

Construction & Environmental Management Plan

Prepared for Trinity College Dublin

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1.0 INTRODUCTION

This document is a Construction and Environmental Management Plan for the proposed demolition of the existing Cunningham House student accommodation building and sports hall on the Trinity Hall campus and subsequent construction of new student accommodation building and sports hall.



Figure 1 - Satellite View of Site at Trinity Hall, Dartry, Dublin 6



Figure 2 - View of Existing Sports Hall and Cunningham House at Trinity Hall

This Construction and Environmental Management plan is intended to outline the approach to Construction Management and the Environment during the course of the works to ensure that the successful contractor complies with all relevant Health & Safety and Environmental Legislation and operates in such a manner so as to eliminate or mitigate, in so far as possible, any deleterious effects on the Environment. The successful contractor, appointed to carry out the works, must produce their own detailed Construction and Environmental Management Plan which will, at a minimum, develop in detail the Principles outlined in this plan and produce a detailed management plan that complies with this outline plan and all relevant Legislation and ensures the works will be carried out in accordance with best practice.

2.0 PROPOSED WORKS

It is proposed to demolish the existing Cunningham House student accommodation building and sports hall at Trinity Hall, Dartry, Dublin 6, and construct new student residences consisting of 358 No. bed spaces in 50 apartment clusters and 9 No. beds in 4 apartment clusters, along with sports hall and associated facilities. The proposed total site area for the works = 1.0982 ha.

2.1 DEMOLITION

This work will be carried out by a specialist Demolition Contractor with experience in this type of work. The scope of Demolitions is as follows:

- The Demolition of Cunningham House, the Sports Hall (including the removal of existing part basement of 104sqm), the eastern section of the historic rear boundary wall and associated single storey ancillary sheds within the curtilage of Greenane House (a Protected Structure) including all associated substructure.
- Grubbing up and removal of all hardstanding (including bit-mac surfacing) within the demolition boundary.
- Decommissioning and grubbing up of drainage pipelines and watermains and all associated chambers. It should be noted that, prior to decommissioning, all drainage pipelines will be pressure flushed clean and a CCTV survey will be carried out to ensure that there are no live pipelines connecting into same. All open ends of pipes remaining after decommissioning will be capped off.
- Decommissioning and grubbing up of all M & E services and associated chambers as shown on the drawings.

All services serving the buildings to be demolished are to be disconnected and confirmation obtained that all services are no longer live by the licensed operators prior to demolition. The final outfall surface water and foul pipes from the site are to be retained to facilitate temporary connections by the successful contractor during the demolition and construction period.

After removal of all hazardous material the buildings will be demolished safely by demolition contractors experienced in such works. Best practice methods will be used with regard to noise, vibration & dust control as outlined in more detail in Section 4. A dust suppression system consisting of a fine mist water spray will be used on site. Due care and attention must be taken to protect the adjoining buildings and surfaces - a supervisor shall observe all works and be in visual contact with the excavator operator at all times.

The demolished materials will undergo sorting and salvage once the property has been demolished. All waste products shall be disposed of by licensed waste carriers as outlined in more detail in the Construction & Demolition Waste Management Plan, Document No 19.114-CDMP-01. During the demolition phase the site management will ensure that no portions of the property are left in an unsafe manner overnight. The site will be inspected by the Contractor each morning before work commences.

The following are some of the key considerations for the Contractor when carrying out demolition works adjacent to the boundary.

- Demolition will result in no damage to areas outside the boundary.
- No foundations or supports of adjacent buildings to be disturbed or undermined.
- Contractor to immediately report to the Engineer any defects which are exposed or become apparent during the demolition works
- Any perimeter wall or structure to be demolished will involve hand demolition and mechanical demolition by pusher arm.

2.2 SURVEY DRAWINGS

It should be noted that survey drawings of the existing buildings will be included for information purposes in the tender package. It should not be assumed that they exactly reflect the “as built” structure which must be confirmed on site prior to demolition.

2.3 CONSTRUCTION

The scope of new construction is as follows:

- Construction of new sports hall and student accommodation building.
- New watermains as shown on the drawings.
- New foul and surface water pipework as shown on the drawings.
- New soft and hard landscaping around proposed structures.
- New mechanical and electrical services.
- New perimeter electrical loop line and associated ducts and chambers.
- Top-soiling and seeding the site as shown on the drawings.

3.0 SITE MANAGEMENT

3.1 GENERAL SITE MANAGEMENT

The works will be carried out by a reputable contractor with adequate skilled resources and management skills to deliver the project to the quality required within the expected timeframe and budget and the minimisation of disruption in so far as practical.

