

**HUNTSTOWN QUARRY, NORTH ROAD,
FINGLAS, DUBLIN 11**

**INCREASE IN INTAKE AND RECOVERY RATE AT
EXISTING C&D WASTE RECOVERY FACILITY AND
RELOCATION OF ACTIVITY TO NEW LOCATION**

**ENVIRONMENTAL IMPACT STATEMENT
NON-TECHNICAL SUMMARY**

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1.0 INTRODUCTION

The Application

- 1.1 This Non-Technical Summary provides supporting information to accompany a planning application to Fingal County Council by Roadstone Limited in respect of a proposed increase in the permitted intake of construction and demolition waste at the existing waste recovery facility at the Huntstown Quarry Complex at North Road, Finglas, Dublin 11, from a maximum of 24,950 tonnes per annum at the present time to 95,000 tonnes per annum in future years.
- 1.2 No further C&D waste will be imported to the existing waste recovery facility, located on a 1.9 hectare site in the Central Quarry. The planning application provides for processing and off-site dispatch of C&D waste stockpiled at the existing facility in the near-term (2-3 years), following publication of End of Waste criteria for recycled aggregate. It also provides for
 - (i) relocation of C&D waste recovery activities to a dedicated new long-term recovery facility on a 5.2 hectare site in the north-eastern corner of the Huntstown Quarry Complex and
 - (ii) construction of a hardstanding area, waste processing shed, surface water management infrastructure and upgraded internal access road at the new waste recovery facility.
- 1.3 The application site extends to 8.3 hectares (20.0 acres) and comprises two distinct areas within the Quarry Complex, the established recovery facility at the Central Quarry and the proposed replacement facility in the north-eastern corner. The application site is indicated on an extract from the 1:50,000 scale Ordnance Survey Discovery series map in Figure NTS-1.

Need for the Development

- 1.4 It is considered that over the medium to long-term, the existing restriction on C&D waste intake at the facility to 24,950 tonnes per annum is likely to be overly restrictive, particularly in light of a significant upswing in the level of construction activity across the Greater Dublin Area since 2014.
- 1.5 National news media, construction trade literature and/or professional journals have published articles in recent months identifying a looming shortage of C&D waste recovery capacity in the Greater Dublin area. These reports are consistent with, and corroborated by, a high level of trade enquiries about availability of recycling capacity and/or strong anecdotal evidence reported by Roadstone staff over the past 12 months.
- 1.6 Traditionally, a significant proportion of C&D waste was recovered by using it as daily cover at municipal landfill sites. Aside from the increased level of construction activity in recent years, part of the increase in demand for C&D waste recycling capacity is due to closure of several municipal landfill facilities in the Greater Dublin Area, coupled with a reduction in the volume of municipal waste intake to any facilities which remain active. Both of these measures have largely been necessitated by the compliance requirements of the EU Landfill Directive (1999/31/EC).
- 1.7 Separate to the recovery capacity / demand aspects, Roadstone has recently undertaken a review of its development plan for Huntstown and its associated rock and aggregate resource requirements. In light of this review, the company has determined that the planned future development of the Central Quarry will

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need to be brought forward at a much earlier stage than it had envisaged heretofore. At the present time, projections are that rock extraction from the Central Quarry will commence in the next number of years. Accordingly, the company has concluded that the existing C&D waste recovery activity at the Central Quarry will need to be wound down and the facility relocated to another location within its Huntstown landholding.

Site Location

- 1.8 The site to which the application relates straddles the townlands of Huntstown, Kilshane and Johnstown in County Dublin, approximately 2.5km north-west of the Dublin suburb of Finglas and 2km north-west of the interchange between the N2 Dual Carriageway and the M50 Motorway. The plan extent of the land owned by Roadstone Ltd. is outlined in blue on a 1:500 scale map of the area, reproduced as Figure NTS-2. The plan extent of the application site is also outlined in red on the same figure.

Site Description

- 1.9 The application area covers a total area of approximately 8.3 hectares (20.0 acres) and includes
- the existing permitted recovery facility on a 1.9 hectare (4.6 acre) site within the Central Quarry (as per permission Ref. F02A/0602) and
 - a new dedicated long-term C&D waste recovery facility located on a 5.2 hectare (12.5 acre) largely undeveloped greenfield site in the north-eastern corner of the Huntstown Quarry Complex. The site is currently used for seasonal grazing by horses.
- 1.10 The existing C&D waste recovery facility uses established site infrastructure (offices, sheds, wheelwash, weighbridges, settlement ponds, internal haul roads etc.), much of which is shared with aggregate, concrete and asphalt production and/or soil waste recovery businesses co-located at the Huntstown Quarry Complex.
- 1.11 The proposed new facility will include new site drainage infrastructure, an extensive hardstanding area for stockpiling of imported C&D wastes and recycled (secondary) aggregate and upgraded internal access road at the new facility and a new waste recovery shed, open on two sides, for processing (crushing) of C&D wastes.

Site Access

- 1.12 Traffic access to the application site is primarily obtained via the existing North Road (the former N2 National Primary Road). Traffic coming from Dublin City Centre or the M50 Motorway turns onto the N2 Dual Carriageway and travels a short distance north, before turning (west) off a dedicated slip road onto the R135 regional Road (known as the 'North Road') at Coldwinters. Thereafter traffic continues south for a short distance along the North Road before turning right (west) via a dedicated right-turn junction onto the access road leading into the Huntstown Quarry Complex.
- 1.13 As well as serving Roadstone's quarries and related businesses, the access road also serves the Huntstown Power generating plant operated by Viridian and the proposed anaerobic digestion plant which has yet to be built by Stream BioEnergy (approved under Permission Ref. FW13A/0089).

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- 1.14 Traffic travelling south from Ashbourne exits the N2 Dual Carriageway at the Cherryhound Interchange near The Ward and continues south along the North Road, through Kilshane Cross, to the right-turn junction with the access road leading into the Huntstown Quarry Complex.

Surrounding Land Use

- 1.15 The application site is located entirely within the existing quarry complex at Huntstown. The land immediately beyond the existing Central Quarry comprises a block making facility to the north, an internal haul road and degraded grassland areas to the east and south, and a major internal access road (running north-south) and nature reserve area to the west.
- 1.16 At the planned re-located facility, the lands immediately to the west comprise the existing soil waste recovery facility and tracts of previously backfilled and restored land. Neighbouring lands immediately to the north and east predominantly comprise grassland in agricultural use. The lands immediately to the south which are within Roadstone's landholding comprise a training gallops and stabling area for horses.
- 1.17 At a greater distance, the Huntstown Power station (operated by Viridian), North Road and recently constructed N2 Dual Carriageway all lie to the east of the application site. The M50 motorway and the proposed alignment for the Metro West light rail line both lie to the south, while there is additional light industrial and commercial development on lands further to the south west. The lands to the north are still used predominantly as agricultural grassland. Existing land-use in the vicinity of the application site, including residential and industrial development, is shown on a land-use map in Figure NTS-2.

Planning and Licensing Status

- 1.18 The existing construction and demolition waste recovery facility at the Central Quarry in Huntstown was established in 2004 on foot of planning permission Ref. F02A/0602. The principal construction and demolition wastes recovered at the facility comprise concrete (ready-mixed, blocks, slabs, reinforced), bricks and bituminous mixtures (principally hardened returns).
- 1.19 A waste permit in respect of C&D recovery activity at the Central Quarry was first issued by Fingal County Council in 2002, in accordance with the requirements of the Waste Management (Permit) Regulations of 1998 which were in force at that time. The waste permit was subsequently renewed by the Council on two separate occasions. On the first occasion, in 2006, it was renewed for a three year period in accordance with the 1998 Regulations (Ref. No. WPT 108), while on the second occasion, in 2010, it was renewed for a five year period in accordance with the Waste Management (Facility Permit and Registration) Regulations of 2007 (Ref. No. FG-WFP-09-0006-01).
- 1.20 At the present time, waste processing / production of recycled aggregates is suspended at the recovery facility at Huntstown at the request of Fingal County Council, principally due to the absence of End-of-Waste criteria for recycled aggregates produced from construction and demolition waste. It is understood that the EPA will publish relevant End-of-Waste criteria for this waste stream in the course of 2017, and that processing / production activities and export of recycled aggregate off-site can resume shortly thereafter.
- 1.21 A waste licence issued by the Environmental Protection Agency (EPA) in February 2015 (Ref. No. W0277-01) provided for the establishment and

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operation of an inert soil waste recovery facility at the nearby North Quarry at Huntstown in order to facilitate backfilling and restoration (in accordance with planning permission FW12A/0022). Although the permitted inert soil intake to this facility was initially limited to a maximum of 750,000 tonnes per annum, planning permission has recently been secured for an increase in the soil waste intake to 1,500,000 tonnes per annum (Planning Permission Ref. FW16A/0120). A waste licence review application for the proposed increase in waste intake is currently under consideration by the EPA.

