7. Construction Activities

7.1 Introduction

As set out in Chapter 1 of this updated EIAR, this is an update to Chapter 7 of the EIAR submitted to An Bord Pleanála in October 2018 as part of the application for approval of the proposed N6 GCRR pursuant to Section 51 of the Roads Act 1993 (as amended). It forms part of the response to the request by ABP for further information in December 2023 where they (in addition to a number of other requests) requested GCC to *"Update the Environmental Impact Assessment Report"*. This chapter describes the construction activities associated with the proposed N6 GCRR and of other elements of the Project, which Project is described in Chapter 5. The Project for Environmental Impact Assessment (EIA) and Appropriate Assessment (AA) is considered and assessed in the subsequent chapters of this updated EIAR.

This chapter considers how the proposed N6 GCRR and the other elements of the Project will be constructed, including construction fencing, site clearance, any necessary investigations, import and disposal of materials, drainage and general construction activities for road infrastructure and activities associated with the construction of horse stables. As detailed in Chapter 5, the Project will be constructed in phases, one year for Phase 1, three years for Phase 2 and one year to complete Phases 3 and 4. Where modifications / changes have been made connected to the construction activities since the 2018 EIAR these have been set out in this updated chapter.

The additional phases in the construction are the main changes of relevance to the construction activities since 2018. The construction of the temporary and permanent stables as separate works phase from the construction of the proposed N6 GCRR, and in particular the Galway Racecourse Tunnel, has simplified the sequence of construction in this area as removes the live construction interface of the tunnel and permanent stables. The additional phases have also introduced some construction traffic to the road network in the Ballybrit area in Phases 1, 3 and 4 which was not present previously. The temporary stables were demolished fully in the 2018 ÈIAR as they were situated on top of the final alignment of the proposed N6 GCRR. However, the proposed arrangement in 2025 whereby the temporary stables are located in the infield of Galway Racecourse facilitates the repurposing of the stables area and the retention of certain portions of the ancillary works which is more sustainable. This chapter provides updated quantities for the construction materials and construction traffic given the additional phases.

This chapter initially sets out the methodology followed in preparing this updated chapter (Section 7.2), describes the receiving environment (Section 7.3) and describes the construction activities associated with the Project (Section 7.4). The potential construction impacts of the Project are described (Section 7.5) and proposed mitigation (Section 7.6) and residual impacts are described (Section 7.7). The chapter concludes with a summary (Section 7.8) and reference section (Section 7.9).

This updated chapter has utilised where appropriate, the information gathered during the constraints and route selection studies for the proposed N6 GCRR and other assessments made under the headings of soils and geology, material assets non-agriculture, noise and vibration, air quality and climate, human beings, population and health, hydrogeology, hydrology, archaeology, architectural and cultural heritage, landscape and visual for this updated EIAR. This chapter should be read in conjunction with Figures 7.001 to 7.002; 7.101 to 7.124; 7.201 to 7.202 and 7.301 to 7.302.

7.2 Methodology

The preparation of this chapter is based on a desk study, site walkovers, ground investigations and on information gathered during consultations with landowners and homeowners, utility and service providers and the public.

During the preparation of the 2018 EIAR construction workshops took place in the Project Design Office. Their purpose was to review and assess how the proposed N6 GCRR would be constructed for the associated environmental assessments. The workshops were attended by various environmental specialists interacting with the design team. The specialists from various different disciplines included ecology, noise & vibration, air quality, climate, landscape & visual, geotechnical and hydrology. An overview of the design of the

proposed N6 GCRR and the key constraints to be considered during construction was presented by the design team. A collaborative discussion was held between the various disciplines to highlight any additional potential constraints and impacts associated with the construction. Further follow up collaboration continued between the various specialists and the design team.

More recently further workshops were held between the design team and the environmental specialists on 27 November 2023 and 26 June 2024. The purpose of these workshops was to review and assess any changes to the proposed N6 GCRR and how the Project would be constructed for the associated environmental assessments given that there is now a sequencing of phases of the Project to accommodate the temporary and permanent stables as set out in Chapter 5. This information was then used by the environmental specialists to understand the key constraints to be considered during construction and enable the project team, including the environmental specialists to assess any associated environmental impacts. This ongoing interactive process informed the assessments included in this chapter and other relevant chapters of this updated EIAR.

The main guidelines used in preparing this chapter are:

- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022)
- Transport Infrastructure Ireland (TII) guidelines on procedures for assessment and treatment of geology, hydrology and hydrogeology for National Road Schemes (TII, 2009)
- TII Environmental Planning of National Road and Greenway Projects (TII, 2023)
- TII Environmental Impact Assessment of National Road Schemes – A Practical Guide (TII, 2008) which was used to inform the preparation of the earlier 2018 documentation

7.3 Receiving Environment

The receiving environment is represented by rural lands mixed with the urban fringe of Galway City and includes some built-up suburban development such as that along the N59 Moycullen Road and the N83 Tuam Road. The area to the west of the N59 Moycullen Road is underlain with granite and to the east of the N59 Moycullen Road with limestone which needs to be taken into consideration in the reuse of materials during construction. The existing road network which could be used as haulage routes is made up of the National, Regional and Local roads. A description of the proposed haul route network is provided below in Table 7.5 and shown on Figures 7.001 and 7.002 and 7.101 to 7.124. Locations of potential blasting for excavations during construction are shown on Figures 7.201 and 7.202 and areas proposed for material deposition areas are shown on Figures 7.301 and 7.302. A full description of the receiving environment is provided in Chapter 5, Description of the Project.

7.4 Construction Activities

7.4.1 Overview

This section outlines the construction phasing (Section 7.4.2), enabling works (Section 7.4.3), site preparation and clearance works (Section 7.4.4), proposed road closures and diversions (Section 7.4.5), potential form of contract (Section 7.4.6), main construction activities which for the purposes of this updated EIAR are divided into sections (Section 7.4.7), proposed construction methodologies (Section 7.4.8), material sources and transportation including, earthworks quantities, proposed haul routes and construction compounds (Section 7.4.9), service and utility diversions (Section 7.4.10), employment and welfare (Section 7.4.11), construction health and safety (Section 7.4.12), commissioning and decommissioning of the Project site compounds (Sections 7.4.13 and 7.4.14).

It is estimated that the overall construction period will last for approximately 60 months, albeit that it will not be a continuous period of construction. The temporary stables and permanent stables, for which a separate planning application was made to Galway City Council by Galway Race Committee Trust, Register Ref. 24/60279, are required so as to mitigate the impacts of the proposed N6 GCRR on the operation of the racecourse and to ensure that the racecourse can continue to operate both during and after the construction of the proposed N6 GCRR. The construction period for the stables will span either side of the proposed N6 GCRR construction, which itself has a duration of up to 36 months. The Project will be constructed in phases

during this time, one year for Phase 1, three years for Phase 2 and one year to complete Phases 3 and 4. A variety of construction activities will occur simultaneously at a number of locations along the route of the proposed N6 GCRR during Phase 2 of the Project but will be in a phased manner. Construction will be undertaken using internationally accepted methods. Construction of the Project will include activities such as excavation, embankment and structural construction, tunnelling, piling, rock breaking and movement of materials within the fenced off working area. This will generate noise, dust and movement of machinery which will potentially impact on the surrounding environment. A series of best practice mitigation measures described in the relevant chapters of this updated EIAR will be incorporated during the construction phase to ensure that strict limit values set to avoid significant impacts will not be exceeded at sensitive locations.

A strategy for construction has been developed with the aim of minimising potential environmental impacts at each subsequent phase of the Project. Major construction activity such as excavation work, requires the use of powerful and often large and heavy equipment. These works take a significant time period to complete and progressive phases of construction entail different activities and require the use of various types of equipment. Overall, however, construction is a temporary activity. Modern machinery and techniques are sophisticated and are designed to be operated to minimise the impact on their surroundings. Any residual impact, which may arise as a result, is for a limited period of time. The works required to construct the Project are essentially similar to other major construction projects in Ireland and across the world.