The demolition and construction contractors will utilise best practices and most appropriate techniques to deliver the works in an efficient manner with the minimum nuisance created to the locality and environs of the site.

All works which are intended to be carried out will be reviewed in advance and detailed method statements provided to ensure that the site management team have taken into consideration all factors and all foreseen potential issues can be mitigated against.

The requirements of the Safety and Health Acts and Regulations will be taken into consideration and, as is required under law, a Project Supervisor Construction Stage will overview the safety arrangements which will cover both the site and the external environs of the work area.

The site working hours will generally be from 8 AM to 6 PM Monday to Friday and 8 AM to 1 PM on Saturdays and with no work on Sundays or Bank Holidays.

On occasion there may be need for works to be carried out outside of these hours. In such instances care will be taken to advise neighbours and to inform the relevant departments of Dublin City Council of any such requirements in advance. Such works will not be carried out without the consent of the Local Authority.

3.2 TRAFFIC MANAGEMENT, ACCESS ARRANGEMENTS AND SITE LOGISTICS

The purpose of the Traffic Management Plan is to control and manage the flow of traffic, and pedestrians entering the construction site during the construction works, and to consider the interaction of the construction traffic with the neighbouring environment. The plan will be drafted in accordance with all site information. During construction the traffic management plan will be implemented and monitored throughout to ensure minimum disruption to the day to day operations of neighbours and businesses in the surrounding streets. A detailed traffic management plan will be developed by the successful contractor and issued for review by the design team and agreed with the Transportation Department, Dublin City Council prior to commencing on site.

Site logistics and traffic management represent one of the critical activities required to support the construction effort. As such, a logistics coordinator will be put in place by the successful contractor to fully develop and implement the Traffic Management and Site Logistics Plan.

The Traffic Management and Site Logistics Plan incorporate in one document the general management of the site with regard to movement of traffic, movement of materials, storage of materials and site setup.

The objectives of the Traffic Management and Site Logistics Plan are as follows:

- To ensure the safety of employees, contractor personnel, the public, pedestrians, cyclists and traffic.
- To ensure compliance with the requirements of Dublin City Council and the conditions of the planning application
- To keep traffic delays to a minimum.

- To maintain satisfactory property access.
- To minimize disruption to the operations of neighbouring residents.
- To minimize disturbance to the environment.
- To ensure that emergency vehicles have clear access at all times
- To enforce a maximum speed limit of 15 kph on the site with pedestrians having the right of way.
- To ensure that strict site traffic controls shall be implemented and enforced.
- Ensure that permits and licenses are in place where required.
- The erection of appropriate road signage at all entrances and junctions
- All construction traffic entering and leaving the site will be closely controlled.
- Vehicles making deliveries to site or removing spoil or demolition material will be logged and the loads checked to ensure that have been loaded correctly and safely.
- Deliveries will be phased and controlled on a 'just in time' basis, all being clearly marked to show their designation. This will minimize travel time around the site and associated noise.
- Designated offload points will be identified, and a schedule of deliveries times and offload times generated and put in place.

The Traffic Management and Site Logistics Plan will provide for the following where required:

- 1) The contractor shall be responsible for and make good any damages to existing roads, footpaths caused by his own contractors or suppliers transport to and from the site.
- 2) The contractor shall at all times keep all public and private roads and footpaths entirely free of excavated materials, debris, rubbish and provide vehicle wheel wash and thoroughly clean all wheels and arches of all vehicles as they leave the site.
- 3) The contractor shall confine his activities to the area of the site occupied by the works and the builders' compound, as far as practicably possible, during any particular phase of the development.
- 4) Haul routes to and from the site will be defined and agreed with TCD.
- 5) An allowance for construction worker parking will be made on site for the period of construction.
- 6) Properly designed and designated access and egress points to the construction site will be used to minimize impact on external traffic.
- 7) Banksman and/or traffic lights will be used to control the exit of construction vehicles from the site onto the public road.
- 8) Establishment and maintenance of a HGV holding area within the site.
- 9) Access to the existing Trinity Hall Residences to be maintained for fire tenders. Existing hydrants to remain accessible.

Suggested headings for the Contractor's Traffic Management and Site Logistics Plan (not exhaustive):

- Construction Traffic Management – General Requirements
- Traffic Safety and Control
- Temporary Traffic Diversions
- Emergency Contact Numbers and Personnel
- Emergency Plan
- Access Arrangements
- Compound and Staff Parking

3.3 CONSTRUCTION TRAFFIC

The works associated with the Proposed Development will develop additional traffic on the road network associated, inter alia, with the removal of excavated material and demolition waste and the delivery of construction materials and ready mixed concrete. The total duration of construction activities is estimated to be approximately three-years from initial bulk excavations to final completion. It is proposed that construction traffic will access the site from Temple Road through a combination of

the existing south western and south eastern entrances to the Trinity Hall campus. These shall be the main access points to the site during the construction stage.

