

5 Construction Activities

5.1 Introduction

This chapter of the EIAR describes the construction activities and sequencing for the proposed works. It considers how the proposed development will be constructed, including duration, site preparation, services and utility requirements, import and disposal of materials and general construction activities for this type of development.

It is anticipated that, with the proper implementation and management of the construction activities described in this chapter, the construction phase of the development will have no significant or long-term impact.

5.2 Geotechnical Investigation

Original site evaluation and testing of the site was completed as part of the original site construction.

The results of the previous site investigations are described in more detail in **Section 14.2.6 of Chapter 14 *Land and Soils*** of this EIAR.

5.3 Duration and Activities

5.3.1 Overview

The works will be carried out in 2 phases.

Phase 1 will consist of the construction of the following:

Phase 1A

- Aqueous waste tank farm and associated works including installation of tanks, gantries, piperacks, pumps, hardstands, etc.
- Tanker unloading area
- Bulk excavation and site preparation for phase 1B
- Miscellaneous site upgrades – including realignment of paved areas local to the reception hall
- Reshaping of berms and landscaping.

Phase 1B

- Bottom ash storage building
- Warehouse, workshop and emergency response team (ERT)/office building
- New concrete yard and parking area
- Development of a permanent Contractors Compound and access to same.

The schedule for the construction and commissioning of the Phase 1 elements is approximately 16 months.

Phase 2 will consist of the construction of the following:

- 10MWe Hydrogen Generation Unit (HGU) including a 10kV electrical supply from the existing installation and an underground gas pipeline to connect to the natural gas grid.
- Demolition of the existing single storey modular office building
- Construction of the new single storey office building.
- Additional car parking.

The schedule for the construction and commissioning of the Phase 2 elements is approximately 12 months.

It is envisaged that the main stages of construction for each phase will be as follows:

- Strip topsoil and vegetation;
- Bulk excavations and general site re-grading, including placing of fill;
- Establish the contractors site compound, including the construction phase power supply, fencing and securing of the site;
- Construction of earth retaining structures, which will happen in tandem with bulk excavations and general site re-grading;
- Establish permanent contractors' compounds and laydown areas;
- Construction of foundations (including piling for the Tank Farm) and substructures;
- Construction of underground tanks and drainage/underground services;
- Construction of ground floor slabs;
- Construction of superstructure elements;
- External and internal completions and finishes of buildings;
- Installation of external plant and equipment;
- Construction of paved roads and parking areas;
- Underground services;
- Surface water drainage system, foul drainage system;
- Connection to existing water and foul services;
- Installation of plant and equipment;
- Fit-out and commissioning buildings and equipment;
- Erection of site fencing;
- Site landscaping;
- Removal of temporary contractor facilities and site hoarding.

5.3.2 Drawings

This chapter presents figures to illustrate the construction activities proposed. A full set of planning drawings accompany the planning application and a summary set of drawings in A3 format included in **Appendix 5.2**, presented in **Volume 3** of this EIAR.

5.4 Site Preparation Works

Site preparation will commence with the establishment of safe access and site haul roads. A perimeter fence will be erected around each of the construction site areas for each phase. Re-grading work will be required. Where feasible, excavated material will be retained on site, for re-use as bulk fill or for landscaping. Otherwise, excavated material will be loaded directly in trucks for export off-site for re-use, recovery or disposal, refer to **Section 16.5.2.9 of Chapter 16 Material Assets** and **Section 5.5** below. There will be no significant stockpiling of excavated material on site. Details on material export requirements and disposal are provided in **Section 5.5** below.

All traffic movements associated with the import and export of materials have been included in the construction traffic impact assessment. Refer to **Chapter 7 Traffic & Transportation** of this EIAR for further details. It is anticipated that the bulk excavation will take approximately 6 to 8 weeks in the case of the Phase 1 works. The peak construction traffic flow of 50 HGV's per day will be experienced at this stage of the Phase 1 works. Bulk excavation for Phase 2 will take 4 to 6 weeks and the peak traffic flow will be 40 HGV's per day.

