Tier 1 Environmental Risk Assessment

For

Illegal Landfill site

Back Field rear of St Munchin's St

St Marys Park

Limerick City

Assessment carried out by;

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1. Introduction

1.1 Objective

The objective of this investigation is to undertake a Tier 1 Risk Assessment in accordance with the Code of Practice for Environmental Risk Assessment of Unregulated Waste Disposal Sites, EPA 2007 (EPA CoP, 2007). The Tier 1 Risk Assessment is an initial screening process that allows for the prioritisation of sites in to high, moderate and low risk, so that resources can be allocated to the investigation of higher risk sites. The risk assessment also enables the source-pathway-receptor (SPR) linkages to be examined for each site.

The Risk Assessment comprised the following:

- Desk study, including aquifer classification maps, aerial photographs, Ordnance Survey Ireland (OSI) maps.
- Site Inspection including walkover survey.
- Development of conceptual site model showing SPR linkages.
- Risk screening as described in the EPA Code of Practice.
- Surface Water Monitoring

2. Desk Study

2.1 Information sources

- OSI maps
- Ordinance Survey Ireland aerial photographs
- Map outlining the Special area of Conservation
- Interviews with existing and retired staff
- Surface water monitoring in the area

2.2 Site location and Walkover Survey Observations

The area of St Mary's Park is located on the northern half of Kings Island. The site is approx. 13.5 hectares and is owned by Limerick City Council. The island is formed by the River Shannon to the north and west and the Abbey River to the east and south. The land is currently not in use but is regularly grazed by horses though this is not compliant with the Control of Horses Bye Laws. The soil in the area is known to be formed of alluvial

silt which has a very poor bearing capacity. The bedrock levels are generally between 8 and 10 metres below ground level. The nearest house is <5m from the waste body. The site walkover survey revealed substantial areas of exposed waste. The walkover survey checklist together with photographs is attached in Appendix 1.

2.3 Surface Water Features

A special area of conservation which is included in the Lower River Shannon runs along the eastern edge of the Island, fronting on to the Abbey River. It comprises fresh water wetland which floods in winter and slowly drains during spring and summer. The area is also subject to tidal inundation. A previous ecological assessment of the site notes that there are no particular rare species within the SAC and that of the species of interest that do exist these are richer towards the east of the SAC adjacent to the Abbey River. The flow of the river is in a southerly direction. A map detailing the SAC area is in Appendix 1.

A number of drains run across site from a west to east direction. The drains then flow into one open drain that runs parallel to an embankment. Appendix 1 contains an aerial photograph taken in 2004 showing the drains.

2.4 Historical Site Use and Waste Disposal Activities

The total area of the site is approx. 13.5 hectares but approximately <3.5 hectare has waste illegally deposited on it. St Mary's park was built in the 1930's and it is expected that intermittent disposing of waste occurred in an area known locally as the Back field. The waste type deposited was mainly municipal waste but agricultural waste (horse manure) was also deposited. An extensive local authority clean up took place in 2001 where waste material was excavated to a depth of 3 metres.

3. Risk Assessment

The Tier 1 Risk Assessment was arranged for the site in accordance with the procedure described in the EPA CoP, 2007. The procedure is not described here in full as a detailed description is available within the document.

Scores were obtained for each of the total of 11 possible SPR linkages based on the nature of the source, the existence of the receptors within defined distances from the source and the pathways available between the source and the receptors. The scoring system is specified in the CoP.

The highest individual linkage scores obtained from the Risk Assessment for St Mary's are summarised in the following table. Detailed results are provided in Appendix 2.

SPR Number	SPR Linkage Score	Max Value	Normalised Score	Risk Classification	Description of linkage
SPR 8	30	60	50%	Moderate Risk (Class B)	Leachate migration through surface water
SPR 9	30	60	50%	Moderate Risk (Class B)	Leachate migration through surface water
Final Risk Classification	**Moderate Risk (Class B)**				

As can be seen from the above table St Mary's is assigned to Class B (moderate risk) due to the SPR linkage of leachate migration through surface water to a surface water body. This was the only SPR linkage score in the moderate risk category. All other scores were low risk (i.e. normalised score of <40).