- 1.22 The Third Schedule of the Waste Management (Facility Permit and Registration) Regulations of 2007 (S.I. No. 821 of 2007, as amended) prohibits operation by the same corporate entity of a waste facility under a Local Authority waste permit immediately adjacent to another facility licensed by the EPA.
- 1.23 As the existing (permitted) C&D facility at the Central Quarry is contiguous to the (licenced) soil recovery facility at the North Quarry, it was necessary to suspend C&D waste recovery activities once soil recovery activity commenced at the adjoining site in Huntstown in October 2015.
- 1.24 In any event the scale of the proposed increase in C&D waste recovery activity at the Huntstown facility is such that it requires a waste licence by the EPA.
- 1.25 In light of the above, there will be no further waste intake to, or output from, the existing C&D facility at the Central Quarry until such time as
 - (a) an EPA waste licence review has been completed, the C&D waste recovery facility has been incorporated into the licensed area and C&D waste recovery activities have been included amongst the scope of activities regulated by way of waste licence; and
 - (b) the EPA has published and adopted End of Waste criteria for recycled aggregates produced from construction and demolition waste.

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2.0 PROPOSED DEVELOPMENT

- 2.1 At the present time, there are extensive stockpiles of C&D waste awaiting processing and some recycled (processed) aggregate within the void at the Central Quarry, partly as a result of relatively low demand for recycled aggregate during the construction downturn after 2008 and more recently because of legislative restrictions and the absence of any nationally recognised End of Waste criteria for recycled aggregates produced from C&D materials. Waste recovery activities at the facility are suspended until such time as it is possible to operate it in compliance with waste regulations.
- 2.2 It is estimated that there is approximately 55,000m³ (110,000 tonnes) of unprocessed C&D waste held at the existing recovery facility. The current restriction on the amount of C&D waste which may be recovered annually means that it could take over 4 years to process / recover existing stockpiled waste.
- 2.3 The existing waste recovery limit is considered to be insufficient to accommodate the recent (and ongoing) increase in the volume of construction and demolition related activity in the Greater Dublin Area.
- 2.4 Separately, as resource constraints elsewhere around the Huntstown Quarry Complex have brought forward planned future development at the Central Quarry, there will be little or no C&D recovery activity at the existing facility beyond the immediate near-term (2-3 years) and there is therefore a requirement to re-locate the activity elsewhere within Roadstone's landholding.
- 2.5 The plan extent of the application site and the existing site infrastructure layout is shown in Figure NTS-2. The existing layout of the existing recovery area at the Central Quarry is shown in Figure NTS-3, while that of the replacement facility located to the north-east of the Huntstown Quarry complex is shown in Figure NTS-4. Details of the proposed landscaping works and restoration plan at the relocated facility are indicated in Figure NTS-5.
- 2.6 Full details of existing waste facility infrastructure, waste operations and procedures and arrangements for environmental controls and monitoring are provided in the main body of the Environmental Impact Statement. Brief details are outlined below in order to provide a basic understanding of the impact assessment undertaken in respect of the planned intensification and relocation of C&D waste recovery activities at Huntstown.

Site Infrastructure

- 2.7 Much of the site infrastructure for the existing and planned replacement C&D waste recovery facility is / will be shared with the adjoining aggregate, concrete and asphalt production facilities and/or soil recovery facility. It includes site offices, staff welfare facilities (canteen and changing areas, washing and sanitary facilities), site security, site roads (both paved and unpaved), traffic control signs, parking and hardstanding areas, wheelwash, weighbridge, fuel storage tanks, a waste inspection and quarantine shed, sewerage and surface water drainage infrastructure (including settlement ponds and hydrocarbon treatment infrastructure), plant maintenance sheds and all required site services and utilities.
- 2.8 It is proposed to construct a large roofed portal frame structure, open on two sides at the future site of the C&D recovery facility in the north-eastern corner of

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the Huntstown landholding. All future C&D waste processing, crushing and recovery will take place within this structure in order to reduce noise and fugitive dust emissions.

C&D Waste Recovery Infrastructure

- 2.9 Construction and demolition waste at the Huntstown facility is recycled by passing it through mobile crushing / screening plant which is brought to the facility periodically, once sufficient quantities of recyclable material has accumulated in stockpiles. Recovery activities produce a particulate, granular aggregate conforming to standard industry specifications which can be readily used to construct hardstanding areas or unpaved access roads on construction and development sites, on agricultural holdings, forest roads etc.
- 2.10 At the present time, all C&D waste recovery activity at the Central Quarry takes place in the open air, on the quarry floor. This will continue in the short term, albeit at an intensified rate, pending relocation of the facility to the north-east of the Huntstown Quarry Complex.
- 2.11 When recovery operations are established at the new facility, crushing plant will be placed on a hardstand surface within the proposed open-sided waste recovery shed. During recycling campaigns, C&D wastes will be transferred from external stockpiles to the mobile crusher within the covered shed. Once crushed and processed, the recycled material (secondary aggregates) will be moved out of the shed to external stockpiles pending testing, sale and export off site.
- 2.12 Given the synergies between C&D waste recycling activity and rock extraction / aggregate production activities, quarry infilling and restoration and the recovery of inert C&D waste, it is expected that recycling activity will continue as long as rock extraction, related production activities and/or backfilling and restoration activities continue across the Roadstone landholding. At the present time, it is expected that some or all of these activities will continue for the next 15 to 20 years.

Surface Water Drainage

- 2.13 Rain falling across the existing C&D waste recovery facility at the Central Quarry either
- runs over unsealed ground into the existing quarry void, to a small pond in the north-eastern corner of the quarry floor or
 - percolates down through the existing soil / rock at the ground surface as recharge to groundwater, at which point it joins groundwater flow through the ground.
- 2.14 Surface water run-off and any dewatered groundwater at the Central Quarry collect in a pond on the quarry floor, from where it is pumped up to the ground surface to the existing water treatment infrastructure (settlement ponds) located on the eastern side of the central infrastructure area.
- 2.15 Thereafter, the run-off is passed through an existing hydrocarbon interceptor and discharged to the Ballystrahan Stream (under local authority licence) and from there, to the Ward River which flows further to the north.
- 2.16 At the present time, rain falling over the proposed replacement facility, at the north-eastern corner of the Roadstone landholding generally

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- percolates down through soil at the ground surface and recharges to the underlying groundwater table or
 - runs south and west over the existing ground surface to a minor (seasonal) pond in the south-western corner.
- 2.17 It is envisaged that when the long-term recovery facility is in place, rainfall will continue to percolate through a layer of permeable hardstanding (crushed rock) placed over the mineral subsoil and down to the underlying groundwater table, as it does at present. It is envisaged that any surface water run-off which does arise will fall over the built-up / regraded ground surface toward an open collector channel running in a verge on the eastern side of the unpaved access road leading to the facility (and along the western side of the recovery facility).
- 2.18 Any surface water run-off will collect in an enlarged pond in the south-western corner of the facility, from whence it will be pumped across the licenced facility to the existing pond on the floor of the North Quarry and from there via existing piped infrastructure and intermediate ponds to the polishing pond (reed-bed) and hydrocarbon interceptor / grit trap before being discharged to the Ballystrahan Stream. This discharge will be regulated by way of a reviewed Waste Licence issued by the EPA.
- 2.19 Rain falling over the proposed waste recovery shed will be collected by gutters along the eaves and flow to downpipes along the side of the structure. It will then flow via a network of buried stormwater drainage pipes around the shed to an open grassed channel (swale) running north-south along the eastern boundary of the application site. Thereafter the roof run-off will discharge to the channel of a former natural stream which runs east toward the Ballystrahan Stream (as indicated in Figure NTS-4).
- 2.20 As roof-run-off from the proposed shed will be uncontaminated, there is no requirement to provide any treatment prior to its discharge off-site. Flood attenuation for roof run-off will be provided by fitting a flow control device / hydrobrake at the downstream end of the swale (and immediately upstream of the channel leading to the Ballystrahan Stream) in order to limit the maximum stormwater run-off to the existing greenfield rate.

Site Preparation Works

- 2.21 Little or no site development works will be required for the existing recovery area at the Central Quarry other than to ensure that all surface water run-off is directed toward the quarry void and the pond / sump at the quarry floor.
- 2.22 At the proposed replacement facility on greenfield lands in the north-eastern corner of the quarry complex, soil cover will be stripped and used to infill a gap in the existing perimeter screening berm along the boundary and to raise the existing berm height. Some semi-mature deciduous trees which are currently growing along the eastern boundary will be transplanted along the northern slope / crest of the perimeter berm in order to soften the visual impact of the recovery facility and enhance the screening provided to it from distant viewing points to the north-east.
- 2.23 Following site stripping, crushed rock will be placed over the exposed mineral subsoil and/or weathered bedrock and compacted to form a hardstanding, typically 300mm to 500mm deep. It is anticipated that final formation levels across the proposed replacement recovery facility, at the top of the hardstanding surface, will be close to the existing average ground level, around 78mOD. It is not proposed to seal / concrete any of the proposed hardstand

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area in order to facilitate continued diffuse input of surface water / rainfall into the underlying ground. The upper surface of the hardstanding will be graded so as to fall very gradually toward an open grassed channel running along the western boundary of the facility.

