

## SECTION 2 : DESCRIPTION OF WASTE RECOVERY FACILITY

### 2.1 PRINCIPAL ELEMENTS

The proposed waste recovery facility at Fassaroe, Bray Co. Wicklow provides for

- (i) Use of imported inert natural materials, principally excess soil, stones and/or broken rock excavated on construction sites, to backfill and restore a large existing void created by previous extraction of sand and gravel
- (ii) Recovery of imported inert construction materials, including stones, granular fill, concrete, blocks, bricks and ceramic tile, using crushing and screening equipment to generate secondary (recycled) aggregate
- (iii) Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) unintentionally imported to site prior to removal off-site to appropriately licensed waste disposal or recovery facilities
- (iv) Use of secondary aggregate to construct internal haul roads within and across the application site
- (v) Sale and export of secondary aggregate off-site for re-use by others
- (vi) Phased restoration of the backfilled void (including placement of cover soils and seeding) and return to use as agricultural grassland
- (vii) Temporary stockpiling of topsoil and subsoil pending re-use as cover material for phased restoration of the site
- (viii) Environmental monitoring of noise, dust, surface water and groundwater for the duration of the site restoration works.

The existing void will only be infilled using inert materials imported from pre-approved external construction sites and secondary aggregate generated on site. No peat, contaminated soils intermixed construction and demolition waste or non-hazardous waste will be accepted at the proposed waste recovery facility. Any non-inert construction and demolition waste will be removed off-site. The location and existing layout of the application site indicated on Figure 2.1.

### 2.2 SITE INFRASTRUCTURE

#### 2.2.1 Site Security

Vehicular access into Roadstone Dublin's landholding and the application site can only be gained via an existing private access road, approximately 930m long, known as Fassaroe Avenue. Aside from this road, there is no other vehicular access to the landholding. At the present time, the entire site boundary is closed off by post and wire fencing and/or hedgerow. Prior to commencement of backfilling and restoration activities, a survey of the entire property boundary will be undertaken and where necessary, existing fences will be repaired and/or replaced and hedgerows will be strengthened or fortified by additional planting.

The only vehicles which will be permitted to access the proposed waste recovery facility will be HGV's carrying inert soil for backfilling and restoration purposes or construction and demolition waste for recovery. The recent planning permission in respect of the proposed backfilling of the quarry void issued by Wicklow County Council provides for up to 200 additional HGV truck movements along Fassaroe Avenue each day (100 in and 100 out of the proposed facility). Planning permission for C&D waste recovery activities was previously granted in 2004.

Inert materials are accepted at the site between 08.00hours and 18.00hours each weekday (Monday to Friday) and 08.00hours to 13.00hours on Saturday. No materials are accepted at any other time including Sundays and Public Holidays. At all other times, the front gates at the access road will be closed, thereby restricting entry.

All heavy good vehicles (HGVs) importing construction and demolition waste or soil and stone to the proposed waste recovery facility are required to pass over the existing weighbridge at the front of the Fassaroe site. Thereafter, they run over the existing network of internal haul roads toward the existing / proposed waste recovery facility.

On arrival at the Fassaroe site, HGV drivers will identify themselves to the weighbridge clerk before proceeding to the C&D waste recovery facility. The weighbridge clerk shall take a copy of

the weigh docket, record the time and date of arrival, the nature and origin of the imported waste, the Client, the truck licence plate number and relevant collection permit details.

### 2.2.2 Site Roads and Parking Areas

All trucks delivering inert waste to the proposed waste recovery facility will be confined within the Applicant's landholding. Trucks will initially travel over a paved road surface leading to the existing weighbridge inside the site entrance. Thereafter they will travel over a network of paved and unpaved internal roads to get to the waste recovery facility and the active restoration or recycling areas. The extent of paved and unpaved haul roads across the application site is indicated on the proposed site layout in Figure 2.2. It is envisaged that the existing paved internal road leading to the block yard will be extended northwards in the direction of the waste recovery facility, past the proposed location of the new wheelwash facility.

Provision for employee and visitor car parking is currently provided on a paved area adjacent to the existing site office, immediately inside the site entrance.

### 2.2.3 Hardstanding Areas

A temporary hardstanding area constructed of secondary aggregate is provided at the existing construction and demolition (C&D) waste recovery facility for

- (i) stockpiling and recovery of inert C&D waste imported to site;
- (ii) separation and storage (in skips) of any separated non-inert C&D wastes inadvertently mixed with it (most likely to comprise metal, timber, PVC pipes, plastic etc) and
- (iii) storage of plant, equipment and materials.

At the present time, the hardstanding area is not sealed and any rain falling over this area either percolates downwards into the underlying soils or runs-off eastwards over the existing ground surface, toward the existing quarry void.

### 2.2.4 Wheelwash and Weighbridge

In order to prevent transport of soil across internal haul roads and onto public roads, it is envisaged that a temporary wheelwash facility will be installed along the access route to the waste facility, as shown on the site infrastructure layout in Figure 2.2. All site traffic exiting the waste recovery facility will be directed through this wheelwash.

In order to track and record the amount of material entering the application site, all HGV drivers importing soil and stones or C&D waste to the waste recovery facility will be required to present and identify themselves at the existing weighbridge inside the front gate of the Fassaroe site. Any secondary aggregate exported off-site and any non-inert construction and demolition waste dispatched to other licensed waste disposal or recovery facilities will also be directed to and weighed at the existing weighbridge. Records of tonnages of imported waste and exported secondary aggregate will be maintained for waste auditing purposes.

### 2.2.5 Laboratory Testing

Laboratory testing of soil, surface water, groundwater and leachate will be undertaken off-site at an ILAB / UKAS accredited geo-environmental laboratory. Any validation testing and laboratory testing required to confirm classification of waste as inert will also be undertaken by the same laboratory. All samples taken on-site will be forwarded to the laboratory on the same day and test results will typically be forwarded to site within seven to ten working days.

It is not envisaged that any environmental monitoring equipment such as pH and temperature meters, conductivity meters, flow meters and dissolved oxygen meters will be stored at the site office for the duration of the restoration works. Any such equipment will be brought to site by an in-house and/or independent environmental consultant as and when required.

### 2.2.6 Fuel and Oil Storage

It is not intended to provide dedicated bunded fuel storage tanks for the waste recovery facility. Fuel for plant and equipment working at the facility will be stored in existing fuel tanks within the

Fassaroe complex. These tanks are constructed on a sealed concrete surface and are bunded to 110% of tank storage volume.

Plant maintained on site will principally comprise mechanical excavators and/or bulldozers, mobile crushing and screening plant. Mobile plant and equipment undertaking site restoration work and/or C&D waste recovery will be refuelled from mobile, double skin fuel bowsers or at maintenance sheds within the Fassaroe complex. Oil and lubricant changes and servicing of wheeled or tracked plant will be undertaken at the existing maintenance shed. Re-fuelling of HGV trucks will take place on site at the auto-diesel tanks adjacent to the existing concrete production facility (Refer to Figure 2.2).

A small bunded tank for waste oils is currently provided at the maintenance shed and is emptied at intervals by a licensed waste contractor and disposed off-site at a suitably licensed waste facility.

### **2.2.7 Waste Inspection and Quarantine Facility**

Any imported waste which, it is suspected, may not comply with waste acceptance criteria for the waste recovery facility, will be transferred across the application site to a covered shed which is currently unused and located adjacent to the concrete production facility (refer to Figure 2.2). This shed is a portal frame structure and is constructed over a sealed concrete slab. It will serve as the dedicated waste inspection and quarantine facility for the waste recovery operation.

As incipient rainfall will not come into contact with consignments of suspected contaminated waste stored at the covered shed, there is no requirement to install drainage infrastructure to provide for collection and storage of potentially contaminated surface water run-off.

Visual inspection, in-situ monitoring and testing of imported waste materials will be undertaken by the Applicant's site staff as inert waste materials are end-tipped at the active restoration area. Should there be any concern about the nature of the soil materials being end-tipped it will be re-loaded onto the truck and re-directed to the waste inspection and quarantine facility for closer examination and inspection. Detailed records of all such inspections will be kept.

Should inspection or testing of suspect soil waste at the inspection and quarantine facility identify any non-inert material which cannot be accepted and used for restoration of this site, it will be segregated and temporarily stockpiled (quarantined) pending removal off-site by permitted waste collectors to a suitably licensed permitted waste disposal or recovery facility. Provision will also be made for temporary storage of any separated non-inert construction and demolition waste (including metal, timber, plastic etc.) at the waste inspection area prior to removal off-site to a licensed recovery facility.

### **2.2.8 Traffic Control**

All traffic to and from the proposed waste facility will travel to and from the Fassaroe Junction on the N11 National Primary Road. Traffic from the N11 will run for a short distance (approximately 600m) over the local road network, travelling initially westwards and then turning south on a public road (Kilbride Road) until it comes to a small roundabout junction with Fassaroe Avenue, a private road, approximately 930m long, leading to the entrance to Roadstone Dublin's landholding.

Internally, within Roadstone Dublin's landholding, warning notices, direction signs and speed restriction signs are established along paved and/or unpaved roads leading to and from the waste facility, the active restoration area and the construction and demolition waste recycling area.

All HGV traffic egressing the application site will be required to pass through the temporary wheelwash facility and the existing weighbridge inside the front gates, shown on Figure 2.2.

### **2.2.9 Sewerage and Surface Water Drainage Infrastructure**

At the present time, site staff at the Fassaroe complex use toilet, hand washing and welfare facilities provided at existing site offices and production facilities. It is envisaged that existing staff welfare facilities will also be used by staff employed at the waste facility. The locations of septic tanks servicing these facilities are shown on the site services drawing in Figure 2.3

Currently, rainfall across the application site either percolates downwards through the unsealed ground to the underlying groundwater aquifer or runs over the ground surface to the two existing surface ponds in the bottom of the worked out quarry (designated northern and southern ponds, refer to Figure 2.1). Surface water collecting in the northern pond is re-used / re-circulated and used for aggregate processing (washing) at the adjacent facility.

#### *Lowering of Water Level in Northern Pond*

Available survey data suggests that the depth of water in the existing surface water pond at the bottom of the proposed infill area varies from 0m to in excess of 5m deep. As backfilling of the former quarry will progress southwards from the northern end, a number of measures are to be adopted in order to effect a lowering of the water level in the northern pond area prior to the importation and placement of inert fill materials. These include

- (i) minimisation of additional recharge by rainfall by constructing drainage channels around the edge of the pond to collect and divert overground surface water flows to the southern pond;
- (ii) construction of a temporary raised berm along the western and south-eastern boundaries of the southern pond (if necessary) in order to increase the capacity of water which may be pumped there from the northern pond and retained on a short term basis (pending re-use in aggregate production and/or percolation through the floor and sides to the underlying groundwater table) and
- (iii) pumping of water across the Applicant's landholding to the much larger surface water pond to the south of the concrete batching plant, indicated on Figure 2.1.

Consideration will also be given to excavating sumps through the silt layer at the sides/or base of the existing pond in order to enhance the rate of downward percolation / recharge through the unsaturated sand and gravel to the underlying aquifer. It is suspected however that the in-situ sand and gravels may be relatively silty and that this measure may not enhance the rate at which the water level in the pond can be lowered.

Pumping from the existing surface water pond will be undertaken over an extended period of time, the intention being to gradually reduce the pond footprint and the area of ground under water in front of the proposed backfill area. Importation and placement of inert materials will proceed according as water levels in the pond are lowered and an increased area of ground is exposed in front of the proposed backfill area.

