

NON-TECHNICAL SUMMARY

Environmental Impact Assessment Report

Backfilling and Restoration of Sand and Gravel Pit / Operation of Soil Waste Recovery Facility at Usk, Kilcullen, County Kildare

Prepared for : Dunlavin Land Restoration Limited

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1.0 INTRODUCTION

1.1 Development Overview

This Environmental Impact Assessment Report (EIAR) Non-Technical Summary has been prepared in support of a Planning Application to Kildare County Council and a Waste Licence application to the Environmental Protection Agency (EPA) by Dunlavin Land Restoration Limited in respect of the proposed backfilling of a former sand and gravel pit in Usk townland, Kilcullen, Co. Kildare using imported excess soil and stone waste generated by construction and development projects across Counties Kildare, Wicklow, Carlow and Dublin to restore it to long-term grassland / agricultural use.

The proposed development comprises the following elements

- Backfilling of a former sand and gravel pit to its former ground level using approximately 1,240,000 tonnes of imported natural inert waste materials and/or suitable by-product materials, principally soil and stone generated by construction and development projects;
- Establishment and operation of an inert soil waste recovery facility to provide for the recovery through backfilling, of natural inert soil and stone waste;
- Installation of site infrastructure including site offices, staff welfare facilities, weighbridge (with dedicated office), wheelwash facility, hardstand areas, fuel storage tanks and site access roads;
- Use of an existing storage shed as a waste inspection and quarantine facility and for storage of plant and equipment;
- Separation of any intermixed construction and demolition waste (principally concrete, metal, timber, PVC pipes and plastic) inadvertently imported to site prior to removal off-site to authorised waste disposal or recovery facilities;
- Temporary stockpiling of imported topsoil pending re-use as cover material for the final restoration of the site;
- Restoration of the final backfilled landform to long-term grassland / agricultural use.

The location of the application site is indicated on an extract from the 1:50,000 scale Ordnance Survey Discovery series map of the area, reproduced as Figure NTS-1.

As much of the inert soil and stone to be imported and used for backfilling and restoration purposes will be classified as waste, the size and scale of the proposed activity is such that it will also require a waste licence from the Environmental Protection Agency (EPA). The proposed activity is technically classed by national and European waste management legislation as 'recovery through deposition on land' and the proposed development is classed as a 'soil recovery facility'.

1.2 The Applicant

The Applicant, Dunlavin Land Restoration Limited, is a recently formed company which has been established with the specific objective of completing the proposed backfilling and restoration of the site at Usk and in so doing, providing a beneficial end use for excess natural inert soil and stone generated by construction and development activity. The directors of Dunlavin Land Restoration Limited are also directors of McGuire Haulage Limited, one of Ireland's leading haulage and excavation companies, based in Callan, Co. Kilkenny.

1.3 Site Context

The application site comprises a former sand and gravel pit located in the townland of Usk approximately 9 km south east of the town of Kilcullen, Co. Kildare and 2.3 km west of the village of Dunlavin, Co. Wicklow (refer to Figure NTS-1). It lies approximately 1.9km east of the M9 motorway.

There is no existing activity at the application site and it is understood that it has remained largely unused since sand and gravel / rock extraction activities ceased at the site at some time after 2010.

The application site is located within a predominantly rural landscape. Within the surrounding area, land use is primarily agricultural, comprising a mix of grassland and tillage uses. There are occasional pits and quarries dotted throughout the landscape, together with some isolated, one-off housing development, principally along the local road network. A channel / stream flowing to the River Greese flows in a southerly direction along the eastern boundary of the application site. Details of surrounding land use are provided in Figure NTS-2.

There are no designated nature conservation sites (Special Area of Conservation (SAC), Special Protection Area (SPA), Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA)) within or adjoining the application site. The closest such site is the Dunlavin Marshes pNHA, which, at its closest point is located approximately 200m to the north-east of the application site. The site is not identified as having any features of geological heritage interest and is not therefore designated as either a Natural Heritage Area or County Geological Site.

There are no recorded monuments located within or immediately adjacent to the application site. The nearest recorded monument, located approximately 230 m to the south of the site in an adjoining field is identified as a ring fort (Ref. KD032-027). There are no structures identified on the National Inventory of Architectural Heritage within or in the immediate vicinity of the application site. The nearest protected / listed structures are clustered in Dunlavin village.

The current Kildare County Development Plan 2017 – 2023 indicates that the site is located in Class 3 landscape sensitivity area which is generally considered to have reduced capacity to accommodate development without impacting the appearance or character of the landscape. The County Development Plan identifies a hilltop view of the surrounding landscape at the summit of Brewel Hill, located approximately 1.2km to the west of the application site, as well as a scenic route along a short section of local road along its eastern flank.

1.4 Site Description

The application area principally comprises lands which were previously worked to extract near surface sand and gravel, extending down into the underlying rock in localised areas. The application site covers an area of 26.6 hectares (64.1 acres). The existing site layout can be seen on the aerial photograph of the application site reproduced in Figure NTS-3.

Ground levels at the application site generally fall from 145mOD to 150mOD along the crest (top) of the western pit / quarry face to approximately 125mOD along the northern and eastern site boundaries, along the L6094 local road which runs beyond the site.

Past extraction activities at the application site were concentrated at its western end, where pit / quarry faces are highest (approximately 15m high) and generally extended down to within a few meters of the groundwater table. Excavations along around the north-western corner of the application site extended locally to a few meters below the seasonal maximum groundwater table. Once pumping / dewatering ceased, this excavation subsequently flooded, giving rise to a minor groundwater pond on the pit floor in this corner of the site.

The lands at the eastern end of the application site have generally been worked to shallower depth, principally for sand and gravel extraction. There has been no extraction of rock across this area and there are several large mounds of undisturbed sand or stockpiles of excavated sand on site. Excavations in this area generally did not extend below the groundwater table, except in a few localised areas where shallow groundwater ponds now occur (at or below 125mOD).

It is understood that the site infrastructure for the former extractive operation was previously located across a hardstand area in the north-eastern area of the application site, the bulk of which has been decommissioned and removed off-site. Within the site, there is also some disused farmyard sheds and an abandoned derelict farm cottage. It is not intended to disturb or demolish these structures and they will remain in-place.

The application site is currently well serviced by utilities. There is a conventional telephone landline running past the site, electric power lines cross it and a water main runs along the L6094 local road which is understood to be part of the Gormanstown Usk Group Water Scheme operated by Kildare County Council. The wastewater treatment system and associated percolation area which was approved by way of an earlier planning permission will be (re-)commissioned and/or replaced for the purposes of this development.

1.5 Site Access

The application site is accessed via local roads which run for approximately 2.9km from a T-junction with the R448 Regional Road (the former N9 National Primary Road) at the southern end of Kilgowan townland to the existing site access in Usk. Traffic initially runs north-east of the R448 junction for 1.3km along the L6096 local road, before turning right and south-east at a T-junction and travelling for 1.6km along another local road (L6094) up to the application site.

The M9 motorway runs along a north-northeast to south-southwest alignment between the town of Naas and Waterford City and at its closest point passes approximately 1.9km to the west of the application site. There is a grade separated interchange providing full access to the M9 motorway located at Junction 2 (Kilcullen) approximately 7.25 km north along the R448 from the junction at Kilgowan. There is another grade separated interchange at Junction 3 (Moone), approximately 10km south along the R448 and west along the R747 Regional Road from the same junction.

The R448 Regional Road (the former N9) also runs from Naas to Waterford. For much of its run length between, between Kilcullen and Ballintore (essentially between Junctions 2 and 3 of the M9 motorway), its carriageway is typically in excess of 6m, with hard shoulders on both sides of the road, which is sufficiently wide to allow two HGV's pass comfortably, without impediment. The road pavement is in good condition and appears to be generally well maintained.

The existing site access and entrance has been in place since 2008 when it was established on foot of planning permission for the former sand and gravel pit development (Ref. 07/795). As the existing access is compliant with current design standards, there is no requirement to amend or upgrade it to facilitate the proposed backfilling and restoration works.

1.6 Alternatives

The proposed establishment of a soil waste recovery facility at Usk offers clear environmental and economic advantages relative to other locations and/or greenfield sites. Although they may differ slightly in their nature, scale and duration, the environmental impacts arising from the proposed waste recovery activities at the application site will essentially be similar to those which previously arose when aggregates were being extracted (specifically in respect of dust and noise emissions, potential impacts on groundwater and traffic related impacts).

Subject to implementation of best environmental management practices and compliance with appropriate planning and licensing controls (i.e. planning conditions and standard emission limit values), the operation of a soil recovery facility at this location is considered to be more appropriate, more sustainable and less likely to generate significant impacts than a similar facility at almost any other alternative location.

2.0 DESCRIPTION OF THE DEVELOPMENT

2.1 Introduction

As previously indicated, the proposed development provides for backfilling of the former sand and gravel pit at the application site using approximately 1,240,000 tonnes of imported natural inert waste materials and/or suitable by-product materials, generated by construction and development projects principally in Counties Kildare, Wicklow, Carlow and Dublin and its restoration for future agricultural land-use.

In order to facilitate this, it is necessary to establish and operate an inert soil waste recovery facility to provide for the recovery through backfilling, of any natural soil and stone imported as waste to the facility. Backfilling activity is technically classed by national and European waste management legislation as *'recovery through deposition on land'* and the existing development is conventionally described as a *'soil recovery facility'* and requires a waste licence from the Environmental Protection Agency.

The application site will be backfilled using only inert, natural soil materials imported from external, pre-approved development sites. No peat, contaminated soils or non-hazardous waste will be accepted at the proposed facility

2.2 Site Preparation / Establishment Works

The initial site preparation / site establishment works to be undertaken at the outset of the development will essentially entail the following

- Securing the existing site perimeter with any additional fencing / planting as required;
- Cutting and off-site removal of all existing scrub and vegetation from pit floors and side slopes off-site to authorised waste facilities (to be undertaken in phases immediately prior to commencement of backfilling works in designated areas);
- Removal of any other waste from prior development (eg. tyres) to authorised waste facilities off-site;
- Establishment of site offices, weighbridge office and staff welfare facilities at site infrastructure area;
- Installation of weighbridge and wheelwash;
- Construction of bunded fuel storage area and concrete slab with sub-surface drainage to hydrocarbon interceptor and soakaway area;
- Installation / (re)-commissioning of septic tank and wastewater treatment facilities;
- Additional paving works around the site access / entrance;
- Connection of power and water supplies;
- Upgrading of internal access roads using imported rockfill aggregate where required to provide access to backfill areas within application site;
- Establishment of environmental control and monitoring infrastructure;
- Backfilling of existing shallow ponds using existing sand stockpiled on site.