4. Follow up Investigation

4.1 Surface Water Quality

Findings of the Tier 1 risk assessment are preliminary only and must be confirmed by field investigations. A site visit was carried out on 15th June 2010 to assess surface water quality in the vicinity of the site. Samples were collected from 4 sites as follows.

SW 1 – Abbey River Down Stream

SW 2 – Drain Located in Back Field

SW 3 – Drain Located in Back Field

SW 4 - Abbey River Up Stream

The results will be forwarded when they are available.

Conclusions

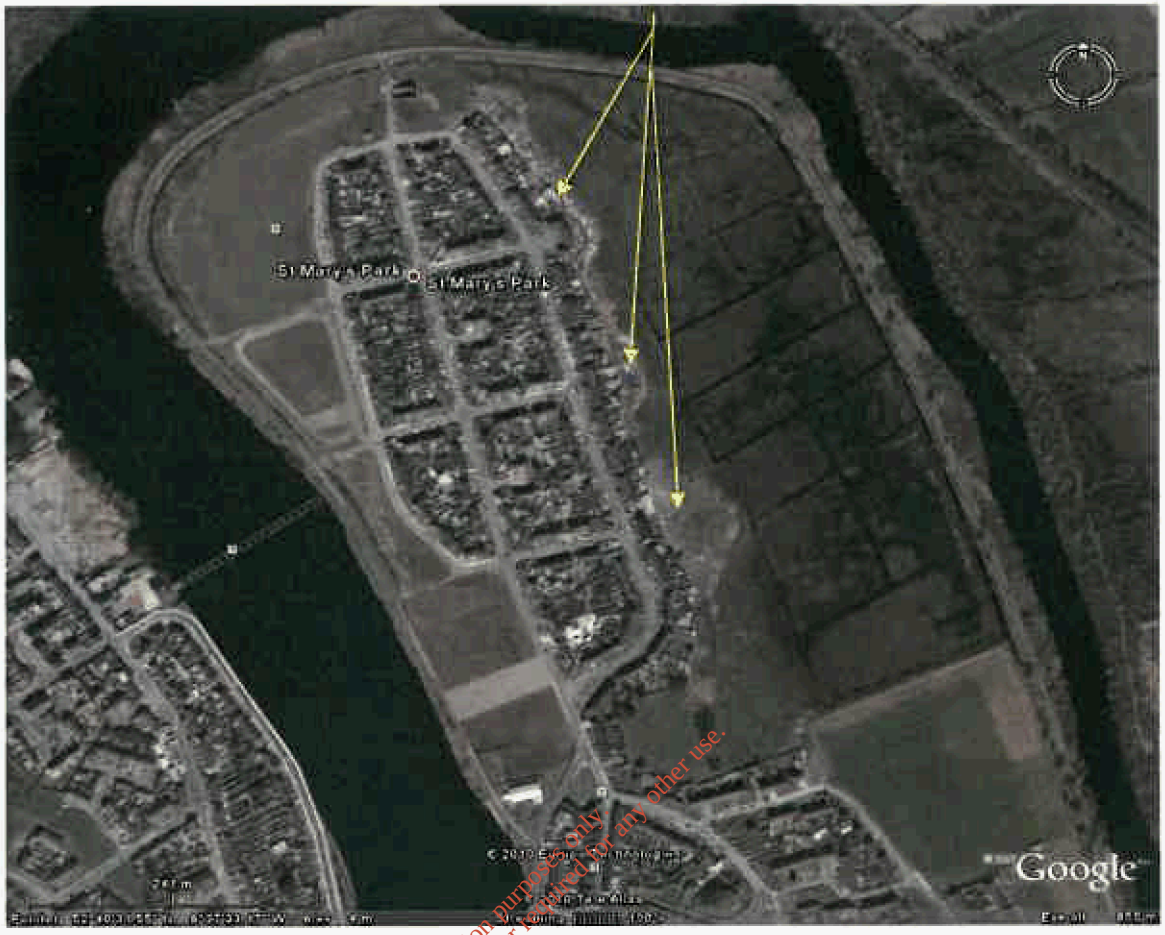
1. Results of the Tier 1 risk assessment for the illegal landfill site at St Mary's Park indicate that the landfill is a class B (moderate risk) site. This is based on the contamination pathway of surface water drainage to protected areas.