Waste Operations and Procedures

- 2.24 There are operating procedures in place at the existing recovery facility to ensure that all C&D waste forwarded for recovery / processing are pre-sorted at source, are inert and free of any non-hazardous / hazardous domestic, commercial or industrial wastes.
- 2.25 Site procedures have also been developed and implemented at the recovery facility in respect of waste acceptance (or rejection), waste inspection, waste handling and waste testing. These procedures will continue in place and be extended accommodate the increased intake / processing of C&D waste in future years.
- 2.26 There are also extensive environmental control procedures and environmental monitoring arrangements in place around the recovery facility and the wider quarry complex at Huntstown to ensure any noise, dust or water emissions are within permitted limits. Records of environmental monitoring and testing are maintained on-site and will be forwarded to the EPA / Fingal County Council as required. Locations of existing / proposed monitoring locations are indicated on Figure NTS-6.

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3.0 HUMAN BEINGS

- 3.1 Quarrying activities have been established across Roadstone's landholding at Huntstown for over 45 years. The nature of any impacts on human beings arising from the proposed intensification in C&D waste recovery activities will be similar to those arising from the ongoing quarry, concrete / asphalt production and soil waste recovery operations.
- 3.2 Noise or dust emissions will have negligible impact on much of the local residential housing surrounding the application site. Existing or planned perimeter screening berms, enclosure of future waste crushing and screening activities in a dedicated recovery shed and the separation distance between dust and noise sources and sensitive receptors all provide significant attenuation of any additional dust and noise emissions likely to be generated by the increase in, and relocation of, C&D waste recovery activity.
- 3.3 Notwithstanding this, established mitigation measures will continue to be implemented in order to minimise / ameliorate the effects of noise or dust emissions from the existing / planned recovery facilities.
- 3.4 An assessment of traffic impacts along the R135 Regional Road (North Road) and across the local road network arising from the increased intake of C&D waste to the existing / re-located recovery facility and the resultant increase in HGV traffic movements, indicates that there will be no significant adverse effect on traffic safety or on the capacity of existing roads and junctions in the local area, either on its own or in combination with other planned development in the local area.
- 3.5 Given established land uses and existing traffic levels along the R135 North Road and N2 Dual Carriageway immediately to the east, it is considered that the increased traffic movements generated by the proposed development will not result in any significant adverse residual effects on the residential amenity of properties along the designated access and egress routes to the facility.
- 3.6 The proposed relocation of the existing C&D waste recovery facility in the near-term will facilitate permitted extraction of aggregates at the Central Quarry and sustain continued economic activity and employment at the quarry. In the longer-term, the completion of aggregate extraction and the ultimate restoration of the Central Quarry by backfilling to original ground level (in line with planning permission) will result in long-term benefits to the landscape and a reduction in the visual impacts of quarry voids.

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4.0 FLORA AND FAUNA

- 4.1 There are no designated or proposed Special Areas of Conservation (SACs) or Special Protection Areas (SPAs) within or contiguous to the application site, existing waste recovery facility or Roadstone's wider landholding at Huntstown.
- 4.2 No designated sites will be directly or indirectly impacted by the proposed increase in the rate of C&D waste recovery at the existing facility in the Central Quarry or the relocated facility to the north-eastern corner of the quarry complex.
- 4.3 The proposed increase in the C&D waste intake rate to the existing C&D waste recovery facility at the Central Quarry will not have any effects on any important ecological habitats.
- 4.4 Provided appropriate mitigation measures are implemented for the protection of breeding birds, there will be no effects on, or legal implications for, any protected species.
- 4.5 Dry calcareous grassland, a habitat considered to be important at the local (county) scale, occurs in the vicinity of the application site, to the east of the Central Quarry. The proposed increase in C&D waste processing and the planned relocation of the recovery facility within the quarry complex will not result in the direct or indirect loss, damage or fragmentation to this habitat, nor is it predicted to generate dust at emission levels where there would be any measureable impact on the species composition and structure within it.
- 4.6 Upon the cessation of quarrying operations, at the Central Quarry, any remaining stockpiles of unprocessed C&D waste will be processed and gradually sold / exported off-site as recycled secondary aggregate. No formal restoration works will be undertaken given the planned and consented commencement of further quarry development at this location in the near future.
- 4.7 On cessation of C&D waste recovery activity at the proposed new relocated facility, any remaining stockpiles of unprocessed C&D waste will be processed and in a similar way, will be gradually sold as recycled secondary aggregate. All infrastructure associated with the facility will be removed and it is envisaged that the site will then be restored back to agricultural grassland.

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5.0 SOILS AND GEOLOGY

- 5.1 Topsoil (the upper layer of soil capable of sustaining vegetation and crop growth) was previously stripped from the area around the Central Quarry in order to facilitate its development and is currently stockpiled (with subsoil) in mounds across and around the application site.
- 5.2 The site of the relocated recovery facility in the north-eastern corner is one of the few relatively undisturbed areas within the quarry complex. Available soil mapping indicates that this area is underlain by thin stony soils comprised principally of partially weathered (limestone) rock fragments, which in turn suggests rock occurs at or close to the ground surface.
- 5.3 Soils in the vicinity of the Huntstown quarry complex are generally well-drained calcareous soils (derived from limestone) which are suitable for a wide range of agricultural activity, generally grassland or tillage. There are also some poorly drained calcareous soils which have more restricted uses, principally as seasonal grassland.
- 5.4 The Huntstown Quarry complex straddles a number of geological formations. It is underlain by the limestones of the Malahide Formation in the southern part, with the Waulsortian Limestones of the Feltrim Limestone Formation and the calcareous mudstones and argillaceous limestones of the Tober Colleen Formation occurring around the Central Quarry area. There is a faulted contact running broadly west-east, which means that the northern part of the complex is also underlain by limestones of the Malahide Formation.
- 5.5 Consultations held previously with the Geological Survey of Ireland (GSI) to established that the geological contact between the Waulsortian Limestones of the Feltrim Limestone Formation and the Tober Colleen Formation exposed in the roadway leading into the Central Quarry at Huntstown has been designated as a Geological Heritage Site as part of Theme 8 of the Irish Geological Heritage (IGH) Programme (Lower Carboniferous).
- 5.6 In time, the existing exposure could be designated as a Natural Heritage Area (NHA) on geological and geomorphological grounds under the Wildlife (Amendment) Act of 2000. The proposed increase in waste intake to the existing C&D waste recovery facility at the Central Quarry will however have no impact on the exposure.
- 5.7 Any increase in the rate of importation of C&D waste will introduce a higher risk of potential contamination of underlying soil and bedrock at both the existing and planned re-located recovery facility, principally through the inadvertent importation of contaminated materials or accidental spills / leaks of fuel or oil.
- 5.8 Assuming the continued implementation of best practice management procedures in operating the existing recovery facility and their extension to the re-located facility, and the provision of any additional plant and human resources required to achieve this, the potential risk of contamination from imported material is considered to be low.
- 5.9 In order to reduce the risk of localised erosion and potential dust emissions during the establishment phase for the replacement facility, the area of bare or newly exposed subsoils will be kept to a minimum and hardstanding materials will be placed over the exposed subsoil as soon as possible after soil stripping. Any new, re-profiled or extended soil stockpiles or raised screening berms will also be immediately vegetated or grassed to minimise erosion.

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6.0 WATER

- 6.1 The bedrock formations underlying the application site and the wider Huntstown Quarry complex are generally considered to be Locally Important (LI) karstified aquifers. Maps published by the EPA indicate that the application site is located in an area with high to extreme groundwater vulnerability status. This reflects the potential for rapid groundwater movement through thin (or non-existent) soil cover into the underlying (poor) bedrock aquifer.
- 6.2 Previous sampling and testing of groundwater from monitoring wells across the Huntstown Quarry complex indicates that groundwater quality around the application site is generally good and that established activities (including C&D recovery operations) have no significant impact on local groundwater quality.
- 6.3 Published mapping indicates that the Huntstown quarry complex straddles two river catchments, that of the Ward River to the north and the Tolka River to the south. In reality, land drainage works and surface water managements systems at Huntstown will have slightly altered the boundary between the Ward and Tolka catchments and all lands within the application site lie within the Ward catchment, with off-site discharges from both the Central Quarry and the relocated facility directed to the Ballystrahan Stream which flows north from the top of its catchment (at the north-east boundary of the quarry complex) to the Ward River.
- 6.4 The Ward River and its tributary the Ballystrahan stream are currently classified as being of 'Poor' status as a result of urban wastewater discharges and siltation by agriculture. Off-site discharges from the established C&D waste recovery activities at the Central Quarry and from the wider quarry complex are currently regulated by way of a discharge licence from Fingal County Council (Ref. No WPW/F/008-01). Discharge compliance is generally good, although there are occasional exceedences of water quality emission thresholds.
- 6.5 If permission is obtained for intensification of C&D waste recovery activities and the corresponding EPA waste licence review application is successful, future discharges from both the existing and relocated recovery facility will be regulated in future by way of a reviewed EPA waste licence (Ref. W0277-01).
- 6.6 Potential impacts of increasing the rate of C&D waste recovery and relocating the facility within the quarry complex have been assessed and it is considered that, in the absence of mitigation measures, the proposed development could have the potential to negatively impact groundwater and surface water quality, specifically by increasing the risk of
- contaminated C&D material being handled / stockpiled at the site
 - fuel or chemical spillages occurring or
 - discharges to the Ballystrahan Stream (or Ward River catchment) having high levels of suspended solids or contaminants.
- 6.7 It is therefore proposed that, as part of the proposed development, a wide range of surface water management and best practice mitigation measures, together with a number of additional measures, will be implemented during the C&D waste recovery activities in order to protect groundwater quality. These measures include implementation of site management protocols in respect of plant refuelling and maintenance activities and detailed C&D waste acceptance and handling procedures.