The general layout of the site and infrastructure area for the duration of the proposed backfilling and soil recovery activities is shown in Figure NTS-4.

2.3 Site Infrastructure

In order to track and record the amount of material entering the application site, all HGV traffic importing soil and stones to the waste recovery facility will be directed across a new weighbridge located immediately inside the site security gates, as shown on the site infrastructure plan in Figure NTS-5. A weighbridge office will also be installed on elevated supports immediately alongside the weighbridge and at a height similar level to that of HGV driver cabins.

In order to prevent transport of clay and dust onto the public road network, a wheelwash will be installed along the egress road leading out of the application site. All HGV and articulated trucks exiting the proposed facility will be required to pass through the proposed wheelwash facility, at the location shown in Figure NTS-5.

Offices and welfare facilities to be established at the site will be portacabin-type structures and will comprise a site office / meeting room, a staff changing room, a kitchen / canteen facility and staff toilets.

All areas around the site access / egress and weighbridge will be paved with concrete or asphaltic road surfaces to minimise the pick-up and transfer of mud / soil off-site. As traffic moves within the application site, it will travel to and from backfilling areas over an internal network of unpaved haul roads constructed of crushed stone / hardcore fill. Provision for HGV and employee / visitor car parking will be made across the existing (unpaved) hardstanding area immediately to the north of the site access.

Fuel will be stored on-site in bunded storage tanks placed along the southern wall of the existing shed at the northern end of the site (at the same location as those previously approved for the sand and gravel facility). All refuelling of plant and machinery will take place over a concrete hardstanding area in front (south) of the fuel tanks. Surface water run-off from the concrete hardstand area will be captured by sub-surface drainage pipes and passed through a hydrocarbon interceptor before being discharged to ground via a soakaway / infiltration area.

It is proposed to designate the existing shed at the northern end of the site infrastructure area as the on-site waste inspection and quarantine facility. The shed is roofed, closed on all four sides and has a concrete floor, thereby preventing any suspect waste from wetting and generating potentially contaminated run-off which would otherwise require treatment prior to discharge. Any soil and stone waste which is suspected to be non-compliant with agreed waste intake criteria will be transferred to the waste inspection and quarantine facility for closer examination and/or testing. Should this indicate that the suspect soil cannot be used in the backfilling and restoration of the former pit, it will be quarantined and removed off site.

Mobile plant and equipment used in soil and stone backfilling and recovery operations will be stored on hardstand areas within the application site. Storage for small items of plant and equipment, replacement parts, minor quantities of hydraulic oil and/or lubricants, storage of minor quantities of liquid (oil) waste, safety clothing and equipment will be provided in a container to be placed along the northern site boundary,

2.4 Backfilling / Soil Recovery Activities

2.4.1 Phasing

The application site will essentially be backfilled in two phases, working progressively from the western limit across to the eastern boundary, up to the perimeter screening berm along the existing L6094 local road and the channel of the River Greese, as indicated in Figure NTS-4.

All HGV trucks delivering inert soil and stone will be confined within the application site. Trucks will turn into the site from the L6094 local road and travel across a paved surface to the weighbridge before then turning left and either turning immediately right to the Phase 1 backfilling area at the western area of the site or proceeding straight on to the Phase 2 backfilling area at the eastern / southern area.

2.4.2 Surface Water Management

There will be no off-site discharge of water from the application site to nearby streams or rivers. Given that the existing site is well drained soil, rainfall is expected to infiltrate rapidly to ground and no significant overground flows of surface water run-off are likely to arise.

During backfilling operations, the upper surface of backfilled soil will be sloped so as to ensure that any rainfall which does not infiltrate the soil and gives rise to surface water run-off will be directed either to

- areas beyond the edge of the working area (where backfilling has yet to commence) where sand and gravel occurs at or close to the ground surface - these areas will act as effective soakaways for the surface water run-off or
- collector drainage channels excavated in natural soils beyond the perimeter of the working area – these will carry any run-off which fails to infiltrate to ground along its length as far as the groundwater pond which will remain in place in the south-eastern corner of the site – this then will serve as an effective settlement lagoon for run-off prior to its discharge to ground.

2.4.3 Rate and Duration of Backfilling Activities

The proposed maximum rate of soil and stone intake to the site will be 300,000 tonnes per annum. At maximum intake levels, assuming 48 working weeks per annum, 5½ working days per week and a minimum payload of 20t per HGV vehicle, the proposed backfilling / waste recovery activities would generate an average of 57 No. HGV return trips per working day (equivalent to 114 one-way movements) every working day. This equates to between 5 and 6 return trips (or a total of 10 to 12 traffic movements in or out of the site) per hour.

The duration of filling activities at the application site will largely be dictated by the rate at which the externally sourced inert soil and stone is imported. It is envisaged that the maximum rate of soil and stone waste importation to the proposed backfill / recovery facility at Usk will be of the order of 300,000 tonnes per annum. Assuming that the average rate of backfilling is ultimately between 200,000 and 300,000 tonnes per annum, the expected operational life of the proposed facility will be between 4 and 6 years. Following closure / cessation of backfilling activities, an aftercare period of up to 3 years may be required for post closure monitoring and surrender of the waste licence to the EPA.

2.4.4 Working Hours

It is intended that the operating hours for the proposed development will be the same as those identified in the planning permission granted previously in respect of sand and gravel extraction (Condition No. 3 of Planning Ref. 07/795). Proposed working hours are between 07:00 to 18:00 hours on Monday to Friday, and between 08.00hours and 16.00 hours on Saturday, with no waste intake accepted or backfilling operations permitted outside of those times.

2.4.5 Employment

Site operations will require a minimum of two personnel to be based at the facility at all times during working hours. One individual will be nominated as site manager and will be required to (i) check that the soil and stone being brought to the facility has been pre-cleared and meets site acceptance criteria and (ii) collate and maintain all records of waste intake. The second individual will be required to (i) operate the site plant and equipment on a full-time basis, like a bulldozer or a mechanical excavator at various times, as may be required and (ii) visually inspect and monitor the suitability of the soil and stone waste being consigned and accepted at the facility.

2.4.6 Waste Handling and Acceptance

On arrival, HGV drivers carrying materials to the recovery facility will identify themselves to the site staff before proceeding to the active backfilling area. Staff will take a copy of the delivery docket, record the time and date of arrival, the nature, origin and weight of the imported soil and stone, the customer / client name, the truck licence plate number, the relevant waste collection permit details and any further details which may be required by the EPA waste licence. All records of waste intake will be maintained on site for waste tracking and auditing purposes.

In order to minimise the risk of importing and introducing contaminated soil / subsoil to the application site, management systems will be introduced to establish the source of imported materials in advance and to confirm that they are inert. Insofar as practicable, the source of each large consignment of soil imported to site for filling and restoration purposes shall be identified in advance and tested to confirm that soils originating at that location can be classified as inert (this is known as characterisation testing). Ideally, these tests will be undertaken by developers, Clients or sub-contractors forwarding backfill materials to the application site.

Operating procedures at the recovery facility will require all imported soil and stones to be pre-sorted at source and largely free of construction or demolition waste or any non-hazardous / hazardous domestic, commercial or industrial wastes. Any consignments forwarded to site with these materials intermixed in them will be rejected and directed to leave the site.

Any waste materials that are deemed unacceptable for recovery at the facility on the basis of a visual inspection at the weighbridge will be rejected and directed to an alternative authorised waste facility.

Once received at the site a multiple level soil testing regime is envisaged which will test the material for compliance, in line with established EPA methodologies for soil recovery facilities: These include:

- comprehensive on-site verification, comprising visual inspection and record of imported soil end-tipped / unloaded at the site;
- frequent, compliance testing covering a limited range of key soil parameters.

All external testing will be undertaken by an independent laboratory on behalf of the Applicant.

All inert soils imported to the site will be unloaded (end-tipped) from trucks at the active filling area. It will be visually inspected by site based personnel at that point to ensure that there is no intermixed construction or demolition, non-hazardous or hazardous waste placed within it.

If, following acceptance of waste, there is any subsequent grounds for concern about the nature of the wastes imported to site, it will be segregated and transferred to the waste inspection and quarantine shed for closer inspection and classification testing. A detailed record will be kept of all such inspections.

Any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) inadvertently imported to the application site will be separated out and temporarily stored in skips at the waste quarantine area prior to removal off-site to appropriately authorised waste disposal or recovery facilities.

2.4.7 Environmental Controls and Monitoring

A number of environmental controls will be implemented during the backfilling and recovery operations in order to reduce and minimise potential environmental emissions and any associated nuisance. Details of these measures are outlined in later sections of this Non-Technical Summary and in greater detail within the specialist Chapters of the EIAR.

The Applicant / operator will establish an environmental management programme to monitor and manage environmental emissions arising from the will be set by the EPA in the event that it decides to issue a waste licence in respect of the proposed recovery activities at Usk. Environmental sampling, monitoring and testing will be undertaken by the Applicant as required by planning and waste consents. Records of environmental monitoring and testing will be held on-site and forwarded to the EPA and Kildare County Council as required.

2.5 Site Restoration

Following cessation of recovery activities the proposed facility will be restored to grassland or other agricultural use by placing natural subsoil and topsoil over the backfilled soil and stone. The soils and/or subsoils used for final restoration will be stockpiled on site or imported / accumulated over the period of the backfilling and recovery operations. An outline of the proposed restoration scheme and the final ground level contours is shown in Figure NTS-6. Cross-sections through the final landform are shown in Figure NTS-7.

On completion, any rainfall over the backfilled ground will either

- (i) percolate directly into the backfilled soil mass (depending on the permeability and/or degree of saturation of the soil at the ground surface);
- (ii) run-off over the ground surface to percolate into the more permeable ground immediately beyond the backfilled / restored areas or
- (iii) run-off over the ground surface toward the groundwater pond which will be left in-situ in the south-eastern corner of the application site.