2. There is a considerable amount of waste visibly exposed on the site.

3. Although no odour was detected during the site walk through there is a possibility of landfill gas production. The SPR linkages have also indicated the possible presence of landfill gas.

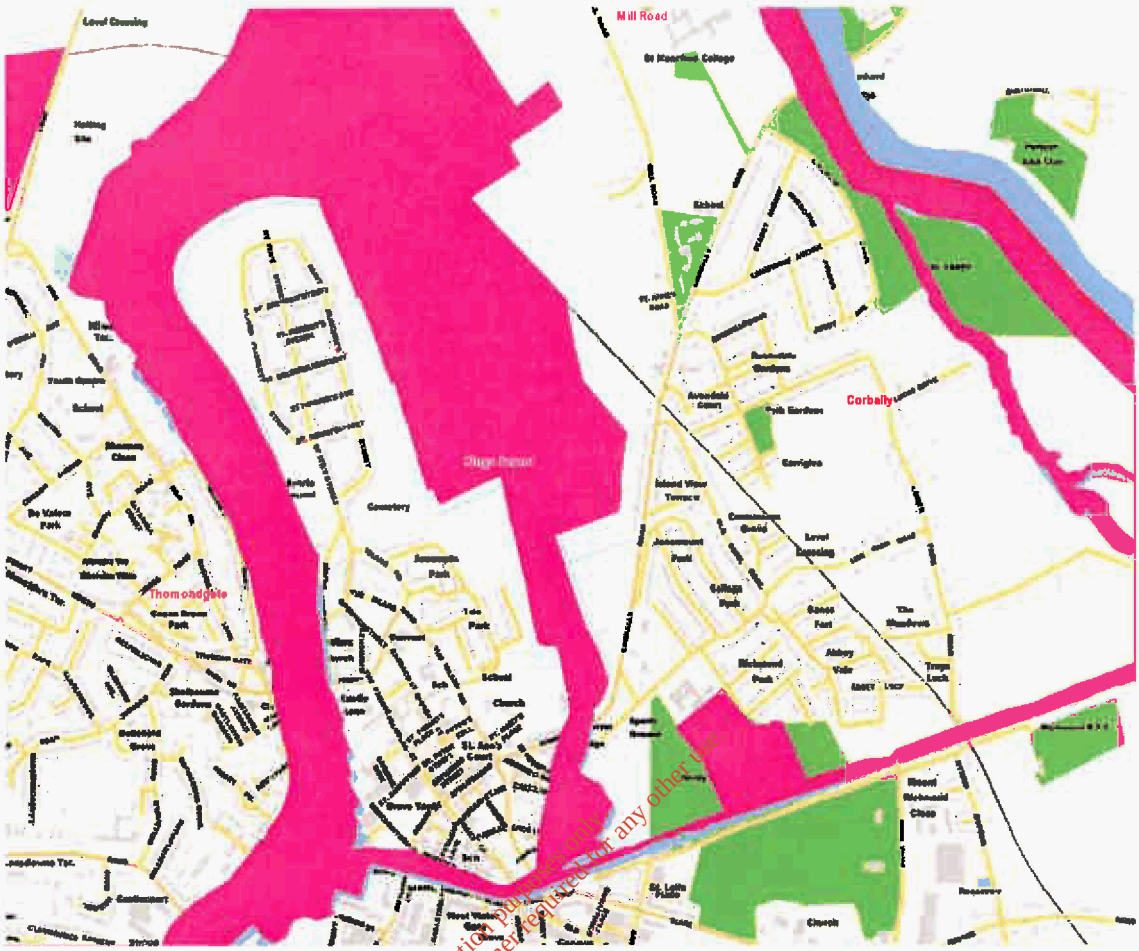
Appendix 1 - Site Walkover survey & Site photographs

Appendix 1 - Site Walkover survey & Site photographs



Aerial Photograph from Google Earth (2010)

Area where illegal dumping has occurred.