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- 6.8 Surface water runoff from the access road, recovery facilities and hardstanding areas will be collected in sumps / ponds at low points and pumped intermittently as required to the existing network of settlement / holding ponds across the quarry complex in order to treat it and reduce levels of suspended solids. All surface water within these settlement ponds will be further treated by passing it through an existing polishing pond (reed-bed) and hydrocarbon interceptor / grit trap before discharging it to the Ballystrahan Stream.
- 6.9 Stormwater runoff from the roof of the proposed recovery shed at the relocated recovery facility will be collected separately and discharged directly to the Ballystrahan Stream without treatment (as it will not be mixed or contaminated with other run-off). Provision will be made for on-site storage (attenuation) of excess stormwater run-off in open channels (swales) during intense rainfall events in order to minimise any increase in downstream flooding potential.
- 6.10 Established surface water and groundwater monitoring regimes will remain in place for the duration of the C&D waste recovery activities at the existing and/or relocated facility.

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7.0 AIR QUALITY

- 7.1 The principal air quality impact associated with the planned intensification and relocation of inert C&D waste recovery activities at the existing / relocated facility will be an increased risk of fugitive dust emissions. Additional emissions are likely to arise during dry periods from
- (i) increased trafficking by HGVs over unpaved surfaces;
 - (ii) increased end-tipping of inert C&D waste; and
 - (iii) increased handling and processing (crushing/screening) of C&D waste.
- 7.2 The principal factor which will reduce and mitigate dust emissions from recovery activities at the existing C&D recovery facility at the Central Quarry will be the continuation of processing / crushing of inert wastes within the existing quarry void, below surrounding ground level, with quarry faces effectively inhibiting and/or limiting emission of fugitive dust off-site.
- 7.3 The principal factors which will reduce and mitigate emissions from recovery activities at the proposed new / relocated C&D facility will be the retention and slight raising of screening berms to the north of the site, processing / crushing of inert C&D wastes within a covered structure / shed and the retention of the existing stand-off semi-mature trees to the east of the proposed site, all effectively limiting the emission of fugitive dust off-site.
- 7.4 In order to further control potential dust rise and dust emissions, there will be continued implementation (and intensification) of existing mitigation measures being implemented at the facility principally
- (i) spraying of water from a tractor drawn bowser on unpaved haul roads and/or stockpiled C&D waste / recycled aggregate as required, particularly during windy periods and/or dry spells;
 - (ii) routing all HGVs leaving site through the 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;
 - (iii) minimising drop heights when unloading / handling materials in windy conditions in external areas;
 - (iv) restricting vehicle speeds through signage and staff training;
- 7.5 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.
- 7.6 A detailed air quality assessment undertaken in respect of the proposed development concluded that, with the range of design measures incorporated into the working scheme and assuming continued implementation of mitigation measures, it will not have a dust deposition impact on assessed sensitive receptors located around the Huntstown quarry complex.
- 7.7 Notwithstanding this, dust emissions levels will continue to be monitored at the waste recovery facility and across the wider Huntstown quarry complex. Dust emissions are ultimately to be controlled by way of existing / future planning permissions and by a future review of the existing EPA waste licence.

NON-TECHNICAL SUMMARY

8.0 NOISE

- 8.1 Noise monitoring in and around the application site and Huntstown Quarry complex indicates that noise levels are elevated and that average ambient noise levels in the local area typically range between 60dBA L_{Aeq} and 75dBA L_{Aeq} , depending on location and proximity to the N2 Dual Carriageway or M50 motorway or the frequency of overhead aircraft movements along the flight path leading in and out of Dublin Airport. These noise levels are consistent with daytime levels in busy urban areas close to heavily trafficked roads.
- 8.2 Noise prediction assessments indicate that there will be minimal, if any, increase in noise levels arising at nearby residences under a worst case scenario when a crushing / screening plant and a front end loader are operating simultaneously 100% of the time at the boundary of the application site (rather than intermittently and some distance inside it, as will most likely be the case in reality).
- 8.3 The resultant predicted (maximum) future noise levels at nearby sensitive receptors are comparable to, and only slightly elevated above, existing ambient levels, making it highly unlikely that any adverse noise impacts will be noticed or experienced by nearby residents. It is therefore considered that mitigation measures to reduce the noise impacts of plant associated with the planned recovery facility are not strictly necessary.
- 8.4 Notwithstanding this, a number of measures will continue to be implemented at both the existing and planned relocated C&D waste recovery facility to further mitigate any potential noise impacts. These include retention / build-up of existing perimeter screening berms, maintenance of plant, fitting of plant silencers, maintenance of road surfaces, control of traffic speed and management of loading / unloading activities within the recovery facility.

NON-TECHNICAL SUMMARY

9.0 LANDSCAPE AND VISUAL IMPACT

- 9.1 The existing inert C&D waste recovery facility at Huntstown Quarry is located on the urban fringe of a large city. The current Fingal County Development Plan (CDP) designates the entire application site as part of a rural zoned area. The proposed development is considered to be in compliance with the stated zoning objectives for this land-use designation.
- 9.2 The entire application site is also designated as a Nature Development Area, i.e. an area with potential for biodiversity enhancement in the CDP. However, notwithstanding this, there are a number of existing permissions in place for ongoing and future extractive and soil / C&D waste recovery activity across the entire quarry complex (Planning Refs. FW02A/0602 and FW12-0022 (and An Bord Pleanála (ABP) Ref. 241693).
- 9.3 No views requiring protection are identified in the vicinity of Huntstown Quarry on the Green Infrastructure Map published in the current (and draft replacement) CDP.
- 9.4 An assessment of landscape impact determined that the sensitivity of the low-lying landscape character surrounding the quarry complex at Huntstown is low and that the proposed increase in permitted C&D waste intake and the relocation of the recovery facility will not increase the magnitude of those landscape effects that are already established and/or permitted.
- 9.5 It was therefore concluded that only a minor additional landscape impact, over and above that which is already extant, will arise as a result of the planned intensification and/or relocation of C&D waste recovery activities at Huntstown.
- 9.6 There will be a minor visual impact on a very limited number of views from the M2 / North Road, due to the partial visibility of the proposed waste recovery shed and waste stockpiles, as well as associated HGV movements within the quarry landholding. However, there will be no visual impacts on the vast majority of views within the study area.
- 9.7 The proposed restoration of the application site will ensure that it is returned to a beneficial agricultural afteruse. This as well as the retention of all boundary hedgerows will help mitigate the overall landscape impacts.

NON-TECHNICAL SUMMARY

10.0 CULTURAL HERITAGE

- 10.1 A cultural heritage study in respect of the waste recovery facility at Huntstown Quarry comprising a paper study and fieldwork was carried out in June 2016. A wide variety of paper, cartographic, photographic and archival sources was consulted. All the lands impacted by the proposed development were visually inspected.
- 10.2 The current Fingal County Development Plan shows a protected structure, a holy well, within Roadstone's landholding, to the north-west of the application site (Ref. No 663). In reality, this is a natural spring, located immediately inside the application site. This structure was removed from the register of protected structures in the Fingal County Development Plan by Fingal County Council in September 2016.
- 10.3 Records held by the National Monuments Service of the Department of Environment, Heritage and Local Government indicate that there are a number of national monuments within and in the immediate vicinity of Roadstone's landholding. Beyond the north-western end of the application site, the ruins of Kilshane Church, a graveyard and holy well (Ref. DU014-012) are identified as part of an extended archaeological site. There are no visible remains of these monuments remaining in situ. The proposed development will have no impact on these ruins.
- 10.4 As much of the application area around the Central Quarry has previously been disturbed by quarry activity, the continuation / intensification of recovery activities at this location will have no direct impact or indirect impact on any known archaeological, architectural or cultural heritage feature or item on cultural heritage.
- 10.5 The site of the relocated C&D waste recovery facility is a relatively flat field of pasture enclosed by a bank with hedgerow, trees and wire fencing. The northern part of the field has been soil-stripped and the soil stored in a now grass-covered heap in the north-east part of the field. There is no indication of any cultural heritage material at the site and the proposed development will have no direct impact or indirect impact on cultural heritage.
- 10.6 Notwithstanding this, any ground disturbance taking place in the unstripped area at the relocated facility will be archaeologically monitored.