The material to be excavated will comprise overburden and previously excavated materials which have been shaped into landscaped berms. Refer to **Section 14.3 of Chapter 14 Land and Soils** of this EIAR for a description of the soils and geology underlying the site. Rock excavation is not anticipated due to the depth of overburden on the site. Refer to **Chapter 10 Noise and Vibration** and **Chapter 8 Air Quality** of this EIAR for specific details on construction noise and dust effects and mitigation measures.

Site preparation works will also include the establishment of facilities for the contractors and the construction management team. These will include the following:

- Site offices, site facilities (canteen, toilets, drying rooms, etc.);
- Offices for the construction management team;
- Secure compound for the storage of all on-site machinery and materials;
- Temporary car parking facilities for construction staff (Phase 1 to be located in a segregated section of the existing temporary trailer parking area, Phase 2 to be located in the new permanent Contractors compound);
- Wheel wash facilities, permanent and temporary fencing and site security.

The existing construction laydown area will be used for Phase 1 and the new contractors compound (replacing the existing trailer parking area) will be used for the Phase 2 construction laydown areas and the construction facilities. **Figures 5.1** and **5.2** below show the construction areas in orange and site compounds in blue for phases 1 and 2 respectively.

5.4.1 Main Construction Works

Once site levels have been established by the initial bulk excavation works and construction of the retaining structures, the construction of the individual structures can begin. This will be followed on by the erection of superstructures, building envelopes, floors, services and finishes as appropriate. Where large pieces of plant or equipment are to be installed, these will be coordinated with the main construction works.

Site roads, car parks and site fencing will be completed, and the landscaping will be undertaken, when the main construction and equipment installation is completed, and commissioning is underway.

5.4.2 Construction Methods

The proposed development will be constructed employing best practice in safety and efficiency. The scale of each stage of the works are relatively small and such that all of the construction can be executed using common building methods and materials.

In-situ reinforced concrete will be used to form foundations. In the parts of the site where the ground levels are raised, or where the bearing strata does not have the required geotechnical properties, foundations will be piled. Continuous flight auger (CFA) piling or augered piles 250mm diameter x 12.0m long on a 3.0m grid will be used for the tank farm foundations only. This piling activity will take 3 weeks to complete.

In-situ reinforced concrete will be used to form ground bearing floor slabs, upper floor suspended slabs and earth retaining structures.

