

Stormwater Soakaway Report

Site address

Takeda Ireland, Grange Castle Business Park, Dublin 22

Date

21 / 12 / 2022

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1.0 INTRODUCTION

An on-site stormwater disposal system is required to accommodate the storm water run-off from a proposed 100m² of hardstand area at a development for Takeda Ireland in the Grange Castle Business Park, Dublin 22. Testing has been carried out at the proposed soakaway location and a suitable soakaway system designed. Soakaway testing and design was carried out in accordance with BRE Digest 365.

2.0 FIELDWORK

A pit (SA1) was excavated at the proposed soakaway location to assess the ground conditions. The pit revealed 1.7m of made ground consisting of stiff dark brown gravelly clay with cobbles and occasional boulders. This overlies a stratum of firm brown slightly gravelly clay from 1.7m to 1.9m which in turn overlies a stratum of stiff brown gravelly silt/clay with cobbles and boulders from 1.9m to 2.4m. Rock was encountered at 2.4m which suggested the presence of fractured limestone bedrock. No groundwater was encountered.

It is anticipated that all the made ground will be stripped from the site before construction is commenced, reducing the existing ground level by approximately 1.7m.

Testing was carried out in accordance with BRE Digest 365. The pit was filled with water and the drop in water level was recorded at regular intervals throughout the test.

From the test results, an f-value was calculated. This is the volume of water dispersed through unit area of soil per unit time.

In this case $f = 6.457 \times 10^{-6}$ m/s

3.0 DESIGN

A soakaway is designed to accommodate the immediate run-off from a hardstand area following a period of rainfall and provide soakage into the surrounding soil, at such a rate, that sufficient storage is made available to accommodate the run-off from the next period of rainfall.

Using the f-value calculated from the test carried out in SA1, a stone filled trench soakaway has been designed for this site. The trench will be 25m long, 1.0m wide and 2.5m deep in total. The invert level of the intake pipe must be no more than 2.0m below existing ground level giving an effective soakaway depth of 0.5m. The trench must be filled using a gravel with minimum 30% voids. The trench should be lined with a geotextile to prevent the gravel becoming clogged with soil over time.

4.0 RECOMMENDATIONS

A stone filled trench soakaway has been designed for this site. The trench will be a minimum of 25m x 1m x 2.5m deep with a maximum intake pipe invert level of 2.0m giving an effective depth of 0.5m.

If the existing ground level is reduced by 1.7m by removing the made ground, the soakaway trench would then be 25m x 1m x 0.8m deep with a maximum intake pipe invert level of 0.3m giving an effective depth of 0.5m.

The soakaway should be built as close as possible to the location of the soakaway test (SA1). Observations must be made during construction to ensure that the stratum exposed are consistent with those observed in the test pit. Because this soakaway appears to reach the top of the bedrock, an oil interceptor should be used to reduce the potential for groundwater contamination.

The gravel used in the trench must provide a minimum 30% free volume.

In accordance with BRE Digest 365, no storm water soakaway should be built within 5m of structural foundations.

APPENDIX 1
Soakaway Designs

Soakaway Design

Pit Details

From	To	Description
0.00	1.70	MADE GROUND (Spoil from previous construction works on the premises consisting of stiff dark brown gravelly clay with cobbles and occasional boulders)
1.70	1.90	Firm brown slightly gravelly CLAY
1.90	2.40	Stiff brown gravelly SILT/CLAY with cobbles and boulders
2.40	-	Rock (possibly fractured limestone bedrock)

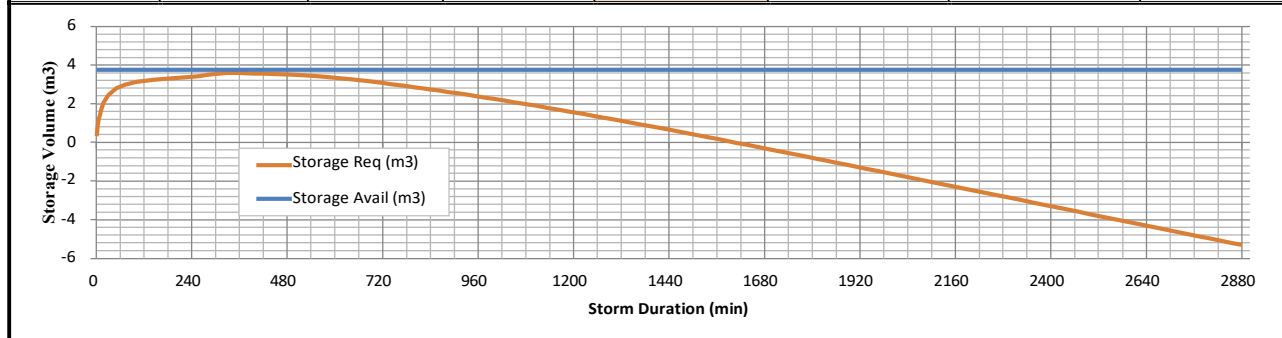
Groundwater Observations None encountered

