



Pwllfawatkin Landfill
TAN15: Flood Consequence Assessment
For Sirius Planning
KRS.0297.034.R.001.A
November 2021

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Pwllfawatkin Landfill

Project	TAN15: Flood Risk Assessment
Client	Sirius Planning
Status	Final
Prepared by	Keelan Serjeant BSc (Hons), MSc, MCIWEM
Date	November 2021

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CONTENTS

CONTENTS	i
TABLES & FIGURES	ii
EXECUTIVE SUMMARY	iii
1.0 INTRODUCTION.....	1
1.1 Background	1
1.2 Technical Advice Note 15 (TAN15)	1
1.3 Justification Test.....	1
1.4 Report Structure.....	2
2.0 LOCATION & DEVELOPMENT DESCRIPTION	3
2.1 Site Location.....	3
2.2 Existing Development.....	3
2.3 Proposed Development	3
2.4 Ground Levels.....	4
2.5 Catchment Hydrology / Drainage.....	4
2.6 Ground Conditions	4
3.0 FLOOD RISK.....	5
3.1 Sources of Flooding	5
3.2 Climate Change	5
3.3 Historic Flooding.....	5
3.4 Existing and Planned Flood Defence Measures	6
3.5 Development Advice Map.....	6
3.6 Fluvial (river) and Tidal Flooding	8
3.7 Groundwater Flooding.....	9
3.8 Surface Water (pluvial) Flooding.....	10
3.9 Sewer Flooding.....	11
3.10 Flooding from Artificial Drainage Systems/Infrastructure Failure	11
3.11 Effects of the Development on Flood Risk.....	12
3.12 Summary of Site Specific Flood Consequence Assessment	12
4.0 JUSTIFYING THE LOCATION OF THE DEVELOPMENT	14
4.1 Justification Test.....	14
5.0 SUMMARY AND CONCLUSIONS	15
5.1 Introduction	15
5.2 Flood Risk.....	15
5.3 Justification Test.....	15
5.4 Conclusion.....	15
APPENDICES.....	16
APPENDIX 1 – Existing Site Layout	17
APPENDIX 2 – Proposed Site Layout.....	18

TABLES & FIGURES

Figure 1 - Site Location	3
Table 1 - Peak River Flow Allowances by River Basin District (use 1961 to 1990 baseline)	5
Figure 2 - Natural Resources Wales Historic Flood Outline	6
Figure 3 - Development Advice Map	7
Table 2 - TAN15 Flood Zones	7
Figure 4 - Flood Map for Planning: rivers/sea.....	8
Table 3 - Definition of Flood Map for Planning Flood Zones	9
Figure 5 - Groundwater Flood Map	10
Figure 6 - Natural Resources Wales Surface Water Flood Map	11
Figure 7 - Natural Resources Wales Reservoir Flood Map.....	12
Table 4 - Risk Posed by Flooding Sources	12

EXECUTIVE SUMMARY

The proposed development would be expected to remain dry in all but the most extreme conditions. The flood risk from all sources would be minimised, the consequences of flooding are acceptable, and the development would be in accordance with the requirements of TAN15.

This FCA demonstrates that the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of TAN15. The development should not therefore be precluded on the grounds of flood risk.

1.0 INTRODUCTION

1.1 Background

This Flood Consequence Assessment (FCA) has been prepared by KRS Environmental Limited to support a planning application for the proposed development at Pwllfawatkin Landfill. An updated Surface Water Management Plan will be submitted as part of the planning application.

This FCA has been carried out in accordance with guidance contained in Technical Advice Note 15 Development and Flood Risk (TAN15) associated Development Advice Maps (DAMs) and Flood Zones. TAN15 (published in 2004) is being replaced by a new TAN15. The current TAN 15 DAMs are being replaced by a new Flood Map for Planning. The existing documents will both be cancelled. These changes will come into effect on 1st December 2021. This FCA uses both the DAMs and Flood Map for Planning.

This FCA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

It is recognised that developments which are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues.

1.2 Technical Advice Note 15 (TAN15)

One of the key aims of TAN15 is to ensure that flood risk is taken into account at all stages of the planning process; to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk.

It advises that where new development is exceptionally necessary in areas of higher risk, this should be safe, without increasing flood risk elsewhere, and where possible, reduce flood risk overall. A risk based approach is adopted at stages of the planning process, applying a source pathway receptor model to planning and flood risk. To demonstrate this, an FCA is required and should include:

- whether a proposed development is likely to be affected by current or future flooding from all sources;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate; and
- satisfy the justification test, including the acceptability of consequences.

1.3 Justification Test

The Justification Test sets out the details required to justify siting a new development in an area believed to be at risk of flooding and is defined in Section 6 of TAN15. The required criteria a site / development must fulfil are;

- i) its location in zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; or
- ii) its location in zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;

and

- iii) it concurs with the aims of PPW and meets the definition of previously developed land; and,
- iv) the potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in sections 5 and 7 and appendix 1 found to be acceptable.

1.4 Report Structure

This FCA has the following report structure:

- Section 2 describes the location area and the existing and proposed development;
- Section 3 outlines the flood risk to the existing and proposed development;
- Section 4 details the Justification Test; and
- Section 5 presents a summary and conclusions.