The general activities and potential impacts associated with the construction of the Project include:

- Site clearance including demolitions and vegetation clearance
- Fencing
- Site access
- Construction compounds
- Site investigations and archaeological testing
- Quarrying and processing of aggregates
- Material requirement and source of material
- Temporary road closures and diversions
- Water management/treatment
- Temporary storage of materials, surplus materials or wastes arising
- Processing and transportation of excavated materials, where suitable, for reuse within proposed N6 GCRR

The above activities are discussed in the following sections which should be read in conjunction with Chapter 5, Description of the Project. In addition to the above list the following are also discussed:

- Construction form and duration of works
- Construction constraints
- General construction methods
- Construction programme, staging and working hours
- Construction traffic and access

Associated construction activities considered in other chapters of this updated EIAR are as follows:

- Earthworks and management of excavated material (ref. Chapter 9, Soils and Geology)
- Site drainage (ref. Chapter 5, Description of Project, Chapter 10, Hydrogeology and Chapter 11, Hydrology)

- Landscaping (ref. Chapter 12, Landscape and Visual)
- Diversion of utilities (ref. Section 7.4.4.3 below and Chapter 15, Material Assets Non-agriculture)
- Transportation and management of earthworks (ref. Chapter 16, Air Quality)
- Embodied carbon of materials, transportation of materials and construction activities (ref. Chapter 17, Climate)
- Noise and vibration linked to construction activities including blasting ((ref. Chapter 18, Noise and Vibration)
- Impacts arising from a combination of all of the above in terms of impacts on population and human health (ref. Chapter 19, Population and Human Health)
- Reuse and management of waste materials (ref. Chapter 20, Resource and Waste Management)

7.4.1.1 Construction Environment Management Plan (CEMP)

A Construction Environmental Management Plan (CEMP) for the Project is provided in Appendix A.7.5 of this updated EIAR. This is an update of the CEMP included in the 2018 EIAR to take account current guidelines since 2018 and also to reflect certain proposed modifications since 2018. It documents the overall environmental management strategy that will be adopted and implemented during the construction phases of the Project. 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 Project. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum. The following is included in the CEMP:

- General Project Details
- Contact Sheets
- Reference Documents
- Organisational Structure/Duties and Responsibilities
- Environmental Commitments and Environmental Control Measures
- Site Specific Method Statements/Management Plans
  - Construction and Demolition Waste Management Plan
  - Sediment, Erosion and Pollution Control Plan
  - Non-native Invasive Species Management Plan
  - Incident Response Plan
  - Construction Traffic Management Plan
- Environmental Awareness Training Strategy
- Communications Strategy
- Inspections, Auditing and Monitoring Compliance Strategy
- Final Handover

The updated CEMP as provided in Appendix A.7.5 must be read in conjunction with the construction activities information provided in this updated EIAR. Refer also to Section 7.6.1 of this chapter for further details on the CEMP.

7.4.2 Construction Phasing

There are additional phases, five in total, in the overall construction sequence from that presented in the 2018 EIAR to accommodate the separate application for permission for the temporary and permanent stables. The construction of the Project occurs over four of the five project phases as follows:

- Phase 1: These works do not form part of the approval sought as part of the Section 51 Application for the proposed N6 GCRR, however Phase 1 does form part of the Project that has been considered and assessed for EIA and AA purposes. Works undertaken as part of Phase 1 will include the construction of the temporary stableyard, machinery shed, maintenance shed, water supply wells, ESB substation and new pre-parade ring and pavilion on Galway Racecourse lands. The works are the subject of an application for planning permission as mentioned above by the owners of Galway racecourse.
- Phase 2: Works undertaken as part of Phase 2 will include the following:
  - The provision of the proposed N6 GCRR in two stages which will take place concurrently:
    - Stage A - N6 Coolagh Junction to N59 Letteragh Junction - 9.9km (Including the N59 Link Road North and South)
    - Stage B - N59 Letteragh Junction to R336 west of Bearna - 7.5km

    Completion of Stage A would provide the benefit of a new river crossing and also provide a new connection to the N59 Moycullen Road and greater Knocknacarra area. The N59 Link Road North and South and Parkmore Link Road could also potentially be constructed as part of an advance works contract however these will be assessed as part of the main contract for the purpose of this updated EIAR as the associated environmental impacts would be the same. Completion of Stage B would enable a full connection from the west of Bearna Village and to the east in Coolagh, Briarhill with various at-grade and grade separated connections
  - Existing stableyard to be demolished, including existing well, existing water tank, machinery shed and adjacent car parking
  - Existing commercial building on the lands the subject matter of the proposed N6 Galway City Ring Road Motorway Scheme 2018 to the north of the Galway Racecourse to be demolished and the site cleared
  - Existing horse box parking off Racecourse Avenue to be demolished, including removal of existing access arrangement to the Ballybrit graveyard, to accommodate the Galway Racecourse Tunnel as part of the proposed N6 GCRR
- Phase 3: These works do not form part of the approval sought as part of the Section 51 Application for the proposed N6 GCRR, however Phase 3 does form part of the Project and has been considered and assessed for EIA and AA purposes. Works undertaken as part of Phase 3 will include construction of the new permanent stableyard upon completion and handover of the proposed N6 GCRR. Again these works are the subject of an application for planning permission as mentioned above by the owners of Galway racecourse.
- Phase 4: These works do not form part of the approval sought as part of the Section 51 Application for the proposed N6 GCRR, however Phase 4 does form part of the Project and has been considered and assessed for EIA and AA purposes. Works undertaken as part of Phase 4will include demolition of the temporary stableyard constructed in Phase 1 and reinstate the site of temporary stableyard as car parking. Retain ESB sub-station, pavilion, machinery shed, maintenance shed and pre-parade ring. Again these works are the subject of an application for planning permission by the owners of Galway racecourse.

7.4.3 Enabling Works

Enabling works are those generally undertaken to existing facilities in order to provide space or access for the permanent works and or construction. By their nature, these works must be complete before the main works can start. The timing of enabling works depends on the programmed start of the phase of main works that they are designed to enable. Some may start well in advance of the main construction activities. The

potential environmental impacts associated with the enabling works have been considered in this updated EIAR.

Before the start of the main construction works, there will be elements of enabling and preparatory works, such as utility diversions, ground investigation, treatment of non-native invasive species and archaeological investigations, which are designed essentially to clear the ground for the main activities. These activities have been considered at this stage to ensure all necessary land and access is included within this planning application.

Some examples of main enabling works in advance of Phase 2 are as follows:

- Diversion of 110kV ESB overhead lines at Coolagh, Briarhill, and Ballybrit
- Diversion of the gas distribution network at Rahoon and gas transmission network at School Road, Castlegar
- Racecourse Avenue diversion and the realignment of the northern access to Galway Racecourse, and replacement of two wells for Galway Racecourse

7.4.4 Site Clearance and Preparation Works

Site clearance including demolitions, vegetation clearance and treatment of non-native invasive species will be undertaken within the Assessment Boundary. The clearance of vegetation and treatment of non-native invasive species will be done in accordance with the CEMP in Appendix A.7.5. There are restrictions for site clearance and construction at locations of breeding birds. Where feasible, vegetation (e.g. hedgerows, trees, scrub and grassland) will not be removed, between the 1 March and the 31 August, to avoid direct impacts on nesting birds. Where the construction programme does not allow this seasonal restriction to be observed, then these areas will be inspected by a suitably qualified ecologist for the presence of breeding birds prior to clearance. Areas found not to contain nests will be cleared within 3 days of the nest survey, otherwise repeat surveys will be required, (ref. Chapter 8, Biodiversity).

Since 2018, there will be a small area of additional site clearance as part of Phase 1, as the existing sand bed and access tracks within the car parking areas in the racecourse infield area in the location of the proposed temporary stables will be cleared, as well as the tarmac car parking area in the location of the proposed pre-parade ring. The site clearance for Phase 2 will be as presented in the 2018 EIAR with all areas of the site required for the construction of Phase 2 of the Project cleared down to ground level, with in some cases demolition of existing structures including residential dwellings and commercial properties, refer to Chapter 15, Material Assets Non-Agriculture. Trees will be protected where practicable when construction accesses are formed. The presence and nature of items of heritage significance will be recorded and preserved where possible. Archaeological monitoring and investigations will also be undertaken in order to record and preserve any buried findings using the appropriate methods. There will be no additional new site clearance required for Phase 3 and Phase 4 construction works.

Access for additional ground investigation work and archaeological testing have been considered as part of this updated EIAR and are included within the Assessment Boundary.

Surplus materials will be reused within the works for the Project where feasible and subject to appropriate testing to ensure it is suitable for its end use. Unavoidable wastes generated will be managed as outlined in Chapter 20, Resource and Waste Management.

7.4.4.1 Fencing

Prior to the commencement of Phase 1, the area around the temporary stables will be temporarily fenced off until Phase 1 is complete. For Phase 2 the land to be acquired for the proposed N6 GCRR will be fenced and access across it restricted. Temporary construction fencing or hoarding may be required during construction prior to the installation of permanent fencing to secure the site and prevent unauthorised access. Fencing in accordance with TII Publications will be used. In Phase 3, the area around the permanent stables will be fenced off until Phase 3 is complete and then the temporary stables will be fenced off during Phase 4 whilst they are being demolished. Drawings of the proposed fence types are included in Figures 5.5.01 to 5.5.30 in Volume 3 of this updated EIAR. These figures were originally submitted as A.1.9 of the 2019 RFI.

Fence types will vary across the Project depending on different circumstances which may require, timber post and rail fencing, timber post and mesh fencing, masonry walls, steel palisade fencing, noise barriers, parapets and may be temporary in nature. The method for erecting the fence will also vary depending on the location of sensitive receptors such as the presence of Annex I habitats. For example, the fencing for Phase 2 of the Project at the Menlough Viaduct will be erected without in any way impacting on the Annex 1 habitat, namely Limestone pavement. The contractor will be required to prepare a method statement in order to demonstrate this. In certain situations, temporary crossing points for livestock and machinery will be allowed until accommodation roads are constructed. Fencing will also be erected from the proposed roadside of the fence. In areas where the Assessment Boundary includes Annex I habitat within Lough Corrib SAC to be retained, the permanent fencing will be located between the proposed N6 GCRR and the Annex I habitat and will not be located within the habitat areas.

