Construction Environmental Management Plan (CEMP)

Proposed Residential Development at Monacnapa, Blarney, Co. Cork

Applicant:- Mr. Eoin Sheehan

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1.0 Introduction

OLS Consulting Engineers werecommissioned by Mr. Eoin Sheehan to prepare a PreliminaryConstruction Environmental Management Plan (CEMP) for submission as part of a Planning Permission Application for a proposed residential development at Monacnapa, Blarney, Co. Cork.

The CEMP is an integral part of the site health, safety, environmental and quality management system and constitutes a component of the Construction Management Plan documentation. The CEMP is also subject to the requirements of the site quality management system with respect to documentation control, records control and other relevant measures.

This plan has been prepared taking account of the many guidance documents on the management and minimisation of construction and demolition waste including:-

- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (Department of Environment, Heritage and Local Government, July 2006).
- CIRIA document ï 133 Waste Minimisation in Construction.
- CIRIA document ï Guidelines Control of Water Pollution from Construction Sites ï Guide to Good Practice.

This report sets out the specific requirements and responsibilities that need to be addressed during the course of the project. It identifies the environmental considerations associated with the construction stage activities and outlines process work practices, management, mitigation and monitoring strategies to ensure the project is carried out in accordance with best practice, minimum impact on the surrounding environment and maximum safety throughout the duration of the project works.

The plan also details the plans, procedures and responsibilities pertaining to the management of Construction and Demolition Waste arising during the course of the project. The Applicant is aware that the costs of construction materials and waste disposal have increased dramatically over the last decade. However, there is not only a strong commercial case for reducing waste, but attention to site waste also plays an essential part in improving overall environmental performance.

A final CEMP cannot be issued until all appropriate permissions have been granted and any further consultants being appointed as required. The CEMP is considered a ódiveô document and as such will be reviewed on a regular basis. Updates to the CEMP may be necessary due to any changes in environmental management practices and/or contractors. The procedures agreed in the latest revision of the CEMP will be audited regularly throughout the construction phase to ensure compliance.

There has been no consultation to date with waste disposal sites with regard to the acceptance of waste arising from the Project, however, final arrangements for the disposal of all waste will be subject to commercial considerations and the possession of each site/facility of the necessary regulatory permissions to accept the particular waste type.

1.1 Project Description

The subject site comprises c7.79 hectares to the northwest of Blarney village. The site is currently in agricultural use and slopes in a southerly direction towards the village. The site is bounded to the east by existing residential housing estates and by similar agricultural lands to the north and west. There is mature forestry to the south.

The proposed development will consist of a strategic housing development of 143no. residential units (8no. 1-bed; 38no. 2-bed; 71no. 3-bed; and 26no. 4-bed units), comprising 105no. houses (3no. detached; 42no. semi-detached; and 60no. terraced units) and 38no. apartments.

The proposed development will also consist of the demolition of an existing garage and southern boundary wall, to be replaced with a new southern boundary wall, as well as the lowering of the existing eastern boundary wall and pier, at no. 1 Sunberry Drive; a crèche; all associated ancillary site development and landscaping works, to include bin stores, bicycle and car parking, ground works and retaining structures, foul drainage, stormwater drainage, water supply, service ducting and cabling, public lighting, relocation of existing ESB substation, and all boundary treatments.

The proposed development is to be accessed via the existing Sunberry Heights/Sunberry Drive off the Blarney Relief Road (R617). An upgrade is proposed to the existing Sunberry Heights/Sunberry Drive and the existing access to the proposed strategic housing development, including the widening of the footpath at the junction with the Blarney Relief Road (R617), raised platforms, security barriers and fencing as necessary, road markings, and road resurfacing to facilitate improved pedestrian/cycle connectivity.

2.0 Phases of Development

The proposed development will be constructed in four phases in accordance with the phasing strategy set out in the Architectôs Design Statement that accompanies this planning application. Development will start from the south and east of the site and develop firstly towards the north and then anticlockwise to the northwest and southwest areas of the site.

- **Phase 1-Southeast Area of the Site**

Phase 1 will comprise of the construction of 38no. dwellinghouses varying from 2 storey height to 3 storey height. Phase 1 will also involve the construction of the childcare facility.

Site setup and site mobilisation will also be undertaken in Phase 1 which will involve the establishment of a contractors compound, site offices, securing of the construction site, erection of signage for site security purposes, site clearance, and the putting in places of surface water management and waste management measures.