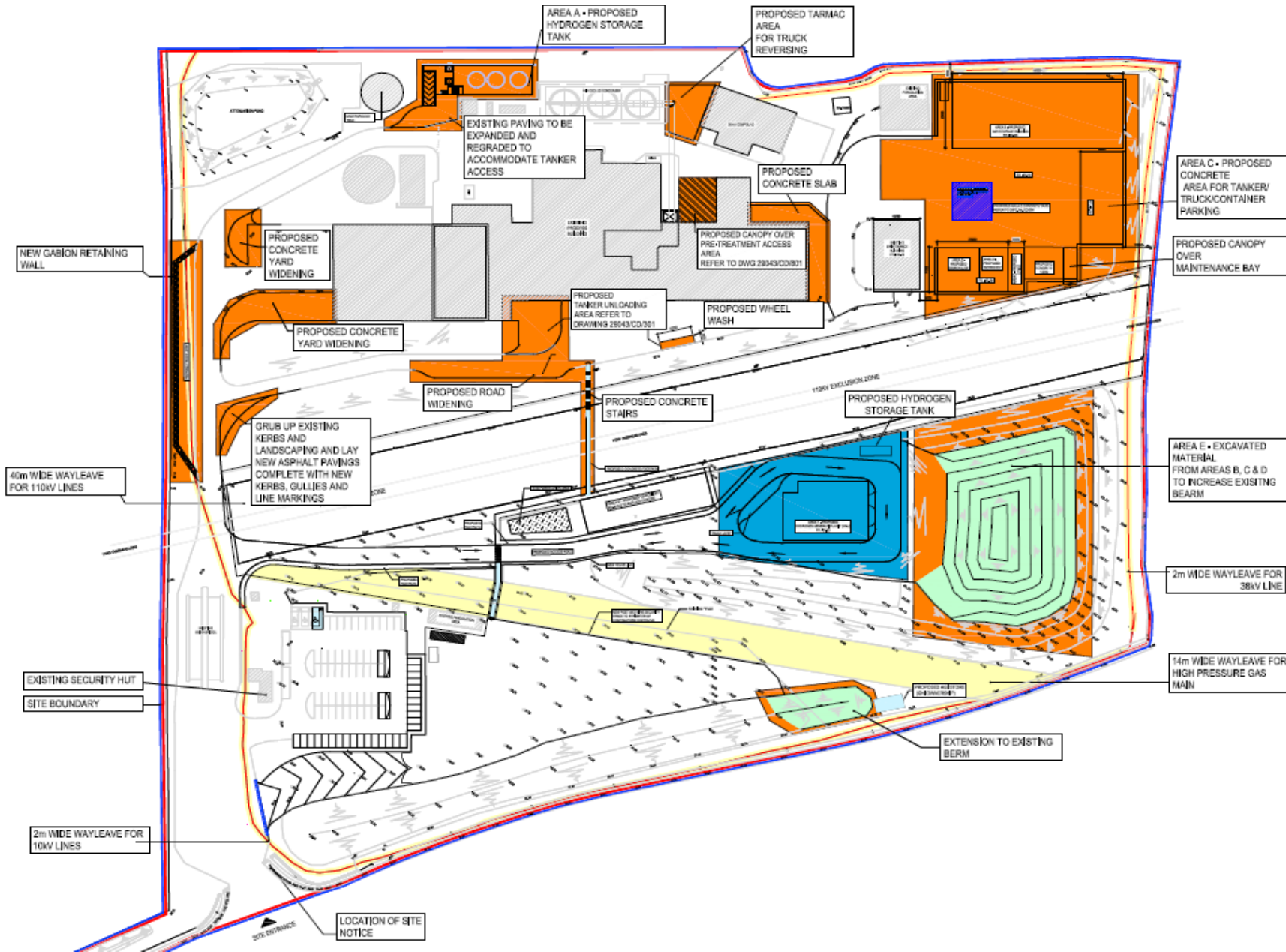


Figure 5.1: Phase 1 construction areas and site compound (highlighted blue). Source Drawing 29043-CD-1101 (refer to Appendix 5.2).