2.0 LOCATION & DEVELOPMENT DESCRIPTION

2.1 Site Location

FCC's Pwllfawatkin Landfill Landholding is located approximately 5km to the north of Pontardawe at National Grid Reference (NGR) 269817, 208799. The proposal site measures c.12. hectares (ha) and is located towards the northern portion of the landholding and is illustrated on Figure 1 and within Appendix 1.



Figure 1 - Site Location

2.2 Existing Development

The site currently consists of a landfill.

2.3 Proposed Development

FCC are seeking to revise the restoration profile of Tip 890 to facilitate closure of the tipping operation in a safe and environmentally responsible manner. In comparison to the previously consented scheme, this will result in:

- Revised restoration contours (covering a reduced area than previously consented) to complete the restoration of Tip 890 by constructing a sidewall extension to the operational cell 4 and not developing the previously consented cell 5;
- Localised re-profiling of cells 3 and 4;
- A reduction in void space from that previously consented;
- An amended scheme of surface water management to account for the revised restoration profile;

- Amended phasing scheme; and
- Amended scheme of landscaping.

The proposed site plans are contained within Appendix 2.

2.4 Ground Levels

The valley floor is at an elevation of approximately 160 metres Above Ordnance Datum (mAOD).

2.5 Catchment Hydrology / Drainage

The site is located in the valley of the upper Clydach River, which flows north to south close to the eastern boundary of the site. The current scheme of surface water management relies on a gravity drainage system and includes a ditch collection system excavated into the re-profiled tip, feeding under gravity into an attenuation and settlement ponds prior to discharging to the Upper Clydach River. Whilst an amended restoration profile is sought for Tip 890, the area of land to be drained is not increasing, furthermore, the principles of surface water management across the site will not alter significantly. An updated Surface Water Management Plan will be submitted as part of the planning application.

2.6 Ground Conditions

The British Geological Survey (BGS)¹ Map indicates the superficial deposits underlying the site consist of Till, Devensian – diamicton and Alluvium – clay, silt, sand and gravel. The bedrock deposits consists of the South Wales Upper Coal Measures Formation – mudstone, siltstone, sandstone, coal, ironstone and ferricrete. Information from the National Soil Resource Institute² details the site area as being situated on slowly permeable wet very acid upland soils with a peaty surface with impeded drainage.

The superficial deposits are designated as a Secondary A Aquifer and a Secondary Undifferentiated Aquifer. The bedrock deposits are designated as a Secondary A Aquifer.

A Secondary A Aquifer is defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

A Secondary Undifferentiated Aquifer is assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

¹ https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.258706122.1781344018.1634629354-557297800.1574946602

² <https://www.landis.org.uk/soilscales/>

3.0 FLOOD RISK

3.1 Sources of Flooding

All sources of flooding have been considered, these are: fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure.

3.2 Climate Change

Projections of future climate change, in the UK, indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall. Guidance included within TAN15 recommends that the effects of climate change are incorporated into FCA. Recommended precautionary sensitivity ranges for peak rainfall intensities and peak river flows are outlined in the Flood Consequences Assessments: Climate change allowances³ which was updated on September 2021.

Table 1 show the peak river flow allowances by river basin district. There is reasonable level of certainty that the future impacts of climate change will lie somewhere between the central and upper allowances. Thee lifetime of development for residential development is 100 years, and for other development it is considered to be 75 years.

Table 1 - Peak River Flow Allowances by River Basin District (use 1961 to 1990 baseline)

River Basin District	Allowance Category	2020s	2050s	2080s
West Wales	Upper end	+25%	+40%	+75%
	Central	+15%	+25%	+30%
	Lower end	+5%	+10%	+15%

3.3 Historic Flooding

Natural Resources Wales has no recorded history of flooding for this area, see Figure 1. There are no records of anecdotal information of flooding at the site including within the British Hydrological Society "Chronology of British Hydrological Events". No other historical records of flooding for the site have been recorded. Therefore, it has been concluded that the site has not flooded within the recent past.

³ https://gov.wales/sites/default/files/publications/2021-09/climate-change-allowances-and-flood-consequence-assessments_0.pdf