Special Area of Conservation outlined in pink

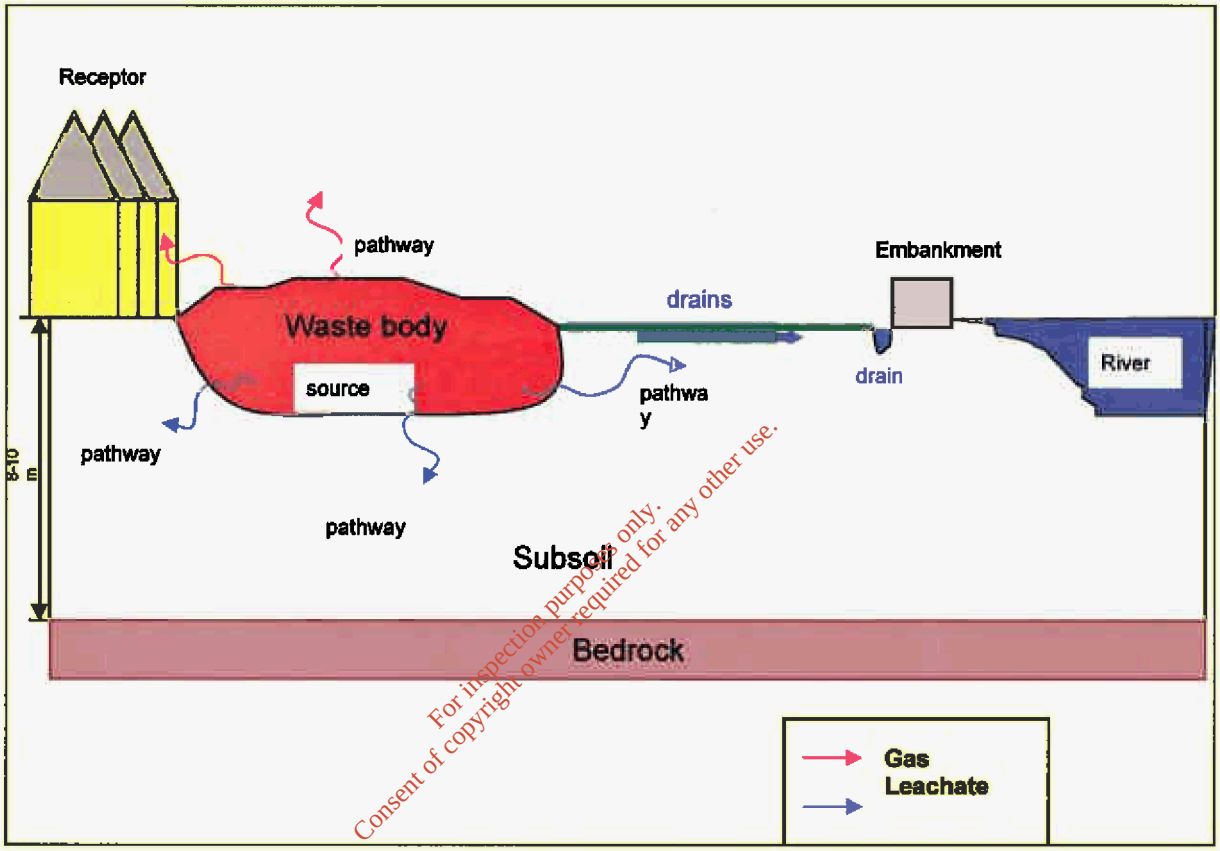
Aeriel Photograph from 2004 showing drains