The following activities will be carried out upon cessation of recovery activities;

- (i) Removal of all offices structures, tanks stores, plant and machinery from site;
- (ii) Decommissioning and/or removal of all on-site infrastructure;
- (iii) Final spreading of overburden soils / topsoil over haul roads and hardstand areas and subsequent seeding with grass;
- (iv) Planting of hedgerows and re-establishment of former field boundaries in line with the restoration plan (shown in Figure NTS-6).

3.0 EXISTING ENVIRONMENT, EFFECTS AND MITIGATION

3.1 Population and Human Health

Environmental Protection Agency guidelines in relation to Environmental Impact Assessment (2017) indicate that the consideration of human health and population in EIA should address employment, human health and amenity issues. For the purposes of EIA, human health is considered in the light of the relevant topics or 'pathways' addressed by the EIA Report, such as noise, air and water, and in the light of established, acceptable limits for exposure.

The application area is located in County Kildare, within the townland and Electoral Division of Usk. The village of Dunlavin, 2.3km to the east, is the largest urban settlement nearby and there are isolated residences and farmsteads located along the local road network.

The closest social welfare office to the site is in Newbridge. The Live Register statistics show that although the number of people on the Live Register is currently falling, the registered figures are still in excess of 4,000. The 2016 census figures indicate that the breakdown of the industries employing those at work locally is broadly similar to County Kildare as a whole, with the exception of 'agriculture' where employment levels locally are approximately four times the rate in the wider county and 'transport and communications' where employment levels are approximately half of those in the wider county. The 2016 census figures indicates that the principal types of employment for those at work locally are similar to elsewhere in both Counties Kildare and Wicklow.

It is considered that the proposed development will have a positive effect on employment. During the construction and operational phases the development will provide employment for a workforce of at least 2 people (on a full time equivalent (FTE) basis). The development will also indirectly support and sustain employment for hauliers servicing the construction and development industry, as well as providing occasional employment for sub-contractors, maintenance contractors and environmental monitoring personnel and advisors as required. This employment effect will cease once the site is restored.

It is considered that the proposed development is not likely to have significant effects on human health. The main potential pathways for effects on human health arising from the proposed site activities are noise, dust and groundwater. Measures will be in place to prevent the spread of dust, to mitigate noise and to minimise prevent spillages of fuel and avoid intake of potentially contaminated soils, both of which could potentially affect groundwater in the underlying (poor) aquifer. With these measures in place, it is considered that potential adverse health effects are unlikely to occur. On cessation of operations, effects on noise and air would largely cease once the site is restored to agricultural use. Any long-term effects on groundwater will be prevented by precautionary measures applied in respect of soil waste intake and placement during the operational phase.

It is considered that the proposed development is not likely to have significant effects on amenity. The main potential pathways for effects on amenity are noise, dust, traffic and landscape. Control measures will be implemented to prevent the spread of dust and to mitigate noise emissions. The access to the application site will be via an existing, previously approved, entrance which complies with technical design and road safety standards. The traffic assessment prepared in respect of the proposed development concluded that there would be no significant adverse effects arising in respect of the capacity or safety of the surrounding public road network.

As part of the proposed development, monitoring will be undertaken in relation to noise, dust, surface water and groundwater. This will measure the actual impact of the development during the site preparation, operational and post closure phases.

3.2 Biodiversity

The application site at Usk extends over approximately 26.6 hectares and encompasses lands previously used for sand and gravel extraction which has undergone some natural regeneration of vegetation, on the pit floor and on side slopes since it closed in 2010. A number of ponds have also formed in flooded low-lying areas across the pit floor. An Ecological Impact Assessment was undertaken to inform the wider environmental assessment of the proposed backfilling and restoration of the former pit using imported inert soil and stone waste.

The application site is not subject to any statutory or non-statutory natural heritage designation and no such sites, including the nearby Dunlavin Marshes pNHA, will be directly or indirectly impacted upon by the proposed backfilling and waste recovery activities, nor will it have any impacts on any habitats listed under Annex 1 of the Habitats Directive, nor will it have significant impacts on species listed in Annex II.

A Stage 2 Appropriate Assessment / Nature Impact Statement prepared in respect of the proposed development activity concluded that it is not likely to undermine the conservation objectives for the River Barrow and River Nore SAC, to which it is indirectly linked via River Greese which flows beyond the eastern site boundary, either as a stand-alone project or in-combination with other projects or plans. Standard mitigation measures, typical for protection of water resources at waste recovery facility developments, will be implemented to ensure that the conservation objectives for SAC will not be undermined by the proposed development at Usk and no additional specific mitigation measures are deemed necessary.

The proposed development will result in the direct loss, damage and disturbance of 1.47ha of habitat at the former sand and gravel pit. This includes circa 1.47ha of wetland habitat comprising of 1.27ha of *FL8 – Other artificial lakes and ponds*, 220m of *FW4- Drainage ditches* and 0.2ha of *FS1 – Reed and large sedge swamps*. This impact is deemed to be significant at Local (higher) level. With the exception of birds and amphibians, the proposed development is not likely to have a significant impact on the local population and conservation status of any individual or group of species.

Without any mitigation and/or compensatory measures, the proposed development could result in a significant impact on birds, especially wetland species and peregrine falcon as listed on Annex I of the EU Birds Directive at Local (higher) value, and on amphibians including smooth newt and common frog at County and Local (higher) values respectively.

However, through the appropriate provision of proposed mitigation and/or compensation measures, it will be possible to retain, enhance and create alternative habitat for amphibians and peregrine falcon, as well as some compensatory wetland habitat providing opportunities for wetland birds. With the implementation of the proposed mitigation and/or compensation measures, there will be no legal implications for any protected species.

The restoration of the former sand and gravel pit to agricultural land use is likely to diminish the value of the site from Local (Higher) to Local (Lower) level. It is considered that any reduction in value is unlikely to significantly affect, at this current time, the overall biodiversity resource at a Local or County level.

3.3 Land, Soils and Geology

The assessment of the likely environmental impact of the proposed backfilling and recovery activities on land soil and geology is based on a desk study of the site and surrounding using published geological data, a site walkover of the lands and available ground investigation information, including earlier geophysical survey and trial pit records (from 2006) and more recent borehole / well installation records (from 2018), as well as recent topographic survey data. Four boreholes were drilled at the site in November 2018 to provide information on the nature and thickness of the subsoils at the site, to

confirm groundwater level beneath the site and install monitoring wells to facilitate subsequent groundwater sampling and testing.

The application site is located within a former pit in which soil cover and some subsoils have previously been stripped and/or removed in order to facilitate the extraction of underlying natural sand and gravel. The proposed backfilling and soil recovery activities will be entirely confined within the existing development footprint of the former pit and will not result in the loss of any agricultural land or any change in existing land-use on surrounding land. In the medium-to-long term, once the site has been backfilled to its original (pre-extraction) ground level, the land will be restored and returned to productive agricultural use.

Published Teagasc soil mapping indicates that there are Rendzinas and Lithosols over much of the eastern part of the site and Lithosols and Regosols across the western part. Each of these soils types are relatively thin / shallow, well drained soils that often form over subsoils which are derived from calcareous limestone and/or near surface limestone bedrock.

Subsoil mapping indicates that the eastern part of the site is underlain by sand and gravels derived from carboniferous limestone, with some localised bedrock outcrop occurring across this area. The mapping also indicates that the western part of the site is underlain by glacial till and that a small area of alluvial (river deposited) subsoil occurs along the channel of the River Greese and extends inside the eastern site boundary.

There is little extractable sand and gravel remaining across the eastern part of the site (at least above groundwater level), much of it having been extracted previously. It is unlikely that any significant depth of glacial till subsoil overlies bedrock at the western end of the site. Any which was present previously was stripped to facilitate rock extraction and is now stockpiled around the western perimeter of the application site. Published bedrock mapping indicates that the former sand and gravel pit at Usk is underlain by the Carrighill Formation described as calcareous greywacke, siltstone and shale.

There are no sites of geological heritage interest or value identified at or in the immediate vicinity of the application site, nor are there any known karst features. The nearest feature of geological heritage interest is a large spring located at Tober Demense, approximately 4km to the north east of the site which flows out of fluvio-glacial gravels and provides a public water supply. The application site is located downstream of this spring and the proposed development will not have any impact on it.

A number of mitigation measures will be implemented for the duration of the backfilling and recovery activities to minimise any adverse effects on soils, subsoils and bedrock geology surrounding the application site. These measures will principally be focussed on preventing potential fuel / oil spills which could arise on site as a result of plant refuelling activities, inadequate plant inspection and/or maintenance, plant or vehicle collisions, poor storage arrangements for hazardous substances etc.

Detailed procedures will also be implemented to minimise the risk of importing and introducing contaminated soil / subsoil to the application site. Management systems will be introduced to establish the source of imported materials in advance and to confirm that they are inert. Once accepted at the site a multiple level soil testing regime will be implemented which will test the intake materials for compliance, in line with established EPA methodologies for soil recovery facilities.

Site activities will be monitored to ensure all soils are placed at safe slope angles and comply with all relevant Health and Safety legislation and guidance published by the Health and Safety Authority guidelines for the extractive sector, thereby limit the potential for instability / unplanned events.

With the implementation of the proposed mitigation measures, the residual impact on soil and geology arising as a result of the proposed development is deemed to be imperceptible. Following completion of the final restoration works and the return of the site to agricultural use, the long-term impact of the proposed development on land and soils is considered to be beneficial at a local scale.

3.4 Water

This section describes the receiving water environment at, and in the immediate vicinity of, the application site and is based on a preliminary desk study of published information, site visits and inspections, monitoring of groundwater quality and levels and collation and analysis of the information gathered.

The bedrock underling the application site is classified by the Geological Survey of Ireland (GSI) as a poor bedrock aquifer and is generally unproductive (meaning groundwater yields from the aquifer are likely to be low). It lies within the Kildare Groundwater Body (GWB) which is also classified as a poor and generally unproductive aquifer. Water quality in the aquifer is classified as 'Good' and it is not subject to any significant environmental pressure (such as abstractions, agriculture, aquaculture, domestic waste water, forestry, etc.).

The sand and gravel deposits which occur locally at the site and surrounding area are not classified by the GSI as an aquifer. The closest sand and gravel aquifers are located 2km north-west, 3.5km south-east and 3.5km north-east of the site. There are some environmental pressures from human related activity on the sand and gravel aquifers close to the application site.