Upon completion of Phase 3 of the Project, fencing and boundary walls will be erected as shown on the photomontages for the proposed development at Galway Racecourse to ensure a secure stableyard.

Upon completion of Phase 4, the fencing as installed in Phase 1 will be retained.

7.4.4.2 Water Management

Site drainage will be provided to collect surface water runoff, which will be directed into a site water treatment facility before being discharged to the local drainage network. Pre-earthwork drains will need to be constructed in advance of main earthworks to prevent flooding of adjacent lands or vice versa.

Drainage ponds and interceptor ditches will also need to be constructed in advance of main earthworks to collect, treat and discharge all surface water run off during construction. Silt traps will be required for any construction in proximity to sensitive watercourses.

As detailed in the CEMP (Appendix A.7.5) (such as the sediment, erosion and pollution control plan) specific controls/mitigation measures will be put in place to manage runoff and minimise pollution to receiving waterbodies during the construction phase. Further details on same are also provided in Chapter 10, Hydrogeology and Chapter 11, Hydrology.

Construction dewatering is unlikely to occur during Phase 1 given the depth below ground to water table.

As per the 2018 EIAR, construction dewatering will be required and managed during Phase 2 of the Project at the following locations:

- Interception of groundwater for cuttings in the Galway Granite Aquifer, with groundwater discharged to surface watercourses
- The cutting west of the N83 Tuam Road Ch. 13+050 to Ch. 13+650 (EW27) may encounter groundwater seasonally during peak groundwater levels in the Visean Undifferentiated Limestone. The design includes drainage to intercept and carry groundwater away from the construction for discharge in the same groundwater body
- The Galway Racecourse Tunnel and its approaches will include dewatering of the Visean Undifferentiated Limestone. The construction drainage will intercept and carry groundwater away from the construction for discharge in the same groundwater body

Construction dewatering will not be required for Phases 3, 4 and 5 of the Project. Therefore, there is no change to the construction dewatering since the 2018 EIAR. Further details on same are also provided in Chapter 10, Hydrogeology.

7.4.4.3 Utilities Diversion

All utility diversion work such as electrical, telecommunications, gas and water are assessed in Chapter 15, Material Assets Non-Agriculture. In Phase 1, a new sub-station will be installed at the rear of the maintenance shed to power the temporary stableyard, maintenance shed, machinery shed and pre-parade ring.

The key main diversions for Phase 2 of the Project include four 110kV overhead line diversions at Ballybrit and Coolagh, one gas main diversion at Rahoon, one temporary gas main and foul sewer diversion at School Road, Castlegar, and two foul main sewer diversions at Ballybrit and Ballymoneen Road.

In Phase 3, connections are made to diversions undertaken during Phase 2 in the vicinity of the permanent stables.

During Phase 4, certain utilities installed in Phase 1 become redundant with the decommissioning of the temporary stables.

7.4.4.4 Demolitions

Demolition of existing buildings is required at a number of areas and these demolitions are considered and assessed in Chapter 14, Material Assets Agriculture and Chapter 15, Material Assets Non-agriculture and shown on Figures 14.1.1 to 14.1.15, and Figures 15.3.01 to 15.3.15.

The demolition work will be carried out by a specialist demolition contractor who will operate in accordance with the method statement and Health and Safety legalisation (refer to Section 7.4.12 below). The method statement will outline how the contractor proposes to undertake the demolition works in accordance with the CEMP in order to demonstrate that the work will be carried out safely and to ensure that significant environmental impacts will not arise. This method statement will be approved by the Employer in advance of any works.

As detailed in the CEMP (Appendix A.7.5), the Contractor will put in place a Public Communications Strategy which will provide a two-way mechanism for members of the public to communicate with a designated member of the Contractor's staff and for the Contractor to communicate important information on various aspects of the Project to the public. This will include a communications strategy for notifying neighbouring residences of proposed demolitions in the area. Warning signs will be erected notifying people of dangers of moving plant/demolition works.

In addition, a suite of mitigation measures and specific controls that the contractor is obliged to put in place in relation to construction works (including demolition works) is specifically detailed and set out in the CEMP in Appendix A.7.5 and Chapter 16, Air Quality and Chapter 18, Noise and Vibration (refer to Section 7.4.1 and Section 7.6 for further details).

Prior to the commencement of any demolition works, security fencing will be erected around the area to be demolished and regularly checked to see that it is in a satisfactory condition. Potential impacts to neighbouring properties during construction will be mitigated by the implementation of the measures outlined in Section 7.6 below.

Prior to any demolition, asbestos surveys will be carried out on all structures to determine if there are any asbestos materials present. Demolition work will not take place unless the structure has been safely cleared of asbestos. Properties will be surveyed for asbestos containing materials by a competent person and the asbestos materials will be removed by trained personnel and placed into appropriate packaging ready for removal off site in accordance with Health and Safety legalisation (refer to Section 7.4.12 below) thereby ensuring significant environmental impacts will not arise.

Prior to the heavy demolition works taking place, all rubbish and debris surrounding the property will be removed and placed into skips for recycling/disposal. These materials will include all the domestic waste, furniture and kitchen appliances dumped on, in or around the properties. These materials will be removed using mechanical techniques and segregated and stockpiled for removal off-site.

Before the commencement of demolition works, all existing services will be identified, located and turned off. This includes ESB, water, gas and telecommunications. The contractor will ensure all services to properties are off before demolition works commence.

A bat survey is to be completed at all properties prior to being demolished. This will involve the ecologist using a cherry picker to access the roof tiles and removing several tiles. Once the ecologist confirms the roof space is clear the demolition can take place.

The demolition process will include the mechanical demolition of buildings and the removal of the materials from site. The works will be carried out as swiftly as possible and in an efficient and safe manner.

Demolition works will be carried out under strict supervision at all times. Demolition of buildings will be well supervised with the area around the building closed off to unauthorised personnel.

Demolition of the larger structures will commence from the roof structure working downwards. The contractor will use a large tracked excavator for the demolition works which will provide extra reach and extra power for the task at hand. A water bowser will be used to suppress dust from the demolition works should the need arise. Dust suppression units will be provided to disc cutting machines, to dampen down dust.

The properties affected will be demolished and all rubble stockpiled for removal. Demolition shall be completed in a controlled manner with no operatives allowed near the structure until the building is completely levelled. All material will be removed off site to a licenced facility. No buildings will to be left in an unstable or unsafe condition.

In general, excavators or other suitable equipment will be utilised to peel off the front walls of the properties first to enable access to remove the floors and their contents. The materials will be pulled clear of the structure to a suitable area for further processing, segregation and loading. The remaining concrete structures will then be demolished and temporarily stockpiled where they fall. The excavator may crunch the structure on a bay-by-bay basis into small sections which will allow the structure to be progressively demolished in a safe manner. This will minimise the dropping of large sections of concrete to the ground in an uncontrolled manner.

When demolition operations allow materials such as timber, steel and concrete will be gathered to a central location, where it will be sorted and segregated for removal off site. On completion of the removal of the property internal structures, the remaining external walls will be pulled down and stockpiled. Removal of waste materials will be carried out during all stages of the mechanical works to create a safe and workable site for both the excavator and the operatives on site. When enough material has been accumulated the segregated stockpiles will be removed for disposal and/or recycling.

Temporary disruption to services in the locality may arise during the course of the work but these will be re-instated. In liaison with the local service providers, all services will be disconnected prior to demolition works.

A designated point man will be present to allow safe manoeuvring of machinery/hauliers. Construction traffic will be managed safely and in accordance with the overall construction traffic management plan (Appendix A.7.5).

No operatives will work under areas of demolition and all equipment operated by the employees will be maintained in good working order and inspected in accordance with manufacturers recommended intervals. All work will be carried out in accordance with the method statement and under fulltime supervision.

Construction waste will vary significantly from site to site but typically would include the following non-hazardous fractions:

- Soil and stone
- Concrete, brick, tiles and ceramics
- Asphalt
- Metals
- Wood
- Other

The hazardous waste streams which could arise from construction activities may include the following:

- Waste electrical and electronic components
- Batteries
- Asbestos

- Wood preservatives
- Liquid fuels
- Contaminated soil

Any metals that can be salvaged for recycling will be removed and stored separately. All glass in the property such as windows and doors, will have been removed prior to demolition works to remove the dangers associated with broken glass in the rubble or during demolition works.

In all cases where demolition and site clearance is being undertaken, the relevant archaeological and architectural heritage mitigation measures will be implemented. Refer to the Construction & Demolition Waste Management Plan of the CEMP included in Appendix A.7.5.

All potential impacts associated with the demolition works are fully assessed within the relevant chapters of this updated EIAR.