In addition to these measures, slow percolation of water through the floor of the pond is expected to contribute to further lowering of the water level in the pond. Meteorological factors will also influence the rate at which water levels will fall, with reduced summer rainfall and increased temperatures contributing to reduced recharge and increased evaporation respectively.

#### *Surface Water Management at Waste Inspection and Quarantine Facility*

As previously outlined, any suspect contaminated waste imported to this facility will be transferred across the application site to a covered shed located adjacent to the concrete production facility. As the floor of the shed is sealed by a concrete slab and as no rainfall will come into contact with consignments of suspected contaminated waste, there is no requirement to install drainage infrastructure to provide for collection and storage of potentially contaminated surface water run-off at the waste inspection and quarantine facility.

#### *Surface Water Management during Quarry Backfilling*

As backfilling of the former quarry proceeds over the short-to-medium term, surface water will continue to be diverted via collector drains to the southern pond or will percolate through the ground to the underlying aquifer. Water collecting in the southern pond will continue to be re-circulated for aggregate processing (washing) at the adjacent plant or will itself discharge through the underlying unsaturated soils to the underlying groundwater aquifer.

Should there be any marked rise in water levels within this pond at any stage, excess water will be pumped across the Applicant's landholding to the much larger surface water pond to the south of the concrete batching plant as necessary.

As backfilling and restoration of the former quarry proceeds to its final phase, it is envisaged that surface water in the southern pond and process water from the plant will either be



- (i) pumped / re-circulated to and from the much larger surface water pond to the south of the concrete batching plant or
- (ii) pumped / re-circulated to and from more modest scale replacement settlement ponds located on undisturbed ground immediately south of the existing sand washing plant.

During and after the final phase of backfilling, ground contours and/or drainage channels will be modified as necessary to ensure that surface water run-off across the site is re-directed to sumps for pumping to the larger surface water pond or the replacement settlement ponds.

At no time during the restoration works or the operation of the construction and demolition waste recovery facility will surface water run-off be directed to watercourses or ponds beyond the site boundary.

#### **2.2.10 Site Services**

Electric power, lighting and heating are all currently provided via the electricity network to the existing site offices at the Fassaroe complex. Permanent telephone (landline), fax and e-mail facilities will all be available at the existing site office. Site staff overseeing backfilling and recovery operations at the application site will be contactable by mobile phone.

Given the lack of combustible waste materials at this site, it is considered highly unlikely that a fire will break out during backfilling and recovery operations. Fire extinguishers will be kept at the site office to deal with any localised small scale fires which might occur.

The Dublin City Council watermain carrying drinking water from the Roundwood reservoir to the city runs through the middle of the application site, as shown in Figure 2.3. Apart from internal water supply and wastewater pipework and a short section of buried electrical cable west of the block yard, no other buried services are understood to occur across the application site. Several overhead electricity transmission cables cross the application site and these are also shown on Figure 2.3.

#### **2.2.11 Plant Sheds and Equipment Compounds**

Plant and equipment used in the backfilling and/or recovery activities will be stored on the temporary hardstanding area at the application site and/or at the existing plant maintenance sheds. Given the restricted access into the Fassaroe site, it is not considered necessary to provide a secure compound at the waste recovery facility.

No dedicated workshops will be provided at the waste recovery facility. Any plant or equipment requiring specialist repair or overhaul will be taken to the existing maintenance sheds at the front of the site.

#### **2.2.12 Site Accommodation**

At the present time, there is a fully serviced permanent site office located at the entrance to the Fassaroe site. This office will be used for all administration and management functions for the waste recovery facility. Staff changing, washing and cooking facilities will be provided at existing staff facilities at the Fassaroe site.

#### **2.2.13 C&D Waste Recovery Infrastructure**

Inert construction and demolition waste imported to site will be recycled at the existing hardstanding area, shown in Figure 2.2. Any metal waste will be separated and placed in a skip pending removal off site to a licensed recovery facility. Any other non-inert waste (timber, plastic etc.) will also be separated off and placed in a skip pending removal off-site by permitted waste collectors to a licensed disposal or recovery facility.

Construction and demolition waste will be recycled by passing it through a mobile crushing plant which will be brought to the facility periodically, once sufficient quantity of recycleable material has accumulated. The crushing plant will produce a particulate, granular fill which may be used to construct hardstanding areas or temporary haul roads.

## 2.3 RESTORATION AND RECOVERY ACTIVITIES

The backfilling of the existing void with inert soils and stone is deemed to constitute inert waste recovery through deposition for the purposes of land improvement or restoration. The proposed restoration scheme provides for direct use of the imported soil and stone, without further processing.

### 2.3.1 Backfilling / Restoration Schedule

Backfilling of the application site will proceed in several phases and on completion, will merge into the surrounding undulating pastoral landscape. An outline of the proposed phasing and the final ground level contours are shown in Figure 2.4. In addition to imported materials, soil in existing screening berms and/or stockpiles within the application area will also be used to backfill the former quarry. Cross-sections through the final landform are shown in Figure 2.5.

It is currently envisaged that backfilling of the existing void will proceed from the northern to the southern end of the quarry. Any temporary additional or replacement infrastructure required to facilitate the proposed works will be constructed and/or installed at the outset of the first phase of backfilling.

The ground profile on completion of the first phase of backfilling is shown in Figure 2.6. Thereafter, backfilling of the quarry will progress continuously southwards, through Phases 2,3 and 4, as indicated on the phasing drawings in Figures 2.7 to 2.10.

On completion of each restoration phase, a cover layer of subsoil and topsoil will be placed and graded across the backfilled soil. This will then be planted with grass in order to promote stability and minimise soil erosion and dust generation.

### 2.3.2 Method and Safety Statements for Construction Works

Any additional infrastructure required at the application site, over and above that which is currently in place will be constructed in accordance with a detailed construction method statement and health and safety plan prepared by external works Contractors. In preparing such plans, regard will be had to safety risks and potential conflicts presented by ongoing aggregate processing, concrete production and C&D waste recovery activities.

### 2.3.3 Material Requirements

The only material requirements in respect of the proposed restoration scheme are the inert soil, stone and rock used in backfilling the existing void. Clean, inert soil and stone is likely to be sourced from greenfield development sites. Intermixed soil, stones and inert construction waste (concrete, block and brick) will be sourced from re-development sites or from utilities excavations in urban areas.

The total void space to be backfilled and restored is approximately 375,000m<sup>3</sup>. As the application site is zoned for development in the future, the backfilled materials will be subject to significant compactive effort in order to densify them and reduce the potential for long-term settlement. A target compaction density of 2.0t/m<sup>3</sup> is therefore assumed for tonnage assessment purposes, indicating that approximately 750,000 tonnes of inert soil and/or subsoil will be required to backfill the existing quarry void.

An estimate of the material quantities required to complete backfilling of the application site is provided below: -

MATERIAL	QUANTITY	SOURCE
Inert subsoil, stones and rock	610,000 tonnes	Imported
Stockpiled soil	130,000 tonnes	In-situ
Topsoil (150mm)	10,000 tonnes	Imported

**Table 2.1 Material Requirements**

In addition to the above, a relatively small quantity of secondary aggregate produced on site will be required to construct temporary haul roads across and through the site as the backfilling works proceed.

#### 2.3.4 Materials Balance

Approximately 65,000m<sup>3</sup> (130,000tonnes) of the inert materials required to backfill the quarry site will be sourced from soil stockpiles and screening berms around the existing quarry void. All remaining inert materials to be used in the restoration of the application site will be imported from external development or construction and demolition work sites

#### 2.3.5 Stability Analyses

The available site investigation data indicates that the area to be backfilled is underlain by a layer of uncompact fine sandy silt over competent silty sand and gravel strata. A gradual increase in loading will be applied to these soils according as backfilling progresses, at a rate which is not expected to result in a build up of excess porewater pressure or to induce undrained failure. Notwithstanding this, groundwater pressures within the sandy silt will be monitored as backfilling progresses to confirm that there is no build up of excess pore pressure within this layer.

It is expected that the application of loading to the underlying in-situ soils will not exceed that which existed prior to extraction of sand and gravel and no deep seated failure of temporary slopes is therefore anticipated.

Temporary side slopes in backfilled soils (above formation level) will be graded at an angle no steeper than 35° (approximately 1v:1.5h), sufficient to ensure no instability arises. It is envisaged that ongoing assessment of slope stability will be undertaken as backfilling progresses across the application site. In the longer-term, once site restoration is complete, there will be no risk of instability as the site will be graded to a relatively flat, shallow slope.

#### 2.3.6 Importation of Construction Materials

Any construction materials required to construct site infrastructure, principally drainage stone and concrete will be sourced from the adjacent concrete plant or aggregate processing facility. It is expected that the requirement for low grade granular fill for hardcore and/or hardstanding areas can be sourced on-site from the existing construction and demolition waste facility.

#### 2.3.7 Removal of Materials Off-Site

Any non-hazardous or hazardous wastes identified within the soil imported for quarry restoration purposes will be transferred off-site by permitted waste collectors to suitably licensed waste disposal or recovery facilities. The Applicant anticipates, on the basis of its experience operating this and other waste recovery facilities to date, that these waste quantities will be very low.

Inert C&D waste recovered on site which is not re-used for internal haul road construction, will be supplied as low grade hardcore to construction companies in the Wicklow and Greater Dublin area. Any non-inert materials within the imported C&D waste (principally scrap metal, plastic and timber) will be removed off-site by permitted waste collectors to appropriately licensed recovery or disposal facilities.

#### 2.3.8 Formation Levels and Gradients

The quarry void has been sub-divided into four separate phases to facilitate progressive restoration and reinstatement of the site to grassland, as indicated on Figures 2.7 to 2.10.

Formation levels for backfilling across the application site are taken to be equivalent to existing ground levels, as indicated on Figure 2.1. During each restoration phase, the upper surface of the backfilled materials will be graded so as to ensure surface water run-off falls to the floor of the pit and thereafter, via a network of drainage channels through the basal silt, toward the southern pond. As the surface water pond on the quarry floor is not hydraulically connected to the groundwater table, no intermediate settling ponds need be provided as suspended solids in surface water run-off will settle out in the surface water pond.

Temporary access ramps into and out of the active backfilling areas will generally be constructed at a gradient of approximately 1v:10h. Temporary side slopes will be constructed at gradients no greater (steeper) than 1v:1.5h in order to ensure stability. On completion, final gradients across the restored ground surface will be very shallow, generally no greater than 1v:15h, as indicated on Figure 2.4.

### 2.3.9 Bund Design

Given the inert nature of the materials being used to restore the application site, no provision is made in the restoration scheme for construction of perimeter / containment bunds at the boundary of each restoration area.

### 2.3.10 Capacity and Lifespan

The estimated volume of material to be placed at the application site is approximately 350,000m<sup>3</sup> (equivalent to approximately 750,000 tonnes). The duration of backfilling activities at the quarry void will largely be dictated by the rate at which approximately 620,000 tonnes of externally sourced inert soil and stone is imported to the site. There are many factors which will influence this in turn, including, but not limited to,

- Availability of acceptable inert materials at construction sites
- Prevailing economic climate
- Construction industry output
- Project location, scale, duration and distance from the facility
- Logistical and/or programming constraints at sites generating inert materials
- Climatic conditions (reduced construction activity in wet weather)
- Availability of hauliers
- Disruptions along the existing local and national road network
- Capacity of earthmoving plant to place and compact materials
- Waste inspection / weighbridge processing constraints

In light of these and other variables, calculation of intake rates and duration is not an exact science. At the present time, assuming 50 working weeks in each calendar year, 5.5 days per working week and 10 hours per working day, it is estimated that the rate of importation of inert materials to the quarry void could vary between 100,000 tonnes and 550,000 tonnes per annum (the maximum equivalent permitted by the recent planning permission issued by Wicklow County Council).

