CHAPTER 6 BIODIVERSITY

6.1 INTRODUCTION

FERS was commissioned by Boliden Tara Mines DAC (BTM) to undertake the Biodiversity Chapter of Environmental Impact Assessment Report with regards to proposed buttressing works to be undertaken on a section of the dam walls of the Randallstown Tailings Storage Facility. These works are proposed to be undertaken with a view to increasing the Factor of Safety associated with the dam walls. It is important to note that owing to time limitations the Biodiversity Chapter was prepared outside of the optimal window for undertaking ecological surveys. Notwithstanding this FERS has been undertaking ecological surveys at the Randallstown Tailings Facility since 2006 on a regular basis and the objective of the site visits undertaken to inform this Biodiversity Chapter, although undertaken in November, was to assess the site for any significant changes to the biodiversity resource known to be present.

6.1.1 FERS Company Background

Forest, Environmental Research and Services have been conducting ecological surveys and research since the company's formation in 2005 by Dr Patrick Moran and Dr Kevin Black. Dr Moran, the principal ecologist with FERS, holds a 1st class honours degree in Environmental Biology (UCD), a Ph.D. in Ecology (UCD), a Diploma in EIA and SEA management (UCD) a Diploma in Environmental and Planning Law (King's Inn) and a M.Sc. in Geographical Information Systems and Remote Sensing (University of Ulster, Coleraine). Patrick has in excess of 20 years of experience in carrying out ecological surveys on both an academic and a professional basis. Dr Emma Reeves, senior ecologist with FERS holds a 1st class honours degree in Botany, and a Ph.D. in Botany. Emma has in excess of 15 years of experience in undertaking ecological surveys on an academic and professional basis. Ciarán Byrne, a senior ecologist with FERS holds a 1st class honours degree in Environmental Management (DIT) and a M.Sc. in Applied Science/Ecological Assessment (UCC). Ciarán has in excess of 10 years in undertaking ecological surveys on both an academic and a professional basis.

FERS client list includes National Parks and Wildlife Service, An Bord Pleanála, various County Councils, the Heritage Council, Teagasc, University College Dublin, the Environmental Protection Agency, Inland Waterways Association of Ireland, the Department of Agriculture, the Office of Public Works and Coillte in addition to numerous private individuals and companies. FERS Ltd. has prepared a variety of Biodiversity Chapters for the purpose of EIAR. FERS has been actively surveying the Flora and Fauna occurring in the vicinity of the Randallstown Tailings Facility since 2006.

6.1.2 Consultation

On the 24th of November 2023, correspondence was sent to the following bodies in order to ascertain fi they might have any comment on the proposed works. A copy of the Flood Risk Assessment prepared by Coyle Environmental was attached in order to inform the bodies as to the proposed project:

- Inland Fisheries (info@fisheriesireland.ie);
- An Taisce (info@antaisce.org);
- Birdwatch Ireland (info@birdwatchireland.ie); and
- NPWS (natureconservation@npws.gov.ie).

In addition, a number of resources were consulted pertaining to the proposed development as a component of the desk study including but not restricted to:

- NPWS boundary data shapefiles for SACs (SAC_ITM_2023_10), SPAs (SPA_ITM_2023_05), NHAs (NHA_ITM_2019_06) and pNHAs (pNHA_ITM_2015_11).
- NPWS habitat/species datasets including National Survey of Native Woodlands (2003-2008), Ancient and Long-established Woodland), Margaritifera sensitive areas, Irish Semi-natural Grassland Survey.
- National Biodiversity Data Centre mapping of species of conservation concern, available from https://maps.biodiversityireland.ie/
- Site documents for relevant Natura 2000 sites including Site Synopses, Conservation Objectives and Natura 2000 Standard Data forms.
- Information outlined in NPWS (2019a) and NPWS (2019b) Article 17 reporting on the conservation status of habitats (Annex I) and species (Annex II, IV and V).

- EPA online mapping data including surface and groundwater quality, water features, river catchment boundaries, groundwater bodies, wastewater/IPPC/waste emission points, pressures on rivers/lakes/groundwater, rivers/groundwater in SAC habitats, rivers/surface waters in SPA habitats, drinking water – rivers/lakes/groundwater, etc.
- OSI Geohive online mapping data including historic 6-inch mapping (1837-1842), satellite imagery (1995, 2000, 2005, 2005-2012, Aerial Premium), contours, soils, geology etc.

6.1.3 Aim of Report

The primary aim of this Chapter of the EIAR is to provide a baseline of ecological data of the proposed application area allowing a comprehensive assessment of any potential constraints and/or impacts (including cumulative impacts) of the proposed development on the local ecological resource. The primary aims of the Baseline Ecological Assessment (which were largely based on existing data) were:

- To survey habitats, flora, and fauna within the study area;
- To assess the potential presence, distribution and conservation status of ecological habitats and species of flora/fauna within the study area;
- To highlight elements or particular areas of specific potential for biodiversity or conservation interest;
- To highlight elements with the potential to damage the ecological integrity of the study area, such as Alien Invasive Plant Species;
- To identify the potential presence and effectiveness of ecological corridors within the study area and linking the study area to adjoining areas of potential biodiversity interest that can inform the development of any Green Infrastructure Network;
- To assess and make recommendations on conservation priorities regarding the identified biodiversity resource of the site;
- To make recommendations regarding future habitat management and ecological monitoring at the site; and
- Where potential impacts are identified, detailed and comprehensive mitigation measures will be proposed, which will include avoidance of an element(s) if, and where deemed necessary.

6.2 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

6.2.1 RATIONALE

Boliden Tara Mines DAC (BTM) is proposing engineering works at the Randalstown Tailings Storage Facility (TSF) - **The construction of a rockfill reinforcement buttress to the extant embankment walls of the TSF.**

BTM has recently become a member of the International Council for Mining and Metals (ICMM) and is in the process of adopting the Global Industry Standard on Tailings Management (GISTM).

A key objective of GISTM is to address the risk of tailings embankment failure through conservative design criteria, independent of trigger mechanisms, in order to minimise potential impacts.

To this end a suitable conservative approach must be taken in terms of the factors of safety to be adopted in scenarios relating to the liquefaction / brittleness of the tailings.

The proposed buttress will be constructed against the extant embankment walls of the Tailings Storage Facility.

- The extant embankment walls have been designed and assessed to meet a target design criterion, for long-term static slope stability, with a Factor of safety (FoS) of >/= 1.5 using effective strength parameters.
- The buttressing works will increase the Factor of Safety to
    - >/=1.5 for the peak strength undrained scenario and to
    - >/= 1.1 for the residual strength undrained scenario which is now required

The Tailings Facility is located approximately 3 km north of the mine site in Navan and encloses an area of c. 250 Hectares. The facility is constructed as a ring-dike configuration with Stages 1,2,3,4 and 5 enclosed by earth fill embankment walls constructed from locally sourced natural materials. It is proposed to construct a buttress to sections of the existing embankment walls to increase their strength thus reducing the risk of failure. Stage 6 is composite lined facility.

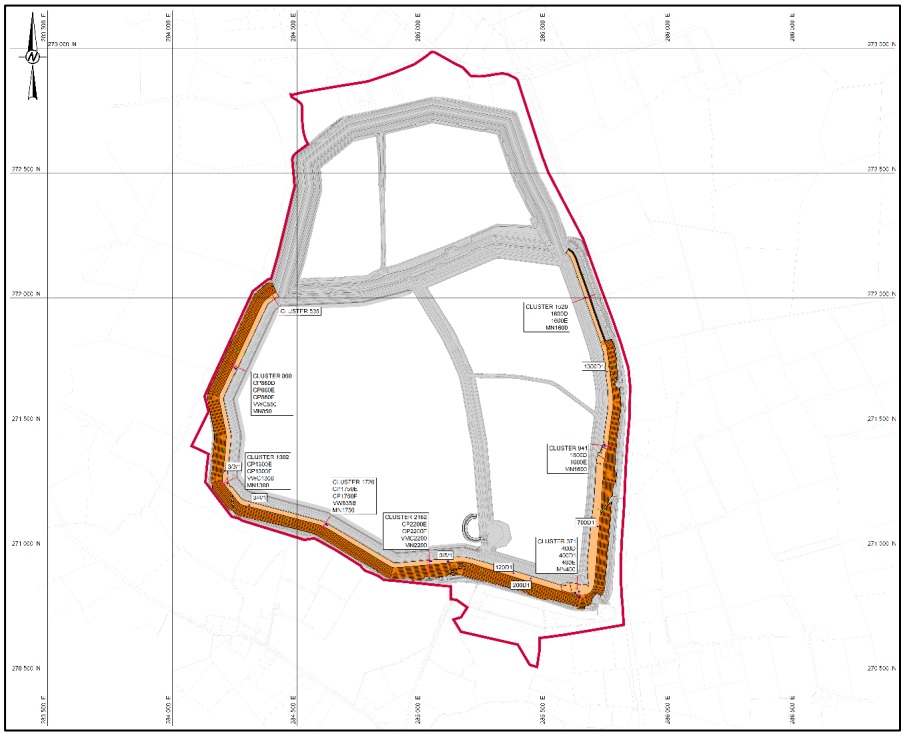

Figure 6.1: Tailings Facility layout plan

The TSF has been constructed in six main stages during the period from 1974 to present.

- Stages 1, 2 and 3 were built at ground level to a height of c.12 metres.
- Stages 4 and 5 were upstream vertical raises over Stages 1,2 and 3 (6m and 4m respectively).
- Stage 6 is a lateral extension to the north of stages 1,2,3,4 & 5.

Refer to Figures 6.2, 6.3 and 6.4

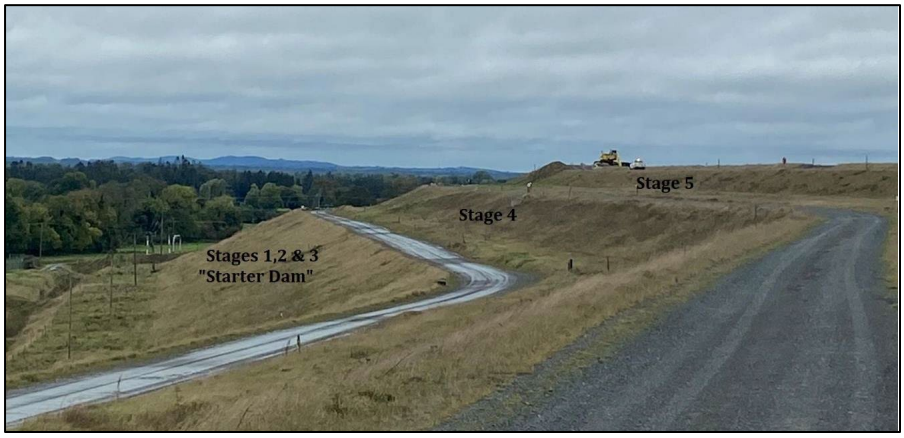

Figure 6.2: Embankments side profile

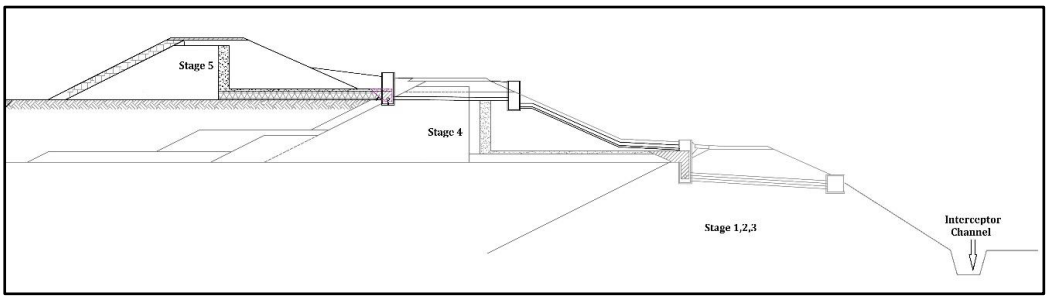

Figure 6.3: Cross section – extant facility embankment

The proposed buttress, to be constructed on the downstream slope of and at the crest of the Stage 1, 2 and 3 starter Embankments, see Figure 6.4, will provide additional support to the Stage 4 dam embankment wall in order to increase the overall stability of the upstream raises i.e. Stage 4 and Stage 5.

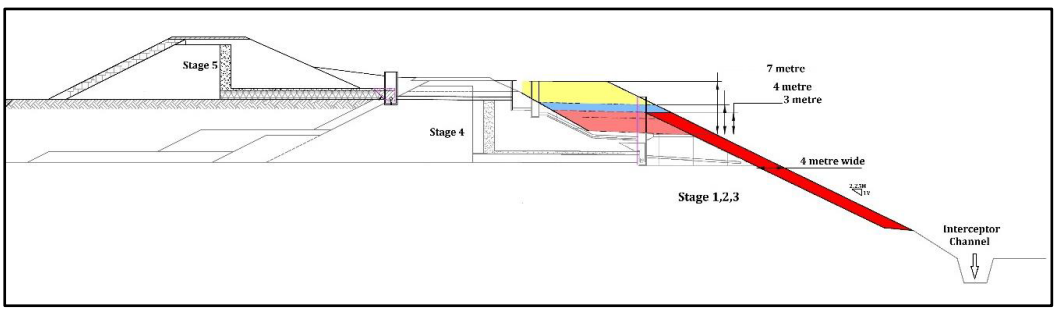

Figure 6.4: Cross section – facility embankment with buttress

6.2.2 FACTOR OF SAFETY (FOS)

BTM has undertaken a comprehensive liquefaction assessment using Cone Penetration Tests (CPT) and laboratory testing on the existing tailings.

As with all loose tailings, the tailings at Randalstown could potentially liquefy either during dynamic or static liquefaction.

- Dynamic liquefaction occurs as a result of seismic activity, the risk of which is very low in Ireland.
- Static liquefaction occurs when the dam wall has already failed for other reasons and the tailings statically liquefy under the large strains as a result of loss of confinement.

In engineering, a factor of safety (FoS) indicates how much stronger a structure actually is compared to what it needs to be for an intended load.

The original facility design and stability analyses were undertaken using effective strength parameters and monitored piezometric levels in the stack wall which is the traditional procedure. The facility was originally designed and assessed to meet a target design criterion for long-term static slope stability of FoS > 1.5 using effective strength parameters.

However, current industry best practice is to evaluate the stability using peak undrained shear strengths and with further analysis using residual undrained shear strengths. Tailings undrained strength parameters simulates excess pore pressure within the tailings and is therefore, a more conservative analysis.

The undrained stability analysis indicates that a buttress is required at the toe of the Stage 4 embankment to achieve a factor of safety of 1.5 based on peak undrained shear strength of the fine tailings.

The buttress will provide additional support to the Stage 4 dam embankment wall in order to increase the overall stability of the upstream raises i.e. Stage 4 and Stage 5.

For the stability analysis based on residual undrained shear strength, the buttress size will need to be increased in height to achieve the required factor of safety of 1.1. In order to achieve this increase in height, it is necessary to construct a buttress to the starter dam to facilitate the further increase in height.

It has been determined that the addition of a rock fill buttress at the downstream toe of the Stage 4 dam would meet the necessary requirements (endorsed by Independent Tailings Review Board (ITRB)).