Aquifer vulnerability mapping published by the GSI indicates the vulnerability of the aquifer across the application site varies from Extreme (E) in the west and High (H) in the east. This assessment reflects the fact that soils and subsoils are well-drained and provide little protection to the underlying bedrock aquifer from potential contamination by human activities at the ground surface.

Monitoring of groundwater levels indicates that groundwater flows at the site are broadly in an easterly direction, within the sand and gravel deposits. Groundwater quality results from the sampled boreholes indicate that the groundwater in the sand and gravel is generally of good quality with low ammonia, phosphate and metal concentrations. Around the site entrance, some very low / trace concentrations of mineral oil and hydrocarbons were recorded (just above detection limit) and may be associated with traffic movements around the former weighbridge area, where HGV traffic movements would previously have been highest.

The application site is not located within or adjacent to a groundwater supply source protection zone (SPZ). There are two such zones within 10km radius of the site. The Usk / Gormanstown Source Protection Area is located approximately 4.5km north-east of the site while the Lipstown / Narraghmore Source Protection Area is located approximately 6.5km south-west of the site.

A channel / stream which forms the headwaters of the River Greese flows in a southerly direction along the eastern boundary of the application site and continues to the confluence with the River Barrow just north of Carlow Town. It is likely that the stream / river channel immediately beyond the eastern site boundary of the application site is fed by groundwater flowing beneath the application site. Therefore any potential direct impacts to groundwater, could also potentially indirectly impact the River Greese.

The River Greese is not in a shellfish, salmonid, nutrient sensitive area or a Special Protection Area (SPA), nor is it designated a Special Area of Conservation (SAC) at the application site. There are no surface water courses on, through or out of the site, nor any off-site discharges to streams or rivers. The River Greese is indicated to be of 'Good' water quality status for approximately 4km downstream of the site.

Flood mapping published by the Office of Public Works indicates that there is no flood risk at the site, although there could be some extended river flooding around the Dunlavin Marshes to the north and east after intense rainfall events.

The GSI national well database identifies an number of private boreholes within the vicinity of the application site, although the area is known to be served by a ground water scheme. There are no recorded surface water abstractions from local watercourses.

Potable water will be supplied to the site offices and welfare facilities from the group water scheme which currently services the site. No groundwater will be sourced from the underlying aquifer. The proprietary effluent treatment system and associated percolation area (which was previously approved) will be commissioned or replaced.

The EIAR has identified the following sensitive receptors in the receiving environment around the application site - the surface water channel (River Greese), local groundwater supply wells and the poorly productive bedrock aquifer underlying the sand and gravel at the application site.

Mitigation measures are proposed in the EIA Report to reduce, as far as possible, any adverse impact on the three identified water environment receptors. As for the receiving geological environment, these measures will principally be focussed on preventing potential fuel / oil spills which could arise on site as a result of fuel storage / plant refuelling activities and minimising the risk of importing and introducing contaminated soil / subsoil to the application site (see above).

Additional measures will also be implemented in the course of the backfilling and soil recovery operation to manage overground flows / surface water run-off (should it arise) at the application site, to ensure that it recharges to ground in a controlled manner. There will be no direct discharge of surface water off-site. Preliminary monitoring locations are identified in Figure NTS-8.

With the proposed mitigation measures in place, it is considered that the residual impact of the proposed development on the water environment receptors will be imperceptible.

A groundwater monitoring programme will be implemented at the application site to confirm there is no adverse impact on groundwater level or quality over time, as activities proceed. The scope and frequency of groundwater sampling and testing will be set by any EPA waste licence issued in respect of the proposed waste recovery activities.

3.5 Air Quality

The principal air quality impact associated with the proposed backfilling and restoration activities and the operation of the soil recycling facility at Usk is expected to be fugitive dust emission. Emissions are likely to arise during dry periods from

- trafficking by HGVs over unpaved soil surfaces;
- end-tipping of inert soil and stone; and
- handling / compaction of the inert soil in-situ.

Given the inert nature of the soil and stone materials being used to backfill and restore the application site and the absence of biodegradable (organic) compounds or wastes within it, no gas emissions will arise from the proposed waste recovery operations.

In order to control potential dust rise and dust emissions, a number of measures will be implemented as part of routine site operations, principally

- spraying of water from a tractor drawn bowser on unpaved haul roads and/or exposed soil surfaces, particularly during windy periods and/or dry spells;
- placing and compacting soils immediately after being unloaded and minimising the amount of soil being stockpiled;
- if temporary stockpiling is required, stockpiles should be formed against pit faces / perimeter berms, as far as possible from nearby residences;
- routing all HGVs leaving site through a proposed wheelwash facility in order to remove and/or dampen any dust / mud material attaching to the undercarriage and to prevent transport of fine particulates off-site, onto the local public road network;

- planting the upper restored surface with grass as soon as possible after placing final cover soils in order to minimise soil erosion and dust emissions.

The amount of dust or fines carried onto the public road network will be further reduced by periodic sweeping of paved internal roads and the existing local road in front of the application site. In the unlikely event that future dust monitoring were to indicate that dust emissions are excessive or problematic, consideration could also be given to installing an automated sprinkler system along site roads to dampen any lying dust.

Having regard to the range of mitigation measures proposed, it is considered that the proposed site activities at Usk will not have a significant dust deposition impact on human health or nearby sensitive receptors (which principally comprise surrounding residential properties).

Habitats and supporting flora surrounding the application site and/or within the Dunlavin Marches pNHA located to the northeast are likely to have been subject to varying levels of dust deposition from past sand and gravel operations and, as such, they are likely to be relatively tolerant and resilient to any dust deposition from the application site.

As dust emissions levels will ultimately be controlled by way of any EPA waste licence issued and as none of the habitats present within the potential zone of influence are considered to be particularly sensitive to dust, it is concluded that there will be no significant impact on nearby ecological receptors (or the Dunlavin Marches pNHA) as a result of any fugitive dust emissions arising from the site.

An air quality / dust monitoring programme will be implemented at the application site to confirm that activities operate within the dust deposition emission limit values set out in any EPA waste licence issued in respect of proposed waste recovery activities. Preliminary monitoring locations are identified in Figure NTS-8.

Following completion of the final restoration works and the return of the site to agricultural use, the long-term impact of the proposed development on air quality will cease.

3.6 Climate

An assessment of potential climate impact has been undertaken having regard to the evolving baseline, climate hazards, project vulnerability and greenhouse gas (principally carbon dioxide, CO₂) emissions. The assessment identified climate change concerns in relation to proposed development, assessed effects and identified mitigation measures where possible.

The assessment had regard to the likelihood and exposure / vulnerability of the proposed development to climate hazards, both now and in the future, and included a climate hazard impact analysis.

The project is not considered to be particularly vulnerable to climate change events, although some consideration will be given to ongoing efforts to reduce vulnerability and improve resilience to extreme rainfall events, potential localised flooding, storms and high winds.

Based on the scale and extend of the proposed development / activities at Usk, greenhouse gas emissions are assessed as not significant in context of existing national emission levels. Measures will be implemented to assess and/or monitor greenhouse gas emissions and to reduce these wherever practically possible.

3.7 Noise

Noise monitoring in and around the application site indicates that average ambient noise levels around the application site typically range between 53dBA LAeq and 69dBA LAeq, depending on location and proximity to the local road and time of day. These noise levels are consistent with daytime levels in rural areas close to a busy local road.

To determine the noise impact from the proposed activities, a noise prediction assessment was undertaken to calculate the resultant noise levels at the nearest noise sensitive receptors to the application site (principally residential properties). Noise attenuation increases with distance and as a result noise impact reduces at receptors located further from the site boundary.

The noise prediction assessments indicate that there will be no increase in noise levels arising under a worst-case scenario when site plant (principally a bulldozer and HGV truck) are operating and generating noise simultaneously at the site boundary, rather than intermittently and some distance inside it (as will most likely be the case in reality).

The resultant predicted (maximum) future noise levels arising at nearby sensitive receptors from on-site sources are well below existing ambient levels, such as to make it highly unlikely that any adverse noise impacts will be noticed or experienced by nearby residents.

Although it has been determined that the proposed backfilling and soil recovery activities at Usk will have negligible noise impact, a number of mitigation measures are proposed in line with standard practice at other sites to minimise the potential noise impact of on-site soil recovery activities. These include retention and reinforcement of existing perimeter screening berms, maintenance of plant, fitting of plant silencers, maintenance of road surfaces, control of traffic speed and unloading activities within the facility.

A noise monitoring programme will be implemented at the application site to confirm that activities operate within the limit values set out in any EPA waste licence issued in respect of proposed waste recovery activities. Preliminary monitoring locations are identified in Figure NTS-8.

Following completion of the final restoration works and the return of the site to agricultural use, the long-term impact of the proposed development on ambient noise levels will cease.

3.8 Material Assets

The Environmental Protection Agency guidelines in relation to environmental impact assessment (2017) indicate that the consideration of material assets in environmental assessment should address built services, roads and traffic and waste management. Traffic is addressed separately and this section principally relates to built infrastructure, services and waste management only.

3.8.1 Road / Rail Infrastructure

The road infrastructure surrounding and servicing the application site, principally comprising the M9 Motorway, R448 Regional Road (the former N9 National Primary Road) and the L6096 and L6094 local roads are described in detail in Section 1.5 of this Non-Technical Summary. The disused Tullow Branch of the Great Southern and Western Railway (GSWR) which linked Tullow to Naas, runs approximately 900m to the south-west of the application site at its closest point. The Dunlavin Town Plan 2016-2022 identifies an objective to develop a section of former rail line close to the village, as a public walkway.

An assessment of likely development impacts on the local road network concluded that the proposed development will not have a likely significant effect on the existing capacity of local roads and junctions. Given the separation distance, the development will have no adverse impact on the former (abandoned) rail line to the west of Dunlavin, nor on any proposed future development thereof as a public walkway.

3.8.2 Utilities

As noted previously, the site is well serviced by utilities. There is a conventional telephone landline running past the site, electric power lines cross it and a water main runs along the L6094 local road which is understood to be part of the Gormanstown Usk Group Water Scheme operated by Kildare County Council. The wastewater treatment system and associated percolation area which was approved by way of an earlier planning permission will be (re-)commissioned and/or replaced for the

purposes of this development. A Bord Gáis Éireann natural gas pipeline runs along a broadly north-south axis close to the western boundary of the application site.

