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SURFACE WATER TRIGGER LEVELS
FORGE HILL RECYCLING,
FORGE HILL,
CORK

LICENCE NO. W0291-01

Prepared For: -

Forge Hill Recycling Ltd,
Forge Hill,
Cork,
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Prepared By: -

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1. INTRODUCTION

1.1 Introduction

Forge Hill Recycling Ltd (FHR) operate a recycling sorting and baling facility at Forge Hill, Cork under a Waste Licence (W0291-01) issued by the Environmental Protection Agency (the Agency). In accordance with Condition 6.13.2 FHR is required to establish trigger levels for the authorised storm water emission. FHR commissioned O'Callaghan Moran & Associates (OCM) to prepare proposed trigger levels.

1.2 Methodology

OCM developed the proposed trigger levels following the guidance set out in the Agency's Document 'Guidance for the Setting of Trigger Values for Stormwater Discharges to Off-Site Surface Waters at IPPC and Waste Licensed Facilities' (2012).

2. SITE DESCRIPTION

The site is located at Forge Hill and consists of a waste transfer building, a site office, weighbridge and a water reservoir building.

Surface water monitoring is carried out at one location (SW-1). Rainwater run-off from clean yard areas is directed to an oil hydrocarbon interceptor and silt trap before flowing to the balancing tank, from where it is pumped to the local stream.

2.1 Surface Water Monitoring

Schedule C.2.3 of the Licence requires weekly monitoring of the surface water discharge for pH, temperature, conductivity, total organic carbon (TOC), total suspended solids (TSS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), total ammonia, total nitrogen, and mineral oil.

3. PROPOSED TRIGGER LEVELS

The Agency's Guidance Document states that a Trigger Level is a parameter value, the achievement or exceedance of which requires certain actions to be taken by the licensee. The objective of setting Trigger Levels is to provide for early detection of likely contamination problems such that appropriate intervention actions can be implemented (e.g. shut off discharge, stop leak etc.). It is not an Emission Limit Value (ELV) or an Environmental Quality Standard (EQS) as prescribed in the European Communities Environmental Objectives (Surface Water) Regulations 2009.

The parameter for which a trigger level is defined should be an appropriate indicator of site specific sources of contamination and, if possible, be the same as an established (EQS) or one where a relationship can be established with a substance for which an ELV has been set. The parameters that are commonly used to monitor storm water discharges are:

- COD
- pH
- Total Organic Carbon
- Suspended Solids
- Metals
- Ammonia
- Temperature
- Electrical Conductivity

The Guidance also states that for trigger levels to be of most value, continuous monitoring is required when the discharge is occurring. However, the Agency recognises the need for non-continuous monitoring techniques due to the nature of contamination issues and that not all parameters can be measured continuously.

3.1 Monitoring Data

The discharge is rainfall dependent and therefore grab samples are collected. The results of the monitoring carried out between 12/09/2016 and 7/02/2017 are shown on Table 3.1.

Table 3.1 Surface Water Quality Data SW-1

Parameter	Units	12/09/2016	17/11/2016	09/02/2017	04/05/2017	24/08/2017	29/08/2017	06/09/2017	14/09/2017
Mineral Oil (C10-C40)	ug/l	<10	<10	<10	<10	<10	<10	<10	<10
Total Ammonia as N	mg/l	0.29	0.29	0.11	0.04	0.08	0.11	0.05	0.1
BOD (Settled)	mg/l	2	4	<1	<1	2	<1	1	<1
COD (Settled)	mg/l	-	-	-	-	122	<7	<7	<7
Electrical Conductivity @25C	uS/cm	-	-	-	-	63	137	69	49
pH	pH units	7.25	6.58	7.43	7.28	7.14	7.6	7.24	6.84
Total Organic Carbon	mg/l	-	-	-	-	2	3	<2	<2
Total Nitrogen	mg/l	-	-	-	-	1.9	2.7	1.6	0.8
Total Suspended Solids	mg/l	14	11	43	<10	14	<10	<10	<10

Parameter	Units	18/09/2017	25/09/2017	05/10/2017	11/10/2017	18/10/2017	24/10/2017	01/11/2017	07/11/2017
Mineral Oil (C10-C40)	ug/l	<10	<10	<10	<10	<10	<10	<10	<10
Total Ammonia as N	mg/l	0.2	0.21	0.03	0.27	0.32	0.28	<0.03	0.05
BOD (Settled)	mg/l	<1	1	<1	2	2	<1	<1	<1
COD (Settled)	mg/l	12	<7	<7	<7	10	<7	<7	15
Electrical Conductivity @25C	uS/cm	93	107	137	558	519	27	143	22
pH	pH units	6.91	7.03	8.1	6.31	6.53	6.25	7.1	6.48
Total Organic Carbon	mg/l	3	<2	<2	<2	3	<2	<2	<2
Total Nitrogen	mg/l	2	1.4	1.4	1.1	1.5	1.1	1.8	0.8
Total Suspended Solids	mg/l	17	<10	<10	10	<10	<10	<10	<10