- **Phase 2 - Northeast Area of the Site**

Phase 2 will comprise of the construction of 29No. dwellinghouses, mainly 2 storey and split level houses as well as 4No. apartments split into two blocks (one up/one down typology).

- **Phase 3 - Northwest Area of the Site.**

Phase 3 will comprise of the construction of 20No. dwellinghouses, mainly 2 storey and split level houses as well as 4No. Apartments split into 2 blocks (one up/one down typology).

- **Phase 4 - Southwest Area of the Site.**

Phase 4 will comprise of the construction of 18No. dwellinghouses varying from 2 storey height to 3 storey height. Phase 4 will also comprise of the construction of 2No. apartment blocks containing 15No. apartments in each block.

Within each phase of the development works, the provision of services and site infrastructure will be developed as required by each phase of development. This will involvethe laying of new sewers and water mainswithin the site, the provision of footpaths, lighting and roadways. As part of any works (i.e. provision of services) along the public areas/roads in the vicinity of the site, it will be ensured that the surface of the roads/areas will be re-instated to a high standard.

The construction of the residential units will, to a certain degree respond to the demand/sale of the units involved, however, it is anticipated that the units will be constructed/completed over a 2 year period and will involve up to 90 no. construction staff (depending on the number of units being constructed at any one time).

3.0 Proposed Construction Methodology and likely Raw Material Usage

The development of the proposed residential development will require a variety of construction methodologies. The anticipated elements of construction will be as follows:-

- Securing the Site on all Boundaries.
- Establishing Site Offices & Compound.
- Identification and Isolation of Existing Services serving the Site.
- Site Clearance of the Site.
- Site Preparation
- Construction of new Dwellings
- Installation of Drainage and Site Services
- Laying of Site Infrastructure (Roads, Footpaths, etc.)
- Landscaping

All personnel involved with the project will receive an on-site induction relating to site operations, to re-emphasize the precautions that are required as well as the mitigation measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures.

A detailed Construction and Environmental Management Plan (CEMP) will be developed by the appointed Contractors. The principal measures which will be set out in the CEMP are summarised below. Construction best practice measures will be implemented throughout the project, including the preparation and implementation of detailed method statements.

The works will incorporate the relevant elements of the guidelines outlined below:-

- NRA (2010) Guidelines for the Management of Noxious Weeds and Non- Native Invasive Plant Species on National Roads. National Roads Authority, Dublin.
- H. Masters-Williams et al (2001) Control of water pollution from construction sites. Guidance for consultants and contractors (C532). CIRIA.
- E. Murnane, A. Heap and A. Swain. (2006) Control of water pollution from linear construction projects. Technical guidance (C648). CIRIA.
- E. Murnane et al., (2006) Control of water pollution from linear construction projects. Site guide (C649). CIRIA.

All staff and subcontractors shall have the responsibility to:-

- Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts,
- Understand the importance of avoiding pollution on-site, including noise and dust, and how to respond in the event of an incident to avoid or limit environmental impact;
- Respond in the event of an incident to avoid or limit environmental impact;
- Report all incidents immediately to their line manager;
- Monitor the work place for potential environmental risks and alert the immediate line manager if any are observed; and
- Co-operate as required, with site inspections.

3.1 Securing the Site and Site Mobilisation

During the construction phase all boundaries will be secured with Heras Fencing which will initially be erected inside the existing site boundaries for security purposes. This will need to be relocated when the necessary boundary treatments are being undertaken/completed and the new entrance is being constructed.

It is envisaged that construction access will belimited to the existing entrance to the site until such time as the new entrance is formed. This will be finalised once a contractor is appointed and a programme/methodology for executing the works has been finalised.

Normal Site Working Hours will be 7.00am to 6.00pm Monday to Friday and 8.00am to 2.00pm on Saturday and not at all on Sundays and Public Holidays. Any deviation from thesetimes will be submitted to the City Council for approval.

3.2 Construction Compound

A construction compound will be created for the duration of the construction phase for the storage of materials, plant and equipment and for site offices. The compound area will consist of a crushed stone working platform, utilities, offices, welfare facilities and stores. The compound will be located towards the southwestern boundary such that there is sufficient separation between the compound and the dwellings on Sunberry Heights.

The site will require temporary connections for water and a connection to the Foul Sewer on the nearby Estate Road. It may be decided to install the permanent connections on the Estate Road to minimise disruption on the Public Road during the initial site setup and mobilisation phase. It will also be necessary to provide temporary power to the Site which will include the installation of a temporary distribution board on site.