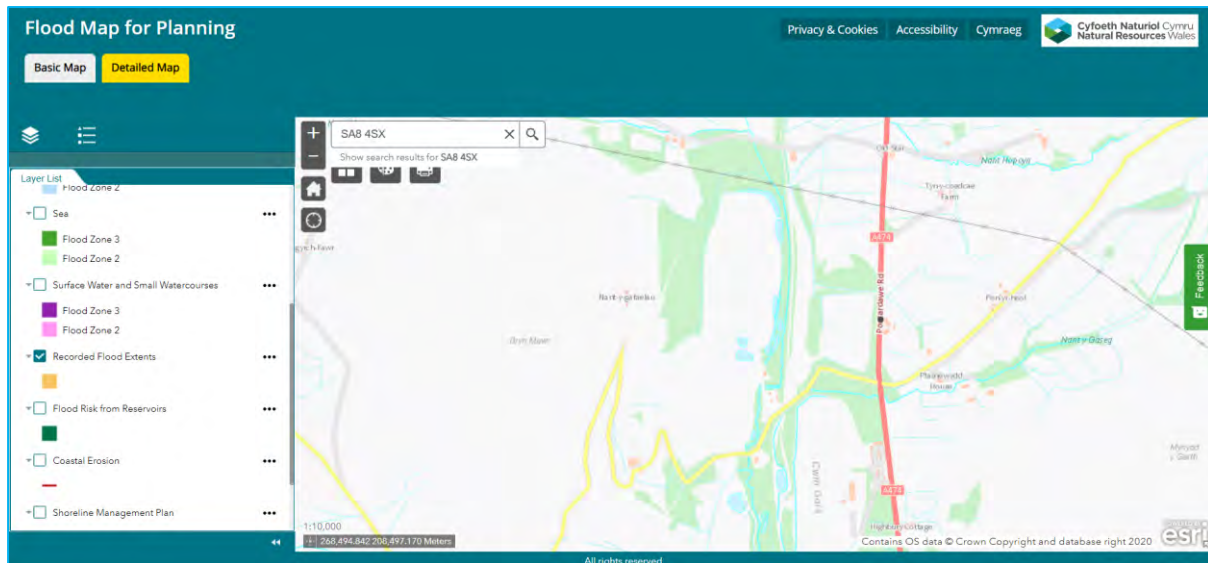


Figure 2 - Natural Resources Wales Historic Flood Outline

3.4 Existing and Planned Flood Defence Measures

The site is not protected against flooding by flood defence measures. The site is not located within the TAN15 Defended Zones.

3.5 Development Advice Map

The DAM which accompanies TAN15 shows that the site is located within Zone A - Considered to be at little or no risk of fluvial or tidal/coastal flooding and Zone B - Areas known to have been flooded in the past evidenced by sedimentary deposits (see Figure 3). However, Section 3.3 concludes that the site has not flooded within the recent past (see Figure 2).

Table 2 describes the composition and use of the TAN15 zones to control and manage development. Applying the Flood Risk Vulnerability Classification in Figure 2 of TAN15, the existing and proposed development is classified as 'highly vulnerable'. The proposed development will not change the vulnerability of the site to flooding.

Zone A is used to indicate that justification test is not applicable and no need to consider flood risk further. Zone B is used as part of a precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further. 'Highly vulnerable' uses are appropriate within Zones A and B.

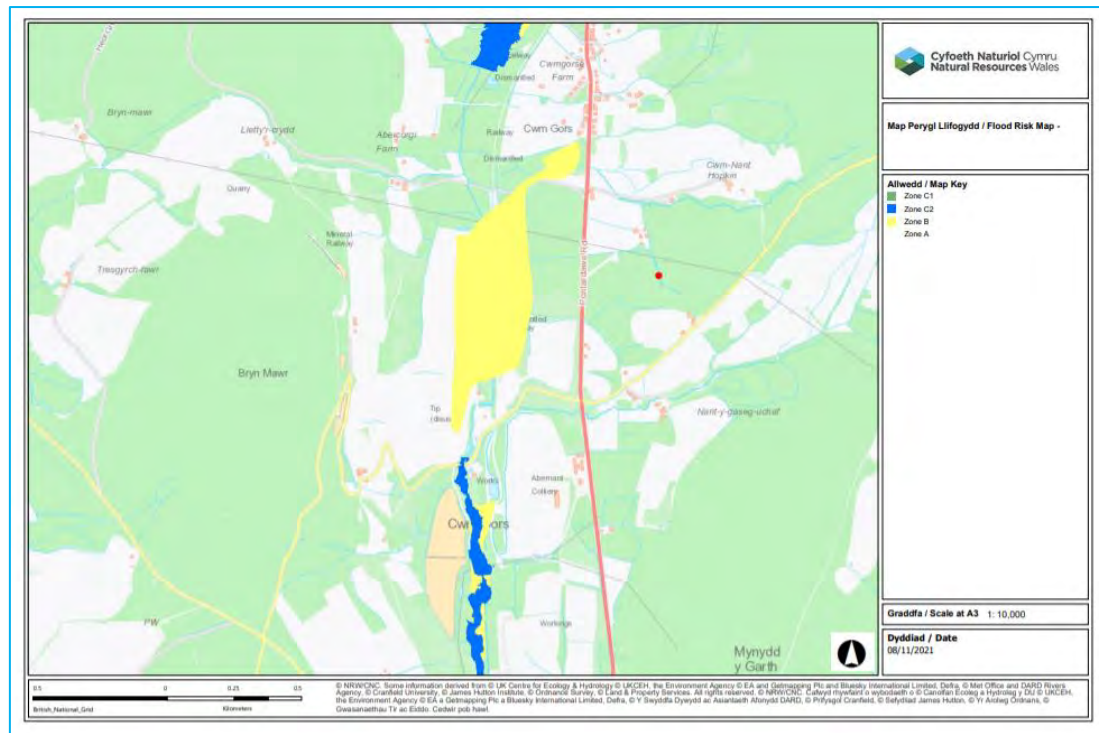


Figure 3 - Development Advice Map

Table 2 - TAN15 Flood Zones

Description of Zone	Zone	Use within the Precautionary Framework
Considered to be at little or no risk of fluvial or tidal/coastal flooding.	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.
Areas known to have been flooded in the past evidenced by sedimentary deposits.	B	Used as part of a precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal)	C	Used to indicate that flooding issues should be considered as an integral part of decision making by the application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences.
Areas of the floodplain without significant flood defence infrastructure.	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

3.6 Fluvial (river) and Tidal Flooding

The fluvial flood risk can be considered to be limited due to the difference in elevations between the site and the identified watercourses. The ground levels of the site are considerably above the normal water level of the watercourses. Flood risk to the site from the watercourse can also be considered to be limited, since the watercourses are located on the boundaries of the site well away from the proposed buildings. Any overbank flow would follow the contours of the surrounding area and would flow directly away from the site rather than flowing towards the site.