Information	Checked	Comment (include distances from site boundary)
1. What is current land use?	√	Open space – subject to illegal grazing of horses
2. What are the neighbouring land uses?		
3. What is the size of the site?	√	<1ha
4. What is the topography of the site?	√	Flat , liable to flooding
5. Are there potential receptors (if yes, give details)?	√	Yes
- Houses	√	Nearest house approx <5 metres
Surface water features (if yes, distance and direction of flow)	√	Area surrounded by river
Any wetland or protected area	√	Yes – SAC
Public water supplies	√	No
Private wells	√	No
Services	√	No
Other buildings	√	No
Other	√	Exposed waste visible on site
6. Are there any potential sources of contamination (if yes, give details)?	√	Yes, potential for surface water contamination
Surface waste (if yes, what type)?	√	Municipal, C&D , horse manure, sawdust,
Surface ponding of leachate	√	None visible
Leachate seepage	√	None visible
Landfill gas odours	√	None detected – olfactory
7. Are there any outfalls to surface water? (If yes, are there discharges and what is the nature of the discharge)		
8. Are there any signs of impact on the environment? (If yes, take photographic evidence)	√	Visible waste. Visual impact and possible surface water contamination
Vegetation die off, bare ground	√	No
Leachate seepages	√	None visible
Odours	√	None detected

Appendix 2 – Risk Assessment Results and Conceptual Site Model

St Mary's Park

Conceptual Site Model



SPR linkage scores for St Mary's Park

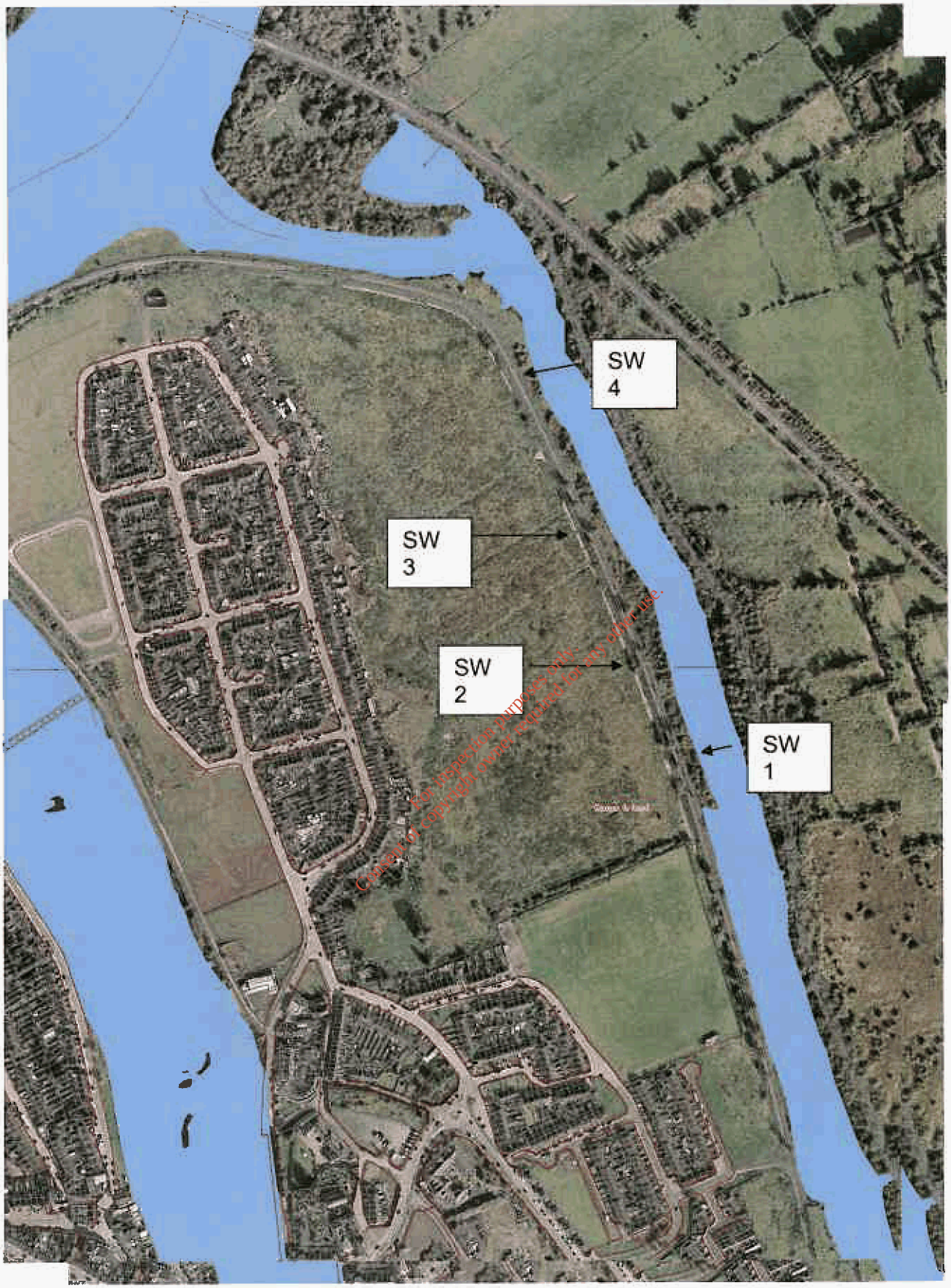
SPR#	SPR Linkage Score	Max Value	Normalised Score
SPR 1	90	300	30%
SPR 2	90	900	10%
SPR 3	0	240	0%
SPR 4	60	240	25%
SPR 5	20	400	5%
SPR 6	30	560	5%
SPR 7	60	240	25%
SPR 8	30	60	**50%**
SPR 9	30	60	**50%**
SPR 10	25	150	17%
SPR 11	25	250	10%