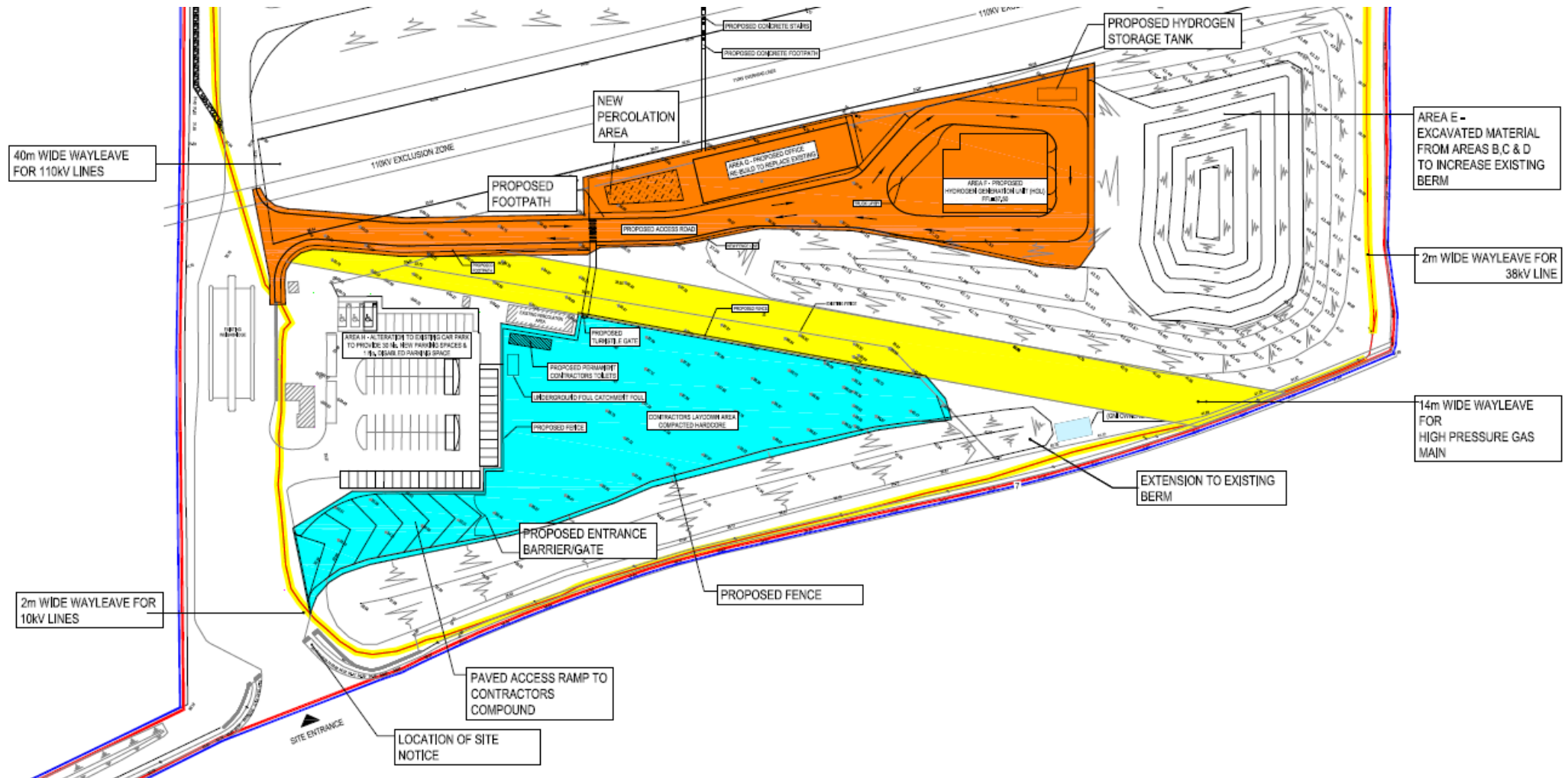


Figure 5.2: Phase 2 construction areas and site compound (highlighted blue). Source Drawing 29043-CD-1102 (refer to Appendix 5.2).

Underground tanks, chambers and process areas will be constructed of in-situ concrete and will be designed as water retaining structures to the relevant codes.

It is likely that all concrete will be brought to site ready-mixed in trucks. The concrete may be placed directly from the trucks, or it may be pumped or be placed by skips hoisted by a crane.

It is envisaged that some of the minor structural elements (e.g. non-load bearing walls) may be constructed in concrete block work.

The superstructures for the buildings will be constructed in structural steel. Steel members will be fabricated off site, in lengths that are safe to transport, and erected on site. Structural steel will also be used to support the process equipment e.g. piperacks, etc., and to provide access platforms.

The buildings will be clad in profiled metal cladding and the roofing will consist of profiled metal cladding or a membrane type system on and metal deck. Depending on the function of the buildings, the cladding and roof will be insulated.

Mobile cranes will be a significant element of the construction plant and it is envisaged that various crane systems will be used for lifting materials in to place.

Typical plant that will be utilised during both phases of the project are listed below:

- 13 tonne excavator;
- 6 tonne excavator;
- 20 tonne excavator;
- 9 tonne dumper;
- Teleporters (2);
- Cherry pickers (4);
- Roller;
- 100 tonne crane;
- CFA-Auger Piling rig (Phase 1 tank farm area only).

Where possible, elements of the construction e.g. steel platforms, tanks, plant and equipment will be assembled off site and delivered on low loaders or similar.

5.5 Material Imports and Exports and Transportation

5.5.1 Material Imports and Transportation

The construction of the proposed development will require considerable movements of materials to and from the site. The selection and specification of construction materials will be informed by local availability of these materials.