Table 7.1 Demolition Quantities and Transportation

	Material Type	Estimated volume (m^3)	Construction Traffic (HGV Journeys)*
Phase 1	0	0	0
Phase 2	Pavement	1,171	281
	Concrete and associated materials	6,745	1,718
	Structural aluminium	3	1
	Metal roofing	15	4
Phase 3	0	0	0
Phase 4	Concrete and associated materials	1,382	332
	Flooring	160	25
Phase 5	0	0	0

*Includes journeys to and from site either empty or full

For further information on the resourcing and management of waste and non-waste materials arising from demolitions, please refer to Chapter 20, Waste and Resource Management of this updated EIAR.

7.4.4.5 Site Offices and Compounds

Site preparation works will also include the facilities for the contractor and the construction management team.

These will include the following:

- Setting up of access control to the site
- Site offices
- Site facilities (canteen, toilets, drying rooms, etc.)
- Offices for construction management team
- Secure compound for the storage of all on-site machinery and materials
- Temporary car parking facilities
- Permanent and temporary fencing

- Site security

See Section 7.4.9.4 for more information on site compounds.

7.4.4.6 Concrete Batching and Rock Crushing Plants

Locations for concrete batching and rock crushing plants within the Assessment Boundary have been considered as part of this updated EIAR.

There will be no concrete batching or rock crushing plants as part of Phases 1, 3 or 4 of the Project.

For Phase 2 of the Project, it is proposed to include a concrete batching and rock crushing plant at Lackagh Quarry (Site Compound SC 11/01). Lackagh Quarry site compound will be one of the principal site compounds for Phase 2 of the Project (the proposed N6 GCRR), given its size and location.

It is also proposed to include a rock crushing and grading plant at site compounds in close proximity to the major cuttings associated with Phase 2 of the Project in order to minimise the distance for haulage of excavated material. It may also be necessary to utilise a mobile rock crushing unit to minimise haulage of excavated material. See Table 7.6 below for a summary of potential site compounds and possible locations identified for concrete batching and rock crushing plants. The appropriate authorisation for crushing plants such as waste facility permits will be obtained by the operator prior to commencement of the activity.

7.4.5 Road Closures and Diversions

The Project will be constructed in a manner which will minimise, as much as possible, any disturbance to the local residents and road users. Requirements for temporary traffic management during the construction of the Project will be explicitly written into the Employer's Requirements for the construction contract documents and tenderers will have to demonstrate compliance with these requirements during the tender process. There are no additional restrictions on road closures or diversions arising from the introduction of Phases 1, 3 and 4 of the Project.

For Phase 2 of the Project, there are two locations where temporary road diversions will be in place in order to construct bridge structures at Ch. 3+300 Aille Road L5384 and Ch. 13+150 School Road, Castlegar L2134. A plan outline of these proposed temporary diversions is presented in Figures 7.001 and 7.002 and described below in Section 7.4.5.

Temporary night-time closure of existing roads may be required where overbridges are to be constructed at locations such as the Rahoon Road, Letteragh Road, N59 Moycullen Road, Menlo Castle Bóithrín, Bóthar Nua, An Seanbóthar, N84 Headford Road, N83 Tuam Road, Briarhill Business Park Road and R339 Monivea Road.

As detailed in the CEMP (Appendix A.7.5), the Contractor will put in place a Public Communications Strategy which will include procedures to inform members of the community who may be directly affected by the construction phase on schedules for any activity of a particularly disruptive nature which is likely to impinge on their property such as blasting, demolition, road closures and diversions, pile driving and any mitigating actions that are being taken (shielding, restriction on work hours, etc.) to minimise such disruption.

There are three permanent road closures in the local road network arising from Phase 2 of the Project. The Ann Gibbons Road (L13215) at Ch. 2+500 in Troscaigh will be severed by the proposed N6 GCRR and a permanent diversion for local traffic will be required via the existing Bearna to Moycullen Road L1321. The existing link road from the Western Distributor Road Roundabout at Gort na Bró to the Knocknacarra Shopping Centre will be closed and replaced with a new link road connecting to the Gort na Bró Road. Access to Galway Racecourse will be permanently closed through Ballybrit Crescent (Racecourse Avenue) and diverted in a U-shaped link to the rear of the proposed permanent stableyard to ensure continued access to the western portion of the racecourse and third parties. There will be temporary road closures on the junction of the R339 and Parkmore Road, and further along on Parkmore Road itself. Details of these road closures are shown on Figures 7.102 and 7.113.

In order to minimise the impact on local residents, landowners and the public, access to existing residential areas, business premises and public facilities will be maintained during construction.

7.4.6 Potential Form of Contract

The construction of Phase 1, 3 and 4 of the Project, will be carried out under two separate contracts, one for Phase 1 and a separate one for Phase 3 to 4. These are likely to be Employer Design due to the very specialist nature of the construction works. Whilst a decision on the exact contractual arrangements for Phase 2 has not yet been made, it is suitable for development as a Design and Build (D&B) Scheme or a Public Private Partnership (PPP) contract.

Regardless of the form of contract, the Contractor for the works will be contractually bound within the contract by any conditions arising from the site constraints, the commitments and mitigation measures set out in the updated EIAR, the employers requirements for the project, any modifications that may be imposed by An Bord Pleanála and any conditions imposed by An Bord Pleanála and or other Statutory Regulations. This may incorporate alternative details provided it can be demonstrated that it provides the same performance criteria (or higher) than those outlined in the CEMP. Prior to construction the CEMP will be finalised by the Contractor and approved by the Employer. The CEMP is included in Appendix A.7.5 and summarises the overall environmental management strategy that will be adopted and implemented during the construction of the Project. 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.

7.4.7 Main Construction Works

The below text provides a summary of the proposed construction and its estimated duration for each phase of the Project, noting again that there are additional phases since 2018. A likely sequence of construction is presented as part of this updated EIAR, this is based on a worst-case scenario so that all potential impacts are considered for each phase of the Project. All construction will be employed using best practice methods and in accordance with the relevant standards.

An overview of each Phase and its associated construction activities are discussed in the following sections which should be read in conjunction with Chapter 5, Description of Project which includes a full description of the Project and Figures 7.1 and 7.2 which show the locations of the proposed site compounds, blasting locations and haul routes.

7.4.7.1 Phase 1

The Phase 1 construction works involve constructing temporary stableyard including horsebox parking, machinery shed, maintenance shed, ESB substation, two wells, new pre-parade ring and pavilion on Galway Racecourse lands. The temporary stables construction will comprise:

- Cut and fill earthworks to level land at the site
- Laying of base material and flooring
- Construction of pre-cast concrete stable and washroom units, loading bays, retaining walls, pavilion, machinery shed, maintenance shed, pre-parade ring and ESB sub-station
- Additional access roads

7.4.7.2 Phase 2

The main construction works associated with Phase 2 will involve the excavation and placement of material for the construction of cuttings and embankments as well as the hauling of materials and importation/exportation of materials to complete the road formation. Materials for the road construction will include materials that need to be brought to site including gravels and bituminous pavement and surfacing materials. In addition to the earthworks construction the main activities will involve the following:

- Road Works – sub-base and base construction, bituminous pavement, surfacing
- Drainage – the installation of pipe culverts, filter drains, linear grassed channels and wetlands
- Structures – the construction of retaining walls, piling works, construction of bridges and viaducts including their foundations, piers, abutments and the installation of large beams and other reinforced concrete works

- Tunnels – the construction of a mined tunnel and a cut and cover tunnel
- Blasting – excavation of rock for cuttings and tunnels. (See also Chapter 9, Soils and Geology)
- The diversion and construction of utilities and services
- Ancillary roadworks including the installation of safety barriers, signage and road marking
- Accommodation works for landowners such as access roads, entrances, fences, gates, walls, ducting and reconnection of severed services
- Temporary traffic management

Phase 2 also comprises the demolition of the existing stableyard at the racecourse, including the demolition of the existing well, existing water tank, existing machinery shed, adjacent car parking (60 spaces).

The main construction work for the proposed N6 GCRR will be split up into different sections along its route. The proposed construction phasing is discussed above in Section 7.4.2.

Table 7.2 below provides a summary of these sub divided construction sections for Phase 2 (going from west to east) and includes the estimated duration of construction for each section. Sections may be completed simultaneously and combined in certain areas. Some sections will be constrained to certain times of the year and some require enabling works. A likely sequence of construction is presented as part of this updated EIAR, this is based on a worst-case scenario so that all potential impacts are considered. It is likely that the contractor will construct the Phase 2 (the proposed N6 GCRR) in a sequence which gives rise to lesser impacts than those described. All construction will be employed using best practice methods and in accordance with the relevant standards.