Comments:

SPR 8 & SPR 9 > 50% - the site is classified as Class B (moderate risk). The main issue is the surface water drainage / runoff to the river.

Table Number	Points Available	Comment
1a	5	Type: Municipal Area >1 ≤5ha
1b	5	Type: Municipal Area >1 ≤5ha
2a	3	Extreme Vulnerability
2b	1	Poorly Productive bedrock Groundwater bodies
2c	2	Direct connection with drainage ditches & surface water body
2d	1	Clay, Alluvium, Peat
2e	1	Clay, Alluvium, Peat
3a	3	Greater than 1km of waste body
3b	3	Within 50m of the waste body
3c	1	Poor aquifer
3d	0	Greater than 1km
3e	3	Within 50m of site boundary
3f	5	On site or within 50m of site boundary

Appendix 3 – Surface Water Results and Locations



SW 1 - Abbey River Down Stream

SW 2 - Drain in Back Field

SW 3 – drain in Back Field

SW 4 – Abbey River Upstream

Appendix 4 – Surface Water Monitoring Results

Parameter	units	SW1	SW2	SW3	SW4
pH		7.02	7.11	7.16	7.02
BOD	mg/l	3.68	5.96	4.32	2.08
COD	mg/l	18	37	23	3
TOC	mg/l	19.4	12.9	13.6	18.6
DO	%	99.1	98.6	98.4	98.2
Ammonia	mg/l	<0.001	<0.001	<0.001	<0.001
Hexavalent Chromium	mg/l	<0.001	<0.001	<0.001	<0.001
Total Phenol	mg/l	<0.001	<0.001	<0.001	<0.001
Total cyanide	mg/l	<0.001	<0.001	<0.001	<0.001
Sulphate	mg/l	10.37	11.77	23.13	41.31
Sulphide	mg/l	<1	<1	<1	<1
Nitrate	mg/l	3.55	<0.1	<0.1	3.66
Nitrite	mg/l	<0.01	<0.01	<0.01	<0.01
Total PAH (16 EPA)	mg/l	<0.001	<0.001	<0.001	<0.001
Mercury	mg/l	<0.001	<0.001	<0.001	<0.001
Aresnic	mg/l	<0.001	<0.001	<0.001	<0.001
Boron	mg/l	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/l	<0.001	0.001	<0.001	0.004
Chromium	mg/l	0.002	0.002	0.002	0.001
Copper	mg/l	0.003	0.005	0.005	0.005
Lead	mg/l	<0.001	<0.001	<0.001	<0.001
Nickel	mg/l	0.001	0.004	0.001	0.002
Zinc	mg/l	<0.001	<0.001	<0.001	<0.001

As can be seen from the table, satisfactory results were obtained for all parameters with little or no difference between upstream and downstream water quality except for parameters sulphate and nitrate. Results of the survey indicate the illegal site is not impacting to any significant extent on surface waters in the area. However the exposed waste on the site must be addressed in order to minimise the risk of future surface water contamination.