A review of the Flood Map for Planning indicates that the site is located within Flood Zone 1 and is not at risk of fluvial or tidal flooding as shown in Figure 4, with less than a 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year. Table 3 describes the composition and use of Flood Map for Planning Flood Zones.

‘Highly vulnerable’ uses are appropriate within Flood Zone 1. There are no constraints relating to flooding from rivers or the sea, other than to avoid increasing risk elsewhere. The justification test is not applicable.

The site has an annual fluvial and/tidal flood risk of less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year. Therefore, the risk of fluvial/tidal flooding is considered to be **not significant**.

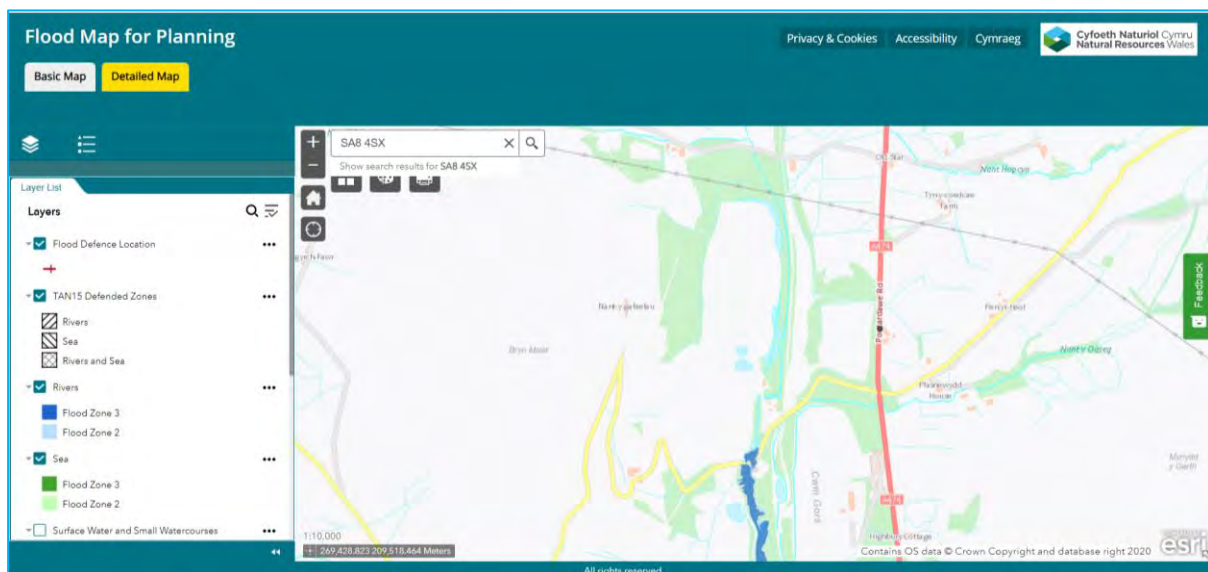


Figure 4 - Flood Map for Planning: rivers/sea

Table 3 - Definition of Flood Map for Planning Flood Zones

Zone	Flooding from Rivers	Flooding from the Sea	Flooding from Surface Water and Small Watercourses
1	Less than 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year		
2	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 200 (0.5%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.	Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.
3	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.	A greater than 1 in 200 (0.5%) chance of flooding in a given year, including climate change.	A greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.
TAN 15 Defended Zones	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from rivers of 1:100 (plus climate change and freeboard).	Areas where flood risk management infrastructure provides a minimum standard of protection against flooding from the sea of 1:200 (plus climate change and freeboard).	Not applicable.

3.7 Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers).

Site conditions suggest a low probability of groundwater flooding (see Figure 5). The local geology is not considered to yield significant volumes of groundwater. The risk of flooding from groundwater flooding is considered to be **not significant**.