- The minimum required FoS of 1.5 is achievable for all static and seismic loading conditions and all failure surface locations when the peak undrained strength of the tailings was considered.

- In order to meet the FOS of 1.1 for the residual undrained strength scenario the analysis indicated that a 4 m wide buttress to the starter dam is required for the majority of the perimeter wall. At the starter dam crest level, the height of the buttress will vary between 3 and 7 m.

The proposed buttress will be approximately 12 m wide at the base and will have an outer slope of 1 V: 2.75 H. This slope will be similar to the downstream slope of the Stage 4 dam wall as well as the downstream slope of the Starter Dams (Stages 1, 2 and 3) at most locations.

The proposed buttress would be sequenced in two phases which may run concurrently. The works will commence at the eastern extremity of the site and proceed westward):

- Phase I will proceed on a horizontal basis along Stage 4 of the tailings dam. Works will begin at the level of the toe of the Stage 4 upstream raise against the embankment wall and will vary between 3, 4 and 7 metres in height. The material will be placed in layers along 500m sections, with each 500 m section taking approximately one month to complete. It is envisaged that the Phase I works will take approximately 30 weeks; and
- Phase 2 will proceed on a horizontal basis at ground level against the embankment wall of stages 1,2 and 3 (starter dams). The material will be placed in layers along 500m sections, with each 500 m section taking approximately one month to complete. It is envisaged that the Phase 2 works will take approximately 80 weeks.

Construction quantities:

Rock Fill (m3)	**Soil (m3)**	**Total (m3)**
265,690	295,650	561,340

6.2.3 PLAN AND CONSTRUCTION SEQUENCE

The following items are designed and specified for the Works and are listed in order of the proposed sequence of works:

- Preparatory Works including cleaning the crest of the Starter Dams, removal of any topsoil, shrubs / scrub from the side-slopes over the footprint of the proposed buttress and to facilitate plant access; and
- Installation of the Phase 1 Buttress (toe of stage 4)
- Installation of the Phase 2 Buttress (at ground level starter embankments)

Preparatory Works

- Accommodation of Monitoring Instrumentation

The construction of the buttress will require the extension or otherwise accommodation of a number of geotechnical instruments which will be impacted by the works. These instruments include Casagrande standpipes, environmental monitoring wells, vibrating wire piezometers and flow measurement weirs.

- Clearance of Work Areas
    - The proposed Phase 1 buttress overlies the crest of the Starter Dams, (Stages 1, 2 and 3). The crest of this road includes a layer of rockfill material as capping and surface dressing. It is proposed that this material be salvaged where possible and where the quality of the material permits. This shall be done by either stockpiling the material temporarily for re-use or preferably, through the re-use of the material as a capping layer on a section where the buttress works have already been completed.
    - Removal of topsoil from the footprint of the area adjacent to the crest road, i.e. the area above the Stage 4 toe drain and the Stage 4 slope shall be completed prior to commencement of the buttressing works.

- For the Phase 2 buttress, it will be necessary to remove the topsoil from the entirety of the starter dam perimeter slope as well as the footprint of the buttress at the toe.

- Topsoil shall be either stockpiled temporarily for re-use or preferably, through the direct re-use of the topsoil on sections where the buttressing works have already been completed. Following excavation to the Formation Level, the footprint will require trimming, grading and compaction prior to the placement of the compacted fill. The final excavated surfaces shall be trimmed and rolled to provide a clean, even and firm foundation to permit the movement of construction vehicles without causing rutting or other deleterious effects. Benching will be employed where buttress materials are being placed onto slopes to ensure that a sufficient key-in is achieved between the buttress and the dam walls.

- A specified number of passes of a suitable vibratory roller will be required for the underlying soils. Soft spots and areas of unsuitable materials identified shall be excavated and replaced with suitable material placed and compacted and / or shall be improved *in-situ* via compaction or the installation of appropriate geosynthetics as approved by the engineer.

As part of the Phase 1 buttress construction works, the material which overlies the Stage 1,2 and 3 chimney drains shall be removed intermittently. This will allow sub-surface water drainage in the section to drain into the Stage 1,2 and 3 chimney drain. This water will then report into the Perimeter Interceptor Channel (PIC) and from there will be returned back to the tailings facility.

6.2.4 LOCATION OF PROPOSED DEVELOPMENT

The approximate location of the proposed development illustrated in Figures 6.5,6.6 and 6.7

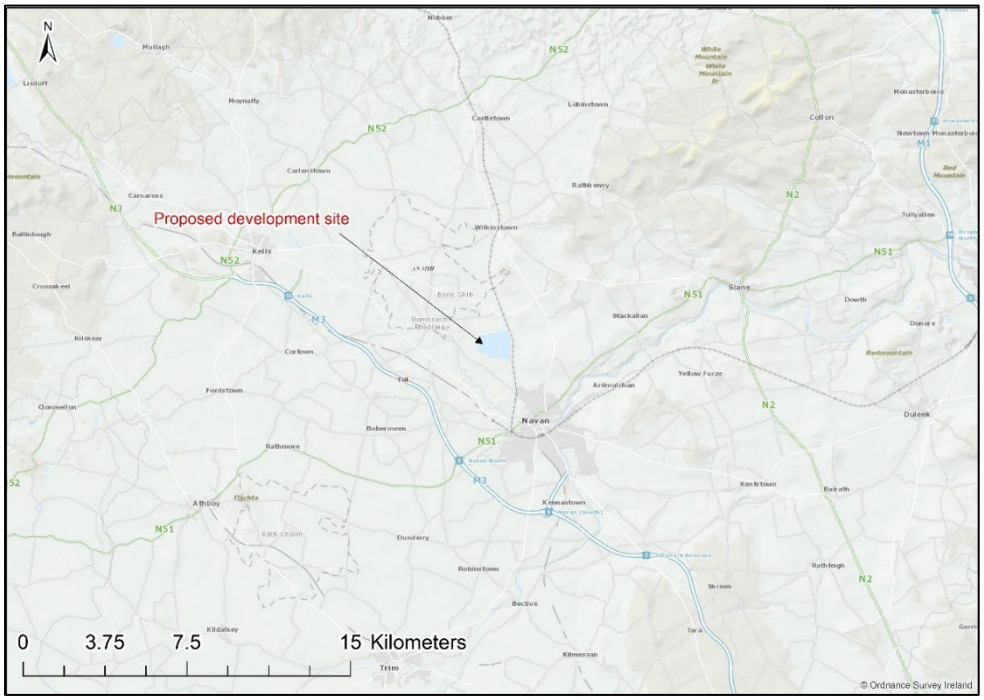

Figure 6.5: Location 1 in 150,000

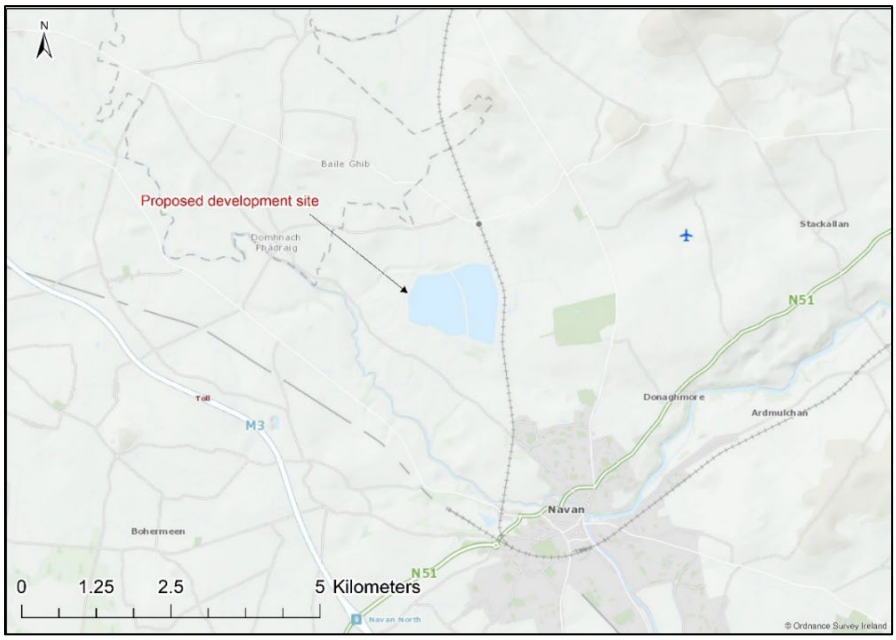

Figure 6. 6: Location 1 in 50:000

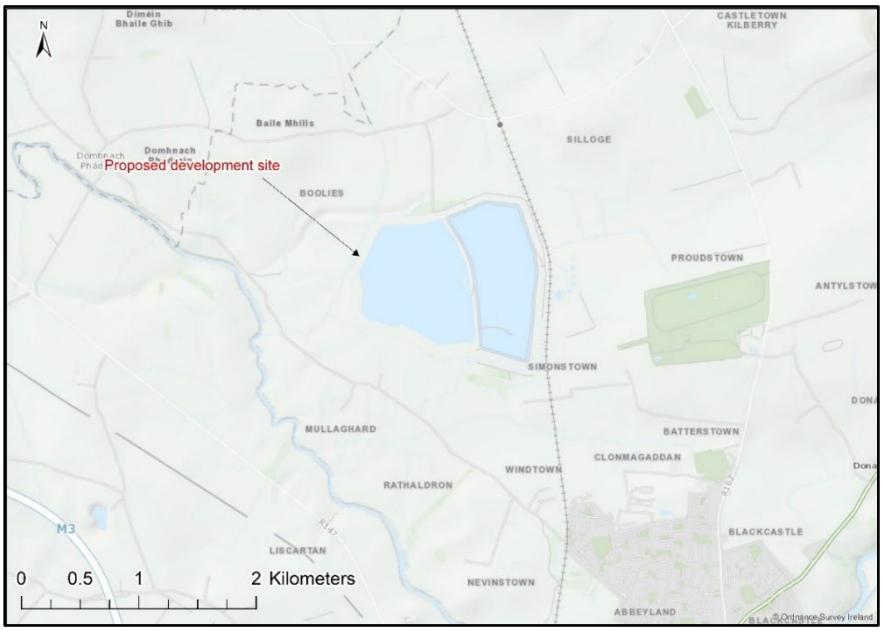

Figure 6.7: Location 1:25,000

Figure 6.8: Satellite imagery indicating approximate location of proposed works (1:12,500)

6.2.4.1 GENERAL CONDITIONS ON SITE

Site visits were undertaken during 2021, 2022 and 2024 (outlined in the Methodology). Site visits were undertaken within the optimal window for undertaking ecological assessments, for the purposes of identifying the potential presence of Annex I Habitats or Annex II/IV species (habitats directive), Annex I Bird Species (EU Birds Directive) or other species of conservation concern.

6.2.4.2 ZONE OF INFLUENCE

The zone of influence of the proposed development is the buffer distance within which it could potentially affect key ecological receptors (KERs)[1]. There is no arbitrary distance for the zone of influence of a project (for the purposes of Appropriate Assessment it is generally set at 15 km). Considering the proposed development, the potential zone of influence of general construction activities (i.e., habitat loss, habitat fragmentation, risk of spreading/introducing non-native invasive species and disturbance due to increased noise, vibration, human presence and lighting), the zone of influence would generally be regarded to be limited to within approximately 2 km from the site perimeter. The application area is, however, in an ecologically sensitive location and the zone of influence is extended to 5 km (with the exception of European sites, where this is extended to 15 km).

[1] Guidelines for Assessment of Ecological Impacts of National Road Schemes (2009), NRA

6.2.5 PLANNING, POLICY AND LEGISLATION

6.2.5.1 LEGISLATION

The following international legislation is particularly relevant to the proposed development:

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended); hereafter the 'Habitats Directive'; and,
- Directive 2009/147/EEC; hereafter the 'Birds Directive'.

The following Domestic legislation is particularly relevant to the proposed development:

- Wildlife Act, 1976 - 2018; hereafter collectively referred to as the Wildlife Acts;
- Planning and Development (Amendment) Act 2010 (as amended);
- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011 (as amended); and,
- Flora (Protection) Order, 2022. This lists species of plant protected under Section 21 of the Wildlife Act, 1976.
- Climate Action and Low Carbon Development (Amendment) Act 2021

The following national biodiversity policies are particularly relevant to the proposed development:

- All-Ireland Pollinator Plan 2021 - 2025; and,
- 4th National Biodiversity Action Plan (NBAP) setting the national biodiversity agenda for the period 2023-2027.
- In addition, the "EU Guidelines on Climate Change and Natura 2000 sites" is relevant to the proposed development.

6.2.5.2 LOCAL AUTHORITY PLANS

The following Local Authority plans are also particularly relevant to the proposed development:

- Meath Co. Development Plan 2021 - 2027[2];
- Meath Biodiversity Action Plan 2015 - 2020[2]; and
- Meath Co. Council Climate Action Strategy 2019 – 2024[2].

[2] www.meath.ie

6.3 ASSESSMENT METHODOLOGY

6.3.1 Desk Study

A desk study to collate relevant environmental information pertaining to the proposed development was undertaken to inform this assessment. The following sources were consulted:

- NPWS boundary data shapefiles for SACs (SAC_ITM_2023_10), SPAs (SPA_ITM_2023_05), NHAs (NHA_ITM_2019_06) and pNHAs (pNHA_ITM_2015_11).
- NPWS habitat/species datasets including National Survey of Native Woodlands (2003-2008), Ancient and Long-established Woodland), Margaritifera sensitive areas, Irish Semi-natural Grassland Survey.
- National Biodiversity Data Centre mapping of species of conservation concern, available from https://maps.biodiversityireland.ie/
- Site documents for relevant Natura 2000 sites including Site Synopses, Conservation Objectives and Natura 2000 Standard Data forms.
- Information outlined in NPWS (2019a) and NPWS (2019b) Article 17 reporting on the conservation status of habitats (Annex I) and species (Annex II, IV and V).
- EPA online mapping data including surface and groundwater quality, water features, river catchment boundaries, groundwater bodies, wastewater/IPPC/waste emission points, pressures on rivers/lakes/groundwater, rivers/groundwater in SAC habitats, rivers/surface waters in SPA habitats, drinking water – rivers/lakes/groundwater, etc.
- OSI Geohive online mapping data including historic 6-inch mapping (1837-1842), satellite imagery (1995, 2000, 2005, 2005-2012, Aerial Premium), contours, soils, geology etc.
- Images from Google Earth Pro were analysed using the “Show historical imagery” function of Google Earth, enabling satellite images of the subject site to be viewed from 1985, 2005, 2010 2015, 2020 and 2022. This facilitates a visual comparison of land use over time.
- CFRAM river flood extents – accessed from https://www.floodinfo.ie/map/floodmaps/

6.3.2 Field surveys

6.2.3.1 Flora Surveys

It is important to note that FERS ecologists have been undertaking various ecological surveys within the Tara Mines Tailings Facility since 2006. Although the site has grown in stature over this period, established habitat on dam walls, etc. has not changed substantially over this period. The results presented here are those associated with a 2021 “Bodiversity Audit”. The site was visited on numerous occasions over the period April – September 2021 inclusive in order to ascertain comprehensively the flora and habitats occurring. While this report concentrated on the existing dam walls, a summary of habitat occurring and species list for the entire Tailings Facility is presented. The flora surveys were carried out within the optimum ecological window by Dr Emma Reeves, Ciarán Byrne and Dr Patrick Moran. The surveys were primarily qualitative in nature as the habitats largely exist as a complex mosaic of habitat depending on the prevailing environmental conditions (slope, aspect, etc.). The findings presented here enable a comprehensive assessment of the habitats and flora present. A survey in December 2023 was undertaken in order to verify that there had been no substantial changes in the habitats present in the intervening period.