As it is proposed to permanently reposition the south eastern entrance on Temple Road the existing gate and wall will be demolished during construction works and suitable temporary controlled access gate installed. The south western entrance on Temple Road will be modified by relocating the access-controlled pedestrian gate to the western side, whilst the remaining section of gate and fencing will be carefully removed and put into temporary storage for the duration of the construction works and restored on completion. This area will then be hoarded and used solely for construction access. Access to the site compound within the campus will be flagman controlled.

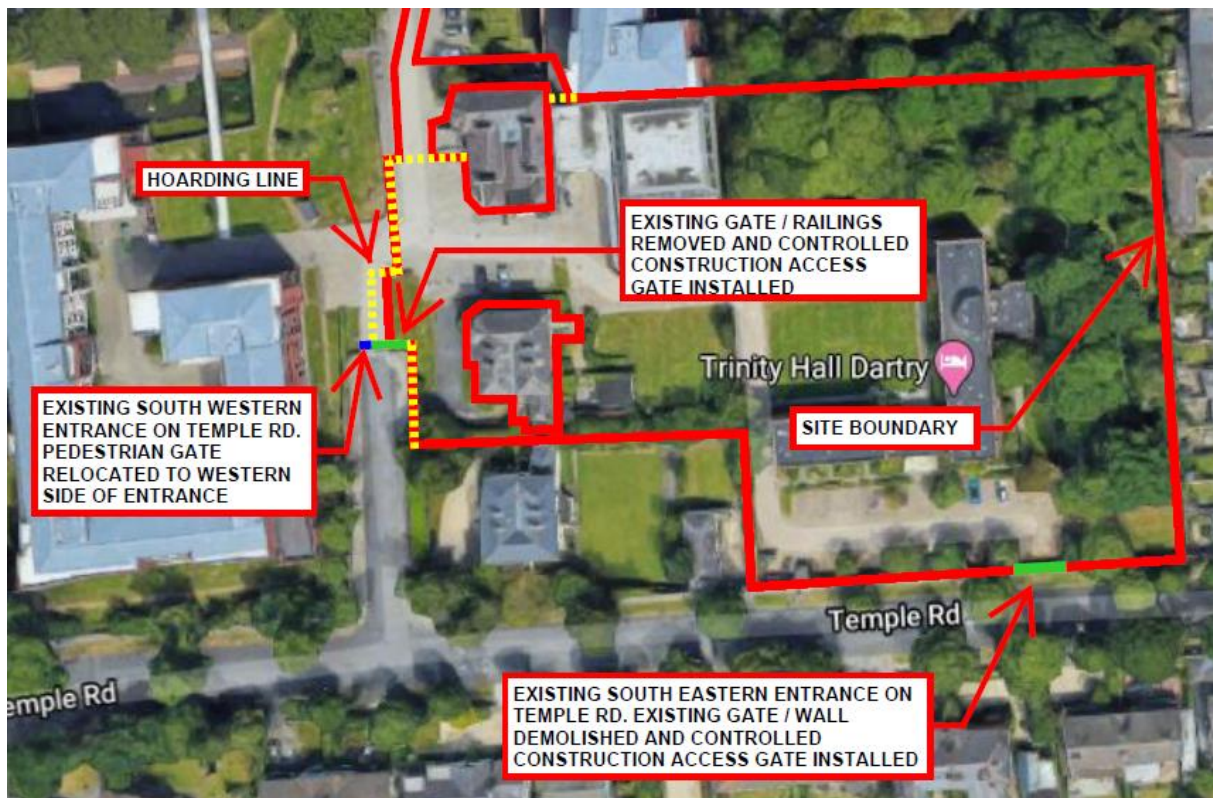


Figure 3 – Proposed Construction Traffic Access

The following is a non-exhaustive list of vehicles anticipated to be utilised during construction activities: -

- Excavators
- Dump trucks
- Concrete delivery trucks
- Concrete pumps
- Mobile cranes
- Mobile hoists.