Following completion of the works; all construction materials will be removed from the compound, all temporary services decommissioned and disconnected and the area will be reinstated with finishes (e.g. topsoil) consistent with the landscaping features as identified in the Site Landscaping Plan.

3.3 Waste Arising

Given the nature of the Project and the construction methodologies outlined above; it is anticipated that the main waste types generated during the construction phase of the project will be general Construction and Demolition Waste. There will also be some waste materials generated in the clearing and stripping of the site to formation level.

Quantities of general construction and demolition waste such as wood, packaging, metals, plastics, bricks, blocks, canteen waste, some hazardous wastes (e.g. oils, paints and adhesives), site clearance and residual wastes will be generated during the construction phase.

Whilst it is difficult to predict at this stage precise tonnages of these wastes, an estimation of the composition of waste materials generated by a typical Irish Construction Site from the EPA National Database Report are presented by Table 2.2 below. A more detailed estimate of the anticipated quantities of these materials will be provided in the detailed waste

management plan following completion of the detailed design and the appointment of a contractor to execute the works.

TABLE 1 - C&D COMPOSITION FROM TYPICAL IRISH CONSTRUCTION SITE (EPA 2004)

Waste Type	**%**
Soil and Stones	71.0
Concrete, Bricks, Tiles, Ceramics, Plasterboard	21.0
Asphalt, Tar and Tar Products	1.5
Metals	1.5
Other Wastes	5.0
Total Wastes	**100.0**

4.0 Proposals for Minimisation, Reuse, Recycling and Management of C&D Waste

4.1 Waste Handling

The primary aim of this Plan is to ensure that the wastes generated in the course of the project are managed in a systematic manner in accordance with the governing Waste Management Legislation and the principles of the Waste Management Hierarchy i.e. prevention, minimisation, reuse, recovery and recycling.

Wastes generated on the construction site must be identified and segregated in accordance to their category as described by the European Waste Catalogue (EWC). In order to effect this, designated Waste Storage Areas will be created in the construction site compound or other suitable location on site for the storage of segregated wastes prior to their transport for recovery/disposal at suitably licensed/permitted facilities.

Suitably sized containers/skips will be provided for each waste stream and will be supervised by the Contractor appointee who will be responsible for the management of wastes during the entire project. Source segregation of wastes will result in cost savings to the Project as well as providing an environmentally sound route for the management of all C&D wastes.

Under the Waste Management (Collection Permit) Regulations 2007 a waste collection permit, for the appropriate EWC Code(s) and destinations is required by a waste haulier to transport waste from one site to another. Compliance with the Waste Management (Movement of Hazardous Waste) Regulations, 1998 is also required for the transportation of hazardous waste by road. The export of waste from Ireland is subject to the requirements of the Waste Management (Shipment of Waste) Regulations 2007. The Contractor will ensure that the transport and movement of all wastes are carried out in compliance with these requirements.

Waste may only be treated or disposed at facilities that are licensed to carry out that specific activity, (e.g. chemical treatment, landfill, incineration, etc.) for a specific waste type. Records of all waste movements and associated documentation should be held on site.

It is planned that the only waste activities to be undertaken at the site will comprise of source segregation, storage and collection and therefore, no waste licensable and waste permissible activity will be undertaken at the site.

In order to prevent and minimise the generation of wastes; the Contractor will be required to ensure raw materials are ordered so that thetiming of the delivery, the quantity delivered, and the storage is not conducive to the creation of unnecessary waste.

It is essential that the construction work planning is carried out closely with the waste management contractors in order to determine the best techniques for managing waste and to ensure a high level of recovery of materials for recycling. The Contractor will be required to continuously seek to improve the waste management process on site during all stage of the project. Construction Waste Management should also be included as an agenda Item at the weekly construction meetings so that the Plan is communicated to all parties involved in the construction project.

An overview of the methods to manage the primary waste streams is presented below.

- **Excavated Clay, Soil and Stones**

Excavated soils, clay, and rock will be loaded directly to vehicles for removal from site for off-site disposal. Topsoil will be stockpiled on site for reuse in soft landscaping.

- **Concrete**

Waste concrete will arise during the demolition works. Consideration will be given to crushing and screening this material for reuse within the site as fill material required as part of the site infrastructure, but this will be dependent on its suitability, quantity and viability of using this material as a fill material. Alternatively, the waste concrete will be loaded directly to vehicles for off-site disposal.

The necessary permissions for any crushing and screening activities should they be required will be discussed with the environment department of the local authority prior to any works being undertaken.