Within the necessary constraints of performance, durability and cost, construction materials will be sourced from local suppliers and manufacturers, where possible. Construction materials will be transported from the suppliers via the local road network. Refer to **Chapter 7 Traffic & Transportation** of this EIAR for an assessment of the impact of construction traffic.

Approximately 2,300m³ of engineering fill and crushed stone will be imported onto the site for the construction works.

In order to minimise the environmental effects, materials required from quarries will be sourced from quarries which are located in close proximity to the site where possible and only from quarries listed on the register maintained by the local authority. The environmental effects associated with the registered quarry will have already been assessed by the local authority under Section 261 of the Planning and Development Act 2000, as amended.

All traffic movements associated with the import of materials have been included in the construction traffic impact assessment.

Refer to **Chapter 7 Traffic & Transportation** of this EIAR for an assessment of the impact of construction traffic.

In the context of capacity of the market in Ireland for construction materials, the requirements of the construction phase will not be significant. Refer also to **Section 16.5.2.11 of Chapter 16 Material Assets**.

5.5.2 Material Exports and Transportation

The construction of the proposed development will require considerable movements of materials to and from the site. Most of the materials leaving the site will consist of soil and materials from the excavation works.

The Contractor will endeavour to re-use as much of the surplus materials and wastes generated during demolition, excavation and construction as feasible within the proposed development boundary subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use. Where possible, excavated materials will be reused on site for backfilling purposes, re-grading and landscaping. However, it is expected that a significant volume of the excavated material will not be suitable for reuse on site.

It is estimated that up to 31,000m³ of surplus material will be removed from the site. The clean and inert surplus excavated material, which is integral to the construction phase, may be reused as a by-product on other sites subject to Article 27 under the Waste Directive Regulations 2011 and notification to the EPA.

Where a re-use for the material cannot be found, the material may be sent to suitably permitted waste facilities or licensed soil recovery facilities in accordance with relevant waste legislation or disposed at suitable authorised waste facilities. The environmental effects associated with the sending the material to suitably permitted waste facilities, licensed soil recovery facilities or authorised waste facilities will have already been assessed by the relevant consenting authorities.

The environmental impact of the removal of the material from site will be minimised by following the hierarchy of options outlined above. The impact of the traffic movements on the surrounding road network has been assessed in the construction traffic impact assessment in **Chapter 7 Traffic & Transportation** of this EIAR.

It is unlikely that any contaminated material will be encountered (refer to **Section 14.3 of Chapter 14 Land and Soils**) however if it is, it will be disposed of to a suitable authorised waste facility, subject to the appropriate waste acceptance criteria at the receiving facility and in accordance with relevant waste legislation.

Section 16.5.2.9 of Chapter 16 Material Assets, describes the surplus material management options (re-use, recovery, disposal) and outlines the criteria that the material must meet in order to be disposed of at such facilities.

A small amount of demolition waste (approximately 20 tonnes) from the Phase 2 activity of re-building the office accommodation will also be generated.

All traffic movements associated with the export of materials have been included in the construction traffic impact assessment. Refer to **Chapter 7 Traffic & Transportation** of this EIAR for further details.

A Construction Waste Management Plan (CWMP) is provided in Section 7 of the CEMP in **Appendix 5.1**.

5.6 Services and Utilities Requirements for Construction

5.6.1 Electricity

It is anticipated that the construction work will require a peak load of 120kVA at peak. This load will be met by a combination of spare capacity on site and the provision of a generator at peak periods.

5.6.2 Water Supply

The construction activities that will require water during the construction phase will be relatively small. The initial estimate of demand is approximately 10m³ per day, primarily based on the demand requirement for the construction workers and the associated support facilities. Water supply will be taken from the existing site system.

5.6.3 Storm Water and Foul Water Disposal

A temporary dedicated holding tank for the temporary storage of construction foul effluent will be installed as part of the contractors compound prior to commencement of the main construction activities. The effluent will be regularly disposed of off-site by tanker by a licensed contractor to an approved licensed facility.