Table 7.2 Construction Sections for Phase 2 (proposed N6 GCRR)

Section No.	Phase	Location	Chainage (m)		Length (m)	Time Constraint	Estimated Construction Time (months)
			From	To			
S1	2	R336 to Aille	0+000	3+300	3300	No	6 - 9
S2	2	Aille to Ballymoneen Road	3+300	5+650	2350	No	6 - 9
S3	2	Ballymoneen Road to N59 Letteragh Junction	5+650	7+550	1900	No	9 - 12
S4	1	N59 Link Road South (LRS)	LRS 1+050	2+020	970	No	9 - 12
S5	1	N59 Link Road North (LRN)	LRN 0+000	0+950	950	No	9 - 12
S6	1	Letteragh Junction to River Corrib	7+550	8+850	1300	No	6 - 9
S7	1	River Corrib Bridge	8+850	9+500	650	No	18 - 24
S8	1	River Corrib Bridge to Menlough Viaduct	9+500	10+100	600	No	9 - 12
S9	1	Menlough Viaduct	10+100	10+430	330	No	18 - 24

Section No.	Phase	Location	Chainage (m)		Length (m)	Time Constraint	Estimated Construction Time (months)
			From	To			
S10	1	Menlough Viaduct to Lackagh Tunnel	10+430	11+150	720	Yes – Construction to be completed without any groundwater dewatering. Construction may cease when groundwater levels are too high to allow dry working. However, works above this level may continue	24 - 36
S11	1	Lackagh Tunnel	11+150	11+400	250	Yes – To be constructed without groundwater dewatering and as such works may need to cease during the winter groundwater high. However, works above this level may continue. Start before mid-February (Peregrine Breeding Season)	24 - 36
S12	1	Lackagh Tunnel to School Road	11+450	13+150	1700	No	12 - 18
S13	1	School Road to Galway Racecourse Tunnel	13+150	14+950	1800	No	12 - 18
S14	1	Galway Racecourse Tunnel	14+300	15+150	240	Yes. Construction sequence plan in accordance with Galway Racecourse Festivals and Activities	24 - 36
S15	1	Galway Racecourse Tunnel to Coolagh Junction	15+150	17+450	2300	No	12 - 18

An overview of each section and associated construction activities are discussed in the following sub-sections and reference is made to any changes since 2018. This should be read in conjunction with Chapter 5, Description of Project which includes a full description of Phase 2 of the Project and Figures 7.001 to 7.002 and 7.101 to 7.123 which show the locations of the proposed sections, site compounds and haul routes. Figures 7.201 and 7.202 show potential locations of blasting for excavation during construction.

7.4.7.2.1 Section S1 – R336 Baile Nua to Aille

This section consists of 3,300m of single carriageway and includes two roundabouts, 11 accommodation roads and eight structures. The main structures along this section include an overbridge at Na Foraí Maola at Ch. 1+375 and an overbridge at Aille Road L5384 Ch. 3+300 and seven culvert crossings. There are six proposed drainage networks located on this section each consisting of an oil and petrol interceptor, a constructed wetland and an attenuation pond.

The proposed level of the proposed N6 GCRR in this section is largely at-grade or in slight fill to maintain connectivity to the local network via an overbridge and roundabouts. The Aille Road L5384 will be raised by c. 4m as the mainline will cross under the local road and will be in a cutting. The main access to this site will be from the R336 at Baile Nua and L-1321 Bearna to Moycullen Road. A site compound (SC 00/01) is proposed on the west of this section at the R336 Baile Nua.

The Aille Road L5384 will be temporarily realigned to the east to accommodate the construction of the overbridge. Traffic disruption will be kept to a minimum during construction of this section. For the construction of the roundabout at the R336 in Baile Nua and the Bearna to Moycullen Road Roundabout traffic will be diverted through one half of the roundabout once complete until the other half is constructed. Similarly, access will be maintained north and south of the proposed N6 GCRR during the construction of the Foraí Maola to Troscaigh overbridge and associated link roads. Temporary traffic management may be required at certain times to maintain safe access.

The Ann Gibbons Road (L-13215) will be severed by the proposed N6 GCRR therefore access will be diverted via the L-1321 Bearna to Moycullen Road. It is also proposed to overlay a portion of the Ann Gibbons Road due to its current poor condition.

7.4.7.2.2 Section S2 – Aille to Ballymoneen Road

This section consists of 2,350m of single carriageway and includes two at-grade signalised junctions, and ten accommodation roads. The mainline of the proposed N6 GCRR is largely in cut on the western end of this section as it crosses under the Aille Road L5384 and rises back to at-grade at approximately Ch. 3+900. Substantial material excavation will be required here to remove the overburden and underlying granite rock. Section 7.4.9 below gives a summary of earthworks quantities. Groundwater seepages from the cutting are expected to be low and will be accommodated in interceptor drains. Excavation for this cutting will likely require blasting and material excavated will be tested for suitability for use along the fill sections west of the River Corrib, (ref. Chapter, 9 Soils and Geology).

There are four drainage networks proposed and five culverts. Site compounds (SC 04/01 & SC 05/01) are proposed at Ch. 4+000 and Ch. 5+250 west of Ballymoneen Road. Access to the site will be from the L-1321 Bearna to Moycullen Road and Cappagh Road.

Similarly, to Section S1, minimal traffic disruption is expected to local traffic with the construction of the Cappagh Road and Ballymoneen Road signalised junctions. Temporary traffic management may be required during diversion phases.

7.4.7.2.3 Section S3 – Ballymoneen Road to Letteragh Junction

This section consists of 1,900m of dual carriageway, two slip lanes for the N59 Letteragh Junction and five accommodation roads. A substantial volume of engineering fill is required here which will potentially be sourced locally from a proposed cutting at Letteragh (if the material extracted is acceptable after crushing and grading), otherwise it will be imported to site from a certified source. Section 7.4.9 below gives a summary of earthworks quantities.

The main structures consist of three underbridges and four culverts. There are three drainage networks located in this section. The nearest site compound (SC 07/01) is proposed at Ch. 7+550. To minimise traffic disruption temporary night time closures of Rahoon and Letteragh Roads may be required during the construction of the underbridges which will require lifting of beams from either side once supporting structures and embankments have been constructed. The Clybaun Road Junction at Mincloon will be realigned in advance of the underbridge construction to redirect traffic safely. Temporary traffic management may be required also during this phase. Access for haul route traffic across Rahoon and Letteragh Road will be manned by stop/go personnel.

7.4.7.2.4 Section S4 – Letteragh Junction to Rahoon Road (N59 Link Road South & Gort na Bró Upgrade)

This section consists of 930m of the N59 Link Road South which consists of 7m wide single carriageway with 2m footpaths in both directions. Due to undulating landscape in the area the lengths of cut and fill vary. The section going from north to south is largely in cut for c.300m and rises to an at-grade signalised junction at Letteragh Road, then continues on embankment for c.200m and lowers to at-grade again to join with the Rahoon Road.

There are two proposed drainage networks to be constructed in this section and one combined hydraulic culvert and mammal underpass. Groundwater seepages from the cutting are expected to be low and will be

accommodated in interceptor drains. There are six access roads to be constructed in this section including a realigned entrance to the Rosán Glas housing estate. Temporary traffic management may also be required during the road closure and diversion stage. There is also a diversion of a gas distribution network at the Rahoon Junction. The nearest site compound is located in Letteragh (SC07/01). There will be minimal interference with local traffic as the majority of this section is offline. Access across Letteragh and Rahoon Road will be manned by stop/go personnel to ensure safety of access/egress. Letteragh and Rahoon Road will require upgrade work including widening at the proposed signal crossings for turn lanes, realignment of vertical curvature to improve visibility and a pavement overlay of the existing network as shown in Figures 5.001 to 5.015.

The Gort na Bró Roundabout on the Western Distributor Road is to be converted to a signal controlled junction. A new link road and entrance to the Gateway Retail Park in Knocknacarra is to be constructed to replace the fifth arm off the existing roundabout. The entrance to Gateway Retail Park has changed since 2018 with the addition of a bus bay on the southern side. The Western Distributor Road will widen to allow for two-way bus lanes on approach to the junction and provide for future connectivity of the public transport network. Temporary traffic diversions may be required during this construction phase. The contractor will ensure to minimise any traffic disruption during this phase.

7.4.7.2.5 Section S5 – N59 Letteragh Junction to N59 Moycullen Road (N59 Link Road North)

This section consists of 1,050m of 7m wide single carriageway with 2.0m footpaths in both directions. This link road connects the Letteragh Junction to the existing N59 Moycullen Road at Bushypark. A deep excavation (9-12m for c.300m) is required to connect this link road at-grade to the N59 Moycullen Road, therefore a substantial volume of soil and rock excavation will be required. Noise and vibration levels will be monitored carefully during excavation due to the proximity of residential properties (ref. Chapter 18, Noise and Vibration).

All material excavated will be tested for suitability for use in fill sections to the west of Letteragh. Site compound (SC 07/01) located nearby will be used for temporary stockpiling of excavated material. The N59 Moycullen Road will require some upgrade work to widen at the location of the proposed signalised junction. Temporary traffic management may be required during this phase.