6.2.3.2 Non-volant Mammal Surveys

General mammal surveys, and crepuscular surveys were undertaken at the application site (dam wall) and immediate vicinity (*environs*) by Dr Patrick Moran in June (23rd and 30th) and July (1st and 29th). In addition to surveys of the area of the proposed development site through direct observations (seeing the animal), observation of faeces, prey remains, shelters, hair, etc., trail cameras were utilised to comprehensively assess the use of the study area by nonh-volant mammals:

- Six infrared trail cameras (Bushnell Core DS No Glow, Bushnell Aggressor No Glow) were deployed around the site between the 23rd of June 30th of 2021 in order to identify “hot spots” of mammal activity where there was evidence observed of regularly utilised wildlife trails, or where it was suspected that mammals may pass. The locations of the six trail cameras deployed is illustrated in Figure 6.9.

- Six infrared trail cameras (Bushnell Core DS No Glow, Bushnell Aggressor No Glow) were deployed between the 1st of July and the 29th of July 2021. These trail cameras were concentrated at locations where there had been evidence of “hot spots” of Mammal activity.

In addition, crepuscular mammal surveys were undertaken my Dr Patrick Moran on the night of the 29th July and morning of the 30th of July 2021. The site area was traversed and surveyed utilising a Pulsar Helion XP 50 thermal camera with any observations being recorded.

Figure 6.9: Location of trail cameras deployed 23/06 – 29/06 2021

Figure 6.10: Location of trail cameras deployed 01/07 - 29/07 2021

6.2.3.3 Otter surveys

The Simonstown stream discharges to the River Blackwater (a component of the River Boyne and River Blackwater SAC for which Otter is a Qualifying Interst) less than two kilometres from the Tara Mines Tailings Facility. Given this connectivity an Otter survey was deemed required, although the nature of the habitat is not optimal. Otter (Lutra lutra) is a primarily piscivorous species, depending largely on salmonids but also consuming frogs, crayfish, etc. It must be noted that the habitats occurring within the application site and immediately adjacent are not suitable for Otter holts, but it was deemed potential commuting/foraging habitat (Otter can travel overland to reach food sources3). Otter surveys were undertaken of suitable habitat within the application site by Dr Patrick Moran on 23/06, 29/06, and 29/07 (per Reid et al 20134). In addition, potential commuting habitat having been identified, a trail camera was

[3] Loy A, Carranza M, Cianfrani C, D'Alessandro E, Bonesi L, Di Marzio P, Minotti M and Reggiani G (2009)*Folia Zoologica (Brno)*, **58(3)**, pp 309 - 326

[4] Reid N, Hayden B, Lundy M, Pietravalle S, McDonald R and Montgomery W (2013). National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

deployed at the Simonstown stream at two locations (location one 23/06 – 29/06 and location two 01/07- 29/07) in order to capture any otter activity.

6.2.3.4 Bat surveys

Bat surveys were undertaken at the site based on the methodologies/techniques presented in:

- Irish Wildlife Manual No. 25 – Bat Mitigation Guidelines for Ireland (2006, Kelleher and Marnell) please note this was updated in 2022 but this update had no impact as regards methodologies utilised.
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes. Dublin: National Roads Authority (NRA, 2006a).
- Bat Survey Guidelines: Traditional Farm Buildings Scheme (2008, Aughney et al 2008).

Bat surveys of the application site were undertaken by Dr Patrick Moran, utilising a combination of techniques/ technologies:

6.2.3.4.1 Static Monitors

The static units used were Pettersson D500x units. These are ultrasound recording units, intended for long-term recording of bat calls. The triggering system allows the device to start recording as a sound is detected. The D500X detects the full spectrum of ultrasound and records in real time. It provides much more detailed data than either frequency division or time expansion detectors.

Static monitors were deployed as follows:

- Six static units were deployed at strategic points in order to determine “hot spots” of bat activity during the period 30/06/21 – 06/07/21 (see Figure 6.11). The results of this informed the emergence and dawn surveys;
- During the emergence and dawn survey, four static units were deployed for the night in order to assess bat activity throughout the night (see Figure 6.12) in conjunction with the dawn/emergence surveys.

Figure 6.11: Location of six Pettersson D500x Units deployed (30/06/21- 06/07/21)

Figure 6.12: Location of four Pettersson D500x Units deployed during emergence/dawn survey (29/07/21- 30/07/21)

6.2.3.4.2 Utilising hand-held detectors during walkover survey through the application area

An emergence/dawn survey was undertaken on the night of the 29th of July/morning of 30th of July by Dr Patrick Moran utilising hand-held bat detectors (Pettersson D1000X and EM3+) and a thermal imaging scope (Pulsar Helion XP50). The weather conditions were optimal for throughout the survey. The surveyor stayed on site during the night. Although all habitats present were surveyed, the effort was concentrated in those areas in which static monitors had indicated most activity. In addition, four static units were deployed for the duration of the emergence and dawn surveys to assess activity over the entire night.

6.2.3.5 Breeding Bird Surveys

Bird Watch Ireland and the RSPB NI have agreed a list of priority bird species for conservation action on the island of Ireland. These Birds of Conservation Concern in Ireland are published in a list known as the BoCCI List[5]. In this BoCCI List, birds are classified into three separate lists (Red, Amber and Green), based on the conservation status of the bird and hence conservation priority. The Red List birds are of high conservation concern, the Amber List birds are of medium conservation concern and the Green List birds are not considered threatened.

The initial breeding bird survey was undertaken by Dr Patrick Moran on the 22nd of April 2021, A modified Country Bird census technique was utilised, walking transects through the site and recording all species heard or seen. The second bird survey was undertaken on the 17th of June, walking transects through the site and compiling McKinnon lists in order to provide a proxy of frequency. A third survey was undertaken on the 1st of July walking transects and recording any new species observed. A crepuscular bird survey was undertaken on the night of the 29th of July and morning of the 30th of July 2021. A thermal imaging camera (Pulsar Helion XP50) was utilised to assess the area in addition to more traditional methods (such as listening for crepuscular species).

[5] Gilbert G, Stanbury A and Lewis L (2021). Birds of Conservation Concern in Ireland 4: 2020–2026. *Irish Birds*, **43**, pp1 - 22

6.2.3.6 Over wintering bird surveys

The primary objective of the overwintering surveys was to asses the numbers of Annex I Whooper Swan and Annex I Golden Plover utilising the habitat present for roosting. Any additional species, were, however noted. It should be noted that there are thousands of gulls present at the tailings facility, although Gulls were so numerous and so mobile at the site that gulls were not counted.

Bird surveys were conducted every month between October 2021 and March 2022. Surveys were conducted at three key times:

- Dawn – from one hour before sunrise until approximately 30 minutes post sunrise;
- Midday – a 30 minute count (dependent on activity) of birds present on the tailings pond was taken between the period 12:00 – 14:00
- Dusk – from 30 minutes before sunset until at least one hour after sunset

Survey were conducted on the following dates:

- October (midday and dusk 24th, Dawn 25th);
- November (midday and dusk 24th, Dawn 25th);
- December (Dusk 6th, Dawn and Midday 7th);
- January (Dusk 20th, Dawn and Midday 21st);
- February (Dawn, Midday and Dusk 20th); and
- March (Midday and Dusk 26th, Dawn 27th).

Birds are habituated to vehicles and for that reason all counts were undertaken from a vehicle utililising:

- Pulsar Helion XP50 thermal camera (counts in darkness);
- Image stabilised Canon 10 X 42 IS Bright L-series binoculars;
- Canon 5D Mark IV fitted with 100mm- 400mm telescopic lens; and
- Nikon P1000 (24 – 3000mm equivalent).

Utilising an IPad Pro with an Apple pen and a pre-loaded Aerial image of the survey area, the direction of flight (incoming and outgoing), roosting locations and numbers of birds of interest were recorded.

6.2.3.7 Kingfisher Surveys

The Kingfisher surveys were undertaken based on the methodology as presented in "Assessment of the distribution and abundance of Kingfisher *Alcedo atthis* and other riparian birds on six SAC river systems in Ireland" (Cummins *et al*, 2010) – which was prepared by Birdwatch Ireland for the NPWS. Suitable habitat was surveyed. In stream surveys were undertaken on 23/06/21, 29/06/21, 01/07/21 and 29/07/21. In addition, potential commuting habitat having been identified, having placed a perching post in-stream such as to attract a foraging Kingfisher, a trail camera was deployed at the Simonstown stream at two locations (location one 23/06 – 29/06 and location two 01/07- 29/07) in order to capture any Kingfisher activity.

6.4 RECEIVING ENVIRONMENT

6.4.1 General description of existing Tailings Storage Facility

The Tailings Facility is located approximately 3 km north of the mine site in Navan and encloses an area of c. 250 Hectares. The facility is constructed as a ring-dike configuration with Stages 1,2,3,4 and 5 enclosed by earth fill embankment walls constructed from locally sourced natural materials. It is proposed to construct a buttress to sections of the existing embankment walls to increase their strength thus reducing the risk of failure. Stage 6 is composite lined facility.

The TSF has been constructed in six main stages during the period from 1974 to present.

- Stages 1, 2 and 3 were built at ground level to a height of c.12 metres;
- Stages 4 and 5 where upstream vertical raises over Stages 1,2 and 3; and
- Stage 6 is a lateral extension to the north of stages 1,2,3,4 & 5.

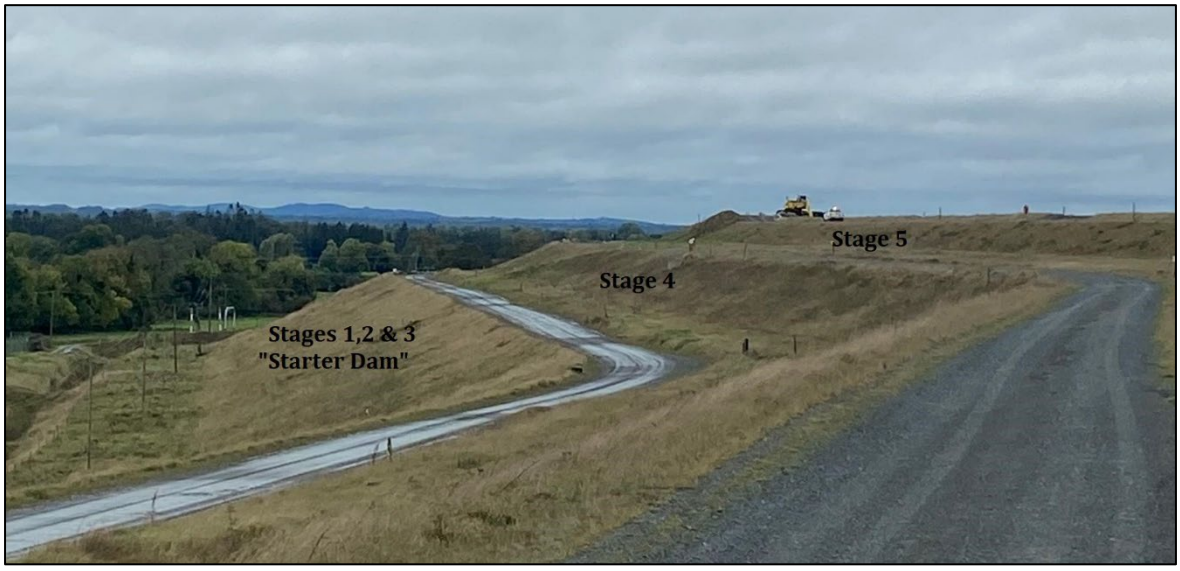

Figure 6.13: Stages 1 to 5 Embankments – side profile

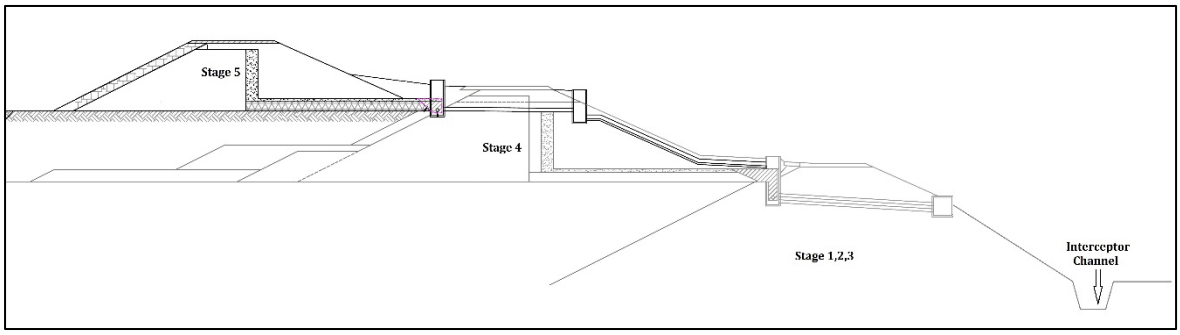

Figure 6.14: Cross-section of existing facility embankment

The habitats occurring in the immediate vicinity of the proposed buttress works are largely improved agricultural grassland. The Simonstown borrow pit occurs to the East and there is an area of Mixed Broadleaved Woodland along the south eastern border of the proposed buttress works. There is also a corridor associated with the Navan-Kingscourt railway line to the East of the proposed buttress works (the new Boyne Valley to Lakelands (BVL) greenway is now located on this railway line). The Yellow River and Simonstown stream both occur proximate to the proposed buttress works. The works, will however, be limited to between the interceptor ditch and the crest of the Stage 4 Dam (Figure 6.16). There will only be direct impacts on the habitat occurring on the embankments, which comprises semi-natural grassland of a mosaic of types, depending on the existing environmental conditions. For example, in the vicinity of the Interceptor Ditch, areas of wet grassland (GS4) occur, while on south-facing slopes the grassland could be categorised as GS1, and indeed a high number of orchids, including Common Spotted Orchid and Bee Orchid occur here.

Figure 6.15:Habitats in the vicinity of the buttressing works

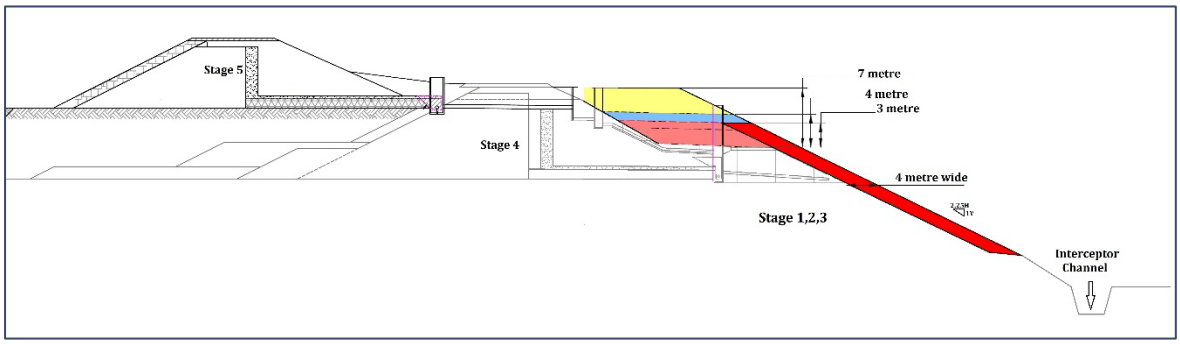

Figure 6.16: Cross section illustrating the extent of the proposed buttressing works

6.4.2 Desk Study

6.4.2.1 Google Earth Historic Imagery

A collection of images from 1985, 2005, 2010, 2015, 2020 and 2022 attained utilising the "historical imagery" tool is presented in Figure 6.17.