The corresponding duration of backfilling activities could therefore vary from just over 1 year to 7.5 years. Assuming an average importation rate of 200,000 tonnes/year, the expected duration of quarry backfilling activities will be just over 3 years.

It is currently envisaged that recovery of imported and site-generated C&D waste will continue while backfilling, restoration and aftercare management activities progress at the former quarry. It is however envisaged that recovery of C&D waste will continue for some time following completion of quarry backfilling activities.

### 2.3.11 Basal and Side Slope Liner Design

Given the inert nature of the materials being used to restore the application site, no provision is made for installation of a basal liner or side slope liners at this facility, nor is any provision made for a drainage blanket at the base of the backfilled materials. It is considered that the fine sandy silt at the base of the former quarry will be of relatively low permeability and will, in reality, function as act as a quasi-liner.

Surface water ponds occur at a number of locations across the floor of the former quarry. In order to minimise the potential impact on the underlying groundwater aquifer, it is proposed to lower the water level in the existing surface water ponds prior to the importation and placement of inert fill materials, as previously outlined in Section 2.2.9.

### **2.3.12 Leachate Management System**

Given the inert nature of the materials being used to restore the application site, no provision is made for a leachate management system at this facility.

### **2.3.13 Landfill Gas Management System**

Given the inert nature of the materials being used to restore the application site, no provision is made for a leachate management system at this facility.

### **2.3.14 Capping and Decommissioning**

The application site will be restored on a phased basis to give a landform similar to that existed prior to extraction of sand and gravel. On completion, the final landform will be profiled to give a domed shape in order to facilitate surface water run-off over surrounding agricultural land or vertically downward into in-situ sand and gravel beyond the former quarry excavation, refer to contour map in Figure 2.4.

A cover layer comprising 150mm of topsoil and approximately 300mm of subsoil shall be placed over the inert backfilled materials on completion of each phase of restoration. This will be immediately planted with grass in order to promote stability and minimise soil erosion and dust generation. The lands will then be progressively returned to use as agricultural grassland.

Topsoil and subsoil will be imported to the site on a continual basis and shall not be used in the general backfilling of the site. The topsoil and subsoil shall be stockpiled pending re-use in the phased restoration of the site. They shall be stored separately within the application site, away from the active backfilling area and in such location and manner as not to create any temporary adverse visual impact.

On completion of the fourth (and final) phase of the restoration works, all mobile plant and equipment associated with the backfilling, placement and compaction of soil will be removed off site. Any dedicated infrastructure and/or services will also be progressively decommissioned and removed off-site. Any plant and equipment required for C&D waste recovery activities will however remain in place.

Wherever necessary, hardstanding surfaces will be broken up using a hydraulic breaker and subjected to validation testing to confirm the materials are acceptable for re-use within the Applicant's landholding for construction of haul roads and/or other hardstanding areas. Any materials which are found to exceed inert waste criteria will be transferred-off site to a suitably licensed waste disposal or recovery facility.

## **2.4 WASTE ACCEPTANCE AND HANDLING**

Only inert, uncontaminated soils and construction and demolition waste shall be accepted at the application site. Inert materials shall be accepted at the site between 08.00 hours and 18.00 hours each weekday and 08.00 hours to 13.00 hours on Saturday. No materials shall be accepted at any other time including Sundays and Public Holidays.

### **2.4.1 Quarry Backfilling / Restoration Activities**

Insofar as practicable, the source of each consignment of soil imported to site for backfilling purposes shall be identified in advance and subject to basic characterisation testing to confirm that soils at that location can be classified as inert. Waste characterisation (ideally including an element of testing) will be undertaken in advance by Clients and/or Contractors forwarding soil to the application site.

All inert soils imported to the site shall be unloaded (end-tipped) from trucks at the active backfilling face. It will be visually inspected by site personnel at that point to ensure that there is no intermixed non-hazardous or hazardous waste placed within it. If, following acceptance of waste, there is any concern about the nature of the wastes imported to site, it will be segregated and transferred to the waste inspection and quarantine facility for closer inspection and classification. A detailed record will be kept of all such inspections. Should inspections and/or subsequent testing indicate that the materials are non-inert and cannot be accepted and used for



restoration purposes at this site, they will be placed in skips and covered pending removal off-site by permitted waste collectors to a suitably licensed / permitted waste disposal or recovery facility.

In addition to the above, a representative sample shall be taken from one in every 500 loads of inert soil accepted at the facility and subjected to a less extensive scope of testing (compliance testing) focusing on key contaminant indicators. These data shall be used to confirm that the accepted soils are inert and comply with acceptance criteria. Compliance testing shall be undertaken by the Applicant.

An outline Waste Handling and Acceptance Plan for this waste facility is provided in Appendix 2.1 of this Environmental Impact Statement.

#### **2.4.2 C&D Waste Recovery Activities**

The processing and/or recovery of C&D waste at the application site will continue to be restricted to stones, granular fill, concrete, blocks, bricks and ceramic tiles. Should any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) occur amongst the C&D waste imported to site, it shall be separated out and temporarily stored in skips prior to removal off-site to appropriately licensed or permitted waste disposal or recovery facilities

Operating procedures at the existing construction and demolition waste facility require all construction and demolition waste forwarded for recovery purposes to be pre-sorted at source, inert and largely free of any non-hazardous / hazardous domestic, commercial or industrial wastes. Any consignments of construction and demolition waste which have such materials intermixed in them will be immediately rejected and removed off site.

### **2.5 ENVIRONMENTAL NUISANCE CONTROL**

#### **2.5.1 General**

Restoration and ongoing construction and demolition waste recovery activities at the application site require a number of environmental controls to eliminate or minimise the nuisance to the public arising from the importation, placement and compaction of inert soils, the importation and recovery of construction and demolition waste and export of processed materials. The proposed environmental control measures are outlined in detail in the following sections.

The restoration works at the application site will ultimately be regulated by conditions attaching to any waste licence issued by the Environmental Protection Agency (EPA). Any additional control measures required by the Waste Licence, in addition to those outlined, will also be implemented.

#### **2.5.2 Bird Control**

As the materials being placed or recovered at the application site are free of putrescible (food / kitchen) waste, site activities are unlikely to attract scavenging birds such as gulls and crows for the duration of the restoration works. Accordingly, it is not intended to implement any specific bird control measures at the site.

In the unlikely event that any putrescible waste is identified among imported materials, it shall be immediately removed to the waste quarantine area pending removal off-site to a licenced waste disposal or recovery facility.

#### **2.5.3 Dust Control**

In dry, windy weather conditions, the ongoing restoration and recovery activities may give rise to dust blows across, and possibly beyond the application site. In order to control dust emissions, the following measures will be implemented:-

- (i) access roads and/or internal roads will be wetted as and when required;
- (ii) the quarry void shall be backfilled and restored in a phased manner and each phase shall be grassed as soon as practicable after placement of cover soils in order to minimise soil erosion and potential dust emissions;

- (iii) the area of bare or exposed soils will, insofar as practicable, be kept to a minimum. Consideration will be given to establishing temporary vegetation cover over temporary surfaces pending final backfilling and restoration to original ground level;
- (iv) all HGV's exiting the site shall be routed through a temporary wheelwash facility at the end of the internal paved site road (refer to Figure 2.2) in order to minimise transport of fines by HGVs on paved internal site roads and the public road network;
- (v) stockpiling of imported soils will be minimized. Soils will ideally be placed and compacted in-situ immediately after being unloaded. If and when temporary stockpiling of soils is required, they will be placed as close as practicable to the centre of the site, away from nearby residences.

The amount of dust or fines carried onto the public road network will be further reduced by periodic sweeping of internal paved site roads and the existing local road leading to the site (Fassaroe Avenue).

#### **2.5.4 Traffic Control**

The proposed backfilling operations at the Fassaroe Plant entail the importation of 620,000 tonnes of material required to fill the void. This translates to a total of 31,000 HGV movements (assuming 20 tonnes per load) to fill the existing quarry void. Roadstone Dublin Ltd has defined a relatively optimistic scenario where it would be possible to fill the void at Fassaroe in just over a one year period. Although it is likely that it will take longer to fill this void, as a result of depressed market demand at the present time, this scenario has been adopted as the worst case traffic impact scenario.

The quarry restoration works will result in an increase in traffic volumes upon Fassaroe Avenue. In the worst case scenario, this increase in traffic volumes will result in an additional 20 No. HGV vehicles during the peak hour period. This will result in a total daily two-way flow of 97 No. vehicles, or 1.5 vehicles a minute. Traffic studies indicate that although the capacity of Fassaroe Avenue has been reduced due to the implementation of traffic calming features, its existing capacity is more than adequate for the projected increase in generated traffic flows.

An assessment was undertaken of the existing Berryfield Roundabout to determine whether any adverse effects such as queuing or delay would be brought about as a result of the waste recovery activities. Traffic studies indicate that in the worst case scenario, there will be minimal queuing and delay at the roundabout and that it is sufficiently sized to cater for the additional traffic that could potentially be generated by the waste recovery facility.

Traffic studies indicate that even in the worst case scenario, there is adequate opportunity scenario for vehicles to enter and exit the residential properties along Fassaroe Avenue without undue delay. As the increase in traffic movements along the access road will increase the possibility of an accident occurring for vehicles exiting these properties, it is proposed to locally realign the road and establish a buffer zone outside these properties, thereby improving road visibility. Details of the proposed re-alignment are provided and discussed further in Chapter 12 of this EIS.

#### **2.5.5 Litter Control**

As the materials being placed or recovered at this site will be largely free of litter, the site restoration and recovery activities are unlikely to give rise to problems with windblown litter. Accordingly, it is not intended to implement any specific litter control measures at the site.

In the unlikely event that any litter waste is identified among imported materials, it shall be immediately removed to the on-site waste quarantine facility pending removal off-site to a licenced waste disposal or recovery facility.

#### **2.5.6 Odour Control**

As the materials being placed or recovered at this site are not biodegradable and do not therefore emit odourous gases, the site restoration and recovery activities will not give rise to odour nuisance. Accordingly, it is not intended to implement any specific odour control measures at the site.

In the unlikely event that any biodegradable waste is identified among imported materials, it shall be immediately removed to the on-site waste quarantine facility pending removal off-site to a licenced waste disposal or recovery facility.

### 2.5.7 Vermin Control

As the materials being placed or recovered at this site are free of putrescible (food / kitchen) waste, site activities are unlikely to attract vermin (rats) for the duration of the restoration works. Accordingly, no specific vermin control measures shall be implemented at the site.

In the unlikely event that any putrescible waste is identified among imported materials, it shall be immediately transferred to the on-site waste quarantine facility pending removal off-site to a licenced waste disposal or recovery facility.

### 2.5.8 Fire Control

As the materials being placed or recovered at this site are free of flammable materials and biodegradable waste which could create a fire or explosion risk, site activities will not present a fire risk for the duration of the restoration works. Accordingly, no specific fire control measures shall be implemented at the site.