Parameter	Units	15/11/2017	23/11/2017	07/12/2017	14/12/2017	20/12/2017	28/12/2017	04/01/2018	11/01/2018	17/01/2018	25/01/2018	07/02/2018
Mineral Oil (C10-C40)	ug/l	<10	470	<10	<10	<10	<10	<10	<10	<10	<10	<10
Total Ammonia as N	mg/l	0.37	0.12	0.15	1.31	0.58	0.21	0.14	0.06	0.15	0.34	0.28
BOD (Settled)	mg/l	<1	1	<1	4	2	NA	1	1	<1	2	<1
COD (Settled)	mg/l	<7	<7	<7	<7	8	<7	<7	<7	8	<7	<7
Electrical Conductivity @25C	uS/cm	160	129	113	209	220	37	69	225	349	357	49
pH	pH units	7.9	6.54	7.59	7.55	7.19	6.32	6.17	7.92	7.54	7.78	7.19
Total Organic Carbon	mg/l	<2	2	<2	18	3	<2	<2	<2	<2	<2	<2
Total Nitrogen	mg/l	1.9	1.6	1.4	1.7	3.2	1.4	1.3	1.3	1.4	1.9	1.7
Total Suspended Solids	mg/l	<10	<10	<10	22	<10	10	<10	<10	<10	11	<10

3.2 Trigger Level Calculation

Trigger levels are based on the average concentration plus (+) or minus (-) 2 standard deviations (SD) for a Warning Limit and the average concentration + or - 3SD for an Action Limit.

The EPA Guidance considers the number of samples that are taken to establish the background baseline variability is extremely important. The more sample data available, the better the estimate.

It is desirable that the SD be calculated on at a minimum of 20 data points (preferably a years' worth of weekly samples i.e. +50 data points) to reflect the range of natural variability over most sampling conditions. Any samples deemed to be contaminated by on-site processes should not be included when calculating the average and SD values as this would not accurately reflect 'normal' values.

As required by Condition 16.3.2 trigger levels were calculated for conductivity, TSS and BOD. It was not possible to calculate a trigger level for mineral oils as the majority of results available were below the method detection limit.

The calculation were based on the data in Table 3.1. The trigger level calculation sheet is in Appendix 1 and the proposed warning and action trigger levels are in Table 3.2.

Table 3.2 Proposed Trigger Levels

Parameter	Units	Warning Level	Action Level
Conductivity	uS/cm	391	515
TSS	mg/l	38	49
BOD	mg/l	4	5
Mineral oil	ug/l	*	*

*Insufficient data to assign a trigger level as all results below the laboratory detection level

APPENDIX 1

Analytical Data & Trigger Level Calculations

Date	TSS	mean y	sy	2sy	3sy	y+2sy	y+3sy	Upper Warning Level	Upper Action Level
	mg/l	16.89	10.54	21.08	31.62	**37.97**	**48.51**	**37.97**	**48.51**
12/09/2016	14								
17/11/2016	11								
09/02/2017	43								
04/05/2017	<10								
24/08/2017	14								
29/08/2017	<10								
06/09/2017	<10								
14/09/2017	<10								
18/09/2017	17								
25/09/2017	<10								
05/10/2017	<10								
11/10/2017	10								
18/10/2017	<10								
24/10/2017	<10								
01/11/2017	<10								
07/11/2017	<10								
15/11/2017	<10								
23/11/2017	<10								
07/12/2017	<10								
14/12/2017	22								
20/12/2017	<10								
28/12/2017	10								
04/01/2018	<10								
11/01/2018	<10								
17/01/2018	<10								
25/01/2018	11								
07/02/2018	<10								

Date	BOD	mean y	sy	2sy	3sy	y+2sy	y+3sy	Upper Warning Level	Upper Action Level
	mg/l	1.92	1.04	2.08	3.11	**4.00**	**5.04**	**4.00**	**5.04**
12/09/2016	2								
17/11/2016	4								
09/02/2017	<1								
04/05/2017	<1								
24/08/2017	2								
29/08/2017	<1								
06/09/2017	1								
14/09/2017	<1								
18/09/2017	<1								
25/09/2017	1								
05/10/2017	<1								
11/10/2017	2								
18/10/2017	2								
24/10/2017	<1								
01/11/2017	<1								
07/11/2017	<1								
15/11/2017	<1								
23/11/2017	1								
07/12/2017	<1								
14/12/2017	4								
20/12/2017	2								
28/12/2017	NA								
04/01/2018	1								
11/01/2018	1								
17/01/2018	<1								
25/01/2018	2								
07/02/2018	<1								