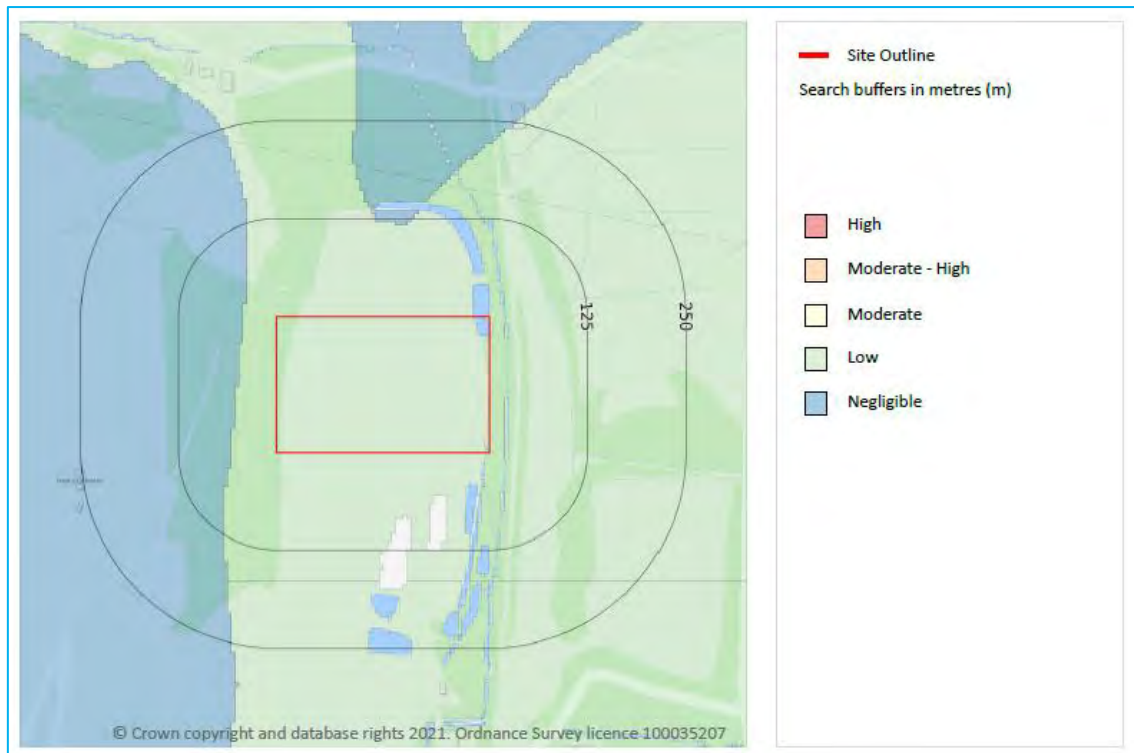


Figure 5 - Groundwater Flood Map

3.8 Surface Water (pluvial) Flooding

The site is not situated near to large areas of poor permeability or areas with the geology and/or topography which may result in surface water flooding. The soil conditions at the site and within the vicinity of the site indicate that the site may be at risk of surface water flooding. Surface water flooding tends to occur sporadically in both location and time such surface water would tend to be confined to the highways around the development.

The Flood Map for Planning shows that majority of the site is located within Flood Zone 1 and has a very low risk of surface water flooding (see Figure 6). A small proportion of the site is located within Flood Zones 2 and 3. Flood Zone 2 has less than a 1 in 100 (1%) but greater than a 1 in 1000 (0.1%) chance of flooding in a given year, including climate change and Flood Zone 3 a greater than 1 in 100 (1%) chance of flooding in a given year, including climate change. This is associated with low spots on the site and existing ponds and may result in low water depths/velocities. Surface flooding poses a low flood risk to the site therefore, the risk of flooding from surface water flooding is considered to be of **low significance**.

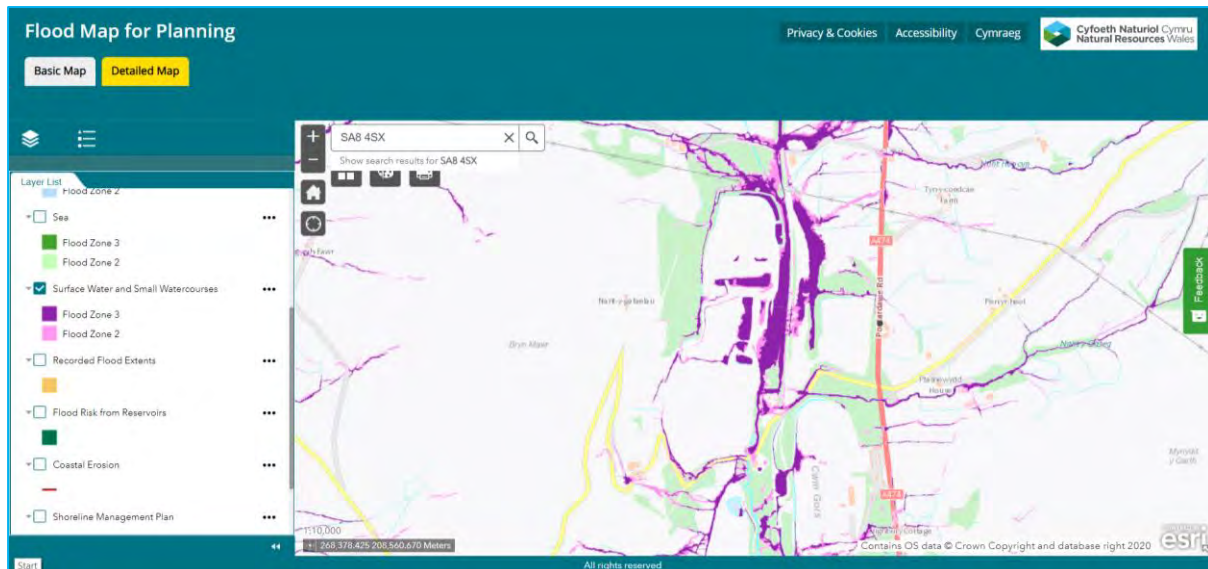


Figure 6 - Natural Resources Wales Surface Water Flood Map

3.9 Sewer Flooding

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled. Sewer flooding tends to occur sporadically in both location and time such flood flows would tend to be confined to the streets around the development.

There are no public sewers located within the vicinity of the site. Flood flows could also be generated by burst water mains, but these would tend to be of a restricted and much lower volume than weather generated events and so can be discounted for the purposes of this assessment. Therefore, the risk of flooding from sewer flooding is considered to be **not significant**.