Storm water will be managed carefully during construction. In general, storm water will be infiltrated to ground via silt traps and managed soakaways. The laydown areas will be suitably drained and any areas which will involve the storage of fuel and refuelling will be paved and bunded and hydrocarbon interceptors will be installed to ensure that no spillages will get into the surface water or groundwater. Refer to **Section 14.8.1 of Chapter 14 *Land and Soils*** and **15.6 of Chapter 15 *Water*** for specific construction mitigation measures.

5.7 Existing Services

The existing services running in the site will be carefully located, identified and suitable working methods will be employed to ensure that these services are protected. Diversion or relocation of services will be undertaken in accordance with the relevant standards and codes of practice.

Some protection measures such as cover slabs may be used for the services which will be left in place. Pipeline protection slabs will be used for works carried out in the vicinity of the gas transmission line.

5.8 Demolition Works

Demolition works proposed on site will be during the Phase 2 construction works where the existing office building will be removed to make way for construction of its replacement. These demolition works will be limited in both time and scale due to the size of the existing building. It is anticipated that these works will be completed within 1 week and that the waste materials (20 tonnes approx.) will be recovered or disposed of using permitted collectors to appropriately licensed or permitted sites. Refer also to **Section 16.5.2.10 of Chapter 16 *Material Assets***.

5.9 Site Hygiene

The following are some of the measures that will be taken to ensure that the site and surroundings are maintained to a high standard of cleanliness:

- Daily inspections will be undertaken to monitor tidiness. A regular program of site tidying will be established to ensure a safe and orderly site.
- If necessary, scaffolding will have debris netting attached to prevent materials and equipment being scattered by the wind.
- Food waste will be strictly controlled on all parts of the site.
- Wheel wash facilities will be provided for vehicles exiting the excavation areas of the project site. Wheel wash run off will be stored in an onsite storage tank and will be disposed of by permitted waste haulage company at a permitted or licensed facility.
- In the unlikely event that mud is carried from the project site to the public road, it will be cleaned as required and will not be allowed to accumulate.
- Loaded lorries and skips will be covered if required.

- Surrounding roads used by trucks for access to and egress from the site will be inspected regularly and cleaned, using an approved mechanical road sweeper, when required.
- In the event of any fugitive solid waste escaping the site, it will be collected immediately and removed to storage on site, and subsequently disposed of in the normal manner.

5.10 Employment and Welfare

Through the construction phase there will be some variation in the numbers working on site. It is anticipated that a maximum of 120 construction workers will be employed on site at any one time during Phase 1, with the works being carried out during the daytime only (minor exceptions to this may arise due to weather, type of works etc). The Phase 2 construction works will peak at 100 people.

Temporary office accommodation and other construction facilities will be installed on site for the construction phase. All temporary units will be of a high standard in accordance with statutory regulations, as a minimum.

The co-ordination of people and materials on-site will be one of the key activities throughout the construction phases. The construction traffic management plan will designate traffic routes, timings and parking arrangements.

Typical working hours during the construction phase will be:

Start	Finish	
0700	1900	Monday – Friday
0700	1300	Saturday

Consideration of safety, weather or sub-contractor availability is likely to necessitate working outside normal hours on occasion. Heavy or noisy construction activities will be avoided outside normal hours and the amount of work outside normal hours will be strictly controlled.

Refer to **Chapter 7 Traffic & Transportation** of this EIAR for further details on construction traffic.

5.11 Construction Traffic

The impact of the generated traffic on the local road network during the construction of the proposed development is evaluated in **Chapter 7 Traffic & Transportation** of this EIAR, and mitigation measures are proposed where necessary.

The appointed contractor will be required to develop a Construction Traffic Management Plan (CTMP) in advance of commencing the works on site. The contents of the plan are outlined in Section 9.3 of the CEMP attached as **Appendix 5.1** to this EIAR. The plan will be implemented at the commencement of the works.

The plan will also implement all relevant mitigation measures identified in this EIAR, together with any additional requirements imposed by conditions attached by An Bord Pleanála decision to grant permission.