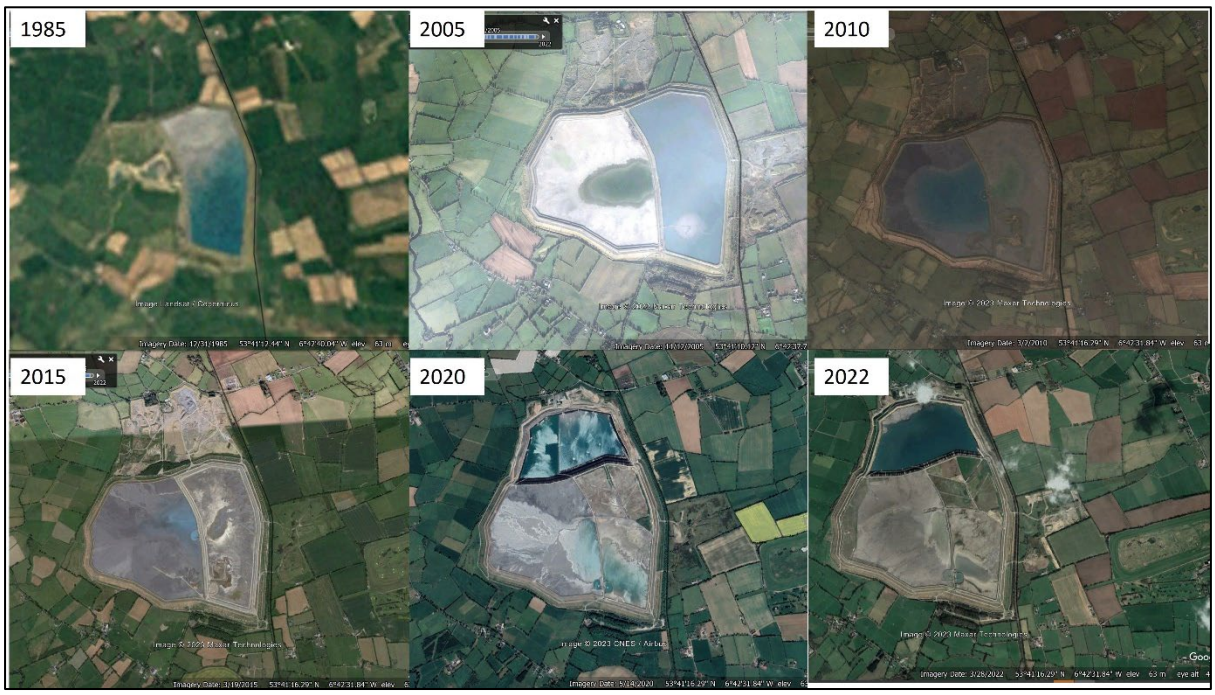

Figure 6.17: Google Earth Imagery of TSF

6.4.2.1.1 NPWS Data Base

There were no records of habitats/species present in the immediate vicinity of the proposed development within the various NPWS databases queried. Regarding designated (natural heritage) sites there is one SAC, one SPA and one pNHA occurring within 5 km of the proposed development. Please see Table 6.1 and Figure 6.18. Please note that an Appropriate Assessment Screening and Natura Impact Statement has been produced for the proposed development, which identifies all Natura 2000 sites with 15 km (002299 and 004232)

Table 6.1: Sites designated within 5 km of proposed works

SITE NUMBER	DESIGNATION	SITE NAME
001592	pNHA	Boyne Woods
002299	SAC	River Boyne and River Blackwater
004232	SPA	River Boyne and River Blackwater

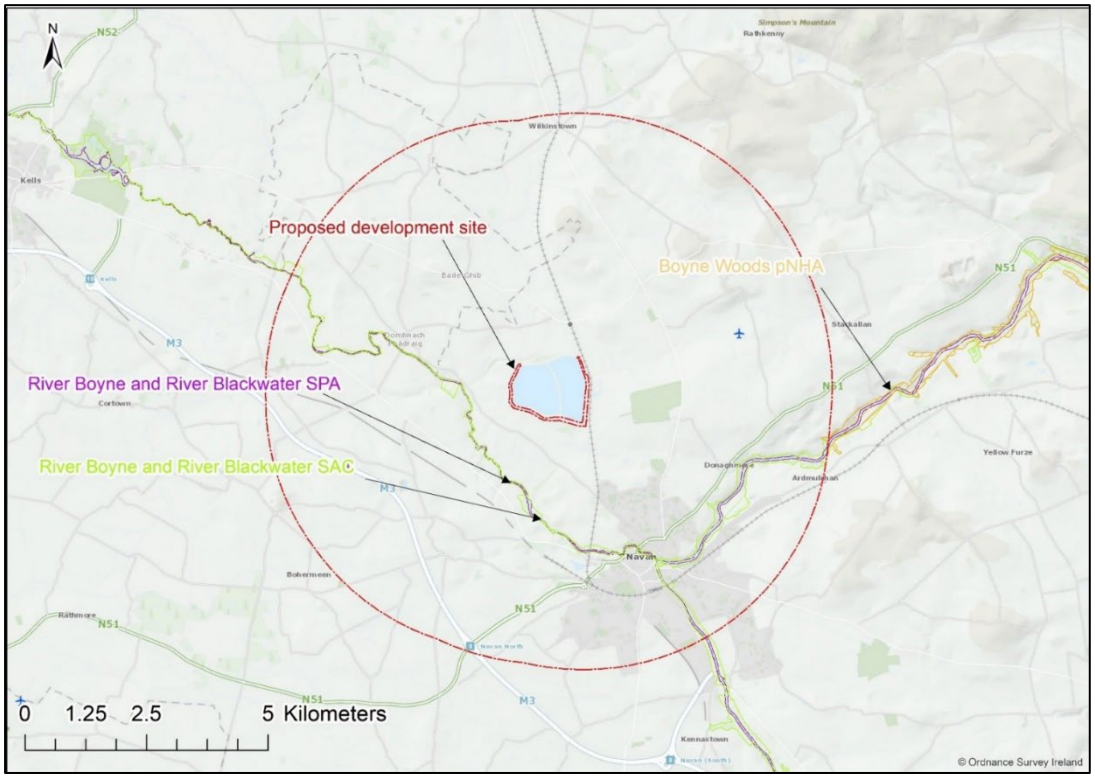

Figure 6.18: Designated sites within 5 km of proposed buttressing works

6.4.2.2 National Biodiversity Datacentre Database

In addition to consulting the NPWS database, the National Biodiversity Data Centre Database was consulted regarding species of conservation concern recorded as occurring within the vicinity of the study area. The NBDC database was accessed on the 4th of December 2023 in order to query records occurring within the vicinity of the proposed development (10 km square, N87 see Figure 6.19). The species of conservation concern as recorded within these 2 km squares are illustrated in Table 6.2.

Figure 6.19: Location of 10km squares queried relative to TSF (yellow arrow)

Table 6.2: Species of conservation concern recorded in the vicinity of the proposed development site (* indicates invasive species of concern)

Scientific Name	**Common Name**	**Date of last record**
Rana temporaria	Common Frog	12/09/2020
Lissotriton vulgaris	Smooth Newt	10/02/2013
Tyto alba	Barn Owl	31/12/2011

Scientific Name	**Common Name**	**Date of last record**
Hirundo rustica	Barn Swallow	12/09/2020
Larus ridibundus	Black-headed Gull	31/12/2011
Fulica atra	Common Coot	21/05/2010
Locustella naevia	Common Grasshopper Warbler	31/07/1972
Falco tinnunculus	Common Kestrel	31/12/2011
Alcedo atthis	Common Kingfisher	31/12/2011
Carduelis cannabina	Common Linnet	31/12/2011
Aythya ferina	Common Pochard	31/12/2001
Actitis hypoleucos	Common Sandpiper	19/04/2010
Gallinago gallinago	Common Snipe	31/12/2013
Sturnus vulgaris	Common Starling	01/01/2023
Apus apus	Common Swift	31/12/2011
Sterna hirundo	Common Tern	31/07/1991
Calidris alpina	Dunlin	31/12/2011
Numenius arquata	Eurasian Curlew	31/12/2011
Anas crecca	Eurasian Teal	02/04/2010
Passer montanus	Eurasian Tree Sparrow	31/12/2011
Scolopax rusticola	Eurasian Woodcock	31/12/2013
Pluvialis apricaria	European Golden Plover	31/12/2011
Mergus merganser	Goosander	31/12/2001
Larus marinus	Great Black-backed Gull	31/12/2011
Phalacrocorax carbo	Great Cormorant	10/03/2023
Perdix perdix	Grey Partridge	14/04/2019
Anser anser	Greylag Goose	31/12/2001
Circus cyaneus	Hen Harrier	31/12/2011

Scientific Name	**Common Name**	**Date of last record**
Larus argentatus	Herring Gull	31/12/2011
Delichon urbicum	House Martin	31/12/2011
Passer domesticus	House Sparrow	01/01/2023
Larus fuscus	Lesser Black-backed Gull	31/12/2011
Egretta garzetta	Little Egret	10/03/2023
Tachybaptus ruficollis	Little Grebe	31/12/2011
Anas platyrhynchos	Mallard	31/12/2011
Larus canus	Mew Gull	31/12/2011
Cygnus olor	Mute Swan	07/06/2020
Vanellus vanellus	Northern Lapwing	31/12/2011
Columba livia	Rock Pigeon	31/12/2011
Riparia riparia	Sand Martin	31/12/2011
Asio flammeus	Short-eared Owl	31/12/2011
Alauda arvensis	Sky Lark	31/12/2011
Muscicapa striata	Spotted Flycatcher	31/12/2011
Columba oenas	Stock Pigeon	31/12/2011
Cygnus cygnus	Whooper Swan	11/03/2021
Emberiza citrinella	Yellowhammer	17/03/2023
Austropotamobius pallipes	Freshwater White-clawed Crayfish	10/10/2012
*Tandonia budapestensis**	Budapest Slug*	07/04/1982
*Potamopyrgus antipodarum**	Jenkins' Spire Snail*	17/08/2018
*Mustela vison**	American Mink*	20/02/1980
*Muntiacus reevesi**	Chinese Muntjac*	31/12/2008
Myotis daubentonii	Daubenton's Bat	16/08/2011
Meles meles	Eurasian Badger	31/12/2014

Scientific Name	**Common Name**	**Date of last record**
Lutra lutra	European Otter	24/07/2017
Nyctalus leisleri	Lesser Noctule	02/07/2011
Martes martes	Pine Marten	30/05/2021
Pipistrellus pipistrellus sensu lato	Pipistrelle	10/08/2010
Cervus elaphus	Red Deer	15/06/2013
Pipistrellus pygmaeus	Soprano Pipistrelle	10/08/2010
Erinaceus europaeus	West European Hedgehog	26/08/2021

Several of these species of conservation concern are known to occur within the TSF complex, including significant numbers of the Annex I bird species Whooper Swan and Golden Plover in addition to Kingfisher (a Qualifying Interest of the River Boyne and River Blackwater SPA). Otter (Annex II/IV species EU Habitats Directive) There are several additional species of conservation concern recorded recently utilising the habitats occurring at the Tailings Facility, including numerous species of bat. Several Annex II and Annex IV species (Habitats Directive) and Annex I species (Birds Directive) are known to occur in the vicinity of the proposed works.

6.4.2.3 EPA Portal

A query of the EIA portal[6] would indicate that there are a number of recent projects requiring EIAR. Owing to the dependence of the Qualifying Interests of the River Boyne and River Blackwater SAC/SPA either directly, or indirectly on water quality, it is key that the proposed development have no significant negative impact on local hydrology/water quality. A comprehensive hydrological assessment of the proposed development has been undertaken as a component of the Chapter 7 of the EIAR, which concludes that "…*This assessment has examined the potential impacts of the proposed buttress and its construction on water levels and water quality at the TSF and in the surrounding local water environment. Following*

[6] https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

implementation of the mitigation measures outlined in Section 7.7, no significant adverse impacts are anticipated as a result of the proposed works…"

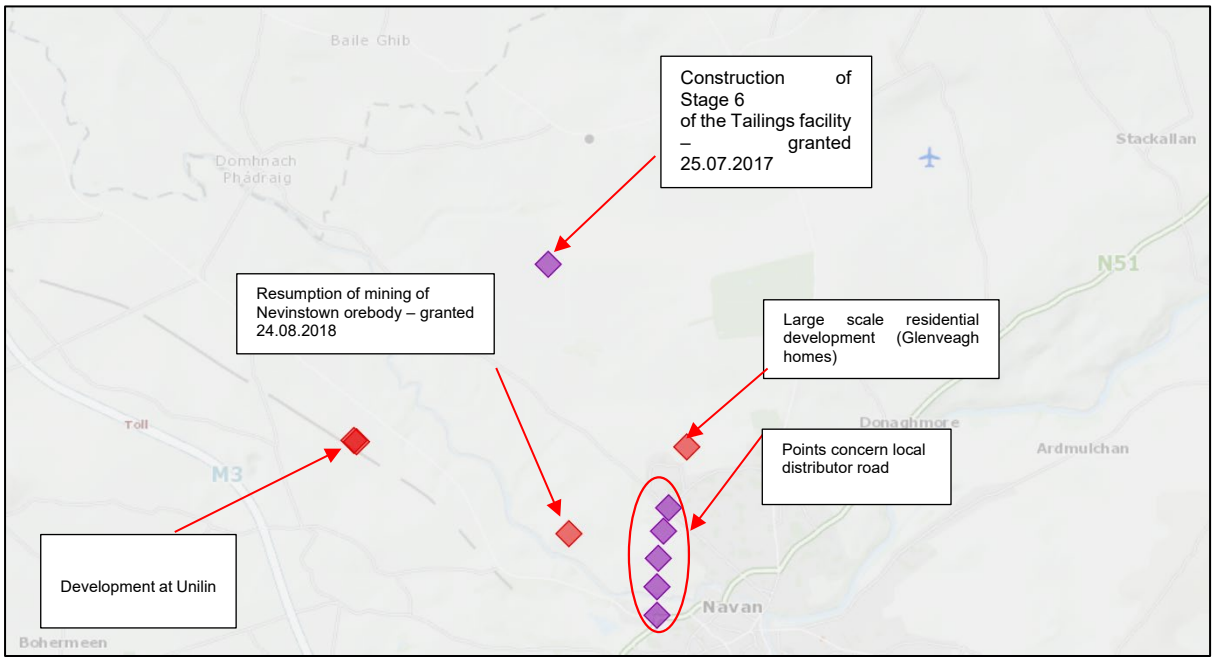

Figure 6.20: Query of EIA portal for projects requiring EIA in the vicinity of the proposed buttressing works

6.4.2.3.1 Pending planning permissions

BTM intend to lodge an application in the immediate future for a solar farm to generate renewable electricity for use within the BTM Knockumber site providing for an electrical capacity of approximately 18 megawatts (advertised in Meath Chronicle date Saturday February 3rd). The development will consist of a ten-year planning permission for a solar energy development with then proposed site extending to a total area of approximately 43 ha comprising (i) photovoltaic solar panels on steel mounting frames; (ii) electrical inverters; (iii) electrical power stations; (iv) an electrical control building and associated electrical apparatus; (v) underground electrical and communications cabling; (vi) on-site access tracks; (vii) a temporary construction compound; (viii) security fencing and security gates; (ix) pole-mounted security cameras; and (x) all associated and ancillary site development, landscaping and reinstatement works. The operational lifetime of the proposed development is 35-years. The proposed development is related to an activity requiring an Industrial Emissions Licence. This

planning application will be accompanied by an Environmental Impact Assessment Screening Report and a Natura Impact Statement.