Date	Mineral Oils	mean y	sy	2sy	3sy	y+2sy	y+3sy	Upper Warning Level	Upper Action Level
	ug/l	470.00	#DIV/0!	#DIV/0!	#DIV/0!	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
12/09/2016	<10								
17/11/2016	<10								
09/02/2017	<10								
04/05/2017	<10								
24/08/2017	<10								
29/08/2017	<10								
06/09/2017	<10								
14/09/2017	<10								
18/09/2017	<10								
25/09/2017	<10								
05/10/2017	<10								
11/10/2017	<10								
18/10/2017	<10								
24/10/2017	<10								
01/11/2017	<10								
07/11/2017	<10								
15/11/2017	<10								
23/11/2017	470								
07/12/2017	<10								
14/12/2017	<10								
20/12/2017	<10								
28/12/2017	<10								
04/01/2018	<10								
11/01/2018	<10								
17/01/2018	<10								
25/01/2018	<10								
07/02/2018	<10								

Date	COD	mean y	sy	2sy	3sy	y+2sy	y+3sy	Upper Warning Level	Upper Action Level
	mg/l	29.17	45.56	91.11	136.67	**120.28**	**165.84**	**120.28**	**165.84**
24/08/2017	122								
29/08/2017	<7								
06/09/2017	<7								
14/09/2017	<7								
18/09/2017	12								
25/09/2017	<7								
05/10/2017	<7								
11/10/2017	<7								
18/10/2017	10								
24/10/2017	<7								
01/11/2017	<7								
07/11/2017	15								
15/11/2017	<7								
23/11/2017	<7								
07/12/2017	<7								
14/12/2017	<7								
20/12/2017	8								
28/12/2017	<7								
04/01/2018	<7								
11/01/2018	<7								
17/01/2018	8								
25/01/2018	<7								
07/02/2018	<7								

Date	Conductivity	mean y	sy	2sy	3sy	y+2sy	y+3sy	Upper Warning Level	Upper Action Level
	us/cm	145.26	123.09	246.18	369.28	**391.44**	**514.54**	**391.44**	**514.54**
24/08/2017	63								
29/08/2017	137								
06/09/2017	69								
14/09/2017	49								
18/09/2017	93								
25/09/2017	107								
05/10/2017	137								
11/10/2017	58								
18/10/2017	519								
24/10/2017	27								
01/11/2017	143								
07/11/2017	22								
15/11/2017	160								
23/11/2017	129								
07/12/2017	113								
14/12/2017	209								
20/12/2017	220								
28/12/2017	37								
04/01/2018	69								
11/01/2018	225								
17/01/2018	349								
25/01/2018	357								
07/02/2018	49								

Parameter	Units	12/09/2016	17/11/2016	09/02/2017	04/05/2017	24/08/2017	29/08/2017	06/09/2017	14/09/2017
Mineral Oil (C10-C40)	ug/l	<10	<10	<10	<10	<10	<10	<10	<10
BOD (Settled)	mg/l	2	4	<1	<1	2	<1	1	<1
Electrical Conductivity @25C	uS/cm	-	-	-	-	63	137	69	49
Total Suspended Solids	mg/l	14	11	43	<10	14	<10	<10	<10

Parameter	Units	18/09/2017	25/09/2017	05/10/2017	11/10/2017	18/10/2017	24/10/2017	01/11/2017	07/11/2017
Mineral Oil (C10-C40)	ug/l	<10	<10	<10	<10	<10	<10	<10	<10
BOD (Settled)	mg/l	<1	1	<1	2	2	<1	<1	<1
Electrical Conductivity @25C	uS/cm	93	107	137	58	519	27	143	22
Total Suspended Solids	mg/l	17	<10	<10	10	<10	<10	<10	<10

Parameter	Units	15/11/2017	23/11/2017	07/12/2017	14/12/2017	20/12/2017	28/12/2017	04/01/2018	11/01/2018
Mineral Oil (C10-C40)	ug/l	<10	470	<10	<10	<10	<10	<10	<10
BOD (Settled)	mg/l	<1	1	<1	4	2	NA	1	1
Electrical Conductivity @25C	uS/cm	160	129	113	209	220	37	69	225
Total Suspended Solids	mg/l	<10	<10	10	22	<10	10	<10	<10

Parameter	Units	17/01/2018	25/01/2018	07/02/2018
Mineral Oil (C10-C40)	ug/l	<10	<10	<10
BOD (Settled)	mg/l	<1	2	<1
Electrical Conductivity @25C	uS/cm	349	357	49
Total Suspended Solids	mg/l	<10	11	<10