Site Data

Area of Site to be Served by Soakaway	100.00	m ²
Depth to Top of Permeable Stratum	1.90	m
Depth to Bottom of Permeable Stratum	2.40	m
Invert Level of Intake Pipe	2.00	m
Total depth of Soakaway (below existing ground level)	2.50	m
Effective depth of Soakaway	0.50	m
Infiltration Rate	6.45745E-06	m/s
Rainfall Return Period	50	years
Proposed Length of Soakaway	25.00	m
Proposed Width of Soakaway	1.00	m
Percentage Free Space in Gravel Pack	30	%
Total Storage Available in Gravel Filled Trench	3.75	m ³

Soakaway Design Calculations (BRE Digest 365)

Duration (min)	Rainfall (mm)	Inflow (m ³)	Outflow (m ³)	Storage Req (m ³)	Storage Avail (m ³)	Drain Time (Hours)	Result
1	3.3	0.33	0.005	0.325	3.750	✓ 0.5	✓
2	5.8	0.58	0.010	0.570	3.750	✓ 0.9	✓
5	10.5	1.05	0.025	1.025	3.750	✓ 1.7	✓
10	15.5	1.55	0.050	1.500	3.750	✓ 2.5	✓
15	19.9	1.99	0.076	1.914	3.750	✓ 3.2	✓
30	26	2.6	0.151	2.449	3.750	✓ 4.1	✓
60	32	3.2	0.302	2.898	3.750	✓ 4.8	✓
120	38	3.8	0.604	3.196	3.750	✓ 5.3	✓
240	46	4.6	1.209	3.391	3.750	✓ 5.6	✓
360	54	5.4	1.813	3.587	3.750	✓ 5.9	✓
720	67	6.7	3.627	3.073	3.750	✓ 5.1	✓
1440	79	7.9	7.253	0.647	3.750	✓ 1.1	✓
2880	92	9.2	14.506	-5.306	3.750	✓ -8.8	✓



Conclusion

Based on these calculations, a 25m long, 1m wide, stone-filled trench has the capacity to accommodate the stormwater run-off from a hardstand area of 100 square metres. Care should be taken during construction to ensure that the ground conditions exposed remain similar to those observed in the trial pit. The gravel used in the trench should have a minimum free volume of 30% and should be separated from the surrounding soil using a permeable geo-textile membrane (to avoid clogging up the gravel over time). It is anticipated that the finished ground level will be approximately 1.7m below existing ground level.

Job No:

WASTE WATER MAINTENANCE LTD.

PO Box 1014, Blessington Road, Naas, Co. Kildare

Site location: Grange Castle International Dublin 22

Pit No: SA1

Client: Takeda Ireland Ltd - Grange Castle

Page No: 1 of 1

Architect: c/o Stephen Hynes

Date: 21/12/2022

Depth (m)	Geotechnical Description	Depth	Sample Number	Sample Type	Sample Depth
-	Filled ground made up of spoil from previous construction works on the premises consisting of Dark Brown blocky stiff gravelly CLAY with cobbles & occasional boulders brown firm slightly gravelly CLAY brown blocky stiff gravelly boulder SILT/CLAY with cobbles & boulders END OF PIT AT 2.4M BEDROCK AT 2.4m				
- 0.5					
- 1.0					
- 1.5					
- 2.0			1.7		
- 2.5			1.9		
- 3.0					
- 3.5					
- 4.0					
- 4.5			2.4		

Depth to groundwater: Not encountered at 2.4m

Depth to bedrock: Encountered at 2.4m.