6.4.2.4 Meath Co. Council Planning

An online review of the Meath Planning resource[7] indicates that there are two significant planning permissions within a distance of 2km of the proposed development. A review of historical planning permissions relating to the proposed development site is indicated in Table 6.3.

Table 6.3: Significant development seeking planning permission within 2km of the proposed development

Application Number	Development Description	Address	App distance from site (m)	Application Status
221558	Amendments to the south-eastern portion (0.71ha) of a residential development permitted under Meath County Council Reg. Ref. NA/181326.	Lands to the north of the Clonmagaddan Road , Clonmagaddan, Navan Co Meath	1500	APPEALED
22924	Large scale residential development	Lands north of Clonmagaddan road, Clonmagaddan, Navan	850	APPLICATION FINALISED

In addition, Meath Co. Council recently granted planning permission (Planning Application Reference 23341) for the construction of a water treatment plant and ancillary infrastructure within the mine site complex at Knockumber. This planning permission relates to an activity

[7] https://housinggovie.maps.arcgis.com/apps/webappviewer

covered by the Company's Industrial Emissions Licence Ref. No. P0 516-04. This granting of planning permission is currently being appealed.

The TSF at Randallstown has been constructed in six main stages during the period 1974 – present.

Table 6.4: Historical planning at the site

Tailings facility Planning by Stage	**Planning ref #**	**Construction Period**	**Status**
1	P 73/125	1975 to 1978	Filled and re-vegetated in 1988
2	P 74/732	1980 to 1983	Filled and re-vegetated in 1988
3	P 83/464	1985 to 1987	Filled in 2003
4	P 96/919	1998 to 2006	Raised facility over Stage 1, 2 and 3 tailings. Filled in 2006
5	NA 901452	2011 to 2016	Raised Facility over Stage 4A tailings. Filled in 2020
6	NA/160408 PL17.247707	2017 to 2022	Lateral extension to Stages 1 to 5 in a northern direction. Filling ongoing

6.4.3 Field Surveys

Please note that owing to times constraints the field survey results presented here relate to surveys undertaken in during the period April 2021 – March 2022. A site visit was undertaken by Dr Patrick Moran on February 1st, 2024. While outside of the optimum window for undertaking ecological surveys, the primary purpose of the site visit was to assess the condition of the site as regards any changes that may have occurred since 2021. Of note, no significant changes and/or disturbance to the primary habitat present were observed and the results of the 2021/2022 surveys are deemed to remain valid.

Figure 6.21: Selection of images captured on 1st February 2024

6.4.3.1 Habitat/Flora survey

In excess of 200 species of flowering plant were recorded from the area of the Randallstown TSF during habitat and flora surveys undertaken during the period April – September 2021. From the dam wall of the TSF alone, in excess of 100 species of flowering plant were recorded. The broader area of the TSF contains a mixture of natural and built land habitats, including recently fertilised and reseed agricultural grassland (where the tailings pond has been

"capped"), scrub, mixed broad-leaved woodland, drainage ditch and streams. The primary habitats occurring on the dam walls, which will be impacted upon by the proposed development, are comprised of semi-natural grassland, which is very uncommon in the intensive agricultural landscape of Meath. There are several different grassland types/mosaics present. Although no species present on the Flora Protection Order (2022) was observed to occur within the habitat to be impacted or within the wider area, several species of note were observed to be present, including a number of Orchid species,

The proposed development is limited to the grassland habitats occurring on sections of stages 1 to 4 the dam walls. It must be remembered that the habitats occurring here are present solely owing to the management of the habitat (or lack thereof) and interventions rare. A full species list of the species present within the larger TSF facility is provided in Appendix I. A separate species list of those species present within the footprint of the proposed development (i.e., dam walls) is provided in Appendix II.

The primary grassland types present are:

- GS1 – Dry calcareous and neutral grasslands. According to Fossitt's A Guide to Habitats in Ireland "*…grazing is a characteristic feature…*" of this habitat. Although this habitat is not grazed by cattle/sheep, there is a significant population of both Rabbit and Irish Hare present, which could be considered as grazing. There is a wide variety of grasses present, including *Briza media* and *Avenula pubescens*, which are indicative of calcareous conditions. There is a diverse herbaceous layer present, including species typical of GS1 such as *Achillea millefolium*, and *Hypochaeris radicata*. Of note, there are a number of species of orchids occurring here - abundant in areas. Correctly managed, the habitat may develop into Calcareous grasslands with high numbers or diversity of orchids corresponding to the priority habitat, 'semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometea) (*important orchid sites) (6210). This habitat is primarily restricted to south-facing slopes of the dam walls.

Figure 22: Area of GS1 habitat supporting several species of orchid

- GS2 – Dry meadows and grassy verges. This is the most abundant habitat occurring along the dam walls with some areas being irregularly mown to prevent scrub encroachment. There are some restricted areas where there is low-intensity sheep-grazing, but the habitat is dominated by Tussock-forming grasses such as *Arrhenatherum elatius* and *Dactylis glomerata,* with a lower diversity in the herbaceous layer than in GS1 areas, with various *Rumex and Cirsium* species abundant. Although floral diversity of this habitat is lower than the GS1 areas, the abundance of species such as *Cirsum* spp support a wide range of invertebrates and is important for pollinators. This habitat occurs along much of the older dam wall, with habitat undergoing succession to scrub in some areas, with encroachment by *Ulex* widespread. The steep slope of the dam walls is a major hindrance to the management of this habitat by mowing and in the absence of management it will eventually revert to scrub.

Figure 6.23: Area of GS2-type grassland with scrub encroachment

Figure 6. 24: Although floristically less diverse than areas of GS1, GS2 supports a wide range of invertebrates

- GS4 – wet grassland

In wetter areas, primarily those associated with the interceptor ditch, grassland best characterised as wet grassland can be found. Water levels fluctuate but there is generally some degree of standing water presence. Species composition varies considerably depending on the depth of the water present and the consistency of wetness. The habitat presents as a mosaic with GS1 and GS2, with GS4 occurring in wetter areas, generally dominated by a mixture of *Juncus* species and grasses such as *Glyceria fluitans* and *Alopecurus geniculatus* with numerous herbaceous species including *Cirsium palustre, Cardamine pratensis Potentilla anserina*, *Veronica beccabunga*, *Filipendula ulmaria* and *Mentha aquatica*. Sedges also dominate in areas. In very wet areas with a reasonable depth of standing water present, the interceptor ditch supports species such as *Alisma-plantago aquatica, Ranunculus flammula*, *Irish pseudacorus* and even *Typha latifolia* and *Phragmites australis*. The habitat is generally restricted to within several metres of the interceptor ditch.

Figure 6.25: Interceptor ditch, the habitat associated with the low-lying levels is primarily of the type GS4

6.4.3.2 Non-volant Mammal Surveys

Owing to the mobility of non-volant mammal species, the results of the surveys conducted for the wider area are present. Generally, use of the dam walls is rather limited as the habitat is very open. The broader TSF area has identified a good diversity of non-volant mammal species including Red Fox, Badger, Pine Martin, Rabbit, Irish Hare, Brown Rat, Wood Mouse and Pygmy Shrew. Grey Squirrel have been observed in the past but were not recorded during the 2021 survey – possibly corelated with the high incidence of Pine Martin. American Mink, an invasive species has also been observed within the general TSF area, as has Fallow Deer. Of particular note is the abundance of Irish Hare throughout the TSF area, with an unusually large population being present. It is not unusual to observe more than five different individuals when driving around the TSF. Non-volant mammals are generally restricted largely to the wooded habitats associated with the fringes of the TSF.

Figure 6.26: Irish Hare are ubiquitous around the TSF in general, likely owing to the protection with no hunting permitted

Figure 6.27: Rabbit are the most common mammal encountered and provide a significant level of grazing

Figure 6.28: Badger too, are abundant throughout the TSF in general, although largely restricted to areas adjacent to wooded habitat

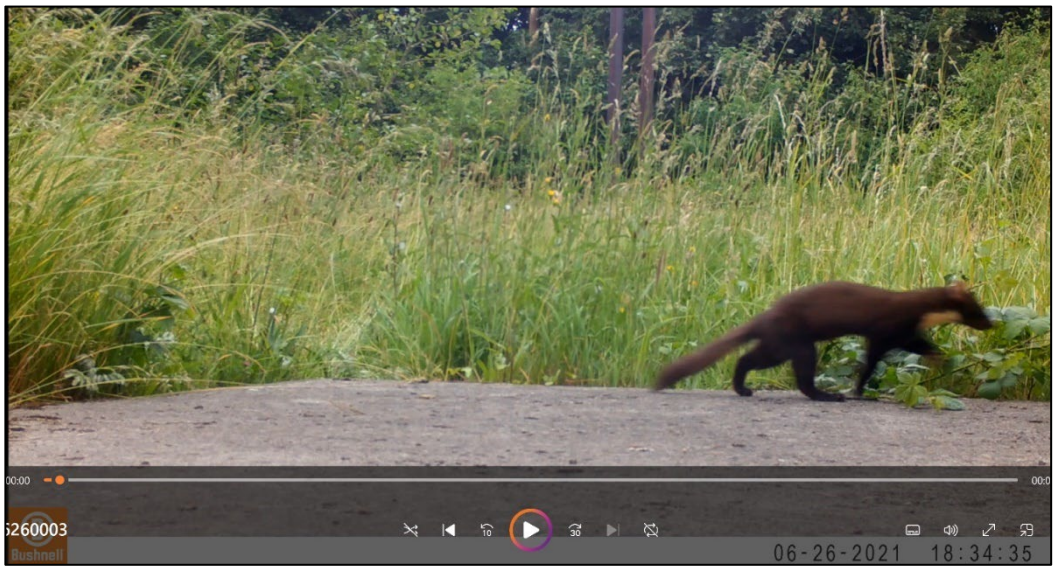

Figure 6. 29: Pine Marten are frequent within the wooded habitats of the TSF

Figure 30: Image of Pine Marten captured at another site

6.4.3.3 Otter surveys

The Simonstown stream discharges to the River Blackwater (a component of the River Boyne and River Blackwater SAC for which Otter is a Qualifying Interst) less than two kilometres from the Tara Mines Tailings Facility. Given this connectivity an Otter survey was undertaken. The nature of the habitat is not optimal and surveys of habitat occurring adjacent to/within suitable habitat yielded no evidence of Otter. A trail camera deployed at the Simonstown stream between 23/06/21 – 29/06/21, however, did capture footage of an Otter utilising the habitat.

Figure 6.31: Trail camera footage recording Otter utilising the Simonstown stream

6.4.3.4 Bat surveys

Bat surveys of the habitats present

6.4.3.4.1 Static Monitors

The static units used were Pettersson D500x units. These are ultrasound recording units, intended for long-term recording of bat calls. The triggering system allows the device to start recording as a sound is detected. The D500X detects the full spectrum of ultrasound and records in real time. It provides much more detailed data than either frequency division or time expansion detectors.

Static monitors were deployed as follows:

Figure 6.32: Location of six Pettersson D500x Units deployed (30/06/21- 06/07/21)

6.4.3.4.1.1 Unit (1)

Unit (1) was located within a grass ride, with wooded habitat present on both sides. A total of 274 bat passes of five species were recorded at this location –

- Common Pipistrelle (141);
- Soprano Pipistrelle (17);

- Leisler's Bat (108);
- Natterer's Bat (7): and
- Whiskered Bat (1)

The vast majority of these passes comprised Common Pipistrelle and Leisler's Bat

6.4.3.4.1.2 Unit (2)

Unit (2) was located on the edge of mature mixed broadleaved woodland habitat. A total of 820 bat passes of three species were recorded at this location –

- Common Pipistrelle (691);
- Soprano Pipistrelle (124); and
- Whiskered Bat (5)

The vast majority of these passes comprised Common Pipistrelle and Soprano Pipistrelle.

6.4.3.4.1.3 Unit (3)

Unit (3) was located within a double hedgerow either side of the Simonstown Stream. A total of only 5 bat passes all Leisler's Bat were recorded at this location representing bats flying overhead as opposed to along the stream.

6.4.3.4.1.4 Unit (4)

Unit (4) was located in grassland habitat occurring on the dam wall in the vicinity of woodland habitat at the edge of mature mixed broadleaved woodland habitat. A total of 347 bat passes of four species were recorded at this location –

- Common Pipistrelle (122);
- Soprano Pipistrelle (88);
- Nathusius' Pipistrelle (16); and
- Leisler's Bat (121)

6.4.3.4.1.5 Unit (5)

Unit (5) was located in grassland habitat occurring on the dam wall on the western side of the . A total of 92 bat passes of three species were recorded at this location –

- Common Pipistrelle (15);
- Soprano Pipistrelle (4); and
- Leisler's Bat (73)

The vast majority of passes, as might be expected at some distance from wooded habitat was Leisler's Bat.

6.4.3.4.1.6 Unit (6)

Unit (6) was located in grassland habitat occurring on the dam wall on the western side of the dam . A total of 172 bat passes of three species were recorded at this location –

- Common Pipistrelle (95);
- Soprano Pipistrelle (16);
- Nathusius Pipistrelle (1);
- Leisler's Bat (56): and
- Whiskered Bat (4).

The vast majority of passes comprised Common Pipistrelle and Leisler's Bat.

6.4.3.4.2 Utilising hand-held detectors during walkover survey through the application area

An emergence/dawn survey was undertaken on the night of the 29th of July/morning of 30th of July by Dr Patrick Moran utilising hand-held bat detectors (Pettersson D1000X and EM3+) and a thermal imaging scope (Pulsar Helion XP50). The weather conditions were optimal for bat surveying throughout the survey. The surveyor stayed on site during the night. Although all habitats occurring were surveyed, the effort was concentrated in those areas in which static monitors had indicated most activity. In addition, four static units were deployed for the duration of the emergence and dawn surveys to assess activity over the entire night (see Figure 6.33).