The primary truck movements are expected to be associated with bulk earthworks which will include site strip, foundations and basement excavation. The estimated earthworks quantities are set out in the table below. The material excavated will generally be fill or naturally occurring boulder clay. The estimated volumes of excavation are as follows:

Item	Soil Excavation Volume (m ³)
Site Strip	1,738
Foundations	435
Lower Ground Floor (Plant Area)	224
Total	2,397

In addition to the above 2,397m³, of bulk earthworks excavation, 3,471m³ of waste material is estimated following the demolition of the existing sports hall and student residences buildings. Using 4-axle trucks with a 25-tonne capacity (15m³) this equates to approximately 391 truck movements for bulk excavations and waste material removal. Assuming peak HGV movements would occur during the period of lower ground (plant area) excavation (224.2m³), this would result in approximately 15 truck movements over a 2-day period giving 8 HGV in/out movements per day over that period. Excavated material will generally be disposed of off-site to an appropriate licensed waste disposal facility.

3.4 CONSTRUCTION SITE COMPOUND

A 2.4m high hoarding will be provided to the boundaries of the development and the site compound will be established within the site boundary. The exact location of the site offices to be selected by the contractor taking into account their proposed method statement and sequencing of the works. The Contractor will be responsible for the security of the site. The Contractor will:

- Operate a site induction process for all site staff.
- Ensure all site staff shall have current "safe pass" cards.
- Install adequate site hoarding to the site boundary.
- Maintain site security staff at all times.
- Separate pedestrian access from vehicular access.
- Ensure restricted access is maintained to the works.

3.5 CONTRACTOR'S PARKING

All contractor's vehicles and plant will be parked within the site area.

3.6 REINSTATEMENT / ROAD CLEANING

Construction Stage

- Prior to the works a detailed photographic survey will be carried out and recorded in a Condition Schedule Report of adjoining walls, roads, footpaths and grass verges. Copies of this Report will be made available to adjoining owners and DCC. This record will form the basis of assessing repairs to adjoining areas in the future should a dispute arise as to their cause.
- Roadways will be kept clean of muck and other debris. A road sweeping truck will be provided to ensure that roads are kept clean and this will be monitored, at operational level, by the site security man reporting to the contractor's site manager.
- A proprietary wheel wash system, utilising an integral tank which captures water for reuse, will be provided for the duration of the earthworks. All waters shall be drained through the settlement tank system described above prior to discharge to the surface water system via a temporary connection to the final outfall surface water pipe from the site.

On Completion

Reinstatement at completion of the works will involve:

- The cleaning of the existing sewers in the vicinity of the development as required.
- Prior to connection to the public watermain, all watermains in the development will be tested and cleaned to the requirements of the Local Authority. This will reduce the risk of contamination of the public water supply when the new network is connected to the system.
- Any damage to any adjacent public roadways, kerbs and grass verges will be fully repaired in accordance with DCC requirements.
- All excavations will be fully reinstated to the requirements of Dublin City Council.
- The area is to be left in a neat and clean condition, removing all material that may have been deposited during construction works.

3.7 HOURS OF WORKING / DELIVERY TIMES

It is proposed that standard construction working hours will apply, 8am to 6pm Mondays to Fridays, and 8am to 1pm on Saturdays, with the caveat that no works will be carried out outside daylight hours and no artificial light used. Any works outside this period shall be strictly by agreement with the Local Authority.

4.0 NOISE, VIBRATION & DUST CONTROL

There are considerable potential generators of noise, vibration and dust impacts during the demolition and construction phases of the proposed development.

4.1 NOISE & VIBRATION

Construction noise and vibration will be kept to a minimum in accordance with BS 5228-2:2009+A1:2014 – Code of practice for noise and vibration control of construction and open sites.

The site is in an urban centre with mainly residential buildings. To mitigate noise and vibration nuisance occurring due to the works the following measures will be put in place.

- Develop a Noise and Vibration Management Plan and methodology after a detailed analysis is conducted of areas and buildings that will be sensitive to the works from a noise and vibration perspective.
- The Site Induction process for all site operatives will ensure awareness of the environment they are working in and the potential nuisances that may result if they do not carry out their duties in an appropriate manner.
- Detailed work method statements will be developed for all activities and will address noise and vibration potential for the specific activity and will devise appropriate measures.
- Site Management and Safety Teams will continually monitor all works to ensure issues related to noise and vibration do not arise.
- Potentially noisy operations will be rescheduled to a favourable time during the day as far as reasonably possible.
- Sound baffle screens will be erected where necessary.
- Avoid leaving plant and machinery running while not in use.
- Any perimeter wall or structure to be demolished will involve hand demolition and mechanical demolition by pusher arm.
- Engaging with the local community and businesses to inform them of the on-going works and times where after hours working or excessive noise or vibration levels may occur. Every effort will be made to avoid such instances. Newsletters will be issued periodically to make the neighbours fully aware of upcoming work fronts that may affect them.
- Ensure plant and machinery are well maintained and in good working order and comply with European Commission Directive regarding noise limits.
- Independently monitored Noise and Vibration gauges will be installed at site boundaries and on all adjacent buildings, including protected structures. These gauges will have a continuous readout and the vibration monitors will have an exceedance alarm. In this regard a vibration limit of 15mm/sec peak particle velocity at 4 to 15Hz will be set. Records will be checked regularly to ensure there are no non-compliance issues.