Smaller quantities of waste concrete may arise during the construction phase and where possible this will be returned to the supplier for reuse.

- **Metals**

During the construction phase, the primary source of metal waste is rebar. Wastage of rebar will be reduced by ordering made to measure rebar from the manufacturer and detailing rebar schedules for all reinforced concrete structural elements.

When the waste metal storage containers are full; they will be removed by the waste storage contractor and sent to a metals recycling facility.

- **Timber**

Timber waste will be stored separately as it is readily contaminated by other wastes and if it is allowed to rot will reduce the recyclability of other stored wastes. Any pallets will be returned to the supplier for reuse. Off-cuts and trimmings will be used in formwork where at all possible. A container for waste wood, covered where possible, will provided in the Site Compound. This waste wood will be collected by a waste contractor who will forward it to a wood recycling facility for chipping.

- **Packaging & Plastic**

Packaging waste can become a major problem on a construction site. Double handing will be avoided by segregating packaging immediately after unwrapping. Many suppliers are now prepared to collect their packaging for recycling, and this will also be investigating prior to works commencing. Waste packaging will be segregated and stored in separate containers, preferably covered, in the Site Compound Area for collection and distribution to packaging recycling facilities.

- **Blocks, Bricks & Tiles**

The careful storage of these raw materials will significantly reduce the volume of this waste arising on site. The most likely wastes produced will be off-cuts, trimmings and wastes from breakages. Every effort will be made to use broken bricks and off-cuts.

- **Hazardous Wastes**

Hazardous liquid waste arisings from the construction process will require careful handling. Oil, paints, adhesives and chemicals will be kept in a separate contained storage area which will be locked when not in use. Lids will be kept on containers in order to avoid spillage or waste by evaporation. Waste oils, paints and chemicals will require careful handling and disposal. This includes the containers and will be stored in a containment tray. A small number of suitably licensed private contractors/facilities are present in the Republic of Ireland for the disposal of these wastes as they arise.

Fuels and chemicals will be stored in double skinned containers or within a bund which must have capacity to contain 110% of the volume of the largest tank stored within it. All containers are to be carefully labelled.

- **Canteen Wastes**

Staff Canteens have the potential to generate food waste and packaging waste. Designated receptacles for food waste, dry recyclables and residual waste. Separate receptacles for the recyclable fractions may be provided such as plastics, metals and glass.

- **Other Wastes**

Waste materials other than those outlined above can constitute a significant proportion of the total waste generated by a construction site. This waste is normally made up of residual non recyclable waste such as soiled paper, cloth, cardboard or plastics as well as canteen waste to include food as above. Other wastes which might be generated are fibreglass, polystyrene insulation and plasterboard.

- **Pest Control**

During construction, effective prevention of infestation from pests or vermin including arrangements for regular disposal of food and material attractive to pests will be implemented. If infestation occurs the contractor will take appropriate action to eliminate and prevent further occurrence.

5.0 Assignment of Responsibilities

A Site Manager shall be designated as the C&D Waste Manager and shall have overall responsibility for the implementation of the Project C&D Waste Management Plan. The C&D Waste Manager will be assigned the authority to instruct all site personnel to comply with the specific provisions of the Plan.

At the operational level, Senior Foreman from the main contractor and Site Foreman from each sub-contractor on the site shall be assigned the direct responsibility to ensure that the discrete operations stated in the Project C&D Waste Management Plan are performed on an on-going basis.

The appointed person(s) in addition to the site personnel must be in a position to:-

- Distinguish reusable materials from materials suitable for recycling.
- Ensure maximum segregation at source.
- Co-operate with site management on best locations for stockpiling reusable materials.
- Separate materials for recovery.
- Identify and liaise with operators of recovery outlets.

The surface water discharge system during works shall be inspected by an ecologist who will ensure that it is fit for purpose and provides adequate protection to existing watercourse.

6.0Training

Copies of the Project C&D Waste Management Plan shall be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the Project C&D Waste Management Plan and informed of the responsibilities which fall upon them as a consequence of its provisions.

Where source segregation and material reuse techniques apply, each member of staff will be given instructions on how to comply with the Project C&D Waste Management Plan. Posters will be designed to reinforce the key messages within the Project C&D Waste Management Plan and will be displayed prominently for the benefit of site staff.

7.0 Waste Auditing

When establishing the systems for managing the details of all arisings, movement and treatment of C&D Waste in the Waste Management Plan, the use of electronic tools should be considered to provide for convenient recording of information in a useful format.