Figure 6.33: Location of four Pettersson D500x Units deployed during emergence/dawn survey (29/07/21-30/07/21)

A total of 313 bat passes were recorded during the emergence and dawn surveys of five species (Common Pipistrelle (180), Soprano Pipistrelle (92), Leisler's Bat (39), Brown Long-eared Bat (1) and Whiskered Bat (1). The vast majority of passes were of Common and Soprano Pipistrelle hunting back and forth along the verge of wooded habitats, with the number of passes representing a far smaller number of bats hunting back and forth past the surveyor as they moved. There was virtually no bat activity in more open habitats apart from Leisler's Bat passing overhead. Both the single Brown Long-eared Bat and individual Whiskered Bat were encountered as the path passed between two areas of woodland.

The variation in species diversity and numbers observed during the dawn/emergence surveys was reflected in the results from the static monitors deployed over-night. While Units (2), (3) and (4) recorded relatively low levels of activity, activity was high in the vicinity of the wooded area in the south eastern corner of the TSF (Unit (1)).

6.4.3.4.2.1 Unit (1)

Unit (1) was located along a path, with wooded habitat present on both sides at the south eastern corner of the TSF at some distance from the dam walls. Most activity was observed during the dawn/emergence surveys in this vicinity. A total of 380 bat passes of five species were recorded at this location –

- Common Pipistrelle (38);
- Soprano Pipistrelle (322);
- Leisler's Bat (18);
- Natterer's Bat (1): and
- Whiskered Bat (1)

The vast majority of these passes comprised hunting Soprano Pipistrelle flying back and forth past the unit, thus representing far fewer individuals than passes indicate. One Natterer's Bat and one Whiskered Bat were recorded.

6.4.3.4.2.2 Unit (2)

Unit (2) was located adjacent to the Simonstown stream within the associated hedgerow. A total of only 36 bat passes of three species were recorded at this location –

- Common Pipistrelle (2);
- Soprano Pipistrelle (24); and
- Leisler's Bat (10)

The low level of activity would indicate that Simonstown Stream is not a heavily used corridor.

6.4.3.4.2.3 Unit (3)

Unit (3) was located within open habitat near at the top of the TSF dam. No bat activity was observed here during the emergence/dawn survey. A total of 43 bat passes of three species were recorded –

- Common Pipistrelle (5);
- Soprano Pipistrelle (7); and
- Leisler's Bat (31)

Low number of passes is indicative of the low usage of this open habitat apart from bats commuting.

6.4.3.4.2.4 Unit (4)

Unit (4) was located along hedgerow habitat at the south western corner of the TSF. A total of 42 bat passes of three species were recorded at this location –

- Common Pipistrelle (16);
- Soprano Pipistrelle (14); and
- Leisler's Bat (12)

Low number of passes is indicative of the low usage of this open habitat apart from bats commuting.

Figure 6.34: Imagery of foraging Soprano Pipistrelle from Thermal Camera

6.4.3.5 Breeding Bird Surveys

The initial breeding bird survey undertaken on the 22nd of April 2021. This survey identified a total of 43 species of bird – some of which were not breeding.

The second bird survey was undertaken on the 17th of June, entailing walking transects through the site and compiling McKinnon lists in order to provide a proxy of frequency (see Table 6.5). A total of 39 bird species were observed and all species were presumed to be breeding at the TSF or proximity. The most frequently observed species were those associated with woodland edge habitat such as Blackbird and Wood Pigeon. Three species identified as breeding within habitat on the dam walls are marked (*) – Meadow Pipit, Skylark and Yellowhammer.

A third survey was undertaken on the 1st of July walking transects and recording any new species observed. A crepuscular bird survey was undertaken on the night of the 29th of July and morning of the 30th of July 2021. A thermal imaging camera (Pulsar Helion XP50) was utilised to assess the area in addition to more traditional methods (such as listening for crepuscular species).

A list of all species observed between the April, June and July surveys are indicated in Table 6.6. Of note is the presence of Peregrine Falcon, Sparrowhawk and Buzzard. Kestrel are known to occur at the site but were not observed during surveys in 2021. The presence of so many raptors is an indication of the health of the general avian population at the site.

Figure 6.35: Peregrine Falcon is generally observed at the TSF during the winter months and early spring

Figure 6.36: Meadow Pipit are abundant and breed in the habitat occurring on the dam walls

Figure 6. 37: Yellow hammer breed at the site typically in scrub occurring on the dam walls

Figure 38: Long-tailed tit were recorded on site and breed in scrub at TSF fringes but were not recorded during the June survey

Table 6.5: Birds observed during June breeding survey and frequency

SPECIES	FREQUENCY (%)
BLACKBIRD	80
WOOD PIGEON	80
WILLOW WARBLER	70
MEADOW PIPIT*	65
CHIFFCHAFF	60
SONG THRUSH	45
GREENFINCH	40
BLACKCAP	35
CHAFFINCH	35
DUNNOCK	35

SPECIES	FREQUENCY (%)
BLUETIT	30
BUZZARD	30
GOLDFINCH	30
MAGPIE	30
ROOK	30
SKYLARK*	30
GREAT TIT	25
SWALLOW	25
GOLDCREST	20
HOODED CROW	20
PHEASANT	20
RAVEN	20
WREN	20
LINNET	15
STONECHAT	15
BULLFINCH	10
JACKDAW	10
PIED WAGTAIL	10
REED BUNTING	10
ROBIN	10
SHELDUCK	10
BLACKHEADED GULL	5
BLACK-TAILED GODWIT	5
COLLARED DOVE	5
GREATER BLACK BACKED GULL	5

SPECIES	FREQUENCY (%)
LESSER BLACK BLACKED GULL	5
MALLARD	5
YELLOWHAMMER*	5

Table 6.6: All species observed between April and June

Common Name
BLACK-HEADED GULL
BLACKBIRD
BLACKCAP
BLACK-TAILED GODWIT
BLUETIT
BULLFINCH
BUZZARD
CHAFFINCH
CHIFFCHAFF
COLLARED DOVE
DUNNOCK
GREATER BLACK BACKED GULL
GOLDCREST
GOLDFINCH
GREAT TIT
GREENFINCH
HOODED CROW
JACKDAW
KESTREL

Common Name
KINGFISHER
LESSER BLACK BACKED GULL
LINNET
LONG-TAILED TIT
MAGPIE
MALLARD
MEADOW PIPIT
MUTE SWAN
PEREGRINE FALCON
PHEASANT
PIED WAGTAIL
RAVEN
REED BUNTING
ROBIN
ROOK
SHELDUCK
SKYLARK
SONG THRUSH
SPARROWHAWK
STONECHAT
SWALLOW
WILLOW WARBLER
WOODPIGEON
WREN
YELLOWHAMMER

6.4.3.6 Over wintering bird surveys

The primary objective of the overwintering surveys was to assess the numbers of Annex I Whooper Swan utilising the habitat present for roosting. The results of the Whooper Swan surveys are presented in Table 6.7. Maps from surveys during which Whooper Swan were observed are presented in Figure 6.39.

Figure 6.39: Whooper Swan survey October Dawn Count max 25 Whooper

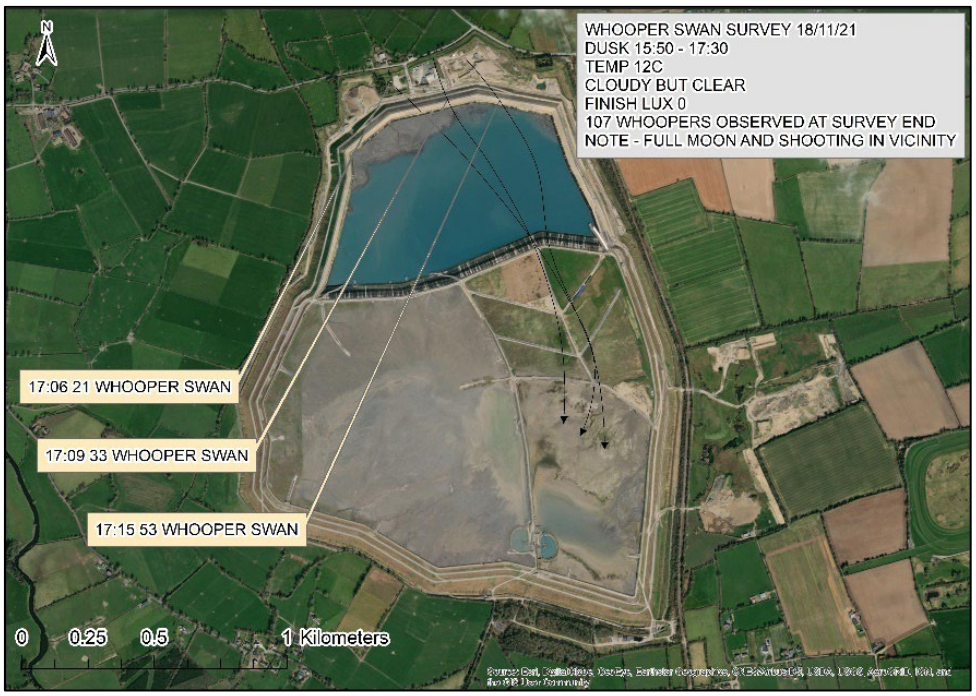

Figure 6.40: Whooper Swan survey November Dusk Count max 107 Whooper

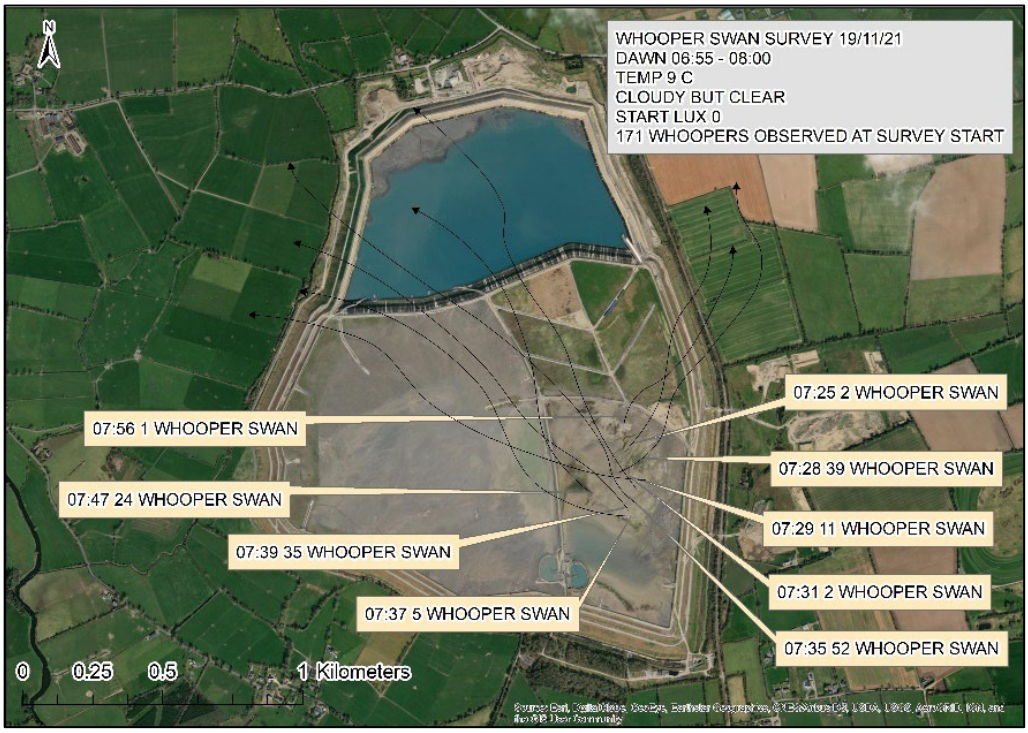

Figure 6.41: Whooper Swan survey November Dawn Count max 171 Whooper

Figure 6.42: Whooper Swan survey December Dusk Count max 18 Whooper

Figure 6. 43: Whooper Swan survey December Dawn Count max 187 Whooper – during Storm Barra – flight paths too complicated to map.

Table 6.7: Results of Whooper Swan surveys in tabulated form

Date	Count	Max number Whoopers
October	Dawn (24/10/21)	25
	Midday (24/10/21)	0
	Dusk (24/10/21)	0
November	Dawn (19/11/21)	171
	Midday (18/11/21)	0
	Dusk (18/11/21)	107
December	Dawn (07/12/21)	187
	Midday	0
	Dusk (06/12/21)	18
January	Dawn (26/01/22)	0
	Midday (26/01/22)	0
	Dusk (25/01/22)	0
February	Dawn (08/02/22)	0
	Midday (08/02/22)	0
	Dusk (08/02/22)	0
March	Dawn (26/03/22)	0
	Midday (26/03/22)	0
	Dusk (26/03/22)	0

It is of importance to note that up to approximately 300 individuals have been observed utilising the TSF for roosting purposes. Numbers vary greatly from year to year and within a season.

6.4.3.7 Kingfisher Surveys

Kingfisher were heard calling in the vicinity of the Simonstown stream during the April breeding bird survey. The Kingfisher surveys undertaken on 23/06/21, 29/06/21, 01/07/21 and 29/07/21 did not identify any suitable habitat for breeding Kingfisher nor were any Kingfisher observed or heard. Having placed a perching post in the Simonstown Stream such as to attract a foraging Kingfisher, a trail camera deployed between 23/06 – 29/06 2021 captured Kingfisher activity. While there is no suitable habitat for breeding Kingfisher, the Simonstown is certainly utilised as a commuting/foraging corridor.

Figure 6.44: Still from video footage of Kingfisher on Simonstown stream

6.4.4 Elements or particular areas of specific potential for biodiversity/conservation interest

The habitats occurring in the immediate vicinity of the proposed buttressing works outside of the industrial complex of the Tailings Facility are primarily comprised of Improved Agricultural Grassland (GA1) These habitats are of very limited potential as regards biodiversity or conservation interest.

The Yellow River and Simonstown Stream are of high biodiversity and conservation interest as both these waterbodies discharge to the River Blackwater and both waterbodies support Otter (a Qualifying Interest of the River Boyne and River Blackwater SAC) and Kingfisher (a Qualifying Interest of the River Boyne and River Blackwater SPA.

The habitat occurring on the embankments of the dam are comprised largely of semi-natural grassland habitat, the precise nature of the grassland related to the prevailing environmental conditions. For example, the grassland occurring in the vicinity of the interceptor ditch is best categorised as Wet Grassland (GS4) while the Grassland occurring on the southern facing slopes of the embankment are a mosaic of grassland types best aligned with Dry Calcareous grassland (GS1) and Dry Meadow (GS2). These habitats are of biodiversity and conservation value owing to the host of species of flora and fauna supported. It must be noted that these habitats and the species supported are only present owing to the current management regime in place. This habitat will undergo extensive disturbance during the buttressing works.

The tailings pond itself, contained within the dam in question is, itself of high biodiversity and conservation concern, supporting important overwintering populations of numerous species including Whooper Swan, Golden Plover and Lapwing.

