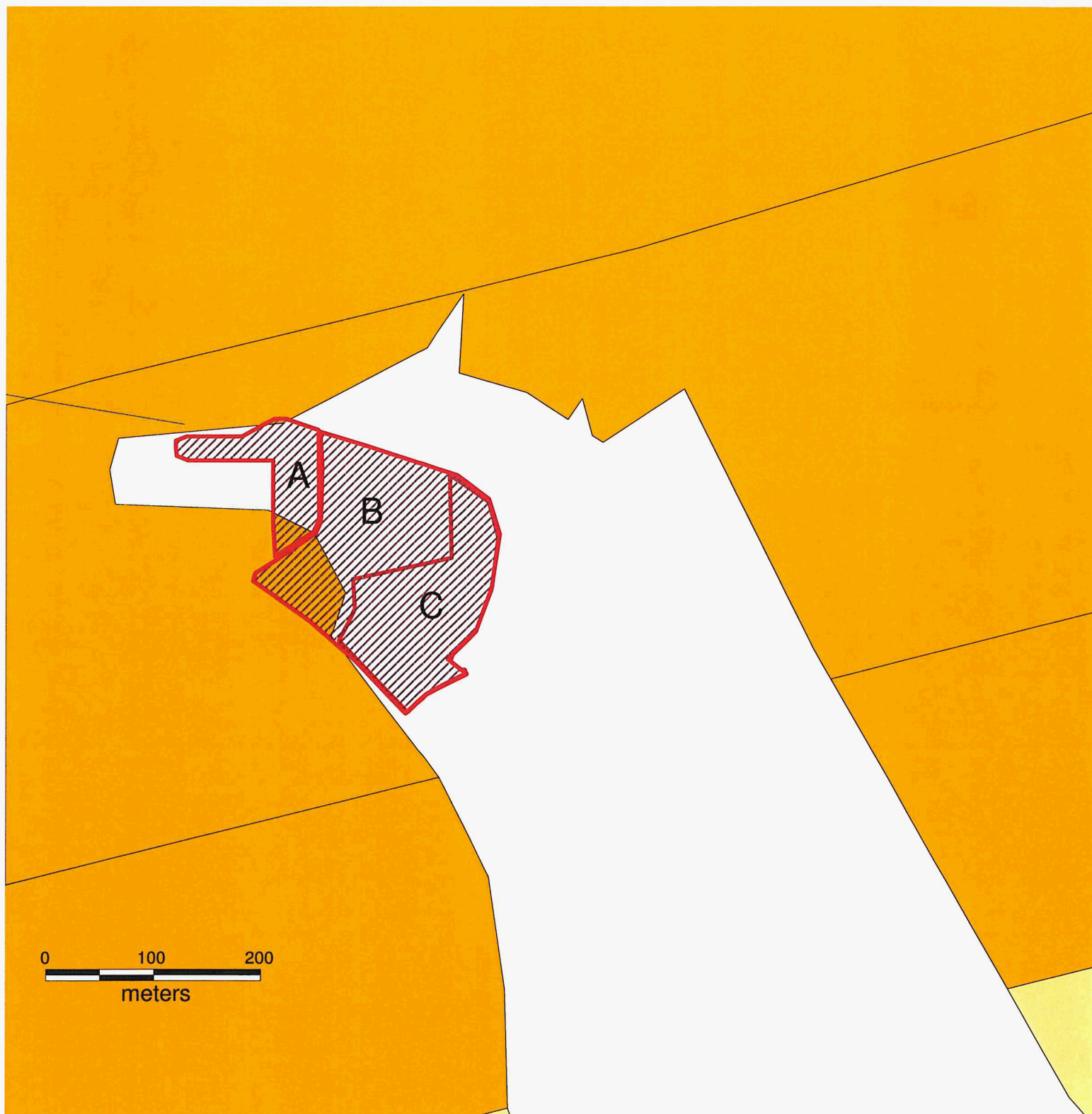
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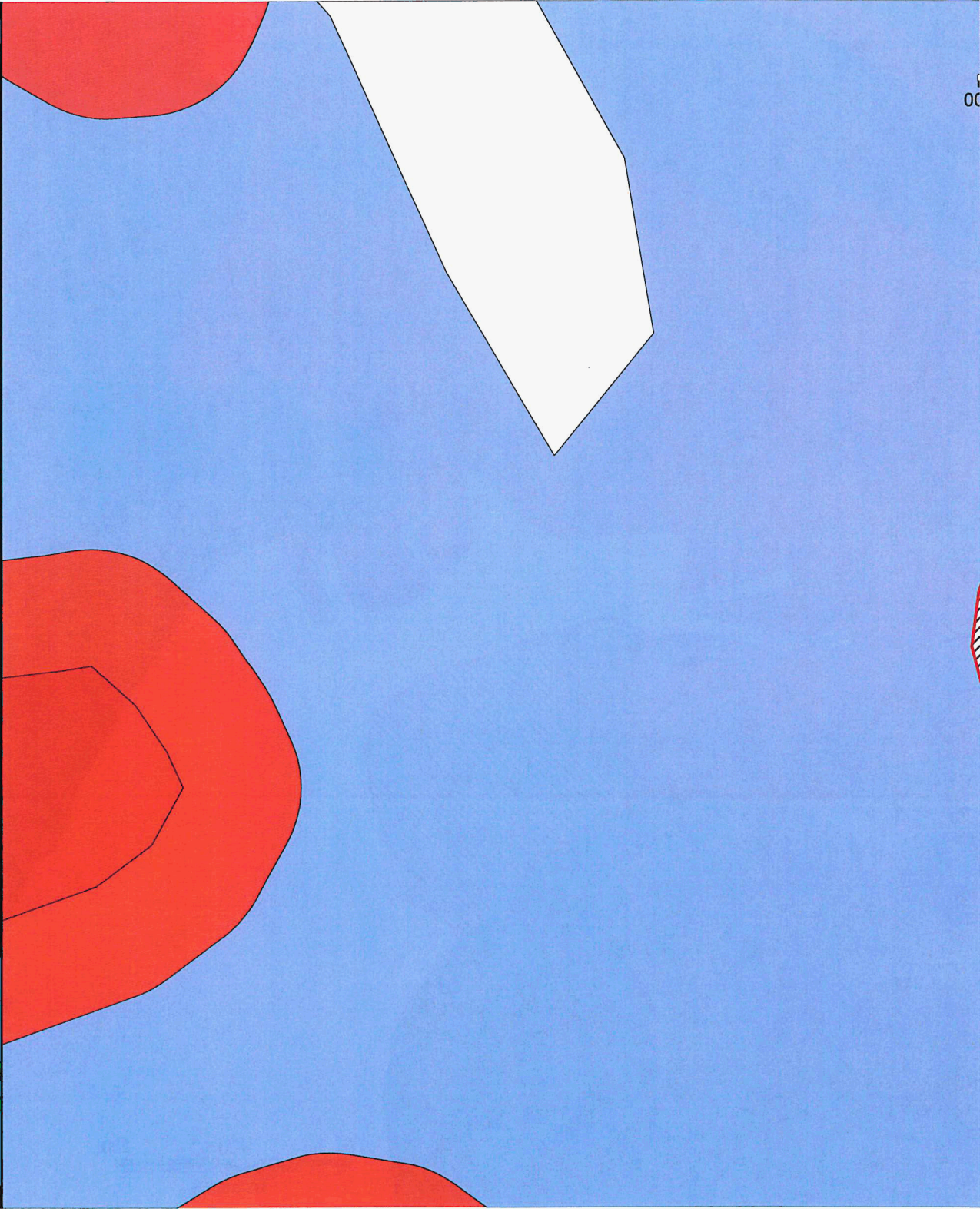
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File R









Project

Environmental Assessment for Waste disposal

Tier 1 Investigation

Drawing Description:

Groundwater Vulnerability

Landfill Name & Reference Number

Clonakilty

Division:

West Cork

Area Office:

Clonakilty

Legend

Landfill Area

Area A - Pre  
Area B - STI  
Area C - Waste  
site

SWRBD Groundwater

X - Extreme (rock <1m)  
E - Extreme (rock close)  
H - High  
M - Moderate  
L - Low  
HL - High-Low  
Water

Issue Details

Drawn: KC

File R