The Contractor will be required to arrange full details of all arisings, movements and construction and demolition waste discards to be recorded during all stages of the project.

The C&D Waste Manager shall arrange for full details of all movements and treatment of construction and demolition waste discards to be recorded during the construction stage of the Project. Each consignment of C&D waste taken from the site will be subject to documentation, which will conform to the requirements of Table 2 and ensure full traceability of the material to its final destination.

TABLE 2 - C&D WASTE DETAILS TO BE INCLUDED ON TRANSPORTATION DOCKETS

DETAILS	PARTICULARS
Name of Project of Origin	-
Material being transported	Identify the material being transported e.g. soil and stone, timber, etc.
Quantity of material	Record the quantity in tonnes (use three decimal places)
Date of material movement	Record the date.
Name of permitted carrier	Record the driver name, vehicle registration and permit number.
Material destination	Record site address and permit number if applicable.
Proposed Use	Record the proposed use, recovery or disposal.

Details of the inputs of materials to the construction site and the outputs of wastage arising from the Project will be investigated and recorded in a Waste Audit, which will identify the amount, nature and composition of the waste generated on the site.

The Waste Audit will examine the manner in which the waste is produced and will provide a commentary highlighting how management policies and practices may inherently contribute to the production of construction and demolition waste. The measured waste quantities will be used to quantify the costs of management and disposal in a Waste Audit Report, which will also record lessons learned from these experiences which can be applied to future projects.

The total cost of C&D waste management will be measured and will take account of the purchase cost of materials (including imported soil), handling costs, storage costs, transportation costs, revenue from sales, disposal costs etc.

8.0 Hazardous Wastes

It is not anticipated that there will be any need for hazardous waste on-site, however if required, the management of hazardous waste will comply with current legislation:

- The Waste Management Acts (WMA) 1996 to 2005.

- Waste Management Regulations 1998; Hazardous waste which may be produced or encountered on site includes:

    - Soils contaminated with waste oils or fuels;
    - Waste oils and fuels;
    - Used aerosol containers.

9.0Management of Construction Traffic

The following Construction Traffic Management Plan identifies the main objectives for the managed procedures which are required to ensure the construction related activities are executed in a safe and controlled manner.

The aim is to identify the potential issues which are relevant to the project, to address these issues and to provide solutions which are satisfactory to all concerned. The issues which we believe to be the key issues are as follows:

- Traffic Route ï Planning and Management of same;
- Construction traffic logistics;
- Planning and management of expected traffic flow rates;
- Planning and management of delivery times;
- Site access and egress;
- Maintenance of public roads;
- Communication with local authorities and neighbours.

There are specific traffic management issues which the applicant can control. These are listed as follows:

- Extensive and thorough site rules for site traffic. This is issued to all sub-contractorsat pre-appointment stage and are contractually bound;

- Gated access and egress will be established at the entrance to the development siteallowing in only authorised traffic which has arrived at theappointed time and by the appointed route;

- Approved contractor parking for all construction related personnel ï this will beprovided internally within the secured development site area.

- The rules regarding access routes, clearways, minimum road width, parking near hydrants,etc. will be relayed to all site staff. Any driver who breaches the rules will be noted and reported to their employer and any driver who consistently or knowingly breaks the ruleswill be refused further access to the site.

- Signage will be erected along emergency vehicle routes, and critical areas such as assemblypoints and means of escape will be kept clear.

- To ameliorate/mitigate impacts on the surrounding area and in order to mitigate noiselevels emanating from the site, all site development and building works will be carried outonly between the hours of 07.00 to 18.00 Mondays to Fridays inclusive, between 08.00 to14.00 on Saturdays and not at all on Sundays and Public Holidays. Any deviation from thesetimes will be submitted to the City Council for approval.

9.1Delivery Times

In relation to deliveries to the site, all large deliveries will have to be notified to site management at least 24 hours in advance. No large deliveries will be allowed to the site during peak traffic times for the area. All deliveries must report to the site security man who in turn will contact the relevant persons to take charge of unloading, etc.

9.2Site Access and Egress

Access and egress to the site will be controlled by the developer. Construction traffic for the proposed development will be via the R617, Sunberry Heights and Sunberry Drive. Indicative site traffic access rules are as follows:-

- No site access permitted before 7.00am;
- No site access permitted after 6.00pm;
- Strictly no parking on any access road to the site;
- No vehicle may park on or around any footpaths in the adjoining areas;
- Caution must be exercised entering and leaving the site;
- All vehicles must stop at the security barrier;
- All instructions from the developer or development staff must be obeyed;
- Vehicles leaving the site must do so only at an appropriate break in the traffic, andmust not force their way into traffic;
- Only vehicles with specific business on the site can enter the site, once permissionhas been granted by the developer and / or his staff;
- Heavy vehicle drivers must check their tyres for lodged stones, and remove themprior to returning to the public roads;
- The proposed speed limit on Sunberry Heights and Sunberry Drive during construction will be10 kph.