Notes: High Clay content throughout
Sheet Bedrock at 2.4m

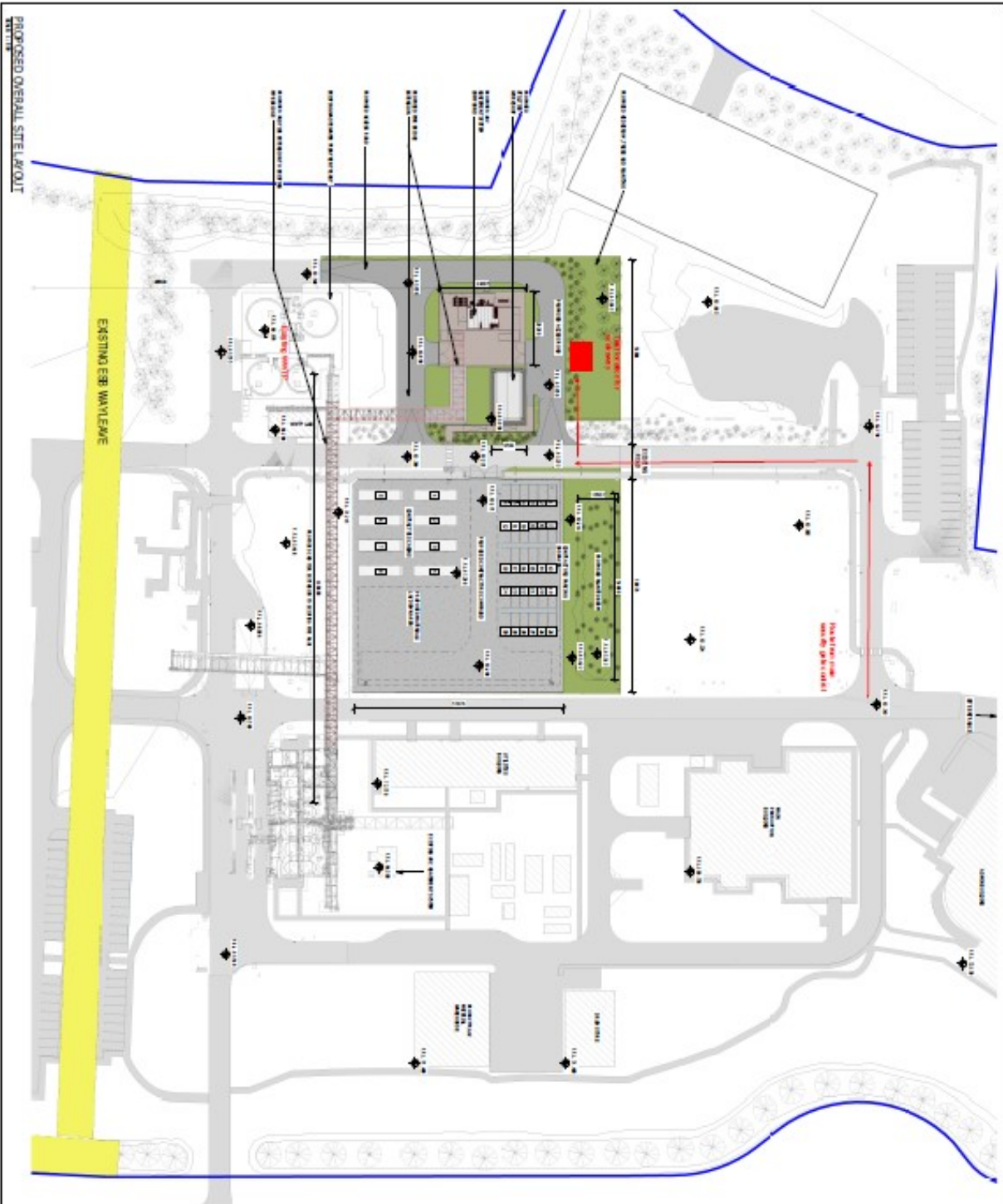
APPENDIX 2
Photographs







APPENDIX 3
Site Map



<p>NOTES</p> <p>1. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>2. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>3. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>4. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>5. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>6. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>7. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>8. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>9. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>10. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>11. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p> <p>12. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE SANS STANDARDS AND CODES OF PRACTICE.</p>	
<p>LOGO</p> <p>Takeda</p> <p>DPS</p> <p>TAKEDA WASTE TREATMENT SYSTEM</p> <p>PROPOSED SITEWORK</p>	
<p>PROJECT INFORMATION</p> <p>PROJECT NO. 123456789</p> <p>CLIENT: Takeda</p> <p>DATE: 12/12/2023</p> <p>SCALE: 1:500</p> <p>DRAWN BY: J. SMITH</p> <p>CHECKED BY: M. JONES</p> <p>APPROVED BY: K. BROWN</p> <p>DATE: 12/12/2023</p>	