Notwithstanding this, the following operational practices will be implemented in order to prevent fire at the application site:

- (i) smoking at the application site and at the site office will be prohibited
- (ii) any biodegradable or flammable waste included in materials imported to site shall be immediately transferred to the on-site waste quarantine facility pending removal off-site to a licensed waste disposal or recovery facility
- (iii) plant and equipment will be removed if they exhibit signs of overheating etc.

In the unlikely event that a fire does occur, the local fire stations in Bray and/or Wicklow will be contacted and emergency response procedures will be implemented. Fire extinguishers (water and foam) will be provided at the site office to deal with any small outbreaks which may occur.

## 2.6 ENVIRONMENTAL MONITORING

### 2.6.1 General

There is an established programme of environmental monitoring at the application site which complies with requirements of the existing waste permit issued by Wicklow County Council. In addition, Roadstone Dublin operates an environmental management programme to monitor and manage emissions for the adjacent aggregate processing and concrete production facilities. No limit values for environmental emissions arising from established activities are identified by existing waste permits or planning permissions. It is expected that such limits will be set by the EPA should it decide to issue a waste licence in respect of the waste recovery facility.

Environmental sampling, monitoring and testing will largely be undertaken by the Applicant's in-house environmental staff as required. Records of environmental monitoring and testing will be maintained on-site and will be forwarded to the EPA as required under the terms of the waste licence. A site plan showing all proposed environmental monitoring locations is provided in Figure 2.11.

### 2.6.2 Dust Monitoring

Dust emissions from all established activities within Roadstone Dublin's landholding are currently measured on a quarterly basis using Bergerhoff dust gauges at 2 No. locations across the site, shown on Figure 2.1. These gauges are located close to existing emission sources within the landholding and are considered to represent an upper bound on dust emission levels from established site activities.

It is currently envisaged that the two existing dust monitoring stations will be supplemented by a third close to the northern boundary of the application site and Roadstone landholding. These

dust monitoring stations will remain in place for the duration of the site restoration works and for as long as waste recovery / aftercare management activities continue thereafter.

### 2.6.3 Ecological Monitoring

In the absence of any rare or vulnerable species of flora or fauna at, or in the immediate vicinity of, the application site, it is not intended to undertake any ecological monitoring during the site restoration works.

### 2.6.4 Groundwater Monitoring

3 No. groundwater monitoring wells have recently been installed across Roadstone Dublin's landholding at Fassaroe (in December 2008). At the present time, it is envisaged that groundwater sampling and testing will be undertaken by external consultants on a bi-annual basis at the 3 No. groundwater monitoring wells within the application site. Groundwater levels will also be recorded on a bi-annual basis. The location of the existing groundwater monitoring wells is indicated in Figure 2.11.

Groundwater samples are currently tested for a wide range of physical and chemical parameters in order to assess water quality and detect possible contamination at the site. Further detail on these data is presented in Section 6 of this Environmental Impact Statement.

It is currently envisaged that the existing groundwater monitoring regime will remain in place for the duration of the site restoration works. Groundwater sampling and monitoring will continue as long as backfilling activities continue and for a short period thereafter.

### 2.6.5 Landfill Gas Monitoring

In the absence of biodegradable waste amongst the inert materials used to backfill and restore the application site, no landfill gas can be generated and accordingly no provision has been made for landfill gas monitoring at this facility.

### 2.6.6 Leachate Monitoring

In the absence of biodegradable waste amongst the inert materials used to backfill and restore the application site, no leachate can be generated and accordingly no provision has been made for leachate monitoring at this facility.

### 2.6.7 Meteorological Monitoring

At the present time, no meteorological monitoring is undertaken at the application site. It is understood that temperature, rainfall, sunshine, wind speed and direction are recorded at the weather station in Baldonnell, Co. Dublin, approximately 22km west northwest of the application site.

It is currently envisaged that representative meteorological data will be acquired from weather stations at Casement Aerodrome, as and if required.

### 2.6.8 Noise Monitoring

Noise emissions from established restoration and recovery activities are currently monitored on a quarterly basis (i.e. three monthly) basis at 4 No. noise sensitive sites around Roadstone Dublin's existing landholding, between existing noise emission sources and nearest sensitive receptors, all of which are private residential property. The existing noise monitoring locations are indicated in Figure 2.11.

It is currently envisaged that the existing noise monitoring regime will remain in place for the duration of the site restoration works and for as long as other production activities continue on site thereafter.

Noise monitoring will be undertaken using a Larson Davis Model 824 Sound Level Meter, calibrated using a Larson Davies Acoustic Calibrator CAL 200 (or equivalent).

### 2.6.9 Odour Monitoring

As the materials being placed or recovered at this site are not biodegradable and do not therefore emit odourous gases, the site restoration and recovery activities will not give rise to odour nuisance. Accordingly, no provision has been made for odour monitoring at this facility.

Site staff will report and record any odour emissions at the site in the highly unlikely event that a complaint is made about odours emanating from the site.

### 2.6.10 Surface Water Monitoring

It is envisaged that surface water sampling and testing will be undertaken by external consultants on a bi-annual basis (i.e. six monthly) basis at the southern pond on the quarry floor. The location of the proposed surface water monitoring location is indicated on Figure 2.11.

Surface water samples will be tested for a wide range of physical and chemical parameters in order to assess water quality and detect possible contamination at the site. Further detail is presented in Section 6 of this Environmental Impact Statement.

It is currently envisaged that the surface water monitoring regime will remain in place for as long as these surface water bodies remain at the application site (ie. until they are backfilled with inert materials).

### 2.6.11 Stability and Settlement Monitoring

On completion of each phase of restoration, a number of fixed stations will be set into the ground surface across the restored area and will be surveyed annually in order to assess the magnitude of settlement and instability (lateral movement), if any, which may subsequently arise.

Temporary slopes, both in natural in-situ soil along the perimeter of the former extraction area and in the restoration soils will be visually inspected on an ongoing basis, at least once a month by site staff and a record will be kept of same. Should these inspections give cause for concern, an inspection of the affected area will be undertaken by an appropriately qualified engineer and measures will be implemented to address any instability identified.

Following completion of restoration works and closure of the facility, stability and settlement monitoring will be undertaken only if required by the waste licence.

## 2.7 FINAL RESTORATION AND AFTERCARE

The principal activity undertaken at the application site is restoration of lands within a former sand and gravel quarry. As previously noted in Section 2.3.14, the application site will be restored on a phased basis to give a landform which merges into the surrounding undulating landscape, refer to final site contour map in Figure 2.4. An outline of the proposed phasing plan is provided in Figure 2.5.

On completion, the final landform will be profiled to facilitate surface water run-off over the ground surface or into the in-situ sand and gravels beyond the site boundary, refer to the final site contour map in Figure 2.4. The final landform will be planted with grass in order to promote stability and minimise soil erosion and dust generation and the lands will be progressively restored to use as agricultural grassland.

Following completion of the quarry backfilling and restoration and any related decommissioning works, provision will be made for further, short-term (<1year) environmental monitoring of air, surface water and groundwater.

Recovery of C&D waste at this facility will continue for the duration of the site backfilling and restoration activities. It is currently envisaged that C&D waste recovery activities will continue thereafter, either as a permitted or licenced waste activity and consequently all associated plant, equipment and infrastructure will remain in place.

Wherever possible, hardstanding surfaces will be broken up using a hydraulic breaker and subjected to validation testing to confirm the materials are acceptable for re-use within the



Applicant's landholding for construction of internal haul roads and/or hardstanding areas. Any materials which are found to exceed inert waste criteria will be transferred-off site to a suitably licensed waste disposal or recovery facility.

## 2.8 CONTINGENCY ARRANGEMENTS

Details of existing contingency arrangements at the application site are provided in the contingency plan, a copy of which is provided in Appendix 2.2 of this report.







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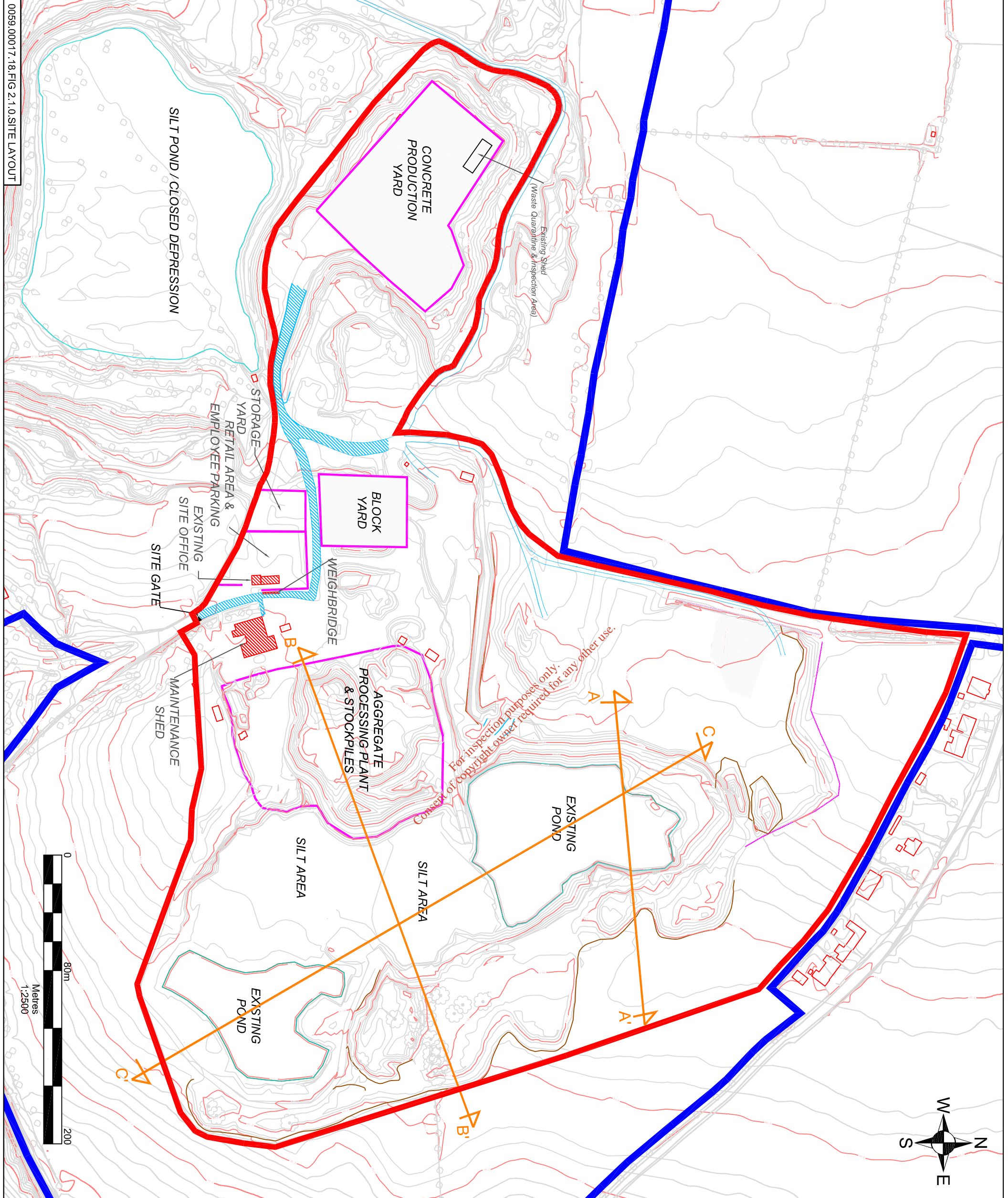
**FIGURES**