Prior to the commencement of development, the developer will liaise with Cork City Council and local residents to agree a protocol to minimise as far as possible disruption to local residents of Sunberry Heights and Sunberry Drive during the construction phase of the proposed development.

9.3Maintenance of Sunberry Heights/Sunberry Drive

For the duration of the construction period there will be a power washer located inside the entrance to the site. This will wash the wheels and undercarriages of all vehicles leaving the site to ensure no debris leaves the site on vehicles. Adequate provision will be made before they leave the site for the removal of stones caught in their tyres or any other debris.

There will be parking spaces at the site compound, reserved for staff, clients and visitors. On street parking will not be acceptable under any circumstances. Unauthorised entry will not be permitted and will be prevented by a security system which will be in operation during construction.

In relation to the provision of the foul, water and storm sewers, the provision of the sewer connectionswill as far as practicable, minimise disruption to traffic. In any event these sewer works will be given priority, in terms of available staff and traffic management, to ensure that this component of the overall development is completed as expeditiously as possible, so as to minimise disruption. As part of any works (i.e. provision of services) within Sunberry Heights/Drive, it will be ensured that these roads/areas will be re-instated to a high standard.

10. Air

The principal sources of air emissions, particularly suspended particulates, likely to occur from the construction site include:-

- Site clearance and demolition works.
- Movement of construction vehicles within the site during dry windy weather. Soiling of the public road with subsequent dust emissions caused by passing traffic and / or in dry windy weather.
- Excavation and loading of trucks with C&D waste material.

Dust emissions arise when an operation causes particulate matter to become airborne. This airborne dust is then available to be carried downwind from the source. The amount of dust generated and emitted from a working site and the potential impact on surrounding areas varies according to the following:-

- The type and quantity of material and working method
- Climate/local meteorology and topography i.e. wind speed and direction

Potential dust particles generated from site operations within the site are expected to comprise of larger dust particulates (i.e. above 30 µm). These site operations include demolition works, excavation, temporary stockpiling, loading and hauling of C&D waste. The maximum distance such particulates are likely to travel is 30 to 60m. Smaller dust particles will remain airborne for longer thus dispersing over a wider area. Particulates below 30 µm-diameter, and particularly below 10µm, typically only form a small fraction of dust emitted from construction sites.

The non-respirable dust fractions (i.e.>10 µm) may generate a cumulative long-term impact if dust deposition outside the site boundary continues over a period of time without amelioration (e.g. staining of vegetation). Short-term impacts may occur from visible dust clouds being generated during windy dry weather events. Respirable dust fractions (i.e.< 10 µm) potentially effect respiratory and cardiovascular systems. S.I. No. 271 of 2002 relating to limit values for particulate matter in ambient air indicates a 24-hour percentile (90.4%) limit value of 50µg/m3 PM10.

A dust minimisation plan will be prepared and implemented by the building contractor during the construction phase of the project. This plan shall take the following into consideration:-

- Site access routes shall be regularly cleaned and maintained as appropriate. Hard surface areasshall be swept to remove mud and aggregate materials from their surface while any un-surfacedareas shall be restricted to essential site traffic only. Furthermore, any area thathas the potential to give rise to fugitive dust must be regularly watered, as appropriate,during dry and/or windy conditions.

- Vehicles on site shall have their speed restricted, and this speed restriction will be enforcedrigidly. Vehicles delivering or removing material with dust potential shall be enclosed orcovered with tarpaulin at all times to restrict the escape of dust.

- All vehicles exiting the site shall make use of a wheel wash facility prior to entering ontopublic roads, to ensure mud and other wastes are not tracked onto public roads.

Publicroads outside the site shall be regularly inspected for cleanliness, and cleaned as necessary.

- The roads will be monitored throughout the works and a road sweeper will be employedwhen required for the duration should the roads become dirty.
- Before entrance on to public roads, trucks will beadequately inspected to ensure no potential for dust emissions.

- At all times, the procedures put in place will be strictly monitored and assessed. The dustminimisation plan will be reviewed at regular intervals during the construction phase toensure the effectiveness of the procedures in place and to maintain the goal of minimisationof dustthrough the use of best practice and procedures.