In order to ensure compliance by contractors and suppliers, the requirements of the EIAR, and all additional requirements imposed by conditions attached by An Bord Pleanála will be included in all contract tender documents and will be discussed in detail prior to awarding a contract. All traffic movements associated with the import and export of materials have been included in the construction traffic impact assessment. Refer to **Chapter 7 Traffic & Transportation**, for further details.

The plan will be regularly reviewed and updated in order to take into account the changing patterns of both the existing traffic and the construction traffic, following consultation with Meath County Council.

The routing of any exceptional loads will require liaison with Meath County Council and the Garda Síochána.

The implementation of this plan will be monitored by the Indaver Site Management team during the course of the project and will also be reviewed at the main site meetings.

5.12 Construction Health and Safety

The requirements of the Safety, Health and Welfare at Work Act 2005, the Safety, Health and Welfare at Work (Construction) Regulations, 2013 and other relevant Irish and EU safety legislation will be complied with at all times.

As required by the Safety, Health and Welfare at Work (Construction) Regulations 2013, a Health and Safety Plan will be prepared which will address health and safety issues from the design stages through to the completion of the construction and maintenance phases. This plan will be reviewed as the development progresses. The contents of the Health and Safety Plan will comply with the requirements of the Regulations.

In accordance with the Regulations, a “Project Supervisor Design Process” (PSDP) has been appointed for the initial design phase associated with this planning application. The file from this process will be passed to a newly appointed PSDP for the detailed design phase in advance of the appointment of a main contractor to construct each phase of the proposed development.

A “Project Supervisor Construction Stage” (PSCS) will also be appointed prior to the start of construction on site of each phase.

The Project Supervisor Construction Stage will assemble the Safety File as the project progresses. The safety file will be incorporated into the overall technical record system at the end of project.

Safety on site will be of paramount importance. During the selection of the contractors and subcontractors, their safety records will be investigated. Only contractors with high safety standards will be selected.

Prior to working on site, every individual will receive a full safety briefing and will be provided with all safety equipment relevant to the tasks the individual will be required to perform during employment on site.

Safety briefings will be held regularly and prior to any onerous or special task. 'Toolbox talks' will be held to ensure all workers are fully aware of the tasks to be undertaken and the parameters required to ensure the task will be successfully and safely completed.

All visitors will be required to wear appropriate personal protective equipment (PPE) prior to going on to the site and will undergo a safety briefing by a member of the site safety team.

Regular site safety audits will be carried out throughout the construction programme to ensure that the rules and regulations established for the site are complied with, at all times.

At any time that a potentially unsafe practice is observed, the PSCS, Construction Manager or a member of the Indaver contract management team will have the right as well as the responsibility to halt the work in question, until a safe system of working is again put in place.

There will be an Indaver contract management team (comprising Indaver staff) on site for the duration of the construction phase. The team will supervise the construction of the works including monitoring the contractor's and the PSCS's performance to ensure that the proposed construction phase mitigation measures are implemented, and that construction effects and nuisance are minimised.

Appropriate site personnel will be trained as first aiders and fire marshals. In addition, appropriate staff will be trained in environmental issues and spill response procedures. Tanks and drums of potentially polluting materials will be stored in secure containers or compounds which will be locked when not in use. Secure valves will be provided on oil and fuel storage facilities. Equipment and vehicles will be locked, have keys removed and be stored in secure compounds.

The contractor will maintain an incident and emergency response action plan which will cover all foreseeable risks, i.e. fire, flood, collapse etc. An Incident Response Plan (IRP) is located in Section 8 of the CEMP in **Appendix 5.1**.

The objective of this Incidence Response Plan is to:

- Ensure the health and safety of workers and visitors along the site.
- Minimise any effects to the environment and ensure protection of the water quality and the aquatic species dependent on it.
- Minimise any effects on properties, services, etc.
- Establish procedures that enable personnel to respond to incidents with an integrated multi-departmental effort (including a link to the existing on-site Emergency Plan) and in a manner that minimises the possibility of loss and reduces the potential for affecting health, property, and the environment.