Standard construction safety practices for working beneath overhead power / telephone lines and in close proximity to buried pipelines will be implemented for the duration of the backfilling operations at the application site in order to protect the infrastructure and more importantly, to safeguard the health and safety of site-based employees, in line with statutory obligations under health and safety legislation. With implementation of these measures, the proposed site activities are considered not likely to have any effect on existing services or utilities.

3.8.3 Waste

There are no existing permitted or licensed waste management facilities in the immediate vicinity of the application site at Usk. The proposed development will however be operated as an EPA licensed soil waste recovery facility and will secure the waste authorisations required under national waste management legislation to import soil and stone waste generated by construction and development activities and re-use it in the proposed site backfilling and restoration works.

No extractive waste will be generated by the proposed development. All natural site-won materials will be used for backfilling and restoration works at the application site.

There is some solid waste associated with former sand and gravel extraction activities at the application site, principally remnants of former plant, equipment and built structures. This waste will be decommissioned / dismantled and removed off-site for recovery or disposal at authorised waste recovery facilities in advance of backfilling works and operation of the soil waste recovery facility.

Management systems will be established and implemented at the site preparation / establishment stage to control and manage all potential waste streams, to avoid waste generation where possible and to maximise re-use or re-cycling opportunities thereafter and during the subsequent backfilling and soil recovery phase. The development will comply with all waste management responsibilities prescribed by conditions attached to any grant of planning permission and/or EPA waste licence and in so doing will ensure that waste management activities have no adverse impact on the local environment or on waste infrastructure.

3.9 Cultural Heritage

The archaeological and cultural heritage component of the environmental assessment the proposed backfilling and soil waste recovery activities at Usk townland comprised a paper / literature review and a site visit / fieldwork study.

The assessment identified a number of features and items of cultural heritage interest and value in the surrounding landscape, although none are known to exist at the application site or immediately adjacent to it. Two appendices are included in the EIA Report which deal with Recorded Monuments and sites in the Sites and Monuments Record within the study area. This section should be read in conjunction with the appendices, provided in Chapter 12 of the EIAR.

The proposed development will have no direct or indirect impacts on any items of cultural heritage, archaeology or buildings of heritage interest in the application area or the immediate vicinity thereof.

3.10 Landscape

A landscape and visual impact assessment (LVIA) of the proposed backfilling and restoration of the former pit at Usk was completed in accordance with accepted guidance.

The application site is located within a gently undulating landscape, made up predominately from fields under pasture, bound by a mix of low and tree-lined hedgerows. A small percentage of the medium to

large sized fields within the study area are arable. There are also some small blocks of mostly deciduous woodland scattered around the study area.

The application site consists of two extraction areas, separated by the former settlement lagoons and a number of former farm buildings. There is also a hardstanding area close to the site entrance. The lowest existing levels within the application site are in the northern and eastern part of the site on the floor of the former sand pit, at 122m and 121m AOD respectively. The floor of the former pit in the western part of the site lies at approximately 127m AOD. Along the site boundaries, ground levels range from 121 m AOD along the eastern boundary (i.e. the boundary with the River Greese). Ground levels rise slightly to 129m AOD at the northern end of the site and to 149m AOD at the highest point, at the rock face at the western boundary.

To the south-west of the site, ground levels continue rising over a distance of approximately 1km to the local highpoint at Brewel Hill at 222m AOD. To the north and east, the land rises gently to a local U-shaped ridgeline, enclosing the Dunlavin Marshes, with highpoints ranging from 155m to 188m AOD. Further east of this ridgeline, to the north-east, east and south of Dunlavin, ground levels rise to over 200m AOD, with local highpoints of 221m AOD, 243m AOD and 254m AOD.

The main settlement within the study area is the village of Dunlavin, approximately 2.3km to the east of the application site. Throughout the study area isolated (one-off) residential housing, as well as clusters of properties can be found along the local road network. The M9 Motorway and the R448 Regional Road (the former N9 National Primary Road) traverse the western edge of the study area in a north-south direction. At its closest point, the M9 Motorway comes within 2.6km of the application site.

The rural pasture landscape is of high scenic quality, particularly in locations where views of distant higher mountains are available. Some man-made elements, including the former sand and gravel pit, but also walls, fences, residential and farm buildings locally reduce the scenic quality.

The site is fully within the area identified as the Eastern Uplands Landscape Character Area (LCA) in the Kildare County Development Plan (CDP) 2017-2023. This comprises a narrow band of elevated land, associated with the foothills of the Wicklow Mountains, along the county boundary with Co. Wicklow. The site is located in Class 3 landscape sensitivity area which is generally considered to have reduced capacity to accommodate development without impacting the appearance or character of the landscape. The Kildare CDP identifies a hilltop view of the surrounding landscape at the summit of Brewel Hill, located approximately 1.2km to the west of the application site, as well as a scenic route along a short section of local road along its eastern flank.

The scale of the landscape is experienced as small to medium when located at the lower elevations within the study area, as local ridgelines enclose the viewer and roadside vegetation reduces or restricts surrounding views. In more elevated locations and where views are available (e.g. where low hedgerows are present or in views over field gates), the scale of the landscape increases significantly.

The existing vegetation and undulating topography provide visual screening of the application site from many locations within the study area. It is expected that this level of screening will be in place for the duration of the proposed backfilling and restoration works.

The landscape and visual impact assessment took consideration of the sensitivity of the landscape surrounding the application site and concluded that the proposed development will, on completion, have an overall positive impact on the landscape character and views within the study area and that no local landscape features will be affected by the development.

The receptors with views of the application site principally comprise local residents and road users. During the site operations, the overall visual impact was determined to be moderate for views from a small area in close proximity to the application site and moderate/minor for any other available views. No scenic upland vistas or designated views and prospects will be negatively impacted on. The visual

impact on views from the designated scenic route (where available) will be moderate / minor and not significant. The visual impact on views from Brewel Hill, which is not publicly accessible, would be similar, if not less, due to the greater distance from the site.

The above assessment has not identified any views of the proposed development from the grounds of the Rathsallagh Demesne or any other outdoor recreational facilities. The ultimately positive impact of the proposed development on landscape character and views within the study area will enhance its amenity value for people travelling through the local landscape.

3.11 Traffic

An assessment of the impacts of the proposed development in terms of road operation and traffic safety was undertaken having regard to the proposed increase in HGV movements and traffic levels generated by the proposed development. The existing road network and proposed haulage route to and from the application site at Usk is described in Section 1.5 of this Non-Technical Summary.

Owing to the current low background traffic flows along the local road network, the impact of the development proposals, when set against existing traffic flows, is pronounced. The proposed development, based on the maximum level of operation, would make up a large percentage of overall traffic; up to 10.8% of the total two-way flow and up to 91.3% of the HGV two-way flows. Historically however, the L6094 and L6096 local roads which service the application site were, for many years subject to traffic generated by extraction activities at the former sand and gravel pit, traffic which has not been taken into account within this traffic assessment.

For the R448 Regional Road, the proposed development, based on the maximum level of operation, would account for up to 2.7% of the total two-way flow and up to 19% of the HGV two-way flows (based on existing traffic levels).

The adequacy of the local roads to accommodate the additional traffic volumes was assessed by reference to technical design standards. They were found to have around 91% reserve capacity, meaning that they will operate comfortably within their theoretical capacity when the projected short-term increase in traffic levels arises as a result of the proposed development. There are no concerns in respect of the capacity of the R448 Regional Road to carry the projected increase in traffic / HGV levels, given that it formerly operated as the N9 National Primary Road. All traffic related impacts will cease once the backfilling and soil recovery activities cease at the application site.

The junction visibility and sightlines, both at the application site and along the proposed haulage route between the existing site access and the R448 Regional Road junction at Kilgowan, and onwards from there to the junction with the M9 Motorway at Junction 2 (Kilcullen), was audited as part of the traffic assessment and found to be appropriate and fit for purpose.

Overall, the traffic assessment concluded that the proposed scheme would not detrimentally impact the operation or safety of the local road network and is considered acceptable in traffic and transportation terms.

Notwithstanding this, HGV traffic can be of particular concern to both local residents and road users so a series of mitigation measures are recommended to alleviate any potential concerns to alleviate any potential adverse short-term impacts (over 4-5 years) which may arise while backfilling and soil recovery activities take place at the application site. These are as follows

- All HGV drivers accessing the application site will be expected and encouraged to operate and maintain their vehicles with the utmost regard for the environment and road safety. Drivers will be required to adopt a courteous driving policy both within the site and on the local road network;

- Drivers will be provided with routing details to emphasise the requirement to travel via the strategic road network and avoid unnecessary travel along other local roads;
- A wheelwash facility will be provided within the application site and all HGV's exiting the site onto the L6094 Dunlavin Road will be required to use this facility;
- A separate hardstanding parking area should be provided on-site for HGV / truck parking, away from staff parking; and
- The vegetation on either side of the site access junction should be maintained to preserve sightlines and ensure that visibility is maximised.

3.12 Interaction of the Foregoing

The interactions of the various potential impacts and mitigation measures have been covered, where applicable, under the relevant sections within the EIAR.