- Weekly dust monitoring will be carried out using a handheld Microdust Pro-Automatic dustmonitoring unit.

- The measures will continue for the duration of the enabling works and thebulk dig which are the periods in which most dust would be created on site.

11. Noise

The main legislation in relation to the emission of noise is the Environmental Protection Agency Act 1992, which defines environmental pollution as including noise that is a nuisance, or that would endanger human health or damage property or damage the environment. It provides for various actions to be taken to prevent or limit noise pollution. The Act gives power to the EPA to take steps to ensure compliance with the terms of a notice to control noise in relation to any premises, process or works and to recover the cost of such an action. The EPA or local authority can require the person or body to take specific measures to prevent or limit noise. Anyone required to take such specific measures by the relevant authority is obliged to do so or face possible prosecution.

The principle sources of noise emissions from the site will be:-

- During the demolition phase, when heavy plant will be used to load trucks with C&D waste material.
- During excavation works.
- General construction activity, including HGV traffic to / from the site, use of power tools etc.

11.1 Mitigation Measures

Noise Best practice noise and vibration control measures will be employed by the contractor. The best practice measures set out in BS 5228 (2009) Parts 1 and 2 will be complied with. Thisincludes guidance on several aspects of construction site environmental measures, including, but not limited to the following:

- The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected.

- If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control ñat sourceò. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

- Mobile plant will be switched off when not in use and will not be left idling.

- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

- A complaints procedure will continue to be operated by the contractorthroughout the construction phase and all efforts should be made to addressany noise issues at the nearest noise sensitive properties;

- Where construction activity takes place in the vicinity of residential properties, itwill be restricted to the stipulated hours of operation identified above.

12.Surface Water Management

Construction Phase at the Project Site

In order to minimise the potential for pollution to surrounding surface waters the proposed approach to surface water management as outlined in Section 1.3 of the NIS will be implemented in full.

The construction management of the site will take account of the recommendations of the CIRIA guides *Control of Water Pollution from Construction Sites* (2001) and *Control of Water Pollution from Linear Construction Projects* (2006) and Inland Fisheries Irelandôs (IFIôs) *Requirements for the Protection of Fisheries Habitat during Construction and Development Works*.

During construction key requirements for the prevention of perturbations to surface water quality will include:

- The open land drain that is to be constructed to the north of the net developable area shall be installed as the first item of works of the construction phase. This will provide for a ñcatch-drainò to the north of the project site during the construction phase and minimise the runoff, from sloping ground to the north of the developable area, over the footprint of the construction site. The clean surface water runoff collected in the catch drain will be directed to the west to an existing field drain and will be allows to drain along the field drain to the south.

- Storage ï all equipment, materials and chemicals will be stored away from any watercourse. Chemical, fuel and oil stores will be sited on impervious bases and within a secured bund of 110% of the storage capacity, within the lay down area;

- Any excavations to be stored on site will be stored in a designated stockpile area located in the construction site compound or other suitable location on site for the storage of segregated wastes prior to their transport for recovery/disposal at suitably licensed/permitted facilities. . Topsoil will be stockpiled on site for reuse in soft landscaping and will be stored separately to subsoils. Stockpiles will be graded to a <1:4 profile Stockpiles will be covered with plastic sheeting during wet weather and a temporary berm will be constructed around the stockpile area to prevent runoff to watercourses or drainage channels. Excess inert spoil material, not to be reused on site, will be transported off site for deposition. All waste spoil material arising from the construction phase will be inert, non-hazardous spoil material and will be disposed at an approved facility.

- Any stockpiles of spoil or waste material generated from the construction process is to be temporarily stored at a remote distance (i.e. greater than 50m) from the un-named minor stream to the southwest of the project site or the field drain along the western boundary of the project site and will be separated from any drainage channels associated with the construction phase surface water management system by a minimum of 25m, before being removed to an accepting licensed waste disposal facility.

- Waste material arising on site during the construction phase will be managed in accordance with the waste management hierarchy detailed in the Construction Environmental Management Plan (CEMP) prepared for the project and provided under separate cover.

- As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded (or stored in double-skinned tanks) and located in the dedicated site compound. Provided that these requirements are adhered to and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

- Oil and fuel stored on site for construction should be stored in designated areas. These areas shall be bunded and should be located away from surface water drainage and features.

- The integrity and water tightness of all the bunding structures and their resistance to penetration by water or other materials stored therein shall also be tested and demonstrated.