The compliance codes of practice and relevant legislation regarding control of Noise & Vibration are as follows:

- **BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites**
- **BS 4142:2014+ A1:2019. Methods for rating and assessing industrial and commercial sound.**
- **S.I. No. 359 of 1996 European Communities (Construction Plant and Equipment) (Permissible Noise levels) (Amendment) Regulations 1996.**
- **Guide to the Safety, Health and Welfare at Work (General Application) Regulations 2007 Chapter 1 of Part 5: Control of Noise at Work**

The table below outlines the typical Contractor approach to noise monitoring & control, mitigation measures, performance indicators and also outlines the party responsible in each case:

Objective	To appropriately manage noise during construction activities to minimise impact to workers, neighbours and community members.		
Actions	Requirements	Responsibility	Timing
Noise and Vibration Mitigation	Reschedule particularly noisy operation to a more favourable time as far as is reasonably practicable	Site Manager	Throughout demolition and construction works
	Erect sound baffle screens where practical	Site Manager	When required
	Avoid leaving machinery running while not in use	Plant operators	Throughout demolition and construction works
	Ensure that plant and equipment are well maintained and in good working order	Site Manager/Plant Manager	Throughout demolition and construction works
Performance Indicators	Avoid complaints regarding noise from workers / neighbours / community members.	Site Manager	Throughout demolition and construction works
Monitoring	Noise monitoring	Site Manager	Throughout demolition and construction works
	Complaint based monitoring	All staff	Throughout demolition and construction works
Reporting	Report to Site manager	All staff	Throughout demolition and construction works
Corrective Actions	Review procedures and make changes were required	Site Manager	Throughout demolition and construction works

4.2 DUST & AIR QUALITY MANAGEMENT

Construction activities have the potential to generate significant dust emissions. The main activities for generating dust would normally occur from Demolition and excavation activities at site. We would foresee dust emanating principally from the following works:

- Demolition of the existing buildings
- Excavation for grubbing up and construction of foundations and services and installation of diverted services where required. The excavation of the lower ground floor area, where the potential for dust generation is greatest, is a relatively minor part of the works and should be complete in less than a week.
- Spreading topsoil

To mitigate the dust generation from these activities, the following measures will be taken:

- An Air Quality Management Plan and Methodology will be developed after a detailed analysis is conducted of areas and buildings and all site activities.

- The Site Induction process for all site operatives will ensure awareness of the environment they are working in and the potential nuisances that may result if they do not carry out their duties in an appropriate manner.
- Detailed work method statements will be developed for all activities and will address dust potential for the specific activity and will devise appropriate measures.
- Site Management and Safety Team will continually monitor all works to ensure issues related to air quality do not arise.
- Wet cutting equipment will be used.
- Tools with vacuum attachments will be used where possible.
- Trucks transporting aggregate or fill will be covered.
- Good housekeeping will be enforced at the site.
- A wheel wash, using recycled water, will be provided for the duration of the earthworks and will be used by all construction vehicles exiting the site. Haul roads and access roads will be kept wet or cleaned on regular basis.
- Roadways will be kept clean of muck and other debris. A road sweeping truck will be provided to ensure that roads are kept clean and this will be monitored, at operational level, by the site security man reporting to the contractor's site manager.
- A mister to be used on heavy plant.
- Notwithstanding that Regulations may not require air monitoring to be carried out when removing particular types of asbestos, it is a requirement of this contract that Air Monitoring be carried out during all Asbestos removal to ensure the air quality is compliant with all H & S Regulations.
- The requirements of the Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition shall be followed prior to commencement of works on site.
- Monarflex/debris screens tied to scaffolds if required.

The below table outlines the typical Contractor approach to dust and air quality management, mitigation measures, performance indicators and also outlines the responsible party in each case.