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**LEGEND**

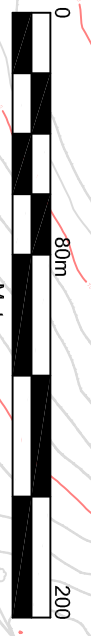
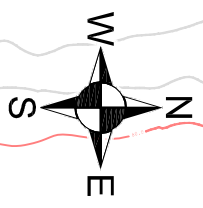
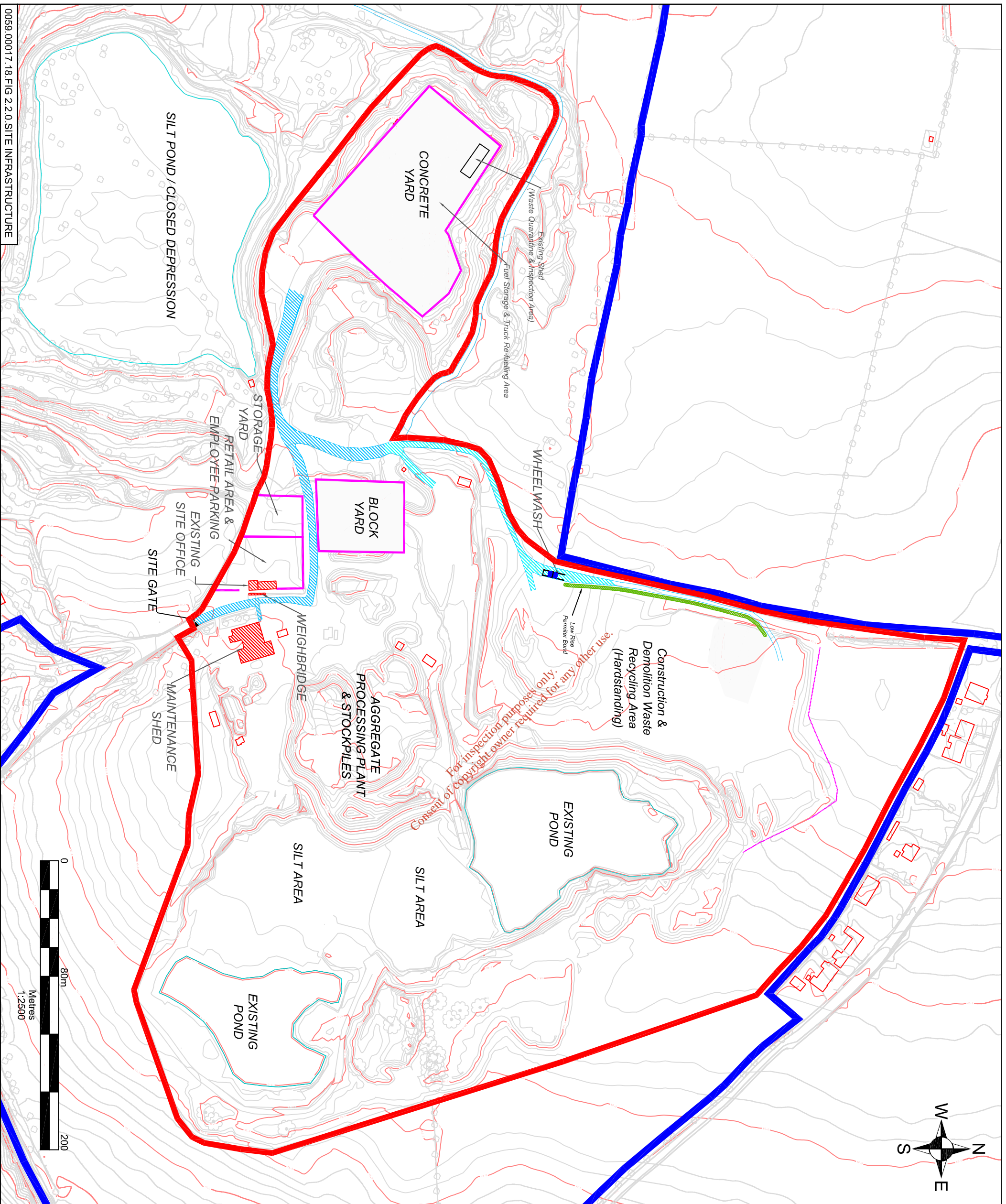
	Applicant's Land Interest (c. 65.1 ha)
	Waste Licence Application Area (c. 21.4 ha)
	Internal Unpaved Road
	Internal Paved Road
	Building
	Cross Sections



0059,00017,18,FIG 2.1,0,SITE LAYOUT

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<b>ROADSTONE DUBLIN LTD.</b> WASTE LICENCE APPLICATION FASSAROE WASTE RECOVERY FACILITY FASSAROE, BRAY, CO. WICKLOW <b>EXISTING SITE LAYOUT</b>	
<b>FIGURE 2.1</b>	
Scale 1:2,500 @ A3	Date APRIL 2009





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**LEGEND**

	Applicant's Land Interest (c. 65.1 ha)
	Waste Licence Application Area (c. 21.4 ha)
	Internal Unpaved Road
	Internal Paved Road
	Building

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SITE INFRASTRUCTURE LAYOUT




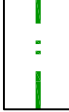

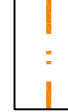
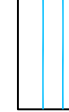
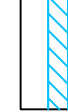
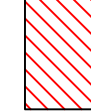

**FIGURE 2.2**

Scale 1:2,500 @ A3 Date APRIL 2009



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**LEGEND**

	Applicant's Land Interest (c. 65.1 ha)
	Waste Licence Application Area (c. 21.4 ha)
	Overhead Cables
	Buried Cables
	Dublin City Council Watermain
	Water Supply Pipeline
	Internal Unpaved Road
	Internal Paved Road
	Building
	Septic Tank

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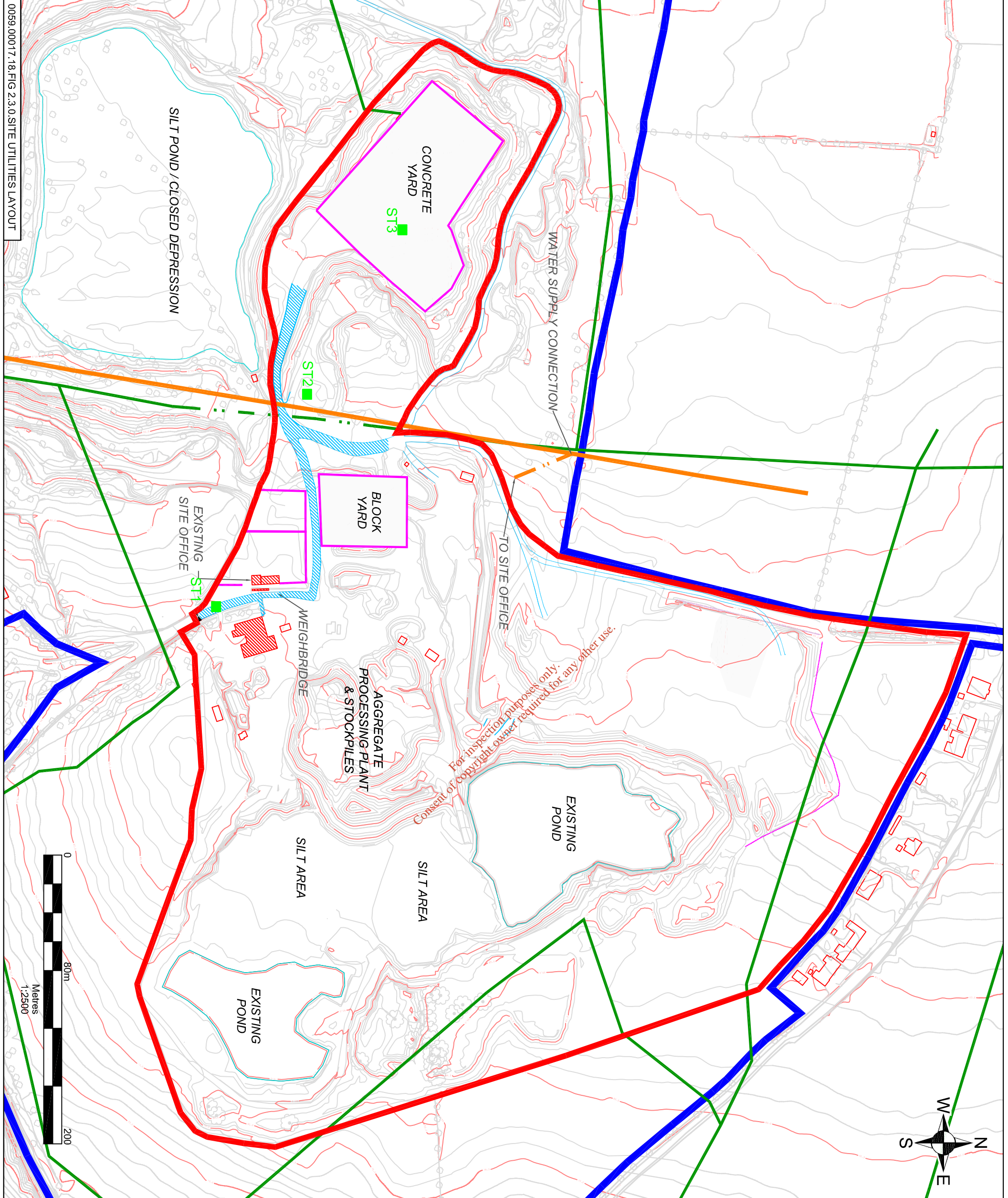
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**SITE UTILITIES LAYOUT**