- All fuel oil fill areas will have an appropriate spill apron.

- Vehicles and refuelling ï standing machinery will have drip trays placed underneath to prevent oil and fuel leaks causing pollution. Where practicable, refuelling of vehicles and machinery will be carried out on an impermeable surface in designated areas, well away from any surface watercourse and surface water drains;

- Maintenance ï maintenance to construction plant will not be permitted on site, unless vehicles have broken down necessitating maintenance at the point of breakdown. All necessary pollution prevention measures will be put in place prior to commencement of maintenance in this instance;

- Concrete - Wet concrete operations would not be carried out within watercourses or adjacent to watercourses or surface drains. Runoff from wastewaters or contaminated storm water will be directed to drains installed as part of the surface water management plan;

- Weather conditions and seasonal weather variations will also be taken account of when planning excavations, with an objective of minimizing soil erosion.

- Concrete batching will take place off site or in a designed area with an impermeable surface.

- Concrete wash down and wash out of concrete trucks will take place off site or in an appropriate facility.

- A designated impermeable cement washout area will be provided. The washout area will be located within the project site at a remote distance (i.e. greater than 50m) from the un-named minor stream to the southwest of the project site and will be separated from any drainage channels associated with the construction phase surface water management system by a minimum of 25m.

- A silt fence will be erected on site to prevent the release of silt-laden waters to the minor stream or woodland to the south of the project site. The silt fence will be implemented prior to the commencement of construction and will remain in place throughout the construction phase. The silt fence will be maintained in line with the requirements detailed in the accompanying CEMP throughout the construction phase. The location of the silt fence to be installed is shown on Figure 6.1.

- Any in-situ concrete work to be lined and areas bunded (where possible) to stop any accidental spillage.

- All new infrastructure is to be installed and constructed to the relevant codes of practice and guidelines.

- All surface water infrastructure is to be pressure tested by an approved method during the construction phase and prior to connection to the public networks, all in accordance with Local Authority Requirements.

- Connections to the public network are be carried out to the approval and / or under the supervision of the Local Authority prior to commissioning.

All new sewers are to be inspected by CCTV survey post construction; to identify any possible physical defects for rectification prior to operational phase.

Surface water generated at the project site during the operation phase will be discharged via the operation phase surface water management system as described in Section 1.3 above. The surface water management system has been designed to capture surface water generated at the project site and discharge water at greenfield runoff rates. A suitable level of surface water attenuation has been catered for within the management system. Following attenuation and prior to release all surface water will be treated via a combine silt and hydrocarbon interceptor so that only treated surface water is discharged to the receiving stream and storm water network.

The provision of these design features will ensure that surface water emitted from the project site during the operation phase is adequately treated and will eliminate any risk of polluted surface water being discharged from the project site during operation.

Construction Phase - Works Associated with the Replacement of the Culvert Crossing R617

A "worst case" approach has been considered in respect to the required remedial works for this crossing in the absence of information on the condition of the precast pipe. In this regard and for the purposes of comprehensive environmental assessment, it is assumed that the entire precast pipe crossing may need to be replaced. The following is an outline scope of the works required to replace the crossing in its entirety:

- Implement Traffic Management appropriate to the task and scope of the works in hand - this may necessitate a temporary road closure depending on how the contractor plans to undertake the works.
- Retain the existing culvert in operation for the duration of the laying of the new culvert crossing to prevent unnecessary contamination of surface water.
- Saw cut existing road surfacing, excavate trenching for new precast pipe and dispose of all waste materials to appropriate licensed facilities by licensed contractors.
- Lay new 600mm Precast Pipe Crossing, backfill with suitable fill material.
- Install new head wall at pipe outfall location.
- Divert surface water flow to new culvert and make good to inlet screen upstream of culvert.
- Decommission/remove old pipework.
- Backfill/reinstate road crossing in preparation for laying road surfacing.
- Lay road surfacing to match existing, seal all joints.
- Reinstate public footpath, hedgerows and existing boundaries .
- Reinstate road markings and signage where affected.
- Stand down traffic management procedures.

The implementation of the approach to these works, as outlined above, will ensure that the new replacement culvert is installed under dry conditions with contact to the existing minor stream waters being avoided. Only after the new culvert is in place will the stream be connected to the newly installed culvert. This will ensure that the potential for pollution to these waters as a result of the culvert installation is eliminated.

Operational Phase

See the Engineering Report of OLS Consulting Engineers& Project Management Ltd. in respect of the proposed surface water networkfor the operational phase post completion of the development works.