Objective	To manage construction activities with the potential to impact on air quality		
Actions	Requirements	Responsibility	Timing
Dust Mitigation	Use of wet cutting equipment when required	Site Manager	Throughout demolition and construction works
	Use of tools with vacuum attachments	All staff	Throughout demolition and construction works
	Ensuring items of plant are well maintained	Site Manager/ Plant Manager	Throughout demolition and construction works
	Trucks transporting aggregates or removing fill or waste from site will be covered	Site Manager	Throughout demolition and construction works
	Good housekeeping practices	All staff	Throughout demolition and construction works
	Misters to be on all heavy plant on site	Operators	Throughout demolition and construction works
Performance Indicators	Avoid complaints regarding dust from workers / neighbours / community members	Site manager	Throughout demolition and construction works
Monitoring	Air Quality monitoring	Site manager	Throughout demolition and construction works

	Complaint based monitoring	Site manager	Throughout demolition and construction works
Reporting	Report to Site manager	All staff	Throughout demolition and construction works
Corrective Actions	Review procedures and changes required	Site manager	Throughout demolition and construction works

5.0 SURFACE WATER MANAGEMENT PLAN & POLLUTION CONTROL

The following Surface Water Management Plan (SWMP) provides the water management framework for potential Contractors and Sub-contractors operating on the site.

The SWMP also outlines the proposed surface water monitoring plan for the construction and operational phase of the development. The site is within the Dodder River Catchment and this plan will be refined through consultation with Inland Fisheries Ireland and DCC to ensure the proposed demolition, excavation and construction activities do not have any deleterious effects on the receiving environment. All measures as outlined in the Natura Impact Statement, which accompanies this planning application, will be adhered to by the successful contractor.

5.1 RELEVANT LEGISLATION & GUIDELINES

The key legislation which will be adhered to are defined as follows:

- Water Framework Directive (2000/60/EC);
- Local Government (Water Pollution) Act, 1977–1990;
- Water Quality (Dangerous Substances) Regulations, 2001;
- Arterial Drainage Act, 1995;
- S.I. No. 41 of 1999 Protection of Groundwater Regulations, resulting from EU Directive 80/68/EEC on the protection of groundwater against pollution caused by certain dangerous substances (the Groundwater Directive);
- S.I. No. 249 of 1989 Quality of Surface Water Intended for Abstraction (Drinking Water), resulting from EU Directive 75/440/EEC concerning the quality required of surface water HES Report No.: P1293 FINAL - Rev 0 Report Date: 31st August 2015 intended for the abstraction of drinking water in the Member States (repealed by 2000/60/EC in 2007);
- S.I. No. 177 of 2000 Quality of Water intended for Human Consumption Regulations and S.I. No. 278 of 2007 European Communities (Drinking Water No. 2) Regulations, arising from EU Directive 98/83/EC on the quality of water intended for human consumption (the Drinking Water Directive) and WFD 2000/60/EC (the Water Framework Directive);
- S.I. No. 327 of 2012 European Communities Environmental Objectives (Surface Waters) Regulations; and,
- S.I. No. 149 of 2012 European Communities Environmental Objectives (Groundwater) Regulations 2010.
- The Arterial Drainage Act 1945.
- The Fisheries Consolidation Act 1959 (as amended).
- The Fisheries (Amendment) Act 2003.
- The Inland Fisheries Act 2017.
- Council Directive 78/659/EEC on the Quality of Freshwaters Needing Protection or Improvement in Order to Support Fish Life.
- The European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. 293 of 1988).
- European Communities (Quality of Shellfish Waters) Regulations 2006 (S.I. 268 of 2006).
- European Communities (Quality of Shellfish Waters) (Amendment) Regulations 2009 (S.I. No. 55 of 2009).

- European Communities (Quality of Shellfish Waters) (Amendment)(No. 2) Regulations 2009 (S.I. No. 464 of 2009).
- The Wildlife Act 1976.
- The Wildlife (Amendment) Act 2012.
- The Local Government (Water Pollution) Act 1977.
- The Local Government (Water Pollution) Amendment) Act 1990.
- The Habitats Directive (92/43/EEC).
- The European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011).
- The Water Framework Directive (2000/60/EC).
- The European Communities (Water Policy Regulations 2003 (S.I. 722 of 2003).
- The European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 (S.I. 272 of 2012).
- The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. 296 of 2009).

The key drainage and water quality guidance documentation relevant to this site are defined set out as follows:

- Fisheries:
 - Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters.
 - Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Eastern Regional Fisheries Board

Note: Notwithstanding that the Development involves no work on or alteration of existing watercourses the Appointed Contractor will make contact with Inland Fisheries Ireland to ensure that the Construction and Environmental Management Plan (including SWMP) complies with their requirements and ensures the Protection and Conservation of the Inland Fisheries Resource in Ireland.