NON-TECHNICAL SUMMARY

11.0 MATERIAL ASSETS

- 11.1 The application site at Huntstown Quarry is well located in terms of access to the strategic national and regional road networks, principally the N2 Dual Carriageway between Dublin and Ashbourne, the M50 Motorway and the R135 Regional Road, the former N2 National Primary Road).
- 11.2 There are also several nationally important utilities in the vicinity of the quarry complex, including 100kV and 220kV power lines to the north and south-west running to the electricity sub-station at the N2/M50 interchange, a gas fired electricity generation plant and a gas pipeline.
- 11.3 The area surrounding Roadstone's landholding comprises a mix of rural agricultural lands to the north and east and large-scale industrial development in the form of several business / technology and industrial parks to the west and south-west. A limited amount of low density residential housing is also present along the local road network.
- 11.4 The proposed increase in the rate of C&D waste intake and relocation of the recovery facility to the north-eastern corner of the quarry complex will not result in any significant adverse short-term or long-term impact on any existing infrastructure or utilities in the surrounding area.
- 11.5 The increased rate of recovery could have potential effects on surrounding land uses and on residential amenity by way of increased traffic, noise and dust deposition. An assessment of the potential impact however concluded that with the implementation of defined mitigation measures, these impacts will be minor. It is therefore considered that the activity will not have any significant adverse effects on material assets or surrounding land use.

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NON-TECHNICAL SUMMARY

12.0 TRAFFIC

- 12.1 The proposed development provides for an increase in the current rate of C&D waste intake at its licensed inert soil recovery facility at Huntstown Quarry, from a maximum of 24,950 tonnes per annum at present, to a maximum of 95,000 tonnes per annum.
- 12.2 The existing recovery facility at Huntstown is well located in terms of access to the strategic highway network and all HGV traffic can be routed on roads considered suitable to accommodate frequent HGV movement.
- 12.3 Junction capacity assessment was carried out to determine the impact the additional development trips would have on the existing junctions within the vicinity of the proposed development. The analysis showed that the existing R135 / Elm Road signalised junction and the R135 / N2 Slip Road roundabout junction will operate within capacity when the development is operational in 2017, 2022 and 2032.
- 12.4 The R135 / N2 Slip Road priority junction and the R135 / L3125 signalised junction at Kilshane Cross are currently operating at capacity. With the development operational in 2017, 2022 and 2032 both junctions will continue to operate at capacity with queues and delays during the AM and PM peak hours. The development flows will have an insignificant impact on the operational performance of both junctions as the junctions are currently operating at capacity and will continue to do so with no development in place in 2017, 2022 and 2032 during the AM and PM peak hours.
- 12.5 Sensitivity testing was undertaken for other committed and other planned development with the proposed development in place in 2022 and 2032. These analyses showed that the existing R135 / Elm Road signalised junction and the R135 / N2 Slip Road roundabout junction will operate within capacity when the developments are operational 2022 and 2032.
- 12.6 The R135 / N2 Slip Road priority junction and the R135 / L3125 signalised junction are currently operating at capacity. With all developments operational in 2022 and 2032 both junctions will continue to operate at capacity with queues and delays during the AM and PM peak hours.
- 12.7 With the future opening of the Western Link Road, traffic flows through the R135 / L3125 signalised junction at Kilshane Cross travelling to and from Dublin Airport will re-distribute onto the Western Link Road. As a result, the R135 / L3125 signalised junction will operate within capacity in 2022 and 2032 during the AM and PM peak hours with the proposed development in place.
- 12.8 A road capacity assessment of the R135 (North Road) was carried out to determine the impact the additional development flows would have on the R135 Regional Road. The assessment showed that in 2016, the R135 operates within capacity for a level of service D with an existing daily traffic capacity (AADT) level of 7,742 vehicles.
- 12.9 In 2017, 2022 and 2032 with the additional development trips and an increase in the background flows, the R135 will continue to have traffic flows below the recommended capacity for a Level of Service D.

NON-TECHNICAL SUMMARY

- 12.10 A review of accident records on the surrounding highway network covering the period from 2006 to 2013 showed that no fatal or serious incidents were recorded at the North Road access to the Huntstown Quarry Complex. The one fatal incident and one serious incident recorded both occurred at Kilshane Cross.
- 12.11 Three minor incidents occurred in close proximity to the North Road quarry access. However it appears these took place prior to the N2 road realignment and upgrading. None are therefore specifically relevant to the development proposal, both in terms of location and incident detail. It is considered that the proposed development would not have a significant impact on road safety.
- 12.12 Overall it is considered that the development proposal would have a minimal impact in terms of highway and transportation. For the above reasons the proposed development of the site accords with the national, regional and county planning policies and is considered to be acceptable in traffic and transport terms.

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FIGURES

Figure NTS-1
Site Location Map

Figure NTS-2
Surrounding Land Use

Figure NTS-3
Existing Recovery Facility Layout – Central Quarry

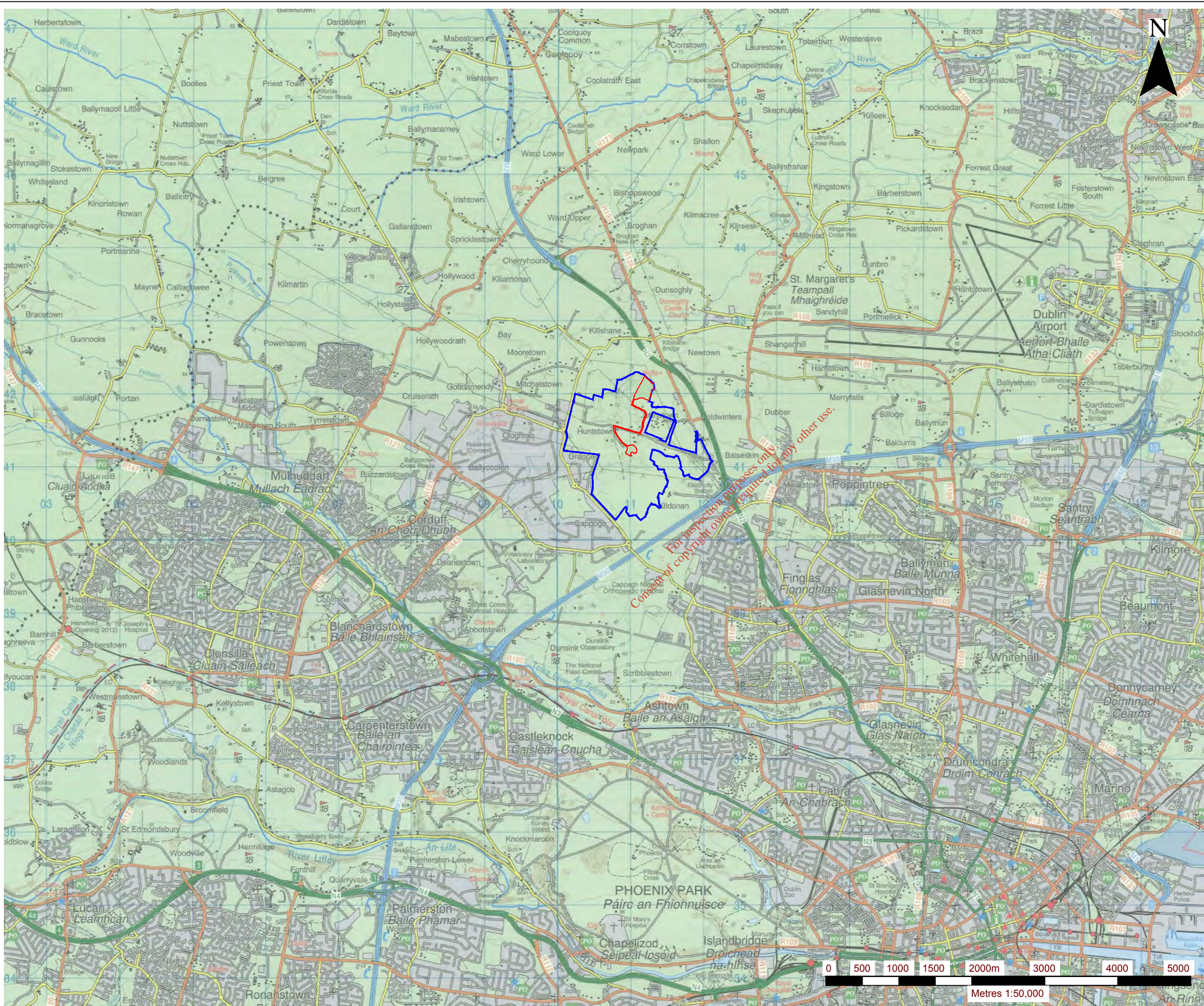
Figure NTS-4
Relocated Recovery Facility Layout – North Eastern Area

Figure NTS-5
Landscape and Restoration Plan – North Eastern Area

Figure NTS 6
Environmental Monitoring Locations

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0180.00166.0.FIG NTS-1.Site Location Map.dwg



NOTES

1. EXTRACT FROM 1:50,000 O.S DISCOVERY MAP NO. 50
2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000716 (C)
ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

- ROADSTONE LIMITED LAND INTEREST (c. 200.3 ha)
- APPLICATION AREA (c. 8.27 ha)