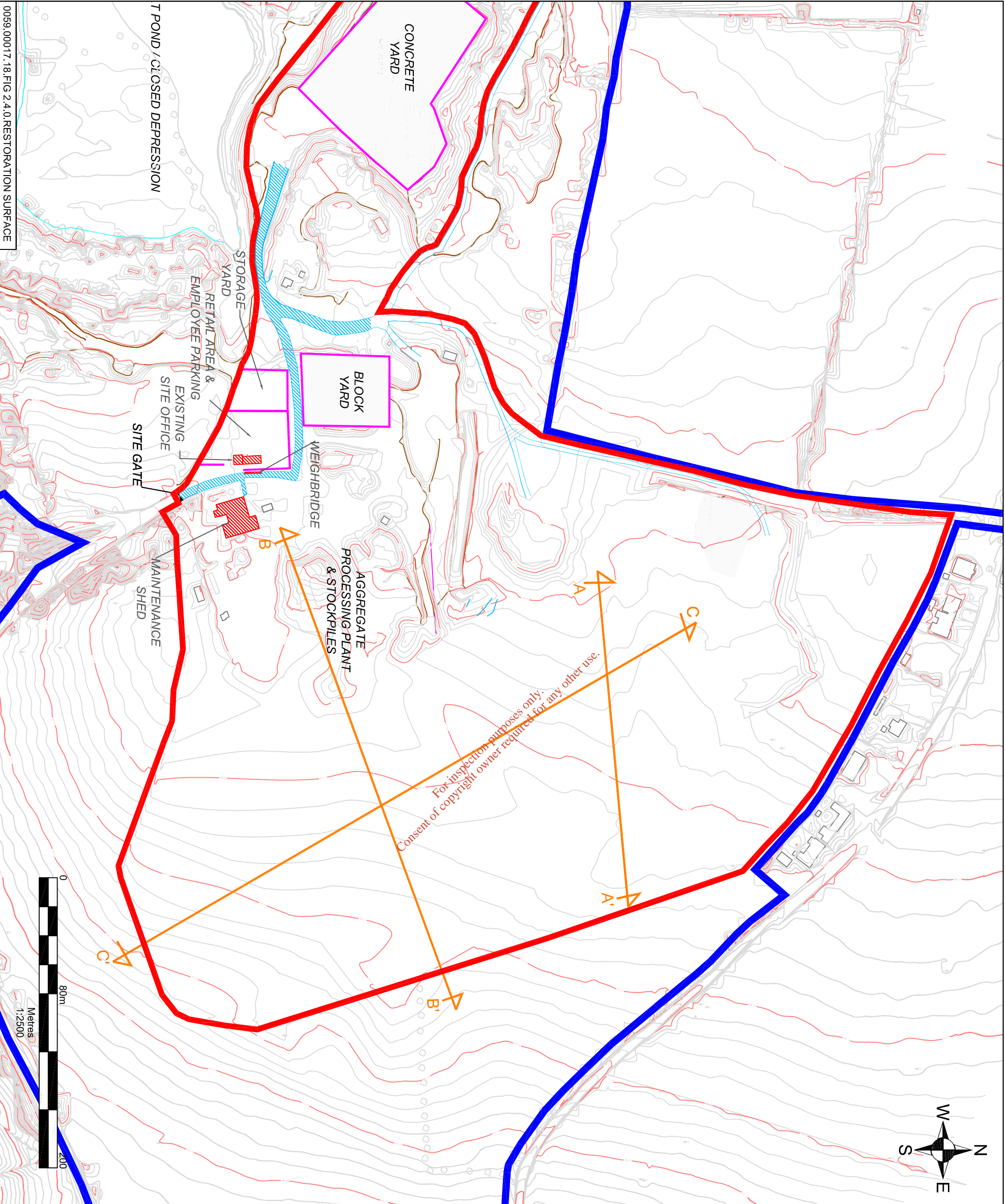
**FIGURE 2.3**

Scale 1:2,500 @ A3 Date APRIL 2009



0059,00017,18,FIG.2.3.0.SITE UTILITIES LAYOUT





**NOTES**

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**LEGEND**

- Applicant's Land Interest (c. 65.1 ha)
- Waste Licence Application Area (c. 21.4 ha)
- Internal Unpaved Road
- Internal Paved Road
- Building
- Cross Sections

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FASSAROE WASTE LICENCE FACILITY  
FASSAROE, BRAY, CO.WICKLOW  
RESTORATION SURFACE

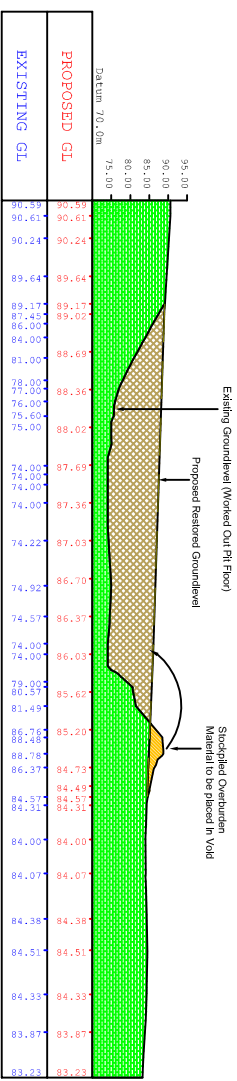
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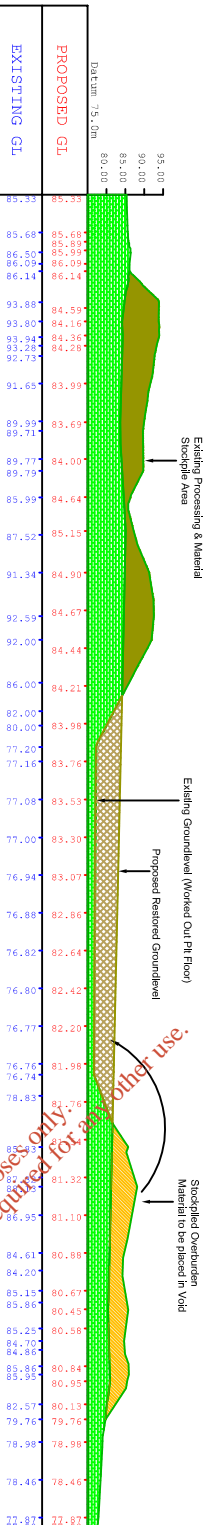
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**FIGURE 24**

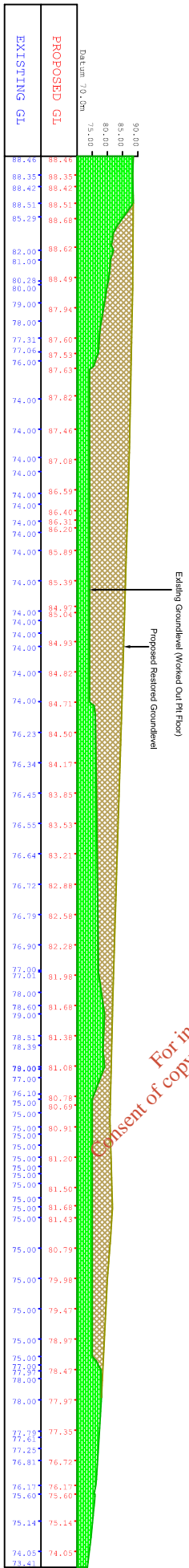
0059.00017.18.FIG 2.4.0.RESTORATION SURFACE



Section A-A'

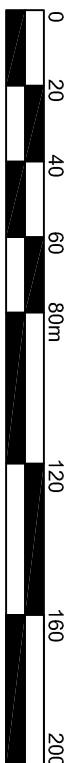



Section B-B'




Section C-C'

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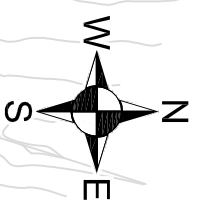
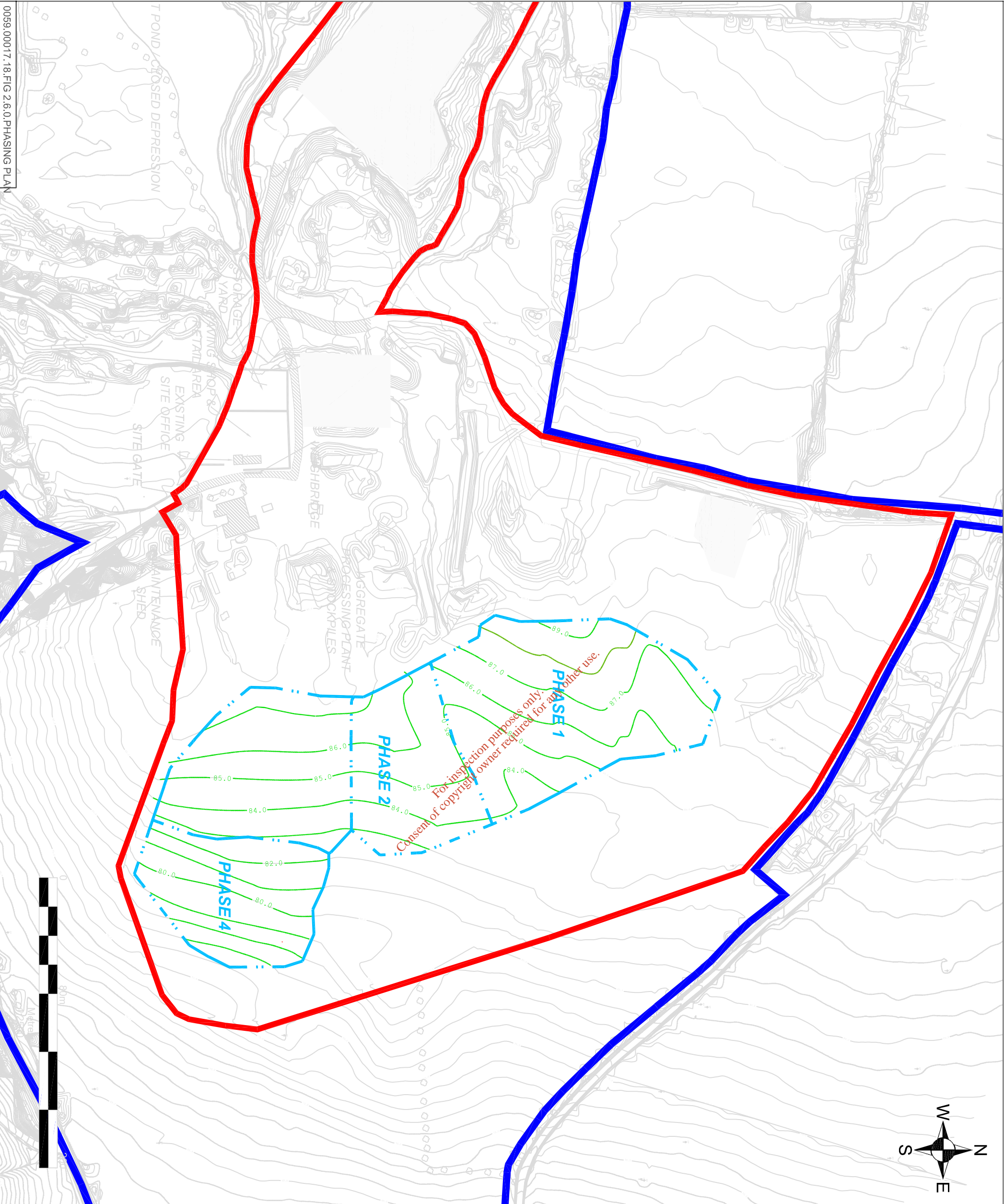
**RESTORED CROSS SECTIONS**