3.10 Flooding from Artificial Drainage Systems/Infrastructure Failure

There are no other nearby artificial water bodies, water channels and artificial drainage systems that could be considered a flood risk to the site. The Natural Resources Wales Reservoir flood map shows that the site is not at risk of reservoir flooding (see Figure 7). The risk of flooding from reservoir failure is considered to be **not significant**.

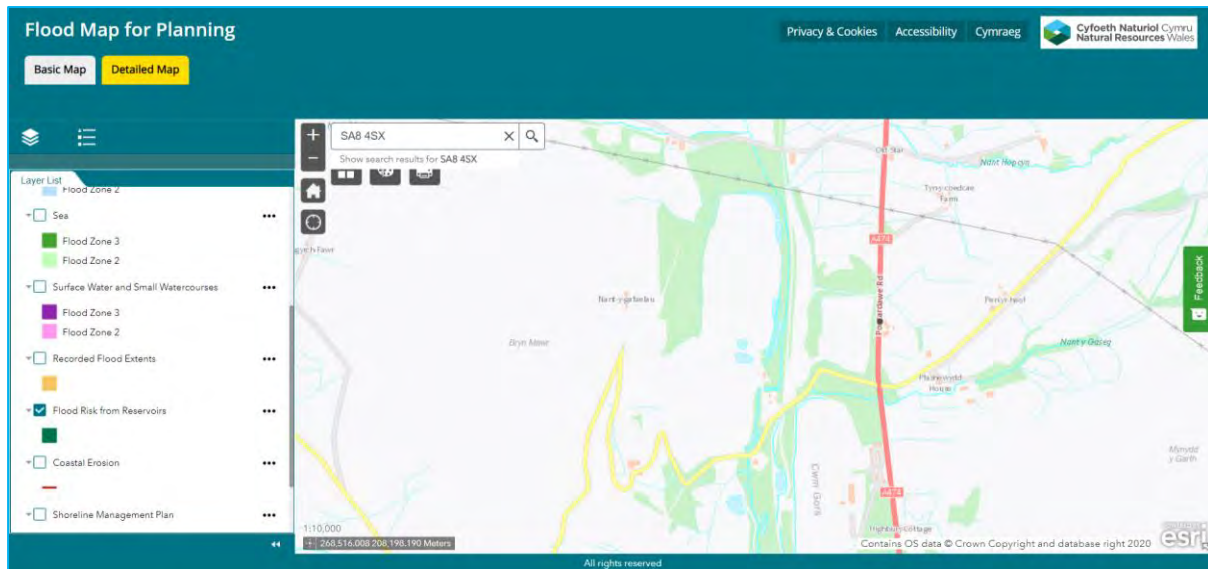


Figure 7 - Natural Resources Wales Reservoir Flood Map

3.11 Effects of the Development on Flood Risk

The overall direction of the movement of water will be maintained within the developed site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. There will be no increase in the floodwater levels due to the proposed development.

3.12 Summary of Site Specific Flood Consequence Assessment

A summary of the sources of flooding and a review of the risk posed by each source at the site is shown in Table 4.

Table 4 - Risk Posed by Flooding Sources

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial Flooding	No	None Reported	None
Tidal Flooding	No	None Reported	None
Groundwater Flooding	No	None Reported	None
Surface Water Flooding	Yes	Low Spots/Ponds	Low
Sewer Flooding	No	None Reported	None
Flooding from Artificial Drainage Systems/Infrastructure Failure	No	None Reported	None

The site is not at risk of flooding from a major source (e.g. fluvial and/or tidal) and is located within DAM Zones A, B and Flood Zone 1 and is not at risk of fluvial or tidal flooding, with less than a 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year.

The existing and proposed development is classified as 'highly vulnerable'. The proposed development will not change the vulnerability of the site to flooding. 'Highly vulnerable' uses are appropriate within Flood Zone 1. There are no constraints relating to flooding from rivers or the sea, other than to avoid increasing risk elsewhere. The justification test is not applicable. A secondary flooding source has been identified which may pose a low risk to the site. This is:

- Surface Water Flooding

There will be no net loss in flood storage capacity or impact on movement of floodwater across the site. The overall direction of the movement of water will be maintained within the developed site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed.

In conclusion, the flood risk to the site can be considered to be limited; the site is situated in DAM Zone A, B and Flood Zone 1, with a low annual probability of flooding and from all sources. The site is unlikely to flood except in very extreme conditions.

4.0 JUSTIFYING THE LOCATION OF THE DEVELOPMENT

4.1 Justification Test

New development should be directed away from Zone C and towards suitable land in Zone A and Flood Zone 1, otherwise to Zone B or Flood Zone 2, where river or coastal flooding will be less of an issue. The existing and proposed development is classified as 'highly vulnerable'. The proposed development will not change the vulnerability of the site to flooding. For developments in Zones A, B and Flood Zone 1, TAN 15 guidance states that the *'justification test is not applicable and there is no need to consider flood risk further'*.

5.0 SUMMARY AND CONCLUSIONS

5.1 Introduction

This report presents a FCA in accordance with TAN15 for the proposed development at Pwllfawatkin Landfill.

This FCA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

5.2 Flood Risk

The site is not at risk of flooding from a major source (e.g. fluvial and/or tidal) and is located within DAM Zones A, B and Flood Zone 1 and is not at risk of fluvial or tidal flooding, with less than a 1 in 1000 (0.1%) (plus climate change) chance of flooding in a given year.