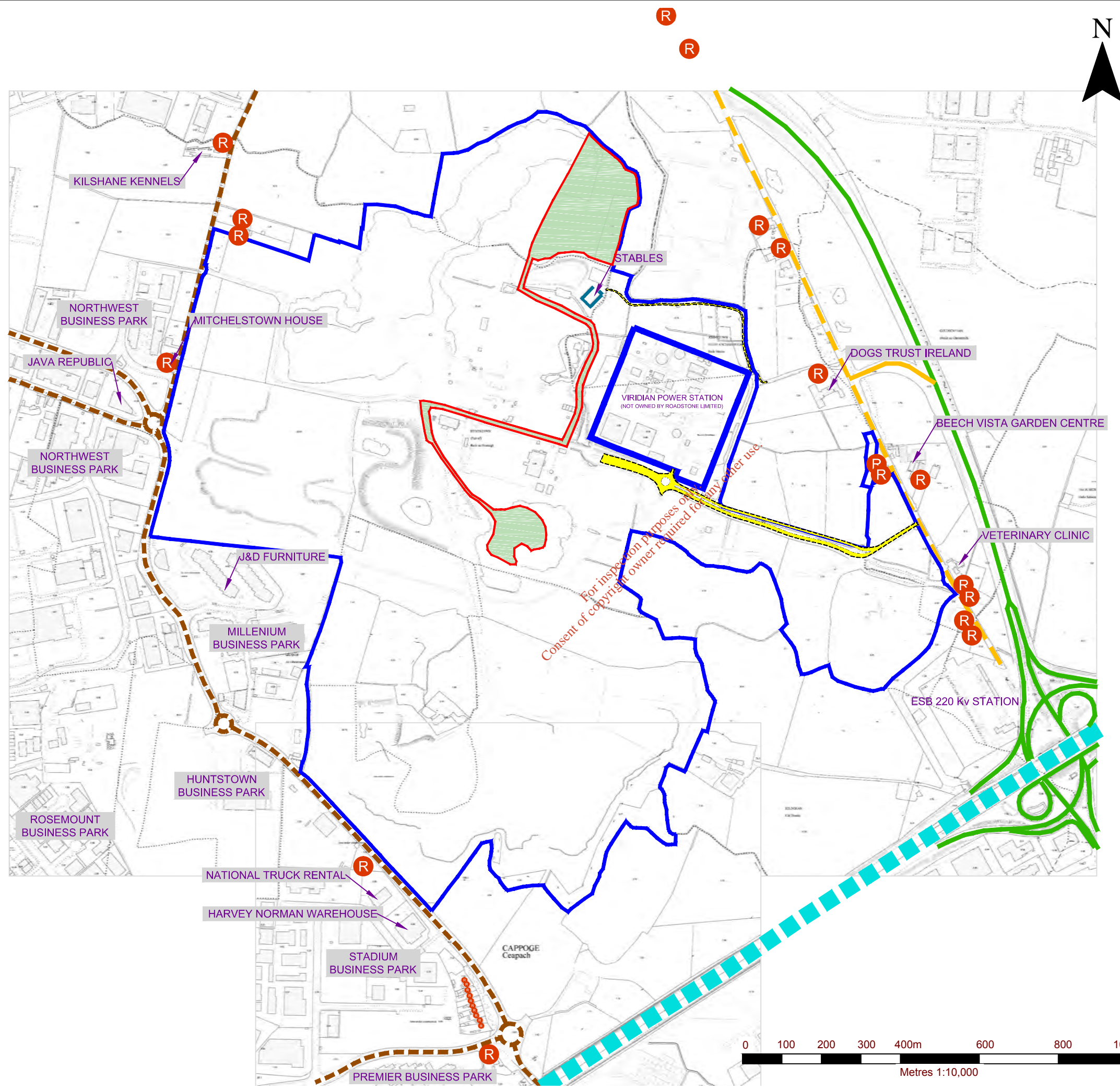
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C&D WASTE RECOVERY FACILITY
HUNTSTOWN QUARRY, FINGLAS, DUBLIN 11
SITE LOCATION MAP

FIGURE NTS 1

Scale: 1:50,000 @ A3 Date: DECEMBER 2016

0180.00166.0.FIG NTS-2.Surrounding Land Use.dwg



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NOTES

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- ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000716 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

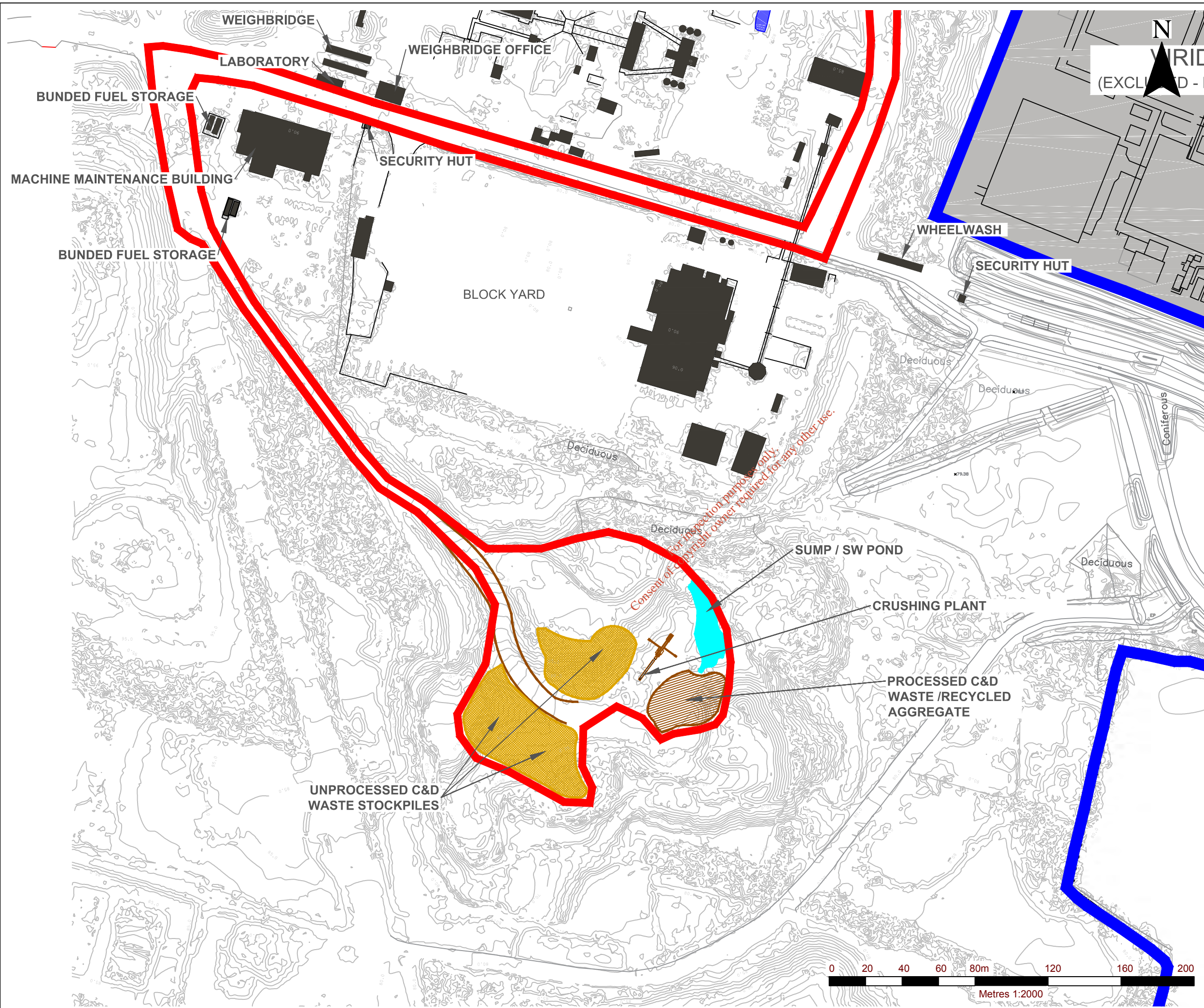
	ROADSTONE LIMITED LAND INTEREST (c. 200.3 ha)
	APPLICATION AREA (c. 8.27 ha)
	N2 DUAL CARRIAGEWAY
	NORTH ROAD (R135)
	LOCAL ROAD
	M50 MOTORWAY
	RIGHT OF WAY
	LOCATION OF NEAREST RESIDENCES

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SURROUNDING LAND USE

FIGURE NTS-2

Scale 1:10,000 @ A3 Date DECEMBER 2016



NOTES
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LEGEND

- ROADSTONE LIMITED LAND INTEREST (c. 200.3 ha)
- APPLICATION AREA (c. 8.27ha)