- Pollution Prevention Guidance Notes:
 - PPG1 Understanding your environmental responsibilities - good environmental practices;
 - GPP02 Above ground oil storage tanks (2017);
 - GPP5 Works and maintenance in or near water (2017);
 - PPG06 Working at construction and demolition sites. 2nd edition (2012);
 - PPG07 Safe operation of refuelling facilities (2011);
 - PPG11 Preventing pollution at industrial sites (2000);
 - PPG18 Control of spillages and fire - fighting run-off (2000);
 - GPP20 Dewatering underground ducts and chambers (2018);
 - GPP21 Pollution Incident Response Planning (2017);
 - PPG23 Maintenance of Structures over Water (1999); and,
 - PPG26 Pollution Prevention Storage and Handling of Drums & Intermediate Bulk Containers.
- Construction Industry Research and Information Association (CIRIA):
 - CIRIA Report C741 Environmental Good Practice on Site;
 - CIRIA Report C532 Control of Water Pollution from Construction Sites;
 - CIRIA Report C648 Control of Pollution from Linear Construction Project; Technical Guidance;
 - CIRIA Handbook C650 Environmental good practice on site;
 - CIRIA Handbook C762 Environmental good practice on site pocket book;
 - CIRIA Report C609 - SuDS – hydraulic, structural & water quality advice; and,

- CIRIA Report C753 – The SuDS Manual.

5.2 PROPOSED SURFACE WATER MANAGEMENT & POLLUTION CONTROL MEASURES – CONSTRUCTION PHASE

Two distinct methods will be employed in the management of construction surface water runoff:

- The first method involves ‘keeping clean water clean’ by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations, construction areas and temporary storage areas.
- The second method involves collecting any drainage waters from works areas within the site that might carry silt or sediment, and nutrients, and to route them towards settlement tanks prior to controlled discharge, to be agreed with the Local Authority, to the existing surface water network / watercourses.

Construction operations will adopt best working practices and the early establishment of Temporary Construction Drainage Facilities will reduce the risk of pollution problems during construction.

A Construction Drainage Control System will be put in place so that all silt laden water will be diverted to temporary settlement storage tanks prior to discharge to the existing surface water system. There will be no direct discharge of any silt laden water to watercourses. This discharge, and the associated pollution control measures, will be subject to the approval of the Local Authority.

The construction of the permanent drainage will start from the downstream sections and progress upstream, connecting conveyance systems with other drainage features as each development phase progresses. As described above, a Construction Drainage Control System will remain in place until all permanent surface finishes have been completed to ensure that silt laden water cannot enter the existing drainage system without first being treated.

The general surface water management good practice measures required during construction are as follows:

- Establish drainage and runoff controls before starting site clearance and earthworks;
- Minimising the area of exposed ground;
- Retain as much vegetation as possible;
- Delay clearing and topsoil stripping of each phase of work until ready to proceed;
- Establish vegetation or Hard landscaping as soon as practical on all areas where soil has been exposed. Failing this all exposed surfaces will be sealed by compaction with excavator to ensure no erosion can occur;
- Close and backfill trenches as soon as practically possible;
- Through consultation with the Construction Manager/Site Supervisor and the Local Authority the Site Environmental Officer will draw up a Schedule for surface water quality monitoring which will be finalised prior to the start of construction; and,
- Where monitoring parameters are found to exceed the standards laid down the Site Environmental Officer will initiate and report on corrective action(s). This may necessitate the alteration of the environmental control measures and in turn the relevant construction method statement(s).

5.2.1 Monitoring of Construction Surface Water Discharge Quality

Field monitoring of water quality parameters and collection of samples will be undertaken by the Contractor’s Site Environmental Officer. He/she will be appropriately trained on the required monitoring methods and the use, calibration and maintenance of all monitoring equipment used.

The proposed monitoring locations and frequency for the construction phase are as follows:

- Daily Turbidity spot checks at settlement tank outfalls (i.e. last manhole within construction phase compound)
- sampling will be carried out at the last upstream Manhole before the public sewer on a weekly basis.

The proposed locations of the surface water monitoring points will be agreed with Inland Fisheries Ireland and DCC in advance of the construction phase.

5.2.2 Laboratory Analysis

Laboratory analysis of water samples will also be undertaken as part of the monitoring programme. Coordination of the laboratory sampling and analytical programme will be undertaken by the Contactor's Site Environmental Officer. Interpretation and reporting of both the field and laboratory data will be the responsibility of the Site Environmental Officer.

Testing for the following parameters:

- Total Suspended Solids - not to exceed 25mg/litre
- pH (field measured) – 6 to 9
- Electrical Conductivity (field measured) – 100 μScm^{-1}
- Biological Oxygen Demand (BOD)
- Chloride – 250mg/l
- Ammonia N – 0.14mg/l
- Total Petroleum Hydrocarbons
- Other parameters if requested by IFI/DCC

5.2.3 Surface Water Monitoring Reporting

Results of water quality monitoring shall assist in determining requirements for improvements in drainage and pollution prevention measures implemented on site.