Figure 6.45: Large flocks of Whooper Swan utilise the Tailings Pond for roosting, although numbers vary

Figure 46: Golden Plover roosting on tailings pond

6.4.5 Elements of the proposed buttressing works with the potential to impact on the biodiversity and conservation value of the overall TSF site

There are a number of potential impacts of the proposed buttressing works on the biodiversity and conservation value of the tailings facility:

- The embankments as they currently exist support a rich diversity of habitats and species. The proposed buttressing works will require the disturbance and potentially loss of these habitats in the absence of mitigation measures;
- There are water courses in the immediate vicinity to the proposed buttressing works – the Yellow River and the Simonstown Stream. There is a potential for the proposed buttressing works to impact on the water quality/hydrological regime of these water courses in the absence of mitigation measures;
- There are water courses in the immediate vicinity to the proposed buttressing works that form a pathway between the site of the proposed works and the Boyne and River Blackwater. Both Otter and Kingfisher are known to occur in the vicinity of the proposed buttressing works. The buttressing works, therefore, have the potential to impact on these species in the form of disturbance in the absence of mitigation measures;
- The tailings pond itself, contained within the dam in question is, itself of high biodiversity and conservation concern, supporting important overwintering populations of numerous species including Whooper Swan, Golden Plover and Lapwing. The buttressing works have the potential to impact on the use of the Tailings Pond by these species as a roost in the absence of mitigation measures; and
- While there are currently no plant species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended) currently known to occur within the site, the proposed buttressing works will entail the importation of a significant quantity of soil from off-site. There is, therefore, potential for import and/or spread of propagules of such species into the tailings facility site in the absence of mitigation measures.

6.4.6 Conservation priorities regarding the key biodiversity resource of the site

The primary conservation priorities regarding the identified biodiversity resource identified should concentrate on:

- Prevention of any impact of the proposed buttressing works on water quality/hydrology. The works will take place within the boundary of the existing interceptor ditch, which should prevent any such impacts;
- Disturbance of the existing embankments is unavoidable during the buttressing works. One of the primary conservation priorities should be to minimise disturbance to the existing biodiversity and to preserve the rich diversity of flora and fauna present;
- Otter and Kingfisher utilise the Yellow River and Simonstown stream adjacent to the proposed buttress works. Disturbance to these species should be minimised, especially in the vicinity of any breeding sites.
- The Tailings Pond itself is utilised by a wide range of wintering avifauna, with numerous species of conservation concern, and regionally significant numbers of species such as Whooper Swan, Golden Plover and Lapwing. One of the primary conservation objectives must be to prevent any disruption of this important wintering site; and
- Preventing the introduction and spread of any propagules of Alien Invasive Plant Species listed on Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 as amended.

6.4.7 Summary of Key Ecological Receptors (KERs)

Key Ecological Receptors (KERs) have been identified based on a combination of desk study and field survey of the proposed development site (and site adjacent area). A summary of the Key Ecological Receptors is presented in table. KERs have been identified as at risk of potentially significant impacts via a source-pathway-receptor link with the Subject Site.

Table 6.88: Summary of KERs at site and site adjacent

Ecological Receptor	Highest Ecological Value Level	Key Ecological Receptor
River Boyne and River Blackwater SAC	International	Yes
River Boyne and River Blackwater SPA	International	Yes
Boyne Woods pNHA	National	No
All Other Natura 2000 Sites	International	No
All Other NHA/pNHA Site	National	No
GS1	Local Importance (Higher)	Yes
GS2	Local Importance (Higher)	Yes
GS4	Local Importance (Higher)	Yes
Flora Protection Order Species	N/A	No

Ecological Receptor	Highest Ecological Value Level	Key Ecological Receptor
Breeding Birds	Local Importance (Higher)	Yes
Breeding Waders	N/A	No
Overwintering Birds (site adjacent)	International Importance (Higher)	Yes
Non-Volant Mammals (site adjacent)	Local Importance (Higher)	Yes
Foraging/Commuting (site adjacent)	Local Importance (Higher)	Yes
General Invertebrates	Local Importance (Higher)	Yes
Amphibians	N/A	No
Reptiles	N/A	No

6.5 IDENTIFICATION OF LIKELY SIGNIFICANT IMPACTS ON KERS

As per the relevant guidelines, likely significant effects have only been assessed for KERs. An impact is considered to be ecologically significant if it is predicted to affect the integrity or conservation status of a KER at a specified geographical scale. All impacts in this section are described in the absence of mitigation. Of note, there were no Annex I habitats or Annex II species (Habitats Directive) observed within the application footprint. There were numerous bat species recorded within the application site, all of which are listed on Annex IV of the EU Habitats Directive, though no roosting sites occur within the site area. There were several Annex I Bird Species (Birds Directive) observed in the vicinity of the application area, including Peregrine Falcon, Whooper Swan and Golden Plover. There were no Flora Protection Order species observed to occur within the application site.

This section has been arranged to assess the KERs in the following order;

- Designated sites – European sites within ZOI identified as KERs (6.5.1)
- Designated sites – Domestic designated sites (pNHA/NHA) within ZOI identified as KERs (6.5.2)
- Identification of Impacts on Habitats (6.5.3)
- Identification of Impacts on Plant species (6.5.4)
- Identification of Impacts on Breeding birds (6.5.5)
- Identification of Impacts Overwintering Birds (6.5.6)
- Identification of Impacts on Non-volant Mammals (6.5.7)
- Identification of Impacts on Foraging/Commuting/Roosting bats (6.5.8)
- Identification of Impacts on general invertebrates (6.5.9)
- Identification of Impacts on Amphibians (6.7.10).

6.5.1 Designated Sites – Natura 2000 sites

There are two Natura 2000 sites within 15 km of the proposed development. A Natura Impact Statement has been prepared and is presented separately. The sites are:

- River Boyne and River Blackwater SAC; and
- River Boyne and River Blackwater SPA

The potential for impacts on these sites is restricted to:

- Impacts associated with changes in ground/surface water quality and/oy hydrology; and
- Impacts associated with disturbance of Qualifying Interests (both Otter and Kingfisher were observed to occur adjacent to the proposed development using the Simonstown Stream.

6.5.2 Designated sites (domestic – pNHA/NHA)

There is one pNHA within 5 km of the proposed development. There are no impacts to this designated site foreseen.

6.5.3 Habitats

The proposed works are limited to that area occurring between the interceptor ditch and the crest of the stage 4 dam wall. The habitats occurring within this footprint are comprised of semi natural grassland (with some scrub encroachment), which is species rich owing to the current management of the habitat (or lack thereof). This habitat will be removed and must be reinstated post works.

There is a short term negative reversible impact associated with the proposed works on this aspect of the environment.

6.5.4 Identification of Impacts on Plant species

As regards impacts on plant species:

- There are no Flora Protection Order species present within the footprint of the proposed development;
- There are no Red Data List species present within the footprint of the proposed development; and

- There are no species listed on Part (1) the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended).

There are several species, including several orchid species that are of conservation concern. These species will be impacted upon through habitat removal. This habitat will be restored post-works.

There is a short term negative reversible impact associated with the proposed works on this aspect of the environment.

6.5.5 Identification of Impacts on Breeding Birds

There is a wealth of breeding bird species present, but the key species that will be impacted upon by the proposed works are those species nesting at or near ground level in the habitat occurring on the dam wall. Namely:

- Meadow Pipit;
- Skylark: and
- Yellowhammer.

These species are of conservation concern and there will be short-term negative impacts owing to removal of habitat. Of note, there is alternative habitat available on the summit of the TSF and the habitat being removed will be restored post works.

There is a short term negative reversible impact associated with the proposed works on this aspect of the environment.

6.5.6 Impacts on wintering birds

The primary concern regarding wintering birds is the substantial flocks of wintering birds and of particular concern Whooper Swan. These species are habituated to what is essentially an active industrial site and owing to the location of the works between the interceptor ditch and crest of stage 4 of the dam wall, these birds will not be significantly impacted upon.

There is no significant impact foreseen on overwintering birds.

6.5.7 Impacts on Kingfisher

Although there are Kingfisher recorded utilising the Simonstown Stream, the habitat is situated within a hedgerow, well isolated from any activity in the proposed development footprint. Any Kingfisher occurring are habituated to disturbance in what is an active industrial complex.

There are no significant impacts foreseen on Kingfisher (assuming no impacts on hydrology/water quality).

6.5.8 Impacts on Non-volant mammals

Although the grassland habitat to be removed is used by grazing Rabbit and Hare, there is plentiful alternative habitat present on the summit of the tailings pond and fringes of the TSF. Although there will be some short-term disturbance of non-volant mammals, the phasing of works and presence of alternative habitat immediately adjacent would indicate that there will be no significant impacts on non-volant mammal barring short-term disturbance, which is a feature of this active industrial site (roads passing through the habitat etc.). The majority of non-volant mammal activity is concentrated at the edges of woodland habitat.

There is a short term negative reversible impact associated with the proposed works on this aspect of the environment.

6.5.9 Impact on Otter

Although there are Otter recorded utilising the Simonstown Stream, the habitat is situated within a hedgerow, is well isolated from any activity in the proposed development footprint. Any Otter occurring are habituated to disturbance in what is an active industrial complex.

There are no significant impacts foreseen on Otter (assuming no impacts on hydrology/water quality).

6.5.10 Impacts on bats

There were no bat roosts occurring within the proposed development footprint. The open nature of the habitat is largely unconducive to bat foraging. The vast majority of bat passes recorded comprised of Common Pipistrelle, Soprano Pipistrelle and Leisler's Bat. The vast majority of bat activity is associated with the wooded habitat in the south eastern corner of the TSF.

There are no significant impacts foreseen on the local bat population.

6.5.11 Impacts on general invertebrates

Although detailed invertebrate surveys were not undertaken as a component of the surveys, numerous incidental species were noted, and the semi-natural nature of the habitat indicates that the habitat is of importance to invertebrates. This habitat will be removed and must be reinstated post works.

There is a short term negative reversible impact associated with the proposed works on this aspect of the environment.

6.6 DO NOTHING SCENARIO

The primary purpose of the proposed development is to increase the Factor of Safety associated with the TSF dam walls. While the negative environmental impact of the proposed development is short-term and reversible in nature, in light of the increased frequency and severity of storms associated with climate change, the do-nothing scenario may potentially result in a dam breach and catastrophic environmental damage.

6.7 MITIGATION MEASURES

It is important to note that all mitigation measures outlined herein are required to be of a clear and enforceable nature, in order to facilitate the effective implementation of said mitigation on the ground during all phases of the proposed development. In order to ensure implementation of all mitigation measures as required to minimise any ecological impacts, and indeed to enhance the environment, an Ecological Clerk of Works (ECoW) must be appointed in advance of the proposed development to oversee the management of ecological risks on site and ensure that all mitigation measures as relating to ecological issues are implemented effectively on the ground. The ECoW must be appointed for the duration of the proposed development (including any required post-works monitoring). he role of the ECoW will include, but not be confined to (subject to agreement with Relevant Authority):

- Review the contractor's method statement and ensure compliance with mitigation measures as outlined herein (in addition to any mitigation measures outlined in the associated Natura Impact Statement). The ECoW will submit a report of same as required by the Relevant Authority prior to commencement of development;
- Attend regular site meetings and input to contractor toolbox talks prior to the commencement of the proposed development in order to ensure compliance with mitigation measures as outlined herein (in addition to any mitigation measures outlined in the associated Natura Impact Statement). The ECoW will submit a report of same as required by the Relevant Authority with the schedule for reporting indicated by the Relevant Authority; and
- Regularly attend on site and undertake unannounced site inspections to ensure compliance with mitigation measures as outlined herein (in addition to any mitigation measures outlined in the associated Natura Impact Statement). The ECoW will submit a report of same as required by the Relevant Authority with the schedule for reporting indicated by the Relevant Authority.

6.7.1 Construction Phase Mitigation Measures

6.7.1.1 Mitigation against any impact on water quality/hydrology

This is key to all other potential impacts. A detailed hydrological assessment of the proposed buttressing works has been undertaken is presented in Chapter 7 of the EIAR. A suite of mitigation measures is outlined, including that

> "…*Prior to construction, a Construction Environmental Management Plan (CEMP) will be prepared by the Contractor in conjunction with the BTM environmental management team, to be approved by the planning authority. The CEMP will detail the measures necessary to avoid, prevent and reduce adverse effects where possible upon the local water environment*…"

6.7.1.2 Mitigation to prevent loss of biodiversity currently existing on embankment of dam

The current dam wall embankments support a rich biodiversity of both flora and fauna. There will be temporary disturbance and removal of this habitat necessitated by the buttressing works. In order to maintain and enhance the existing biodiversity, a Habitat and Biodiversity Conservation and Management Plan has been prepared and must be implemented. This plan will need to be informed by the works, and in turn will inform the methodology/timing of the works. This plan allows for a degree of "Plasticity" such that it can be informed, in an iterative manner, by ongoing monitoring. The appointment of an ECoW will ensure that the Habitat and Biodiversity Conservation and Management Plan is appropriately implemented.

6.7.1.3 Mitigation against disturbance of Otter and/or Kingfisher

Otter and Kingfisher are Qualifying interests of the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA respectively. In order to minimise any risk of disturbance, monitoring of the water-courses occurring proximate to the proposed buttressing works must be undertaken on an ongoing basis during the proposed development in order to assess activity, which should inform a post-works Conservation Management Plans for each species.

6.7.1.4 Mitigation against disturbance of over-wintering birds

The Tailings Pond is utilised as a significant roosting site for numerous species of conservation concern in regionally important numbers. In order to prevent any disturbance of such populations (which include a significant population of Whooper Swan) the works should be minimised, with no supplementary artificial illumination during the months October – March inclusive in order to prevent any disruption to the roosting of these species.

6.7.1.5 Mitigation against introduction of propagules of Alien Invasive Plant Species

Given the requirement for importation of material (greenfield soil) from more than one site of origin, there is a significant potential for the introduction of propagules of one or more Alien Invasive Plant species. The three primary threats are Japanese Knotweed, Himalayan Balsam and Giant Hogweed.

6.7.1.5.1 Japanese Knotweed – *Fallopia japonica*

This plant is a rhizomatous perennial, capable of reaching 2m in height. This plant spreads exclusively by vegetative means, spreading very aggressively under disturbed conditions. The plant is capable of forming extensive monoculture stands. There is a negative impact on ecosystem function and biodiversity through a number of mechanisms – primarily through the shading-out of native plants due to the rapidity with which large stands of the plant can form. In addition, this plant has a deleterious effect on the banks of waterways owing to the fact that during the winter, when *F. japonica* dies back, there is little or no vegetation growing underneath, and hence nothing to prevent erosion of the bank. This species is well established in Ireland and is rapidly spreading throughout the country, especially by roadsides and along watercourses.

Figure 6.47: Well-established Japanese Knotweed along the Boyne Navigation Canal

6.7.1.5.2 Himalayan Balsam, *Impatiens glandulifera*

Impatiens glandulifera is one of the tallest annuals occurring in Europe, growing up to 150 cm. It is a native of the Himalayas and has rapidly become one of the most problematic of invasive species in Europe, particularly along watercourses. The dominance of large stands of I. glandulifera along watercourses causes problems for stream management in addition to the negative impact on native flora due to the formation of large monoculture stands. The massive production of nectar to induce pollinators, in addition to the “explosive” means by which seeds are spread (pods explode on contact, hurling seeds away from the parent plant) contribute to the ability of this plant to out-compete native species. This plant is rapidly becoming a serious threat to biodiversity along Ireland’s waterways.