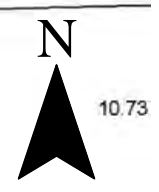
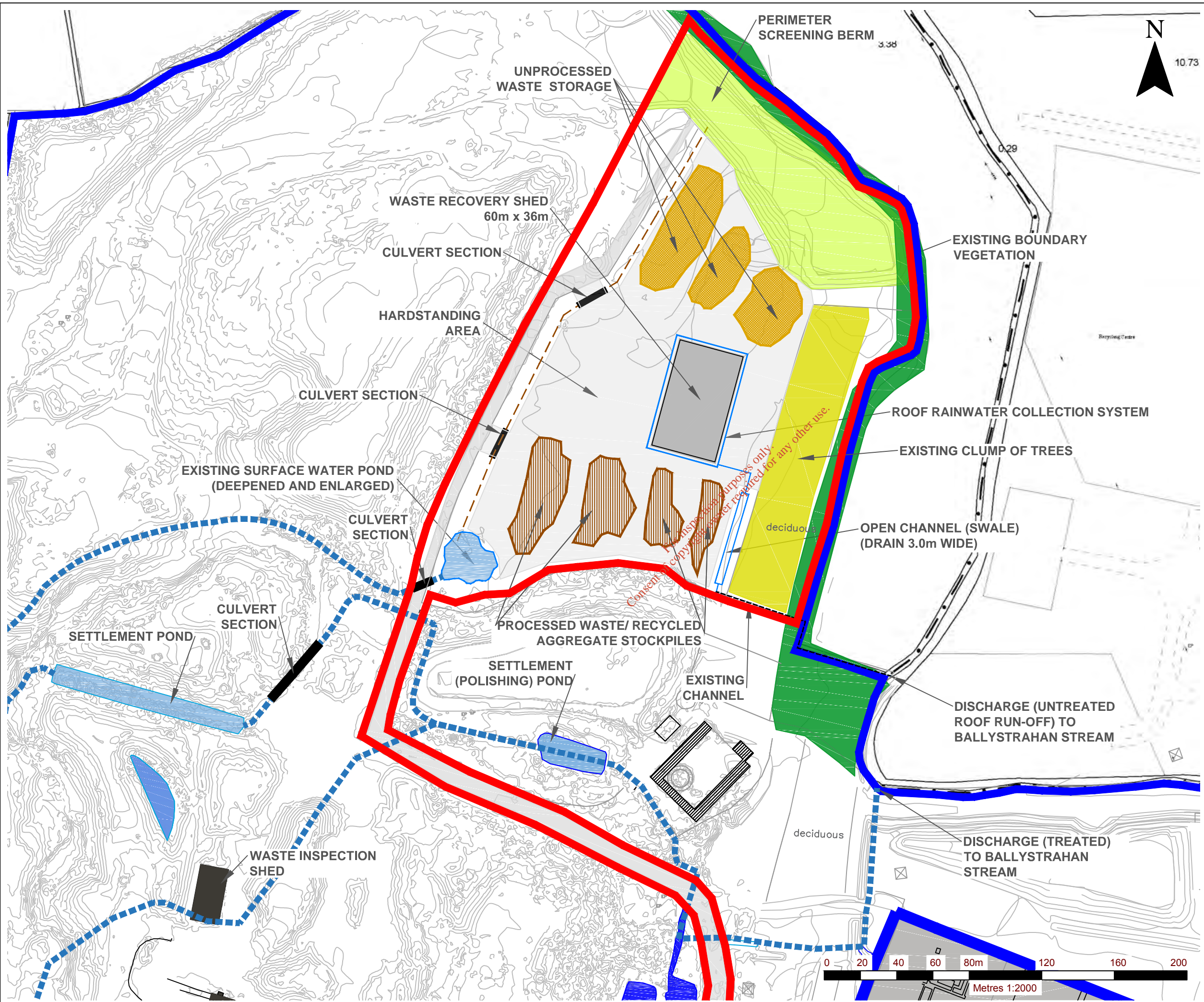
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CENTRAL QUARRY EXTENDED C&D WASTE RECOVERY FACILITY

FIGURE NTS-3
 Scale 1:2,000 @ A3 Date DECEMBER 2016

0180.00166.0.FIG_2-3.Relocated C&D Recovery Facility.dwg



NOTES

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- ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000716 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

	ROADSTONE LIMITED LAND INTEREST (c. 200.3 ha)
	APPLICATION AREA (c. 8.27 ha)
	STORMWATER DRAINAGE (ROOF RUN-OFF)
	COLLECTOR CHANNEL FOR SURFACE WATER RUN-OFF (FROM HARDSTAND AREA)
	SURFACE WATER RUN-OFF (FOR TREATMENT)



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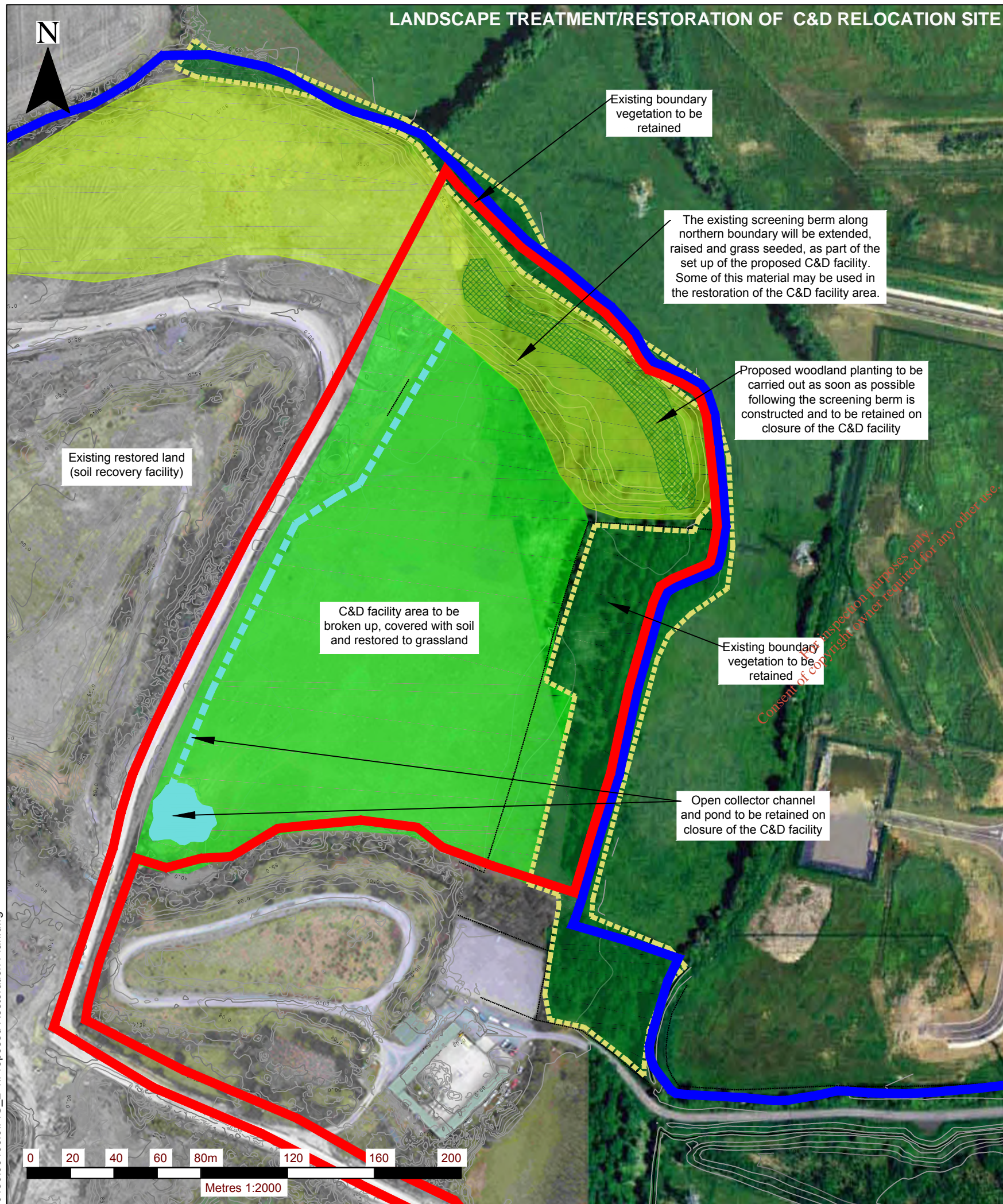
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RELOCATED C&D RECOVERY FACILITY
PROPOSED LAYOUT

FIGURE NTS-4

Scale: 1:2,000 @ A3 Date: DECEMBER 2016

LANDSCAPE TREATMENT/RESTORATION OF C&D RELOCATION SITE



Landscape Proposals (to be carried out as part of the setting up of the relocated C&D Facility):

- The existing berm along the northern boundary will be raised to a level of 83m AOD (note: existing level 82m AOD) and will be extended to meet the existing berm adjoining the western boundary of the application area, using the material to be stripped from the remainder of the site.
- Topsoil and subsoil will be stripped separately and the topsoil will be placed on the berm last. All areas of the berm, which were disturbed in the process, except for the woodland planting area, will be grass seeded.
- Woodland planting to be carried out on the northern slopes of the extended berm, as per the planting mix below. This planting will augment the existing vegetation present along the northern and eastern site boundary, in particular in height, and will help screen the vast majority of the proposed development in view from locations to the northeast (i.e. the elevated section of the N2 in particular).
- As an alternative to the tall feathered trees included in the below woodland mix, it will be attempted to transplant some of the semi-mature trees which are planted in 5 rows along the eastern site boundary onto the screening berm. About 20 trees will be taken from the two westernmost rows of trees, using suitable transplanting equipment for large trees (e.g. a tree spade), ensuring that large parts of the root system will be moved with the tree. This will leave a minimum of 3 rows of semi-mature trees along the eastern boundary intact, which provide effective screening in views from locations to the east.