One drainage network is to be constructed north of the N59 Moycullen Road to treat surface water runoff from this section before discharging to the River Corrib. This network consists of a hydrocarbon interceptor, constructed wetland and attenuation pond connected via an underground pipe. Groundwater seepages from the cutting are expected to be low and will be accommodated in interceptor drains.

7.4.7.2.6 Section S6 – N59 Letteragh Junction to River Corrib

This section includes 1,300m of dual carriageway and two slip lanes for the N59 Letteragh Junction and consists of one of the largest cuttings in the proposed N6 GCRR (>14m) for the N59 Letteragh Junction which will likely require drill and blasting excavation, refer to Chapter 9, Soils and Geology of this updated EIAR for the quantities and types of soil and rock excavation at this location. Groundwater seepages from the cutting are expected to be low and will be accommodated in interceptor drains. A large site compound SC 07/01 (2.93ha) is proposed in close proximity to this cutting to allow for crushing, regrading and temporary stockpiling of excavated material and storage of plant machinery. This site can be accessed from the east via N59 Moycullen Road or from the north once the N59 Link Road is constructed.

There is one underbridge proposed in this section, spanning over the N59 Moycullen Road. Night time closures of the N59 Moycullen Road may be required to construct the bridge and temporary traffic management will be in place for diversions.

Also included in this section are five accommodation roads, one culvert, four retaining walls, and four mammal underpasses. Material for the fill sections will be sourced locally from the excavated section of the N59 Letteragh Junction where possible. Site compound (SC 08/01) is the located at Ch. 8+700 and access will be from the N59 Moycullen Road. This will be a storage only compound.

There are three drainage networks which discharge directly to the Lough Corrib SAC, namely S15, which drains the proposed N59 Link Road North and outfalls to an existing drainage ditch which ultimately outfalls to the River Corrib, S18A and S18B which both directly discharge to the River Corrib as shown on Figures 11.5.106 and 11.5.107.

Additionally, there are two drainage networks (S14A and S14B) which outfall indirectly to the Lough Corrib SAC via an existing stream which flows to the west of Aughnacurra residential estate as shown on Figures 11.5.106.

A working width of 15m is available for the construction of the above drainage networks to allow room for the necessary machinery and equipment to operate. The extent of the proposed development boundary does not include any Annex I habitat within the Lough Corrib SAC in these areas.

The headwall at the outfalls into the Lough Corrib SAC will be constructed flush with the existing drainage bank. The headwall can be constructed using either a precast headwall or by casting the headwall in-situ. For either method, the construction process will be undertaken using standard best practices. Where the headwall will be constructed using a precast headwall, a temporary cofferdam structure can be constructed if necessary to allow the precast concrete headwall to be lowered into position. Where the headwall is to be cast in-situ, a temporary cofferdam will be constructed to allow the necessary ground works to be completed and to cast the headwall. This cofferdam is used to prevent any potential impact to the water quality of the river/stream/drainage ditch. Where any pumping of water is required, this water will go through environmental treatment to remove all pollutants before being reintroduced to the local surface water drainage network. Once the headwall has been constructed the temporary cofferdam is removed.

7.4.7.2.7 Section S7 – River Corrib Bridge

The River Corrib Bridge clear spans the river (i.e. with no piers in the river) and as such a balanced cantilever construction is proposed over the river section and the spans over the river banks. Due to the larger span, the superstructure structural depth is significantly larger at the pier locations and varies in depth along the span. This increases the construction complexity of the deck. Post-tensioned in-situ concrete deck can be built using travelling formwork over the river and side spans; and using falsework or travelling formwork on approach spans. For full details of the proposed construction of the River Corrib Bridge see Appendix A.7.1.

The bridge continues on a viaduct west of the River Corrib to maintain access for the UoG Sporting Campus, therefore, management of construction traffic and material delivery is required to minimise disruption and interaction with activities in the sports campus at peak times.

There are two drainage networks proposed west and east of the River Corrib in Section S7. There are two site compounds located in close proximity to the structure on the west (SC-08/01 (storage compound only)) and east (SC-09/01) of the River Corrib.

7.4.7.2.8 Section S8 – River Corrib Bridge to Menlough Viaduct

This section consists of 600m of dual carriageway and is mainly on embankment. There is one underbridge structure over Menlo Castle Bóithrín, a mammal underpass and a retaining wall to be constructed along this section. Three accommodation roads will be constructed, and three mammal underpasses/culverts. It is proposed to realign An Bóthar Nua to accommodate the underbridge and improve overall safety of this road. Temporary traffic management may be required during this work.

A retaining structure, reinforced soil embankment, between Ch. 9+850 to Ch. 10+050 will retain the proposed N6 GCRR from encroachment on the Annex I habitat of the Lough Corrib SAC. The construction of the retaining structure will be undertaken within the fence line for the proposed N6 GCRR and outside the areas of Annex I habitat. The reinforced soil embankment will be constructed using heavy plant machinery with the height of the retaining structure increasing at the same rate as the embankment height increases.

A site compound (SC-09/01) is proposed east of the River Corrib off the Menlo Castle Bóithrín and access to this site will be from Bóthar Nua in Coolough once site clearance and haul routes have been completed. There is an infiltration basin located east of the River Corrib and south of the proposed N6 GCRR. Material for the fill sections will be sourced from nearby cuttings where feasible such as the western approach for Lackagh Tunnel, otherwise it will be imported to site from a certified source. Material can be transported from stockpiles, once crushed and re-graded, along haul routes identified in Figure 7.107.

7.4.7.2.9 Section S9 – Menlough Viaduct

The Menlough Viaduct is required to span over Annex I habitat, namely Limestone Pavement and a Turlough adjacent to the Lough Corrib SAC. There are three alternative construction methods possible for constructing Menlough Viaduct to reduce the potential impacts to the Annex I habitats. Construction Method 1 includes the construction of a protection system over the Limestone pavement and using this as a construction platform and Construction Method 2 utilises the balanced cantilever system in conjunction with

a protection system over the Limestone pavement. Construction Method 3 is a prestressed precast beam superstructure construction method. This method is similar to Method 1 and a protection system over the Limestone pavement will be provided.

The stages of the construction under the proposed methodologies are as follows:

- Stage 1 - Site access and enabling works
- Stage 2 - Construction of the Limestone pavement protection system
- Stage 3 - Viaduct construction

All of the construction methodologies are described in full in Appendix A.7.2 and incorporate the need to protect the Annex I habitats. There is some scope to integrate the methodologies to incorporate aspects of the cantilever method and to add false work if required.

The potential environmental impacts of each of these three construction methodologies are the same and have been fully assessed in this updated EIAR. All such construction methodologies ensure that there will be no effect on Annex I habitats with the exception of the removal of Limestone pavement for one of the pier locations.

A specialised sealed drainage system will capture the runoff on the bridge deck, transport it beneath the structure in a network of sealed carrier drains, before discharging to a wetland and infiltration basin at a suitable location located east of the viaduct. This specialised sealed drainage system is required due to the sensitivity of the areas which the viaduct is crossing above i.e. Annex I habitat.

7.4.7.2.10 Section S10 – Menlough Viaduct to Lackagh Tunnel

This section consists of 720m of dual carriageway commencing on embankment after the Menlough Viaduct before entering a deep cutting of 7-12m for a length of c.300m as it approaches Lackagh Tunnel. There are three accommodation roads to be constructed to maintain farm land access as well as to facilitate an emergency exit road. Seanbóthar will require upgrading, overlay and verge widening at the underbridge.

Two drainage networks are proposed in this section which consists of an oil and petrol interceptor, a constructed wetland and infiltration basin. A culvert structure is proposed at Ch. 10+735 for a stream diversion. Retaining walls on the approach to Lackagh Tunnel will be constructed to retain the embankment of the proposed N6 GCRR from encroachment on the Annex I habitat of the Lough Corrib SAC. The construction of the retaining wall will be undertaken within the fenceline for the proposed N6 GCRR and outside the areas of Annex I habitat. The construction process for the retaining wall will be undertaken in tandem with the construction of the embankment. The embankment will be constructed using heavy plant machinery with the height of the retaining wall increasing at the same rate as the embankment height increases.

A combination of retaining systems will be implemented along the Western Approach and above the western tunnel portal at Lackagh Tunnel (Ch. 10+850 to Ch. 11+150) where the use of unsupported slopes is not used as they would encroach on areas of Annex I habitats. The retaining system type is governed by the ground conditions encountered at that particular location. Within this area the rock head level changes significantly, requiring retaining system solutions for shallow and deep rock ground conditions which can be constructed outside the Annex I habitat within the Lough Corrib SAC.

The retaining systems constructed in this area include the following construction methodologies:

- In areas of shallow rock:

  The overburden will be removed followed by rock excavation which will be progressed in levels in a cyclic manner including drilling, blasting, rock mapping by a geotechnical expert and mucking out. A composite rock stability support system in the form of rock bolts, rock dowels, steel mesh and sprayed concrete will be implemented where required for stability on the rock face prior to excavation to the next excavation level based on the rock mapping results. A watertight reinforced concrete retaining structure will be constructed within the rock excavation cutting, generally at the base of the excavation (where the excavation is below +17.7mOD).