**FIGURE 2.5**

Scale 1:2,000 @ A3

Date APRIL 2009





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**LEGEND**

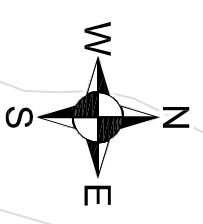
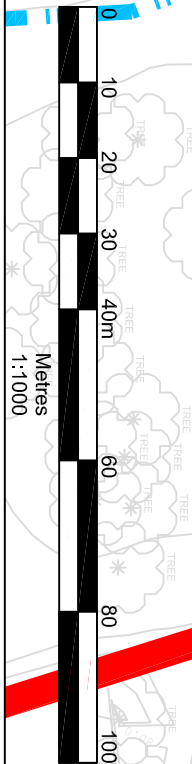
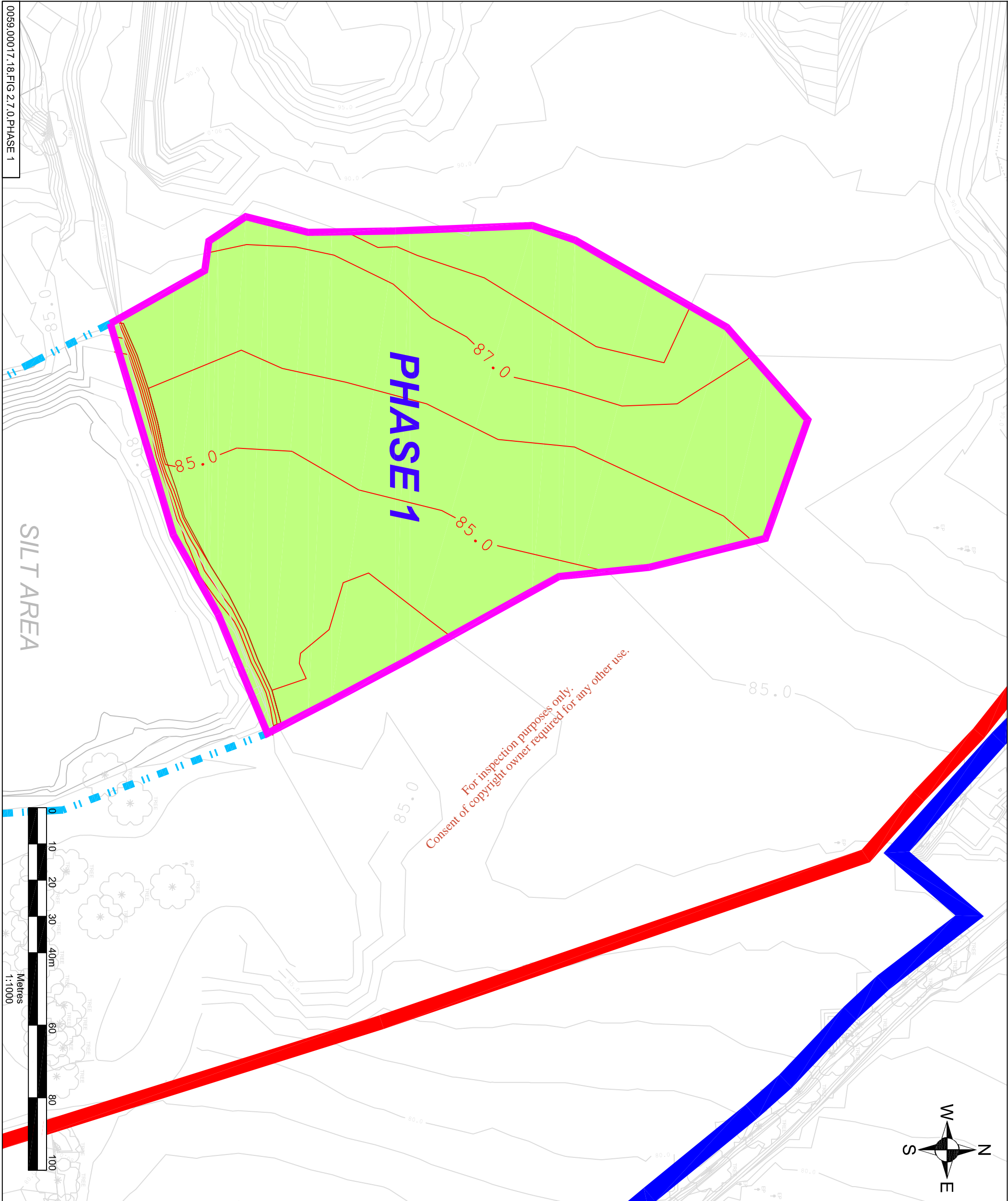
	Applicant's Land Interest (c. 65.1 ha)
	Waste Licence Application Area (c. 21.4 ha)
	Restoration Area
	Restoration Contours 85.0

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PHASING PLAN  
**FIGURE 2.6**

Scale 1:2,500 @ A3  
Date APRIL 2009



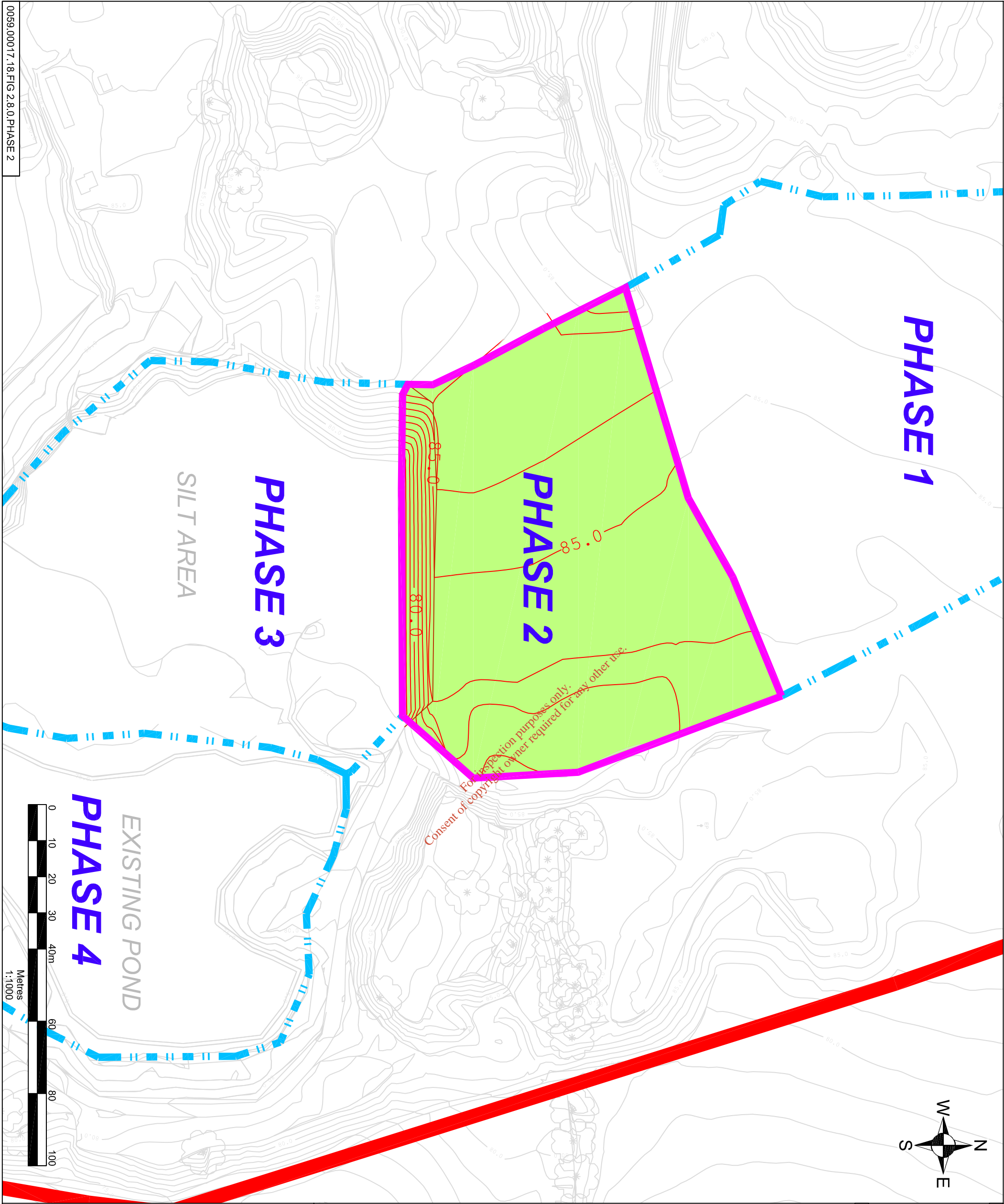
- NOTES**
1. Based on OSI 6inch sheet no. 21
  2. Ordnance Survey Ireland Licence no. SU 0000709 (c) Ordnance Survey of Ireland & Government of Ireland
  3. Volume of Fill in Phase 1 is 160,403m<sup>3</sup> equivalent to 288,725 Tonnes

**LEGEND**

	Applicant's Land Interest (c. 65.1 ha)
	Waste Licence Application Area (c. 21.4 ha)
	Restored Area

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ROADSTONE DUBLIN LTD. WASTE LICENCE APPLICATION FASSAROE WASTE RECOVERY FACILITY FASSAROE, BRAY, CO. WICKLOW PHASE 1 FILLED TO FINAL LEVELS <b>FIGURE 2.7</b>	
Scale 1:1,000 @ A3	Date APRIL 2009





0059.00017.18.FIG 2.8.0.PHASE 2

**PHASE 1**

**PHASE 3**

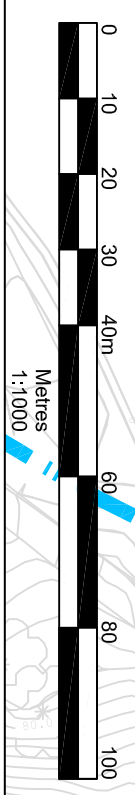
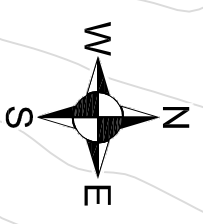
**PHASE 2**

**PHASE 4**

EXISTING POND

SILT AREA


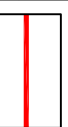
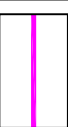
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3. Volume of Fill in Phase 2 is 74,903m<sup>3</sup> equivalent to 134,825 Tonnes

**LEGEND**

-  Applicant's Land Interest  
(c. 65.1 ha)
-  Waste Licence Application Area  
(c. 21.4 ha)
-  Restored Area



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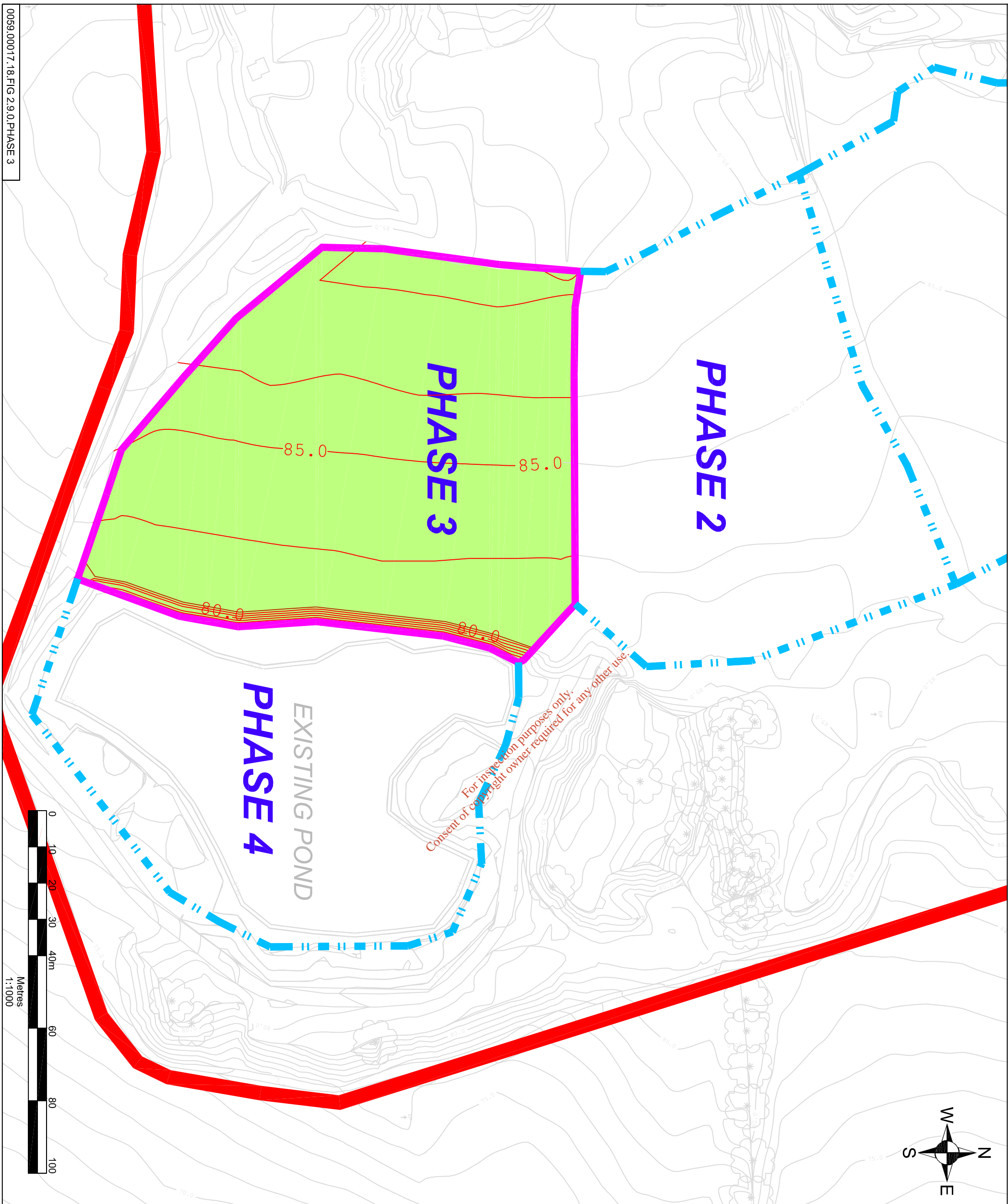