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FIGURES

Figure 1
Site Location Map

Figure 2
Surrounding Land Use

Figure 3
Aerial Photograph

Figure 4
Proposed Site Layout at Backfilling Phase

Figure 5
Proposed Infrastructure and Site Services

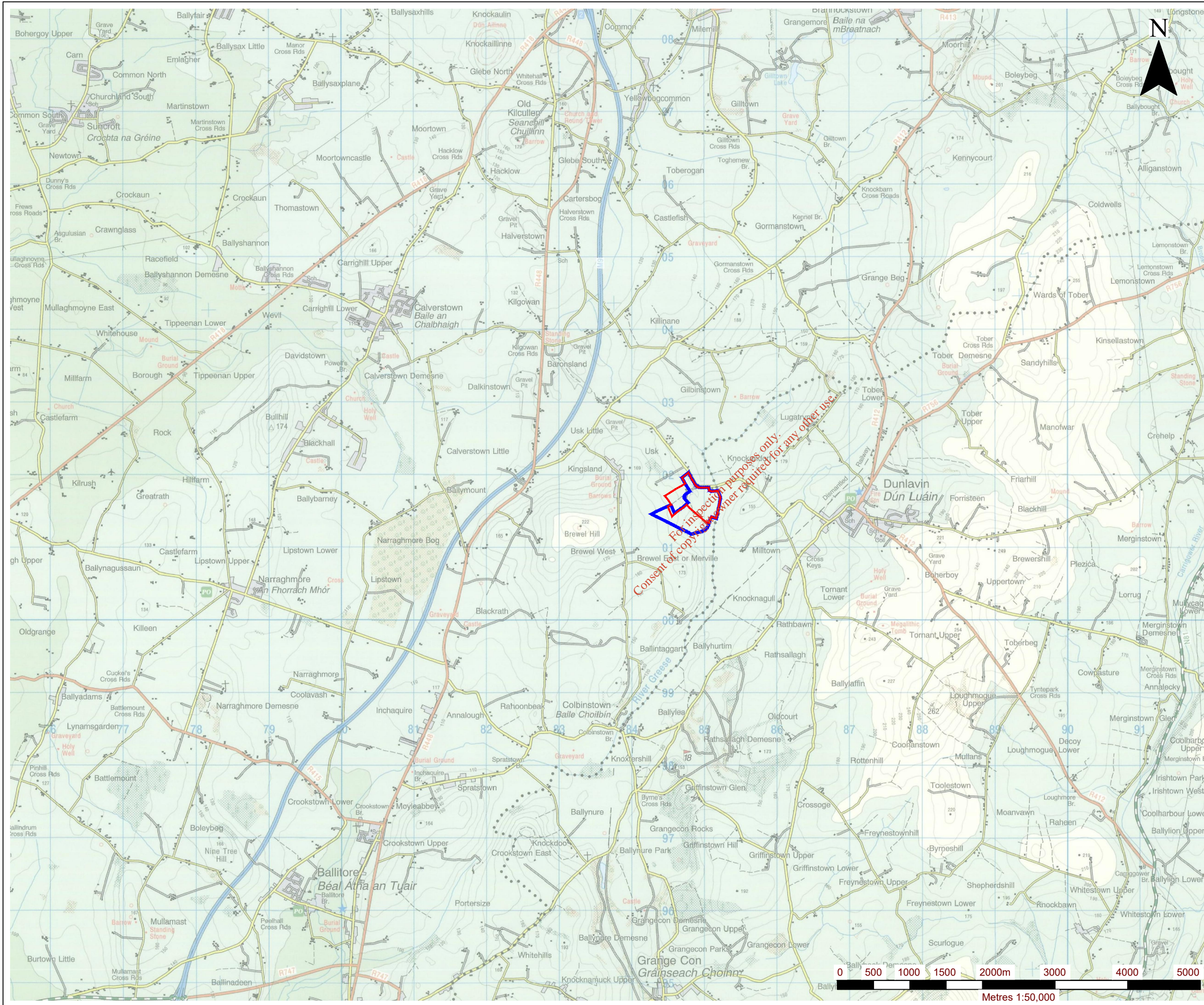
Figure 6
Final Restoration Plan

Figure 7
Restoration Cross-Sections

Figure 8
Environmental Monitoring Locations

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- NOTES**
1. Extract from Ordnance Survey Discovery Series Mapping Map No. 55
 2. Ordnance Survey Ireland Licence No. SU 0000719 (c) Ordnance Survey Ireland and Government of Ireland

LEGEND

- LAND INTEREST BOUNDARY
- PLANNING APPLICATION AREA (c. 26.6 Hectares)

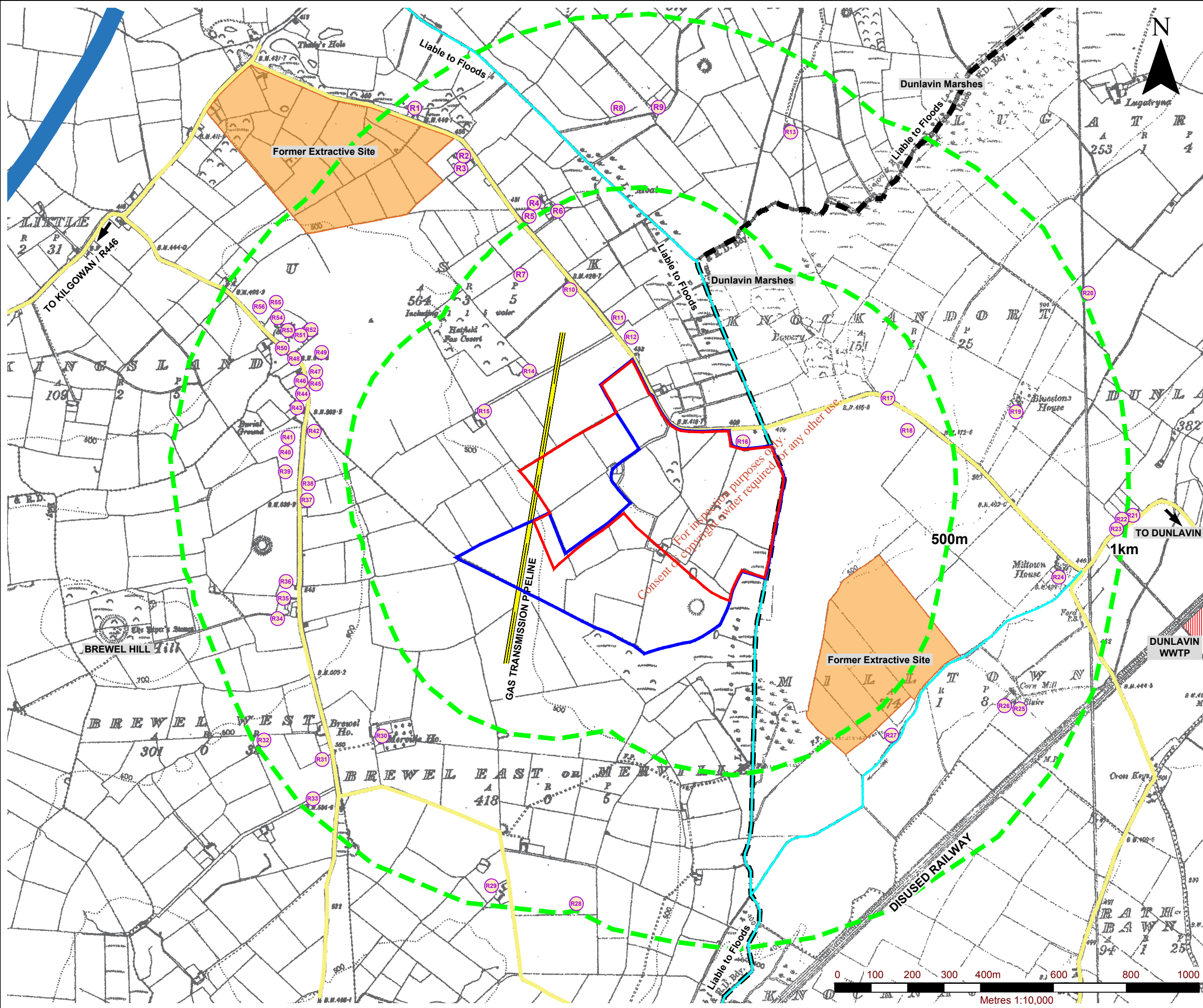
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DUNLAVIN LAND RESTORATION LTD.
EIAR NON-TECH SUMMARY
LANDS AT USK TOWNLAND,
KILCULLEN, CO. KILDARE
SITE LOCATION MAP
Figure NTS1

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NOTES

- EXTRACT FROM 6 INCH ORDNANCE SURVEY MAP NO.s WW013, WW014, KE032 & KE033.
- ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000719 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND.

LEGEND

| | |
|--|----------------------------------------------|
| | LAND INTEREST BOUNDARY |
| | PLANNING APPLICATION AREA (c. 26.6 Hectares) |
| | OFFSET FROM APPLICATION AREA |
| | M9 MOTORWAY |
| | LOCAL ROAD NETWORK |
| | COUNTY BOUNDARY |
| | RESIDENTIAL PROPERTY |
| | LOCAL STREAMS |

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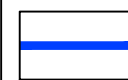
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EIAR NON-TECH SUMMARY
LANDS AT USK TOWNLAND,
KILCULLEN, CO. KILDARE
SURROUNDING LAND USE

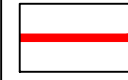
FIGURE NTS 2

Scale: 1:10,000 @ A3
Date: JULY 2019



LEGEND

 LAND INTEREST BOUNDARY

 PLANNING APPLICATION AREA
(c. 26.6 Hectares)