The existing and proposed development is classified as 'highly vulnerable'. The proposed development will not change the vulnerability of the site to flooding. 'Highly vulnerable' uses are appropriate within Flood Zone 1. There are no constraints relating to flooding from rivers or the sea, other than to avoid increasing risk elsewhere. The justification test is not applicable. A secondary flooding source has been identified which may pose a low risk to the site. This is:

- Surface Water Flooding

There will be no net loss in flood storage capacity or impact on movement of floodwater across the site. The overall direction of the movement of water will be maintained within the developed site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed.

In conclusion, the flood risk to the site can be considered to be limited; the site is situated in DAM Zone A, B and Flood Zone 1, with a low annual probability of flooding and from all sources. The site is unlikely to flood except in very extreme conditions.

5.3 Justification Test

The development proposals should be considered by the LPA to satisfy the Justification Test as set out in TAN15.

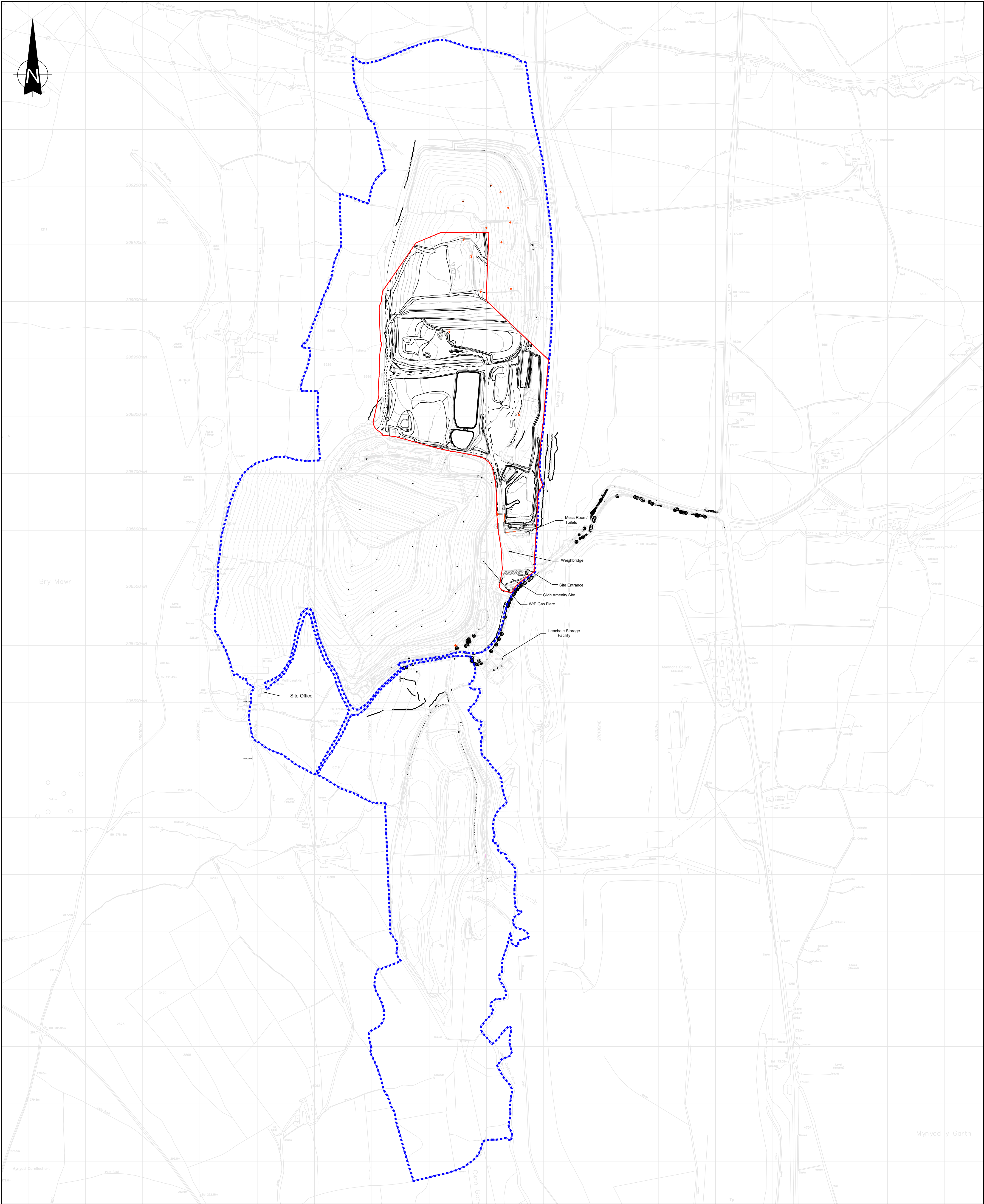
5.4 Conclusion

In conclusion, the proposed development, would be expected to remain dry in all but the most extreme conditions. Providing the recommendations made in this FCA are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable, and the development would be in accordance with the requirements of TAN15.

This FCA demonstrates that the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of TAN15. The development should not therefore be precluded on the grounds of flood risk.

APPENDICES

APPENDIX 1 – Existing Site Layout



CLIENT

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Sirius Planning
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NOTES

1. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM.

2. DO NOT SCALE FROM THIS DRAWING.

3. ANY ANOMALIES IDENTIFIED WITH THE DETAILS SHOWN ON THIS DRAWING ARE TO BE BROUGHT TO THE ATTENTION OF SIRIUS ENVIRONMENTAL PRIOR TO CONSTRUCTION WORKS COMMENCING.