Figure 6.48: Himalayan Balsam along the River Boyne kept in check by scrub

6.7.1.5.3 Giant Hogweed, *Heracleum mantegazzianum*

Giant Hogweed, as its name suggests, can reach heights of 5m. This perennial reproduces exclusively by seed, but can produce up to 100,000 seeds per individual, with up to 90% germination rate. In addition to this, this plant is capable of self-fertilisation, which means that one plant is capable of resulting in the invasion of a new habitat. Like *F. japonica*, and *I. glandulifera*, it is the tendency of Giant Hogweed to grow very tall very quickly, forming a monospecific stand that results in the negative impact of this species on native biodiversity. It is, however, the phototoxic sap of this species, and the increasing number of human injuries associated with this sap that has made *H. mantegazzianum* one of the most problematic alien invasive plant species throughout Europe.

Figure 6.49: Giant Hogweed growing adjacent to the River Boyne

An Alien Invasive Plant Species Management and Control Plan has been prepared and must be implemented when a contractor is appointed in order to ensure that no propagules of any plant species listed in Part (1) of the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations of 2011 (as amended). This should be incorporated into the contractors CEMP.

6.7.1.5.4 Mitigation against post-construction biodiversity loss

In the absence of an appropriate management and monitoring protocol, there is potential for biodiversity to be lost post-construction. For example, the use of fertiliser and reseeding with commercially available grass-seed mixes, or introduction of inappropriate grazing regime would result in a net decrease in biodiversity. The requirement for post-construction management and monitoring is an integral component of the Habitat and Biodiversity Conservation and Management Plan.

6.8 RESIDUAL IMPACTS

Assuming the mitigation against the primary potential impacts, no residual impacts are foreseen. Indeed, the implementation of the Habitat and Biodiversity Management Plan will enhance the existing conditions.

6.9 INTERACTIONS ARISING

The comprehensive assessments undertaken as a component of the EIAR have identified that as regards potential interactions arising as regards biodiversity.

Noise, visual, air quality and climate effects could overlap at an ecologically sensitive location such as a designated area. The predicted impacts are of such a low scale that there is not considered to be any potential for interactions with biodiversity resources in and around the application site. Opportunities will be sought to enhance resources for biodiversity through the employment of an Ecological Clerk of Works to oversee the implementation of the buttressing works.

6.9.1 Water and hydrology

Chapter 7 of the EIAR concluded that

> "*…This assessment has examined the potential impacts of the proposed buttress and its construction on water levels and water quality at the TSF and in the surrounding local water environment. Following implementation of the mitigation measures outlined in Section 7.7, no significant adverse impacts are anticipated as a result of the proposed works…*"

There should, therefore, be no medium or long term impacts associated with impacts on Water and Hydrology.

6.9.2 Air Quality

Chapter 8 of the EIAR concluded that ….
The overall impact of the construction phase of the plant will be negligible and effects will be short term in nature. All air quality guidelines and limit values will be complied with during the construction phase of the project.

There will be no net increase in direct impacts on air quality as a result of the continued operation of the tailings facility.

Following an assessment of predicted emissions of Carbon monoxide, Oxides of nitrogen, Sulphur dioxide Total particulates as PM_{10} and $PM_{2.5}$, Depositional dust, Arsenic, Cadmium, Lead, Zinc and Benzene, it was concluded that the facility operations will not give rise to any significant impact with emissions of these air pollutants from cumulative emissions from facility activity and traffic remaining well within Irish statutory air quality limits.

In conclusion, the proposed installation of the embankment Buttress and continued operation of the tailings facility will have negligible impact on the surrounding population with respect to Carbon monoxide, Oxides of nitrogen, Sulphur dioxide Total particulates as PM_{10} and $PM_{2.5}$, Depositional dust, Arsenic, Cadmium, Lead, Zinc and Benzene.

6.9.3 Material assets: Roads and Traffic

The assessment of any impact of the proposed development on material assets as presented within Chapter 5 of this EIAR concludes that, following traffic analysis, which include a link, and junction, capacity analysis, it was determined that the proposed development would have an imperceptible impact on the local road network.

Once the identified mitigation measures, appropriate design standards and operational infrastructure management plans are adhered to, it is considered that any impacts on the Material Assets (including waste management and utilities) surrounding the Proposed Development will be imperceptible and not significant.

6.9.4 Climate Change

The assessment of any impact of the proposed development on climate, as presented within this EIAR concluded that

"*…the long-term impact of the proposed development is negligible – slight positive in terms of climate change…"*

6.10 POTENTIAL CULULATIVE/IN-COMBINATION IMPACTS

6.10.1 EIA portal

A query of the EIA portal[8] would indicate that there are a number of recent projects requiring EIAR. Owing to the dependence of the Qualifying Interests of the River Boyne and River Blackwater SAC/SPA either directly, or indirectly on water quality, it is key that the proposed development have no significant negative impact on local hydrology/water quality. A comprehensive hydrological assessment of the proposed development has been undertaken as a component of the EIAR and concludes that

> "*…This assessment has examined the potential impacts of the proposed buttress and its construction on water levels and water quality at the TSF and in the surrounding local water environment. Following implementation of the mitigation measures outlined in Section 7.7,* ***no significant adverse impacts*** *are anticipated as a result of the proposed works…"*

6.10.2 Planning application search

6.10.2.1 Concurrent planning applications

BTM intend to lodge an application in the immediate future for a solar farm to generate renewable electricity for use within the BTM Knockumber site providing for an electrical capacity of approximately 18-megawatts (MW). The development will consist of a ten-year planning permission for a solar energy development with the proposed development site extending to a total area of 43 hectares comprising (i) photovoltaic solar panels on steel mounting frames; (ii) electrical inverters; (iii) electrical power stations; (iv) an electrical control building and associated electrical apparatus; (v) underground electrical and communications cabling; (vi) on-site access tracks; (vii) a temporary construction compound; (viii) security fencing and security gates; (ix) pole-mounted security cameras; and (x) all associated and

[8] https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

ancillary site development, landscaping and reinstatement works. The operational lifetime of the proposed development is 35-years. The proposed development is related to an activity requiring an Industrial Emissions Licence. This planning application will be accompanied by an Environmental Impact Assessment Screening Report and a Natura Impact Statement.

6.10.2.2 Current planning applications within 2 km of proposed development

An online review of the Meath Planning resource[9] indicates that there are two significant planning permissions within a distance of 2km of the proposed development (see Table 6.3). A review of historical planning permissions relating to the proposed development site is indicated in Table 6.4.

In addition, Meath Co. Council recently granted planning permission (Planning Application Reference 23341) for the construction of a water treatment plant and ancillary infrastructure within the mine site complex at Knockumber. This planning permission relates to an activity covered by the Company's Industrial Emissions Licence Ref. No. P0 516-04. This granting of planning permission is currently being appealed.

6.10.2.3 Historical planning at the proposed site location

The TSF at Randallstown has been constructed in six main stages during the period 1974 – present (Table 6.4). Stages 1,2,3,4 and 5 The facility is constructed as a ring-dike configuration, enclosed by earth fill embankment walls constructed from locally sourced natural materials. The storage facility has an area of approximately 250 Hectares.

[9] https://housinggovie.maps.arcgis.com/apps/webappviewer

6.11 MONITORING

The Habitat and Biodiversity Management and Conservation Plan has identified the following as pertaining to ecological monitoring required in order to maintain and/or enhance the biodiversity resource present at the site.

"*…A monitoring regime must be implemented in order to assess the success of the management of the habitat restoration, and to iteratively alter the management if required (for example the use of green hay if necessary). Monitoring will include (but may not be limited to):*

1) *Monitoring the development of the habitats within area of the works. In compliance with the Habitat and Biodiversity Management Plan, the area will be restored "Passively" – i.e., there will be no reseeding or fertilising of the habitat. This will maximise the opportunities for biodiversity. Monitoring of the progress of recolonisation will be required in order to inform the management plan as to whether additional measures, such as the importation and spread of "Green Hay", which is now commonly used in Europe in the passive restoration of species-rich seminatural grassland both on former arable land and former intensive grassland[10] are required. In order to monitor the progress of the development of the habitat, approximately 20 -30 2m X 2m permanent quadrats will established within the proposed grassland area (with pre-works relevés established) and these quadrats will be monitored on an annual basis in May/June recording the cover and abundance of all species present and photographing each quadrat from a fixed point for a minimum of five years post construction. This monitoring will permit the degree of success of the habitat restoration to be assessed, informing the management of the habitat as to whether additional measures are required;*

2) *The site is an important local site for breeding birds, supporting numerous species of conservation concern. Two breeding bird surveys separated by a minimum of two weeks should be undertaken annually within the zone of the works for a minimum of*

[10] Wagner M, Hulmes S, Hulmes L, Redhead J, Nowakowski M and Pywell R (2020). Gren Hay transfer for grassland restoration: species capture and establishment. *Restoration Ecology*, **9.**

five years, such as to establish the degree of success of mitigation measures and to inform the management of the site; and

3) *The Tailings Management Facility is an Internationally Important site for Whooper Swan. The use of the facility by this species should be monitored on a bimonthly basis (pre-dawn, noon and post-sunset) between the months October – March inclusive for a minimum of three years post construction in order to inform any management measures required to support the continued use of the habitat by this species…"*

6.12 CONCLUSIONS

Following a comprehensive assessment of the biodiversity occurring within the application site and immediately adjacent, and assuming the full and successful implementation of the mitigation measures outlined within the EIAR, based on objective scientific evidence, and peer-reviewed literature, it is the opinion of the authors that the proposed development will not result in significant negative impacts on:

- The Natura 2000 network; or
- Domestic designated sites

Following a comprehensive assessment of the biodiversity occurring within the application site and immediately adjacent, and assuming the full and successful implementation of the mitigation measures outlined within the EIAR, based on objective scientific evidence, and peer-reviewed literature, it is the opinion of the authors that the proposed development will not result in significant negative impacts on:

- Habitats and flora occurring;
- Breeding birds;
- Kingfisher;
- Overwintering birds;
- Non-volant Mammals;
- Otter;
- Roosting/Commuting/Foraging Bats; and
- General Invertebrates.

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www.biodiversityireland.ie – website of the National Biodiversity Data Centre

www.npws.ie – website of the National Parks and Wildlife Service, source of information for data regarding Natura 2000 sites and Article 17 Conservation Assessments.

www.europa.eu – official website of the European Union, source of information on EU Directives.

APPENDIX 6: PLANT SPECIES OCCURRING

Plants on and near proposed development
Acer pseudoplatanus
Achillea millefolium
Agrostis canina
Agrostis capillaris
Agrostis stolonifera
Alisma plantago-aquatica
Alnus cordata
Alnus glutinosa
Alnus incana
Alopecuris geniculatus
Alopecurus pratensis
Anacamptis pyramidalis
Anagallis arvensis
Angelica sylvestris
Anthoxanthum odoratum
Anthriscus sylvestris
Anthyllis vulneraria
Apium inundatum
Arctium minor
Arrhenatherum elatius
Asplenium scolopendrium
Avenula pubescens

Bellis perennis
Betula pendula
Betula pubescens
Blackstonia perfoliata
Brachypodium sylvaticum
Brachythecium rutabulum
Brassica rapa
Briza media
Calystegia sepium
Cardamine pratensis
Carex flacca
Carex hirta
Carex nigra
Carex panicea
Carex pendula
Carex remota
Carex rostrata
Catapodium rigidum
Centaurea nigra
Centaurium erythraea
Cerastium fontanum
Chenopodium album
Cirsium arvense
Cirsium palustre
Cirsium vulgare
Crataegus monogyna

Cynosurus cristatus
Dactylis glomerata
Dactylorhiza fuschii
Danthonia decumbens
Daucus carota
Deschampsia caespitosa
Dryopteris affinis
Dryopteris dilatata
Dryopteris filix-mas
Elytrigia repens
Epilobium angustifolium
Epilobium ciliatum
Epilobium hirsutum
Epilobium montanum
Epilobium parviflorum
Equisetum fluviatile
Equisetum pratense
Equisetum telmateia
Euphrasia agg
Fagus sylvatica
Festuca gigantea
Festuca ovina
Festuca rubra
Filipendula ulmaria
Fraxinus excelsior
Galium aparine

Galium saxatile
Galium verum
Geranium dissectum
Geranium pyrenaicum
Geranium robertianum
Geum urbanum
Glyceria fluitans
Gymnadenia densiflora
Hedera helix
Hedera hibernica
Helicotrichon pubescens
Heracleum sphondylium
Holcus lanatus
Holcus mollis
Hylocomium splendens
Hypericum tetrapterum
Hypnum jutlandicum
Hypochaeris radicata
Ilex aquifolium
Iris pseudacorus
Isolepis setacea
Juncus acutifloris
Juncus articulatus
Juncus bufonius
Juncus conglomeratus
Juncus effusus

Juncus inflexus
Kindbergia praelonga
Koeleria macrantha
Lapsana communis
Lathyrus pratensis
Lemna minor
Leucanthemum vulgare
Linum catharticum
Lolium perenne
Lotus corniculatus
Lotus pedunculata
Luzula campestris
Matricaria discoidea
Medicago lupulina
Medicago sativa
Mentha aquatica
Myosotis laxa
Myosotis scorpoides
Myosotis secunda
Odontites vernus
Ophrys apifera
Orchis mascula
Pellia endiviifolia
Persicaria maculosa
Phalaris arundinacea
Phleum pratense

Phragmites australis
Pilosella officinarum
Pinus sylvestris
Plagiomnium undulatum
Plantago lanceolata
Plantago major
Poa annua
Poa pratensis
Poa trivialis
Polygala vulgaris
Polygonum aviculare
Polystichum setiferum
Potamogeton spp
Potentilla anglica
Potentilla anserina
Potentilla reptans
Primula veris
Primula vulgaris
Prunella vulgaris
Prunus avium
Prunus spinosa
Pseudoscleropodium purum
Ranunculus acris
Ranunculus aquatilis
Ranunculus bulbosus
Ranunculus flammula

Ranunculus repens
Reseda luteola
Rhytidiadelphus squarrosus
Rosa arvensis
Rosa canina
Rubus fruticosus agg
Rubus idaeus
Rumex acetosa
Rumex acetosella
Rumex crispus
Rumex obtusifolius
Rumex sanguineus
Salix aurita
Salix cinerea
Salix fragilis
Sambucus nigra
Samolus valerandi
Scorzoneroides autumnalis
Scrophularia auriculata
Scrophularia nodosa
Senecio erucifolia
Senecio jacobaea
Senecio vulgaris
Silene dioica
Sinapis arvensis
Solanum dulcumara

Sonchus arvensis
Sonchus asper
Sonchus oleraceus
Sparganium erectum
Stachys sylvatica
Stellaria graminea
Stellaria media
Taraxacum agg
Torilis japonica
Trifolium dubium
Trifolium pratense
Trifolium repens
Tripleurospermum inodorum
Tussilago farfara
Typha latifolia
Ulex europaeus
Ulex gallii
Urtica dioica
Veronica beccabunga
Veronica chamaedrys
Veronica montana
Veronica serpyllifolia
Vicia cracca
Vicia sativa
Vicia sepium