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EIAR NON-TECH SUMMARY

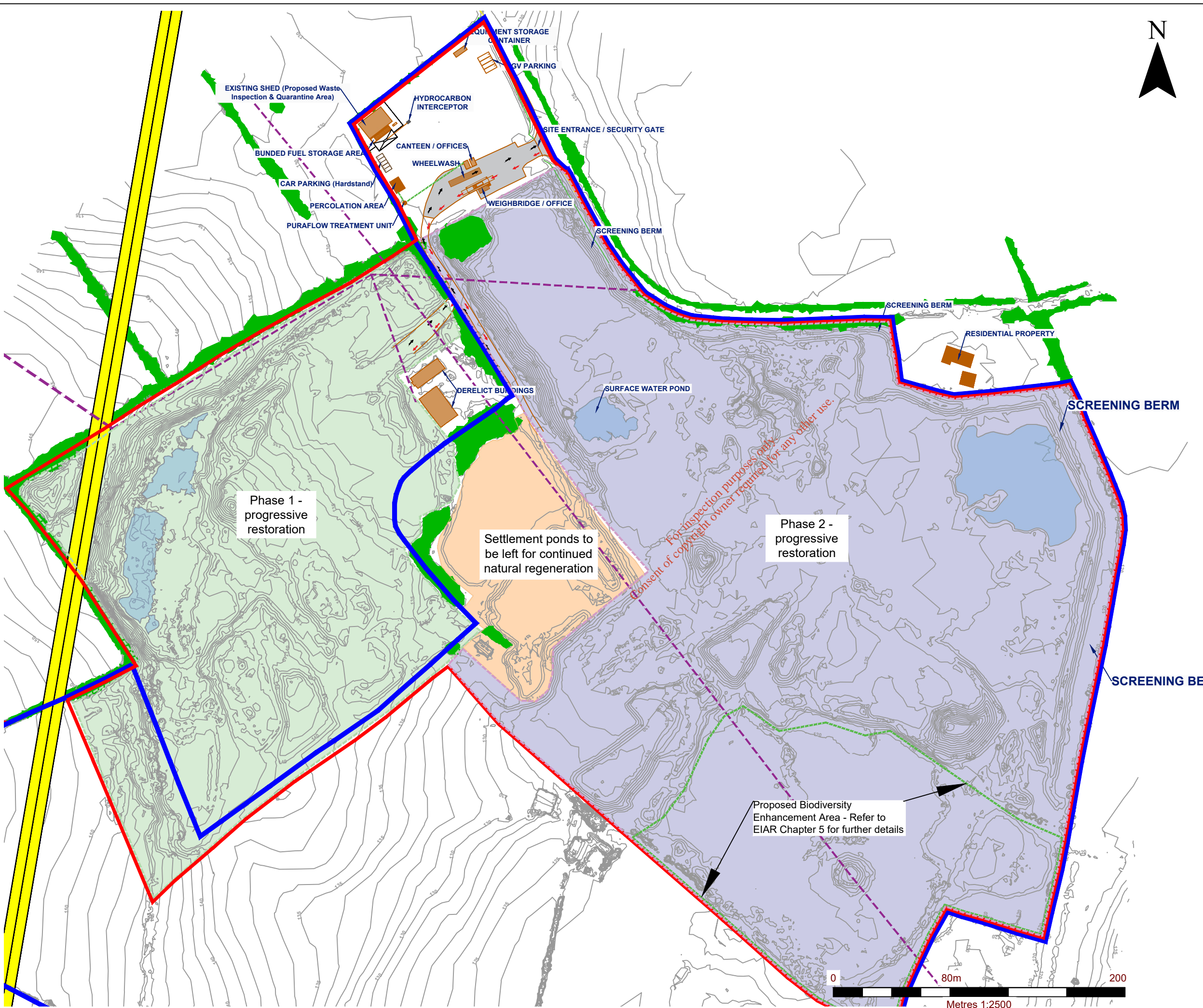
LANDS AT USK TOWNLAND,
KILCULLEN, CO. KILDARE

AERIAL PHOTOGRAPH

Figure NTS 3

| | |
|-----------------------|-------------------|
| Scale 1:4,000 @ A3 | Date JULY 2019 |
|-----------------------|-------------------|

00507.00001.USK.SRF.EIAR-Fig 2-2. Proposed Site Layout at Backfilling Phase.dwg



NOTES

- Extract from Map Scale 1:5,000 Ordnance Survey No. 3895 & 3837
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LEGEND

| | |
|--|-------------------------------------------------|
| | LAND INTEREST BOUNDARY |
| | PLANNING APPLICATION AREA (c. 26.6 Hectares) |
| | HGV TRAFFIC IN |
| | HGV TRAFFIC OUT |
| | VEGETATION |
| | EXISTING SURFACE WATER PONDS |
| | PAVED AREA |
| | BUILDINGS |
| | OVERHEAD POWERLINE |
| | OVERHEAD TELECOM LINE |
| | WASTEWATER DRAIN |

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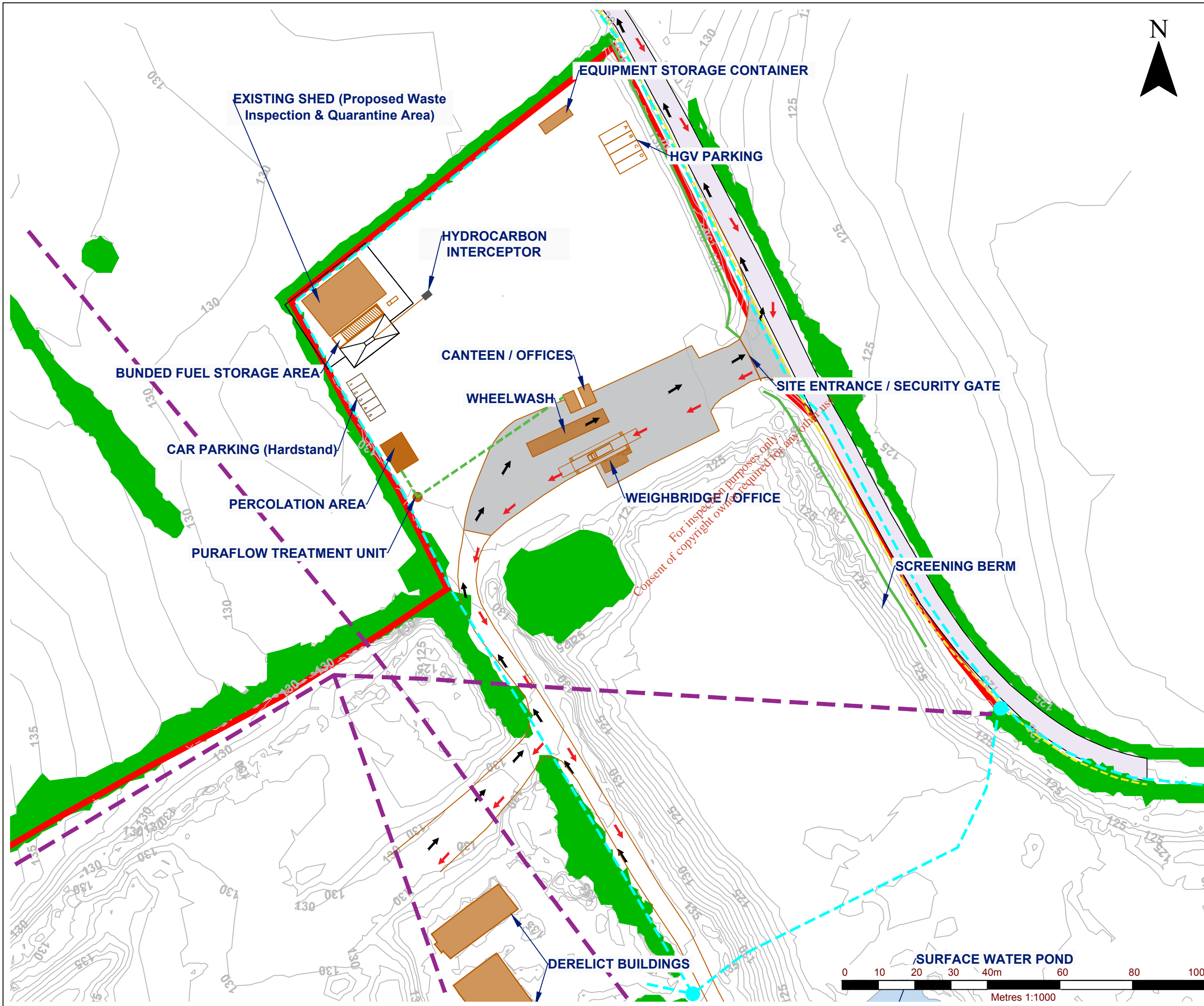
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LANDS AT USK TOWNLAND,
KILCULLEN, CO. KILDARE
**PROPOSED SITE INFRASTRUCTURE LAYOUT
& BACKFILLING PHASES**

Figure NTS 4

| | | | |
|-------|--------------|------|-----------|
| Scale | 1:2,500 @ A3 | Date | JULY 2019 |
|-------|--------------|------|-----------|



00507.00001.USK.SRF.EIAR-Fig 2-3.Proposed Infrastructure Area & Site Services.dwg



NOTES

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LEGEND

| | |
|--|-------------------------------------------------|
| | PLANNING APPLICATION AREA (c. 26.6 Hectares) |
| | HGV TRAFFIC IN |
| | HGV TRAFFIC OUT |
| | VEGETATION |
| | PAVED AREA |
| | BUILDINGS |
| | OVERHEAD POWERLINE |
| | OVERHEAD TELECOM LINE |
| | WASTEWATER DRAIN |
| | WATER SUPPLY (INDICATIVE) |

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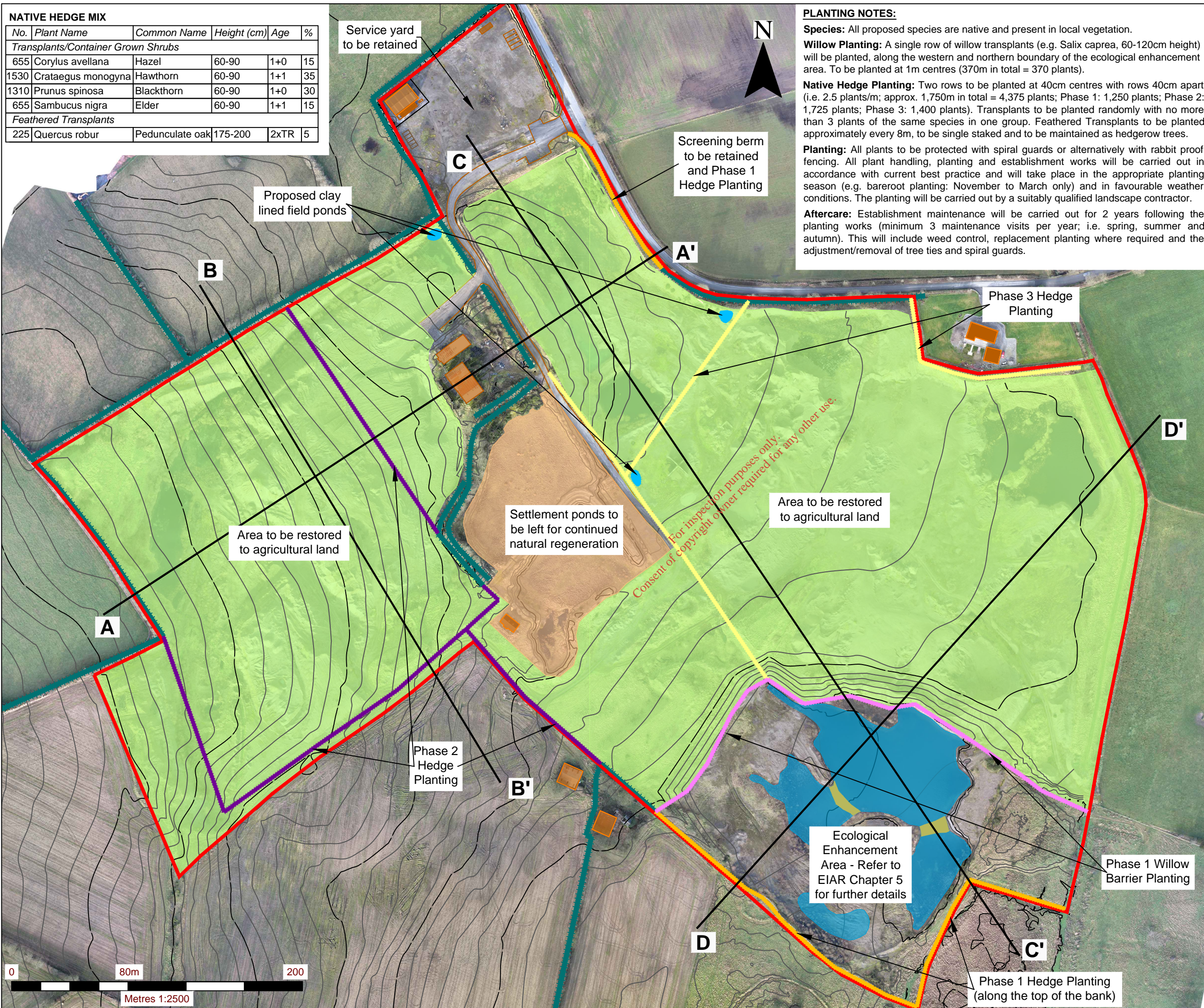
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 LANDS AT USK TOWNLAND,
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INFRASTRUCTURE AREA & SITE SERVICES