Restoration Proposals (to be carried out on closure of the relocated C&D Facility):

- All stockpiles, the waste recovery shed and all processing plant and machinery will be removed from the site. The open water channel to the east of the access road along the western site boundary and the pond in the southwestern corner of the site will be retained.
- The hardstanding layer will be excavated and recycled. A replacement cover layer comprising a combined 300mm of topsoil and mineral subsoil will be placed over the exposed in-situ soil. This material may be sourced from the perimeter screening berm around the recovery facility or from other soil stockpiles around the Huntstown Complex.
- The whole area will be graded to fall gently towards the stream to the south of the site and grass seeded.

General Notes:

- All plant handling, planting and establishment works will be carried out in accordance with current best practice (e.g. CPSE - "Handling and Establishing Landscape Plants", available on gohelios.co.uk).
- Works are to take place in the appropriate planting season (e.g. bareroot planting: November to March only) and in favourable weather conditions.
- The tall feathered trees/transplanted semi-mature trees are to be staked appropriately.
- All transplants to be supplied with spiral guards.
- Planting will be carried out by a suitably qualified landscape contractor.
- Establishment maintenance will be carried out for 3 years following the planting works. This will include weed control, replacement planting where required and the adjustment/removal of tree ties and spiral guards.

NATIVE WOODLAND PLANTING MIX:

To be planted at 1.5m centres (2,250sq.m. in total = 1,000 plants). Tall feathered trees (if required, see text above) to be planted near the top of the berm in same species groups of 3. Transplants & container grown plants to be randomly planted in same species groups of 8-12.

No.	Plant Name	Common Name	Height (cm)	Age/Size	%
Tall Feathered Trees					
20	Betula pubescens	Downy birch	175-200	2xTr	2
20	Quercus robur	Pedunculate oak	175-200	2xTr	2
Transplants					
80	Betula pubescens	Downy birch	60-90	1+1	8
150	Corylus avellana	Hazel	60-90	1+0	15
150	Crataegus monogyna	Hawthorn	60-90	1+1	15
150	Ligustrum vulgare	Wild privet	60-80	1+1	15
100	Prunus padus	Bird cherry	60-90	1+0	10
150	Prunus spinosa	Blackthorn	60-90	1+0	15
80	Quercus robur	Pedunculate oak	60-90	1+1	8
Container Grown Shrubs					
100	Ilex aquifolium	Holly	60-80	2Lt	10

NOTES

- Orthomosaic produced from Aerial Photography flown March 2016 by SLR Consulting Ireland (IAA Permit No. 04/2015).
- Orthomosaic was merged with aerial from www.bing.com/maps to show wider area in October 2016.
- Orthomosaic produced using Ground Control Points; Related to Irish Transverse Mercator Coordinate System & OS Malin Head Level Datum.
- The accuracy of the orthomosaics and the digital elevation models (DEM) strongly depends on the flight height, lighting conditions, availability of textures, image quality, overlap, and type of terrain. Contours / 3D data relates to the surface model and not terrain levels. All Dimensions and Levels are to be checked on site. Any deviation or discrepancy from this Orthomosaic to be referred to SLR Consulting Ireland.

LEGEND

- ROADSTONE LTD. LAND OWNERSHIP BOUNDARY
- PLANNING APPLICATION AREA
- EXISTING DENSE VEGETATION ALONG NORTHERN AND EASTERN BOUNDARY TO BE RETAINED
- SCREENING BERM TO BE EXTENDED, RAISED AND GRASS SEEDED
- WOODLAND PLANTING ON NORTHERN SLOPES OF SCREENING BERM
- C&D FACILITY AREA TO BE CLEARED, COVERED WITH SOIL AND GRASS SEEDED
- OPEN COLLECTOR CHANNEL AND POND TO BE RETAINED



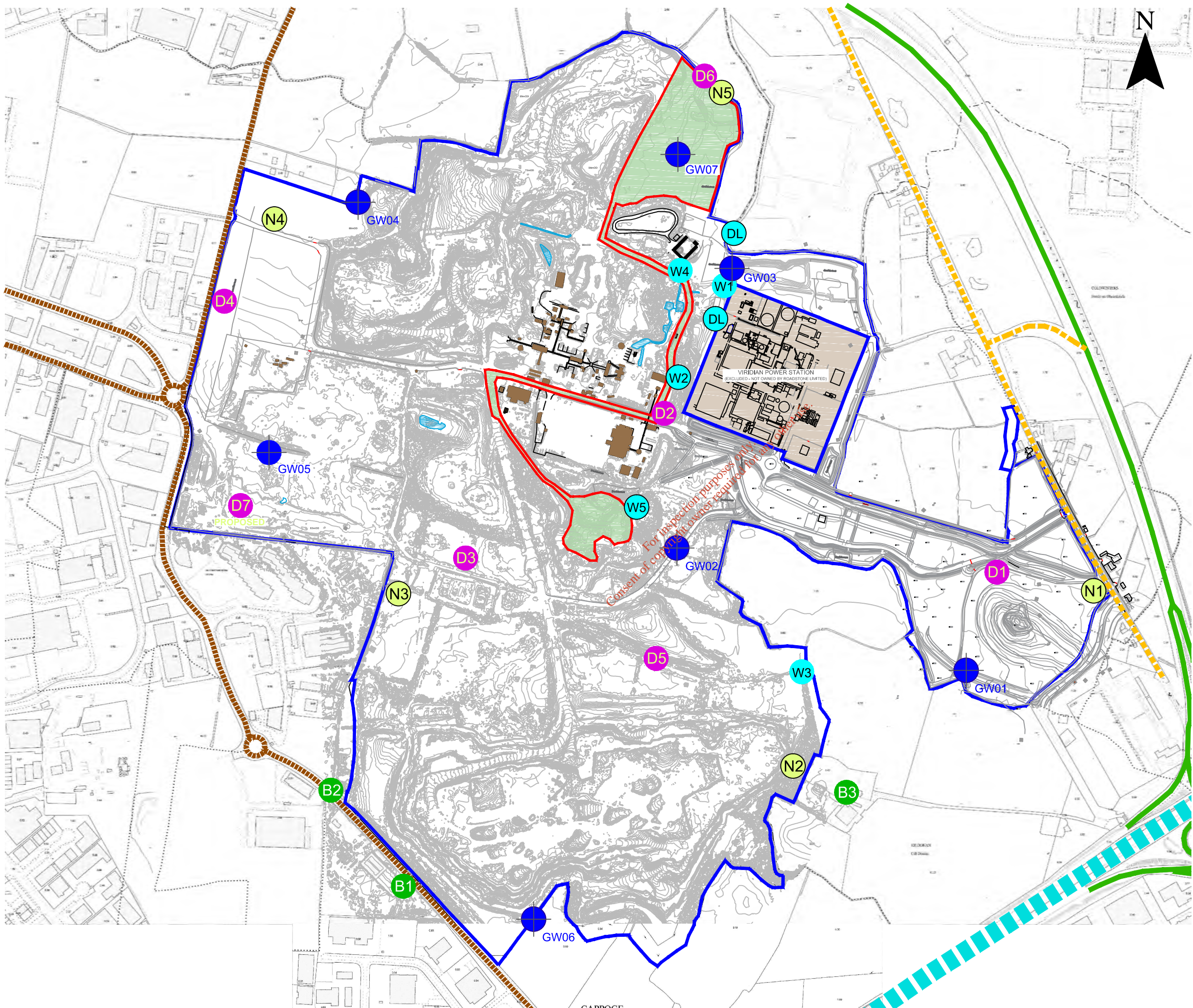
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LANDSCAPE AND RESTORATION PLAN

FIGURE NTS-5

Scale 1:2,000 @ A3 Date DECEMBER 2016

0180.00166.0.FIG_2-9.Environmental Monitoring Locations.dwg



NOTES
 1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO'S. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A & 3130-B.
 2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000716 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND

	ROADSTONE LIMITED LAND INTEREST (c. 200.3 ha)
	APPLICATION AREA (c. 8.27 ha)
	N2 DUAL CARRIAGEWAY
	NORTH ROAD (R135)
	LOCAL ROAD
	M50 MOTORWAY
	NOISE MONITORING LOCATION
	DUST MONITORING LOCATION
	GROUNDWATER MONITORING WELL LOCATION
	SURFACE WATER MONITORING LOCATION
	BLAST MONITORING LOCATION

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 ENVIRONMENTAL MONITORING LOCATIONS

FIGURE NTS-6
 Scale 1:8,000 @ A3
 Date DECEMBER 2016