It will be the responsibility of the Site Environmental Officer to present the ongoing results of water quality monitoring at regular site meetings. There will also be regular meetings between the Environmental Officer and construction staff which will include a look ahead for upcoming works and any required environmental management required to facilitate ongoing construction works.

Reports on water quality will consider all field monitoring and results of laboratory analysis completed that period. Reports will describe how the results compare with baseline data as well as previous reports on water quality. The reports will also describe whether any deterioration or improvement in water quality has been observed, whether any effects are attributable to construction activities and what remedial measures or corrective actions have been implemented. The reports will be made available to Inland Fisheries Ireland & DCC on request.

5.2.4 Fuel Usage/Storage

The following procedures will be implemented for on-site storage of fuels, lubricants and hydraulic fluids used on the construction site:

- Storage of fuels, lubricants and hydraulic fluids will be located at the contractor's compound, which will be fenced and have a lockable gate, thereby ensuring that the area in which fuels, lubricants and hydraulic fluids are stored will be properly secured against unauthorised access or vandalism.

- The storage area within the compound will contain a bund lined with an impermeable membrane in order to prevent any contamination of the surrounding soils and vegetation and of groundwater.
- Selection of the location for storage of fuels, lubricants and hydraulic fluids will be based on the following:
 - It will be remote from surface drains and watercourses.
 - It will be readily visible for supervision and inspection.
 - It will be readily accessible for filling and maintenance.
 - It will be protected against accidental impact.
- The bund will have capacity of at least 110% of the largest tank accommodated or 25% of the total maximum capacities of all tanks, whichever is the greater, where more than one tank is installed. They will be constructed and managed in accordance with the EPA Guideline, Bunding and Spill Management (2007)

The following procedures will be implemented during construction operations:

- Fuels and oils will be carefully handled to avoid spillages.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and disposed of appropriately.
- Any waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or recycling. All site plant will be inspected at the beginning of each day prior to use. Defective plant shall not be used until the defect is satisfactorily fixed. All major repair and maintenance operations will take place off site
- As a minimum, simple spill protection equipment that will be held locally will include specialist absorbent mats / pillows and granules for containment / clean-up of oil. Adequate quantities will be held in stock and be available for immediate use.
- Appropriate spill control equipment, such as oil soakage pads, will be available on site to deal with any accidental spillage and emergency response procedures will be put in place.
- Designated contractors' personnel will be trained and certified in oil spill control and clean up procedures, and in the proper and safe disposal of any waste generated through such an event.

5.2.5 Hazardous Material Control Measures

- All hazardous substances will be stored in a safe manner in such a way that they will not be at risk of spillage or damage, e.g. away from traffic routes;
- Chemicals stored on site will be minimised. This storage area if required will be bunded appropriately for the chemical storage volume (i.e. 110 % of maximum volume);
- All material data sheets will be readily available on site and the Site Environmental Officer will keep copies of Material Safety Data Sheets for all hazardous substances centrally;
- Anywhere hazardous materials are to be used they will be specifically mentioned in the Method Statement along with information on how to handle the substance and how to deal with any accidents;
- Empty canisters or containers that contained hazardous substances will be disposed of in hazardous waste skips and appropriately recorded on the waste register;
- Subcontractors must provide a copy of the Material Safety Data Sheets to the Site Environmental Officer for all hazardous substances brought on site; and,
- The contents of any tank/container/drum will be clearly marked with the appropriate warning signage, and a notice displayed requiring that valves and trigger guns be locked when not in use.

5.2.6 Cement Based Products Control Measures

- No batching of wet-cement products will occur on site if possible;
- Ready-mixed supply of wet concrete products and where possible use of pre-cast elements will take place. Where possible pre-cast elements for culverts and concrete works will be used;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water possible (see reference to RCW wash unit below);
- No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be tanked and removed from the site to a suitable, non-polluting, discharge location;
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event; and,
- All concrete wash down at the site will be completed in a dedicated RCW concrete wash unit (<http://www.siltbuster.com/sheets/RCW.pdf>). This unit catches the solid concrete and filters and holds wash liquid for pH adjustment and further solids separation. The residual liquids and solids can be disposed of off-site at an appropriate waste facility.

6.0 INVASIVE SPECIES

It is noted from the Natura Impact Statement that there are two non-native invasive species present on site: Spanish Bluebell and Three-Cornered Garlic. Best practice mitigation measures as noted in the Ecological Impact Assessment will be adhered to by the contractor at all times.