The primary function of the site security team will be to ensure that no unauthorised entry to site occurs. There will be fencing around the sites to minimise the risk of vandalism and unauthorised access. This process will be made easier by all operatives possessing an ID card. ID Cards will only be issued to operatives that have attended the relevant site safety induction.

5.13 Potential Construction Effects

Potential construction phase effects are addressed in other chapters of this EIAR. For example, the construction phase effects on air quality, climate and noise and vibration are evaluated in **Chapters 8 Air Quality, 9 Climate and 10 Noise and Vibration** of this EIAR respectively. Construction traffic is addressed in **Chapter 7 Traffic & Transportation** of this EIAR. There is an evaluation of the construction effects on flora and fauna in **Chapter 11 Biodiversity** of this EIAR.

The construction impact on the archaeological, architectural and cultural heritage is addressed in **Chapter 12 Archaeological, Architectural & Cultural Heritage** of this EIAR. Visual effects and lighting effects during construction are detailed in **Chapter 13 Landscape and Visual** of this EIAR. Potential construction phase effects on soils, geology, hydrogeology are addressed in **Chapter 14 Land and Soils** of this EIAR whilst potential construction phase effects on hydrology are addressed in **Chapter 15 Water**. The risk of a major accident as a result of construction activities impacting on the existing site has been addressed in **Chapter 17 Major Accidents & Disasters** of the EIAR.

The potential cumulative effects arising during the construction phase are also addressed in **Chapters 7 Traffic & Transportation, 8 Air Quality, 9 Climate, 10 Noise and Vibration, 11 Biodiversity, 12 Archaeological, Architectural & Cultural Heritage, 13 Landscape and Visual, 14 Land and Soils, 15 Water, 16 Material Assets, 17 Major Accidents and Disasters and 18 Cumulative Effects, Other Effects and Interactions** of this EIAR.

5.14 Construction Environmental Management Plan

Every effort will be made to ensure that any detrimental environmental effects will be avoided, prevented or reduced during the construction phase of this project. Specific construction phase mitigation measures are described in the individual EIAR chapters.

A **Construction Environmental Management Plan** (CEMP) has been prepared prior to construction commencing (Refer to **Appendix 5.1**). The CEMP summarises the overall environmental management strategy that will be adopted and implemented during the construction phase of the proposed development. The purpose of the CEMP is to demonstrate how the proposed construction works can be delivered in a logical, sensible and safe sequence with the incorporation of specific environmental control measures relevant to construction works of this nature. The CEMP sets out the mechanism by which environmental protection is to be achieved during the construction phase of the proposed development. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum.

The CEMP is a working document and will be finalised by the Contractor following appointment and prior to commencing works on site. All of the content provided in the CEMP will be implemented in full by the Contractor and the finalisation of the CEMP by the Contractor will not affect the robustness and adequacy of the information presented in **Appendix 5.1** and relied upon in the EIAR and Natura Impact Statement (NIS). The CEMP, when finalised, will comprise all of the construction mitigation measures, which are set out in this EIAR and NIS.

5.15 Commissioning Phase

Following completion of construction and installation of equipment, and before operation of the facility commences, there will be a testing and commissioning phase. Commissioning is considered in **Chapter 4 Description of the Proposed Development**.

5.16 References

British Standard BS 5228 – 1 (2009 +A1 2014) (*Code of practice for noise and vibration control on construction and open sites – Noise*).

British Standard BS3882 (2015) *Specification for Topsoil*.

Construction Industry Research and Information Association, (2015) *Environmental Good Practice on Site*, CIRIA, London.

Construction Industry Research and Information Association, (2001) *Control of Water Pollution from Construction Sites, guidance for consultants and contractors*, CIRIA, London.

Department of Transport (2010) – Traffic Signs Manual

Murnane E., Heap A., Swain A. (2006) *Control of Water Pollution from Linear Construction Projects* CIRIA, London.

National Construction and Demolition Waste Council (2006), *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects*, NCDWC, Dublin.

National Roads Authority (2014) *Good Practice Guideline for the Treatment of Noise during the planning of National Road Schemes*, NRA, Dublin.

Safety, Health and Welfare at Work (Construction) Regulations 2013