Prior to undertaking this excavation, a detailed ground investigation, including down the hole geophysical survey to determine the rock mass geometry will be completed to inform the detailed design and ensure that this method is feasible. In the event that this method is not feasible a piled solution from surface level will be implemented, which is described below.

A trial blast, as per the Schedule of Commitments and will be carried out as part of a blast assessment. The monitored trial blast will be undertaken in the same bedrock formation by the blasting contractor in a controlled location, not exceeding the vibration limitations of the local sensitive receptors, posing no risk to sensitive receptors including Annex I habitat in Lough Corrib SAC. The trial blast will calibrate the blast design to a site specific design.

- In areas of deep rock (overburden only) or a combination of overburden and rock:

  Piled retaining walls, with ground anchors will be implemented in these areas. The piled wall will be either a contiguous or secant piled wall. Both of these wall types are installed using the same rig and construction methods. A contiguous piled wall is not watertight as it is a linear series of individual piles whilst a secant piled wall can be designed to be watertight as it is a linear series of interconnected/overlapping piles. A watertight system is only required below +17.7mOD, therefore contiguous piled walls will be implemented with a watertight structure constructed within the excavation.

  The piles will be installed from the existing ground level prior to excavation works or from a reduced excavation level where potential impacts to the Annex I habitat in Lough Corrib SAC can be avoided. The piling rig will be set up outside of the footprint of the Annex I habitat. Once the piles have been installed, the excavation of the overburden and bedrock will be completed. The bedrock will be broken using a hydraulic hammer or by blasting with the piled wall acting as an additional buffer to the rock blast.

  A watertight reinforced concrete retaining structure will be constructed within the excavation footprint where required.

  Prior to undertaking the piling works, a detailed ground investigation, will be completed to inform the detailed design and ensure it is site specific.

These retaining solutions are considered and assessed throughout the assessment for this updated EIAR.

Access to Section S10 will be primarily from Seanbóthar in Menlough. Acceptable material excavated for the Lackagh Tunnel approach will be used for the embankment section. Excess excavated material can be hauled back to Lackagh Quarry site compound (SC 11/01) for temporary stockpiling after crushing and re-grading and used elsewhere on the proposed N6 GCRR.

7.4.7.2.11 Section S11 – Lackagh Tunnel

The construction activities for Lackagh Tunnel is split into three sections:

Section 1:	Stabilisation of the Lackagh Quarry Face
Section 2:	Construction of the eastern entry portal
	Construction of tunnel (from east to west) – Mined (drill and blast)
	Stabilisation of the connection to Section 3 (Western Approach)
Section 3:	Installation of retaining wall structures where required
	Excavation of overburden
	Installation of retaining wall temporary/permanent support
	Construction of western approach road

The following construction sequence is envisaged. It is possible for Section 3 to be constructed in parallel with the construction of Sections 1 and 2.

Stage 1:

- Site enabling and preparation works

Stage 2:

- Stabilisation of the Lackagh Quarry western face (Section 1)
- Construction of the tunnel entry portal (Sections 1 and 2)
- Installation of a retaining wall from existing ground level in Section 3

Stage 3:

- Construction of the proposed tunnel (Section 2)
- Ongoing installation of retaining wall from existing ground level in Section 3 and commencement of the excavation works (Section 3)

Stage 4:

- Excavation ongoing for Section 3
- Stabilisation of the rock along the Section 2/Section 3 boundary (if/where required)
- Completion of the proposed tunnel (Section 2)
- Construction of the proposed road (Section 3)

A detailed report of the constructability of Lackagh Tunnel and the Western Approach and its potential impacts are assessed and included in Appendix A.7.3. This report concludes that due to the sensitivity of nearby groundwater receptors that construction will be undertaken without dewatering. Peak groundwater levels may lead to construction ceasing during part of the winter. This report has been updated to capture the detailed discussed at the oral hearing in 2020.

When the groundwater rise occurs all construction activities within the zone below the high water groundwater level for the tunnel will cease and the operation made safe until groundwater levels drop, which may include the installation of berms to prevent groundwater entering or exiting the tunnel from the tunnel portal. Construction shall start before the Peregrine breeding season (before mid-February) rather than after nesting takes place.

Access to the eastern side of this section of the proposed N6 GCRR will be from Lackagh Quarry which is accessed via Coolough Road and access to the western side will be from Seanbóthar. Lackagh Quarry (SC 11/01) will be the main site compound for this section. It is proposed to construct a tunnel services, monitoring and maintenance building within Lackagh Quarry which will serve the function of maintenance facility for the proposed tunnel. An emergency exit road for westbound traffic will be constructed to allow egress from the proposed N6 GCRR in advance of the eastern tunnel portal if required. This will exit onto Coolough Road at the existing entrance to Lackagh Quarry. Similarly, an emergency exit road for eastbound traffic will be constructed to allow egress from the proposed N6 GCRR in advance of the western tunnel portal. This emergency exit road forms part of a loop which exits onto Seanbóthar and then crosses under the mainline and connects back to Bóthar Nua in Coolough. These emergency exit roads will primarily serve as access for emergency service vehicles with gated barrier controlled entry and exit. These will also be used in the event of an over-height vehicle detection to safely remove the vehicle in advance of the tunnel.

7.4.7.2.12 Section S12 - N84 Headford Road Junction/Lackagh Quarry to School Road

This section consists of 1,700m of dual carriageway with one grade separated junction at the N84 Headford Road. The mainline of the proposed N6 GCRR will span the N84 Headford Road, therefore temporary night time road closures may be required when constructing the overbridge once supporting structures and embankments have been built up on either side. A temporary diversion of School Road, Castlegar will also be required. The road will be realigned west of the existing road and this will also require a temporary

diversion of a gas transmission network and foul sewer which currently runs along School Road. Once the cutting has been excavated from the east and the overbridge structure put in place the gas main and foul sewer can be relocated to the bridge structure.

Site access will be from the N84 Headford Road. The nearest site compound on the west of this section will be Lackagh Quarry (SC 11/01) and on the east will be at Twomileditch (SC 14/01) within the area of the proposed N83 Tuam Road Junction. There will be a large cutting into the eastern face of Lackagh Quarry. Material excavated will be stored at Lackagh Quarry site compound and tested for suitability for use in fill sections of the proposed N6 GCRR.

The main structures in this section include one underbridge, two overbridges, four mammal underpasses and three retaining walls. There are six accommodation roads to be constructed and three drainage networks included in this section.

The material excavated from the cutting at School Road, Castlegar will be drawn back to either site compound SC 11/01 or SC 14/01. Vibration and noise monitoring will be required due to the proximity of residential and commercial properties (ref. Chapter 18, Noise and Vibration).

7.4.7.2.13 Section S13 School Road to Galway Racecourse Tunnel

This section consists of 1,800m of dual carriageway with one grade separated junction at the N83 Tuam Road. The mainline of the proposed N6 GCRR will span over the N83 Tuam Road therefore temporary night time road closures may be required when constructing the overbridge once supporting structures and embankments have been built up on either side. Site access will be from the N83 Tuam Road. The nearest site compound is at Twomileditch (SC 14/01, SC 14/02 and SC 14/03) within the area of the N83 Tuam Road Junction.

At the N83 Tuam Road Junction the mainline will cut into a hill and remain in cut until the portal of the proposed Galway Racecourse Tunnel, therefore substantial material excavation will be required here. This excavated material can be reused if deemed suitable for the embankments on the mainline and slip lanes connecting to the Parkmore Link Road. The Parkmore Link Road and the City North Business Park Link will be constructed in advance of removing the existing access from the N83 Tuam Road to Galway Racecourse in order to maintain access.

The main structures in this section include one underbridge, one overbridge, one mammal underpass and one retaining wall. There are nine accommodation roads to be constructed and three drainage networks included in this section.

During the construction phase noise monitoring will be undertaken at the nearest sensitive locations to ensure construction noise limits (outlined in Table 18.1 of Chapter 18, Noise and Vibration) are not exceeded.

Vibration monitoring will be undertaken at identified sensitive buildings, where proposed works have the potential to be at or exceed the vibration limit values. Baseline vibration monitoring will also be undertaken at potentially vibration sensitive activities for manufacturing facilities within the Parkmore and Racecourse Business Parks (ref. Chapter 18, Noise and Vibration).

7.4.7.2.14 Section S14 - Galway Racecourse Tunnel

A construction programme of works has been compiled in conjunction with Galway Racecourse to minimise the disruption to the commercial practice of the business throughout the year, not only for the racing festivals. An advance works schedule is included in this programme which includes two well relocations and associated infrastructure, water, telecoms, E-net and electrical utility diversions, access road realignments and replacement link roads. A 230m cut and cover tunnel will be constructed in phases over a three-year period with nine-month construction windows per year. Blasting of material will be required to remove shallow rock head which has been established from ground investigation work. Noise and vibration monitoring will be implemented due to the proximity of commercial and residential buildings in the area. A diversion of the main IDA surface water and foul sewer is required at the eastern portal of the tunnel. Material excavated will be tested for suitability for use in fill sections such as the Coolagh Junction.