KEY

--- Land Under The Applicants Control

--- Planning Application Boundary

REV	DESCRIPTION	DATE	BY

JOB TITLE

PWLLFAWATKIN
LANDFILL SITE

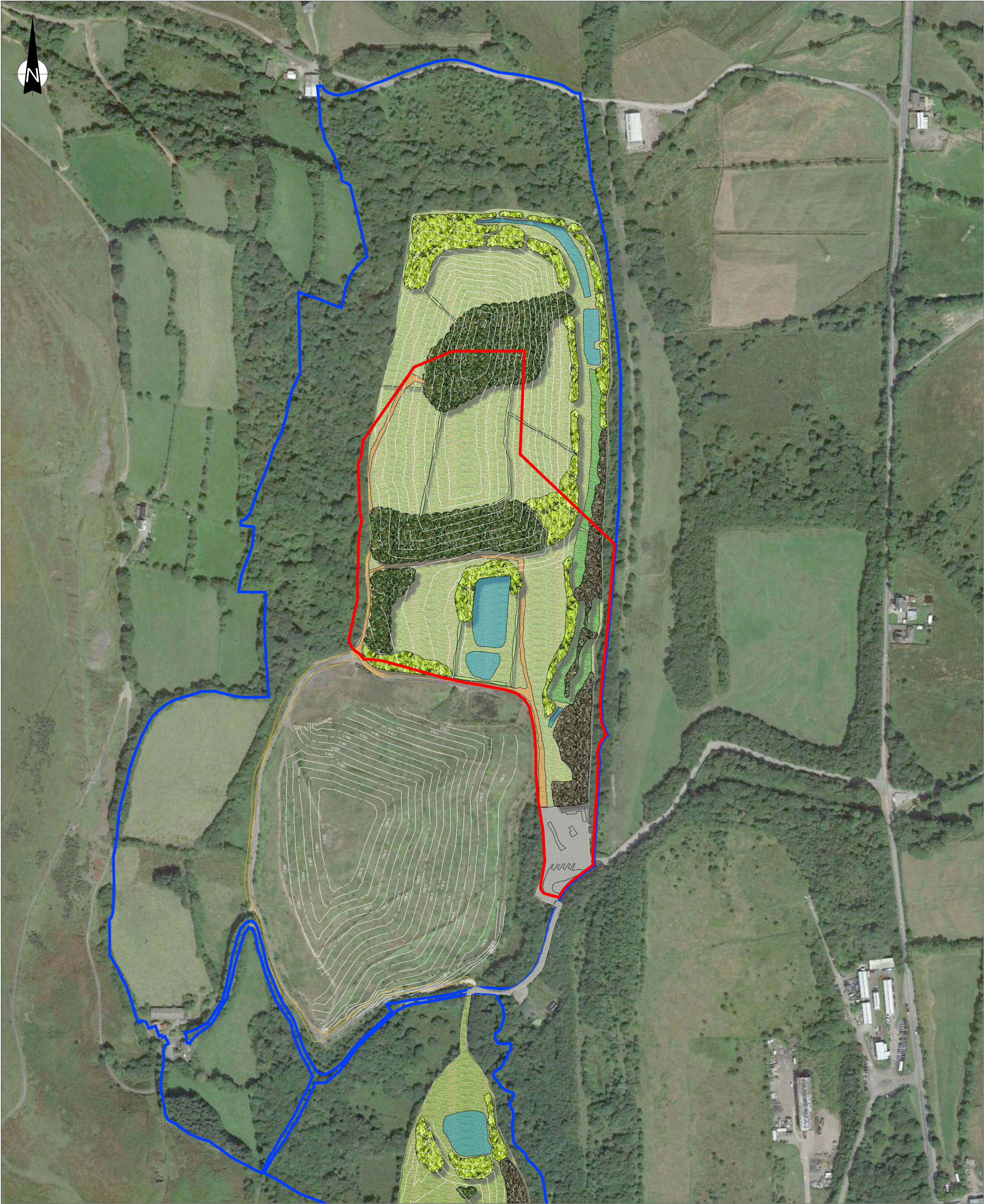
DRAWING TITLE

Planning Application Boundary and
Land Under the Applicants Control

DRAWN	DATE	APPROVED	DATE
M.C	02/11/2021	F.W	02/11/2021

SCALE	SHEET	DRAWING NUMBER	REVISION
1:3000	A1P	WR7816/12/02	0

APPENDIX 2 – Proposed Site Layout



CLIENT





KEY

Site Boundary

Planning Application Boundary

Post-settlement Surface Contours

Proposed Native Woodland

Proposed Scrubland Restoration

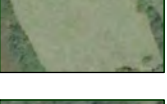
Proposed Hedgerows

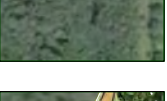
Proposed Species Rich Grassland













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A	ADDITIONAL OF CELL 5 (PARTIAL)	07/08/19	AS
REV	DESCRIPTION	DATE	BY

JOB TITLE

PWLLFAWATKIN LANDFILL SITE

DRAWING TITLE

PROPOSED RESTORATION PLAN

DRAWN	DATE	APPROVED	DATE
A.S	18/11/2021	J.C	18/11/2021

SCALE	SHEET	DRAWING NUMBER	REVISION
1:200	1	WR7816/12/08	-



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