Figure NTS 5

| | |
|-----------------------|-------------------|
| Scale 1:1,000 @ A3 | Date JULY 2019 |
|-----------------------|-------------------|

| NATIVE HEDGE MIX | | | | | |
|-------------------------------------------|--------------------|-----------------|-------------|------|----|
| No. | Plant Name | Common Name | Height (cm) | Age | % |
| Transplants/Container Grown Shrubs | | | | | |
| 655 | Corylus avellana | Hazel | 60-90 | 1+0 | 15 |
| 1530 | Crataegus monogyna | Hawthorn | 60-90 | 1+1 | 35 |
| 1310 | Prunus spinosa | Blackthorn | 60-90 | 1+0 | 30 |
| 655 | Sambucus nigra | Elder | 60-90 | 1+1 | 15 |
| Feathered Transplants | | | | | |
| 225 | Quercus robur | Pedunculate oak | 175-200 | 2xTR | 5 |



PLANTING NOTES:

Species: All proposed species are native and present in local vegetation.

Willow Planting: A single row of willow transplants (e.g. Salix caprea, 60-120cm height) will be planted, along the western and northern boundary of the ecological enhancement area. To be planted at 1m centres (370m in total = 370 plants).

Native Hedge Planting: Two rows to be planted at 40cm centres with rows 40cm apart (i.e. 2.5 plants/m; approx. 1,750m in total = 4,375 plants; Phase 1: 1,250 plants; Phase 2: 1,725 plants; Phase 3: 1,400 plants). Transplants to be planted randomly with no more than 3 plants of the same species in one group. Feathered Transplants to be planted approximately every 8m, to be single staked and to be maintained as hedgerow trees.

Planting: All plants to be protected with spiral guards or alternatively with rabbit proof fencing. All plant handling, planting and establishment works will be carried out in accordance with current best practice and will take place in the appropriate planting season (e.g. bareroot planting: November to March only) and in favourable weather conditions. The planting will be carried out by a suitably qualified landscape contractor.

Aftercare: Establishment maintenance will be carried out for 2 years following the planting works (minimum 3 maintenance visits per year; i.e. spring, summer and autumn). This will include weed control, replacement planting where required and the adjustment/removal of tree ties and spiral guards.

NOTES

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- LEGEND**
- PLANNING APPLICATION AREA
 - EXISTING HEDGEROWS TO BE RETAINED
 - SETTLEMENT LAGOONS TO BE LEFT FOR CONTINUED NATURAL REGENERATION
 - ECOLOGICAL ENHANCEMENT AREA (REFER TO EIAR CHAPTER 5 FOR FURTHER DETAILS)
 - AREAS TO BE RESTORED TO AGRICULTURAL LAND (AS SOON AS SUITABLY LARGE SECTIONS BECOME AVAILABLE)
 - FIELD PONDS (TO BE INSTALLED AS PART OF FINAL RESTORATION, CLAY LINED, APPROX. 5M DIAMETER, WITH SHALLOW MARGINS AND UP TO 1.5M DEEP AT THE CENTRE)
 - PHASE 1 WILLOW PLANTING (TO BE PLANTED ON COMMENCEMENT OF THE DEVELOPMENT TO PROTECT THE NORTHERN AND WESTERN BOUNDARY OF THE ECOLOGICAL ENHANCEMENT AREA)
 - PHASE 1 NATIVE HEDGE PLANTING (TO BE PLANTED ON COMMENCEMENT OF THE DEVELOPMENT AT THE SITE ENTRANCE AND TO PROTECT THE SOUTHERN BOUNDARY OF THE ECOLOGICAL ENHANCEMENT AREA)
 - PHASE 2 NATIVE HEDGE PLANTING (TO BE PLANTED AS SOON AS THE FILLING OF THE WESTERN/ELEVATED PART OF THE SITE IS COMPLETED)
 - PHASE 3 NATIVE HEDGE PLANTING (TO BE PLANTED ON COMPLETION OF ALL FILLING WORKS)

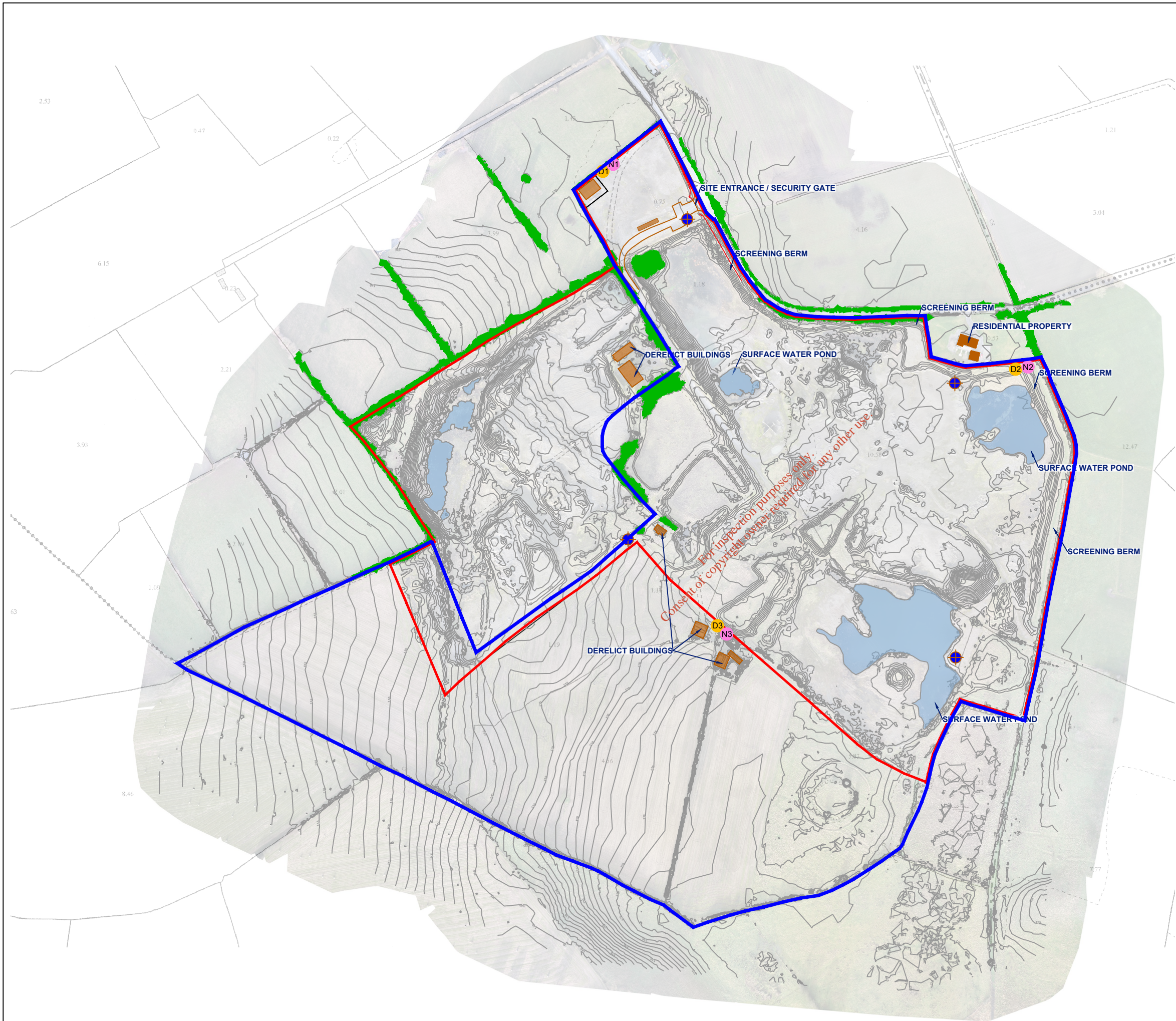
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FINAL RESTORATION SURFACE

FIGURE NTS 6

Scale: 1:2,500 @ A3 Date: JULY 2019

00507.00001.USK SRF.EIAR-Fig 2-5.Final Restoration Surface.dwg



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LEGEND

| | |
|--|----------------------------------------------|
| | LAND INTEREST BOUNDARY |
| | PLANNING APPLICATION AREA (c. 26.6 Hectares) |
| | DUST MONITORING LOCATION |
| | NOISE MONITORING LOCATION |
| | GROUNDWATER MONITORING WELL LOCATION |
| | VEGETATION |
| | EXISTING SURFACE WATER PONDS |
| | BUILDINGS |

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ENVIRONMENTAL MONITORING LOCATIONS
Figure NTS 8

| | |
|-----------------------|-------------------|
| Scale 1:4,000 @ A3 | Date JULY 2019 |
|-----------------------|-------------------|

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