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PHASE 2 FILLED TO FINAL LEVELS  
**FIGURE 2.8**



Scale 1:1,000 @ A3 Date APRIL 2009







- NOTES**
1. Based on OSI 6inch sheet no. 21
  2. Ordnance Survey Ireland Licence no. SU 0000709 (c) Ordnance Survey of Ireland & Government of Ireland
  3. Volume of Fill in Phase 3 is 91,450m<sup>3</sup> equivalent to 164,610 Tonnes

**LEGEND**

	Waste Licence Application Area (c. 21.4 ha)
	Restored Area

  
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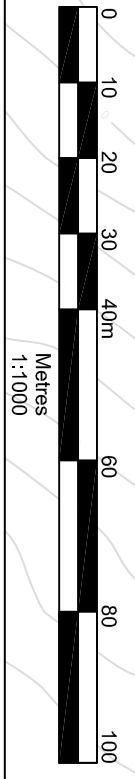
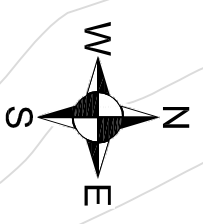
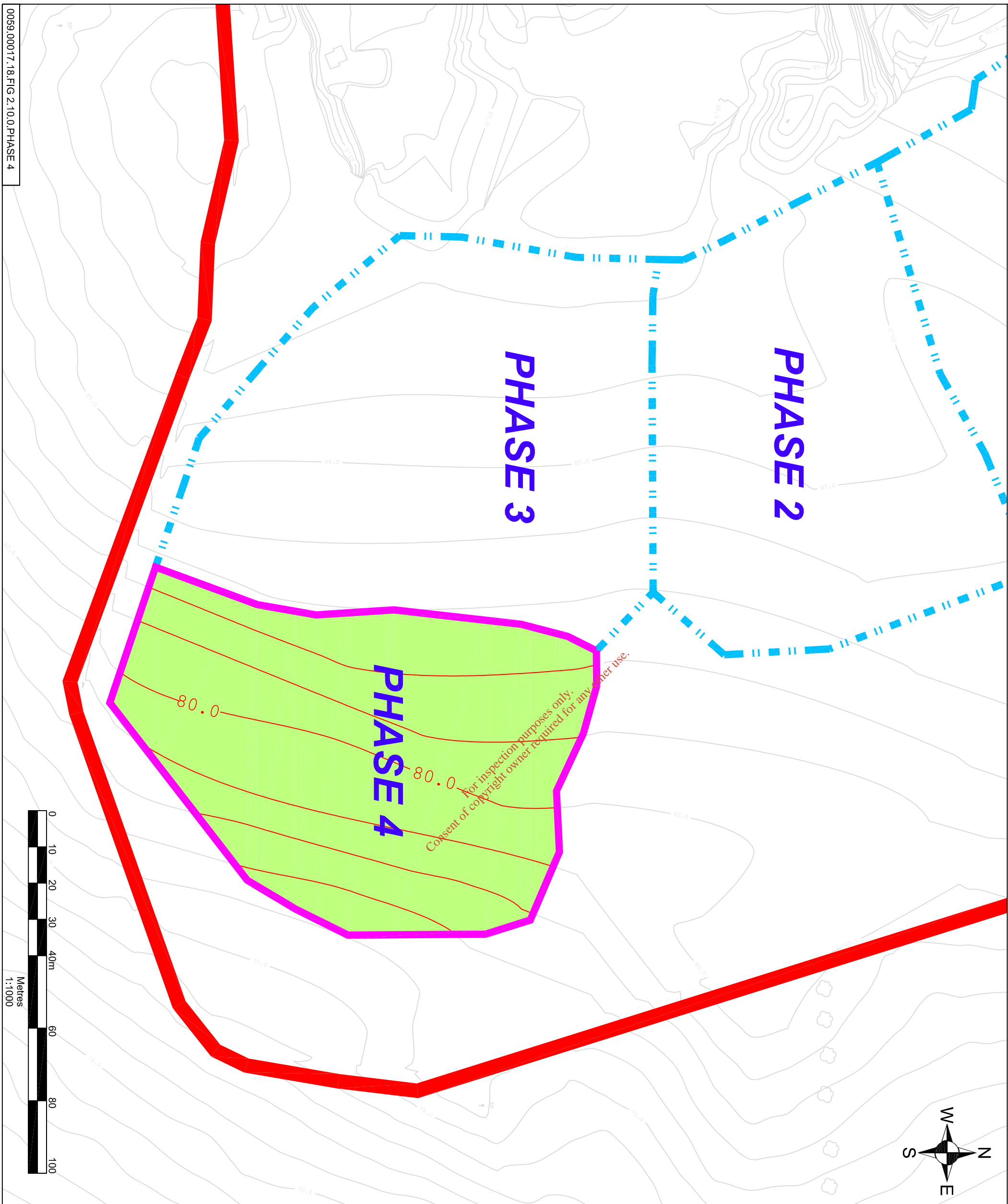


  
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 PHASE 3 FILLED TO FINAL LEVELS

**FIGURE 2.9**



Scale 1:1,000 @ A3 Date APRIL 2009




**NOTES**


1. Based on OSI 6inch sheet no. 21
2. Ordnance Survey Ireland Licence no. SU 0000709 (c) Ordnance Survey of Ireland & Government of Ireland
3. Volume of Fill in Phase 4 is 41,565m<sup>3</sup> equivalent to 74,817 Tonnes

**LEGEND**

-  Waste Licence Application Area (c. 21.4 ha)
-  Restored Area



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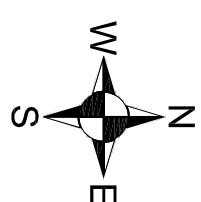
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**PHASE 4 FILLED TO FINAL LEVELS**

**FIGURE 2.10**

Scale 1:1,000 @ A3 Date APRIL 2009

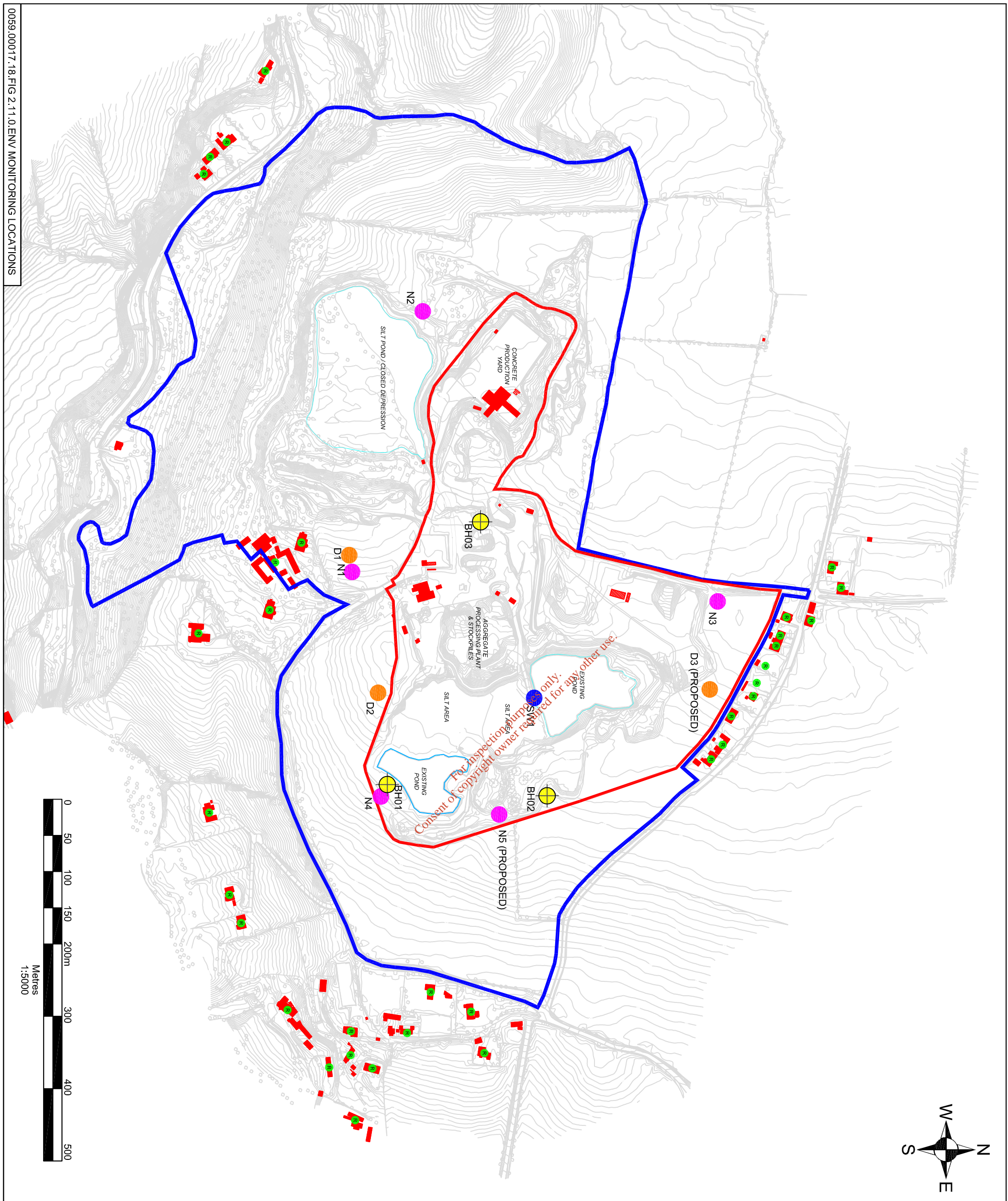




- NOTES**
1. Based on OSI 6inch sheet no. 21
  2. Ordnance Survey Ireland Licence no. SU 0000709  
(c) Ordnance Survey of Ireland & Government of Ireland

**LEGEND**

	Applicant's Land Interest (c. 65.1 ha)
	Waste Licence Application Area (c. 21.4 ha)
	Location of Residences
	Building
	Noise Monitoring Locations
	Dust Monitoring Locations
	Groundwater Monitoring Location
	Surface Water Monitoring Location



0059.00017.18.FIG 2.11.0.ENV MONITORING LOCATIONS

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LOCATIONS

**FIGURE 2.11**

Scale 1:5,000 @ A3 Date APRIL 2009