Refer to Appendix A.7.4 for further information regarding this construction sequence programme. This has been updated since 2018 to reflect the fact that the temporary stables are constructed in the infield of the racecourse and do not interact with the proposed N6 GCRR construction, and the fact that construction of the permanent stables does not commence until post completion of the proposed N6 GCRR.

7.4.7.2.15 Section S15 - Galway Racecourse Tunnel to Coolagh Junction

There is a large amount of engineering fill required in this section due to the proposed overbridges and raised junction at Coolagh, Briarhill (ref. Section 7.4.9 below). There are two underbridges, two overbridges, and two retaining walls included in this section. Two of the underbridge structures will be constructed over existing public roads (R336 Monivea Road and Briarhill Business Park Road) therefore it is envisaged that night time road closures will be required to construct beams once embankments and supporting structures have been constructed on either side.

Both retaining walls are in close proximity to two commercial properties therefore care will be required in construction of the walls to minimise disruption to the businesses as a result of the construction. Site compounds (SC 15/01 & SC 16/01) will be the main depots serving Section S14. See Table 7.6 below for more information regarding the site compound locations. Access to the southern section will be provided from the R339 Monivea Road and access to the northern section will be from the Briarhill Business Park Road. Access to the north will be over R339 Monivea Road once the bridge has been constructed. Racecourse Avenue will be used as a haul route but will have restricted use. It will be used for delivery of materials only and will not be permitted for hauling excavated materials.

Traffic congestion at AM and PM peak times is a major issue at this location therefore contractors must ensure to minimise construction traffic movements at these times.

The main cuttings in this section include the eastern approach to the Galway Racecourse Tunnel and the connection with the existing N6 at Coolagh, Briarhill. Hard ripping using a hydraulic hammer or blasting will be required at these excavation locations due to the presence of shallow rock (ref. Chapter 9, Soils and Geology). There is also a risk of encountering a high water table in this area therefore, if encountered on site pumping will be implemented (ref. Chapter 10, Hydrogeology). There are six drainage networks in this section. (ref. Chapter 5, Description of Project for description of drainage networks).

A Construction Traffic Management Plan is included in the CEMP in Appendix A.7.5 and will be finalised and updated by the Contractor prior to construction. This plan will be complied with throughout construction for the sequencing of Coolagh Junction to ensure there is no major disruption to existing traffic.

Phase 3

The permanent stableyard including horsebox parking will be constructed in Phase 3, to the north of the temporary stables. This will be completed after completion of Phase 2. The works involved in constructing the permanent stables will be similar to those involved in constructing the temporary stables.

Phase 4

Phase 4 involves the demolition of the temporary stables, and retention of the pavilion, machinery and maintenance sheds, pre-parade ring, and ESB sub-station. The area previously used for the temporary stables will then be reutilised as car parking. The main activities will involve the following:

- Demolition of concrete structures and other buildings
- Clearing demolished materials from site
- Providing suitable surface for car parking

Phase 5

Phase 5 is the operational phase of the Project, it does not involve any construction activities.

7.4.8 Construction Methods

7.4.8.1 General

This section outlines the main construction activities and the associated methodologies that will be employed for the Project. The following table is a high-level summary of these methodologies which will use best practice methods in accordance with the relevant standards.

Table 7.3 Construction Activity Methodologies

Construction Activity	Construction Methodologies
Bulk Earthworks	Excavation works Drill and blast Rock crushing Fill
Cut and Cover Tunnel	Excavation Drill and blast Bottom up construction In-situ/precast Waterproofing Backfilling Mechanical & Electrical Ventilation Fire safety
Retaining Walls	Sheet Piling Anchors Rock Bolts Pins/Straps/Ties In situ casting
Mined Tunnel	Drill and blast Excavation Backfilling Supporting In-situ casting Waterproofing Mechanical & Electrical Ventilation Fire safety
Menlough Viaduct Construction	Limestone pavement protection system Pier construction (in-situ) Geotextile grid layer Floating beams
Bridge Construction	Pier construction (in-situ) Balanced cantilever beams
Structures	In-situ casting Mechanical & electrical Ventilation Masonry construction Surfacing Precast unit fixing

Construction Activity	Construction Methodologies
Road surfacing	Excavation Compacting Layering Marking
Demolition	Material removal Site clearing Mechanical demolition

Detailed description of methodologies proposed for the construction of significant structures such as the River Corrib Bridge, Menlough Viaduct, Lackagh Tunnel and Galway Racecourse Tunnel are included in Appendices A.7.1 to A.7.4 of this updated EIAR.

7.4.8.2 Earthworks

The earthworks being considered in this section are for all phases of the Project and take account of the modifications to the Project detailed in Chapter 5 of this updated EIAR.

For Phase 1, topsoil and subsoil will be excavated and the ground levelled to provide the needed surface for construction of the temporary stables within the infield of Galway Racecourse. The excavated soil will be transported directly off site. Construction of the temporary stables in Phase 1 includes the excavation of an attenuation pond to the south of the proposed temporary stables.

For Phase 2, topsoil and subsoil will be excavated and replaced with road construction. Stripped topsoil and subsoil will be stored within the site boundary and reused within the construction of the Project where feasible subject to testing to ensure it is suitable for its proposed end use. Where off-site storage is required for any period, the contractor will ensure that these storage facilities have the appropriate waste licences or waste facility permits in place. All earthworks shall be managed having regard to the TII Management of Waste from National Road Construction Projects (GE-ENV-01101) (December 2017).

Details on material testing, storage and re-use can be found in Chapter 20, Resource and Waste Management of this updated EIAR.

Materials will be transported to and from the site using the existing road network. Excavation and filling will be carried out using mechanical plant.

Road embankments will be constructed using excavated material or, where necessary, imported fill material and will generally be compacted using static and vibrating rollers or similar equipment.

The embankments will be constructed for the majority from self-supporting fill material. Where during the detailed design, the requirement for soil retention is identified it shall be provided by using steepened earthworks which shall have a vegetated finish or reinforced soil or reinforced concrete retaining walls with a specified range of acceptable finishes to the exposed faces. The requirements for the aesthetic appearance of the exposed faces will be specified in the contract documents.

For Phase 3, as the permanent stables will be constructed on the levelled site presented at the completion of Phase 2 to the north of the covered tunnel there will be minimal earthworks to be excavated before construction. Again, any excavated material will be transported directly off site using predetermined haul routes, as discussed in Section 7.4.9.3.

There is potential for some earthworks to be excavated during Phase 4 when the site previously holding the temporary stables will be reformatted to facilitate parking. Any earthworks quantities generated from this phase will be minimal and will be transported directly off-site.

7.4.8.3 Pavement Works

Two lane tarmac roads are proposed as part of both the temporary and permanent stables (Phases 1 and 3 of the Project) to provide access for horse boxes and other vehicles to the stables. These roads will be constructed using tarmacadam surfacing. Phases 1, 3 and 4 will also contain horsebox parking facilities which will again be paved with tarmacadam surfaces. The circulatory areas in the temporary stableyard and permanent stableyard will be surfaced with a rubberised flooring.

During Phase 2, bituminous paving will be undertaken throughout the extent of the proposed N6 GCRR. The thickness of the road pavement will be determined at detailed design stage but on this type of road, a new blacktop thickness of 350mm could be anticipated.

All new blacktop material will be transported to site in trucks designed for the transportation of materials at high temperatures. The material shall be transferred directly to paving machines, which spreads the blacktop onto the road in layers. The spread material is then compacted using rollers.

7.4.8.4 Environmental Management

Every reasonable effort will be made to ensure that any damaging environmental effects will be minimised during the construction of the Project. The construction planning will be geared towards keeping disruption and nuisance to a minimum.

Environmental impacts during construction will be mitigated or reduced where possible (refer to the individual chapters in this updated EIAR for specific mitigation measures).

In this regard, prior to the commencing any works on site, the CEMP included in Appendix A.7.5 of this updated EIAR will be finalised by the main contractor (Refer to Section 7.4.1.1 above). Adherence to this plan will be a contract requirement and this will ensure good working practices are followed so as to minimise and manage any environmental impacts arising from construction.

7.4.9 Material Sources and Transportation

7.4.9.1 Overview

The earthworks operations will be a major activity on site and will include excavation, stockpiling, processing, deposition, blasting, material reuse, import and transportation from site for recovery/disposal. The construction of Phase 2 of the Project will require considerable movements of materials to, from and around the site. Most of the materials leaving the site will consist of hazardous material from the excavation works.

The current design of the proposed N6 GCRR, including the modifications detailed in Chapter 5 of this updated EIAR, has an overall surplus of excavation material west of the River Corrib and an overall deficit of fill material east of the River Corrib, see below for details. All excavated material deemed to meet the required standards will be reused as part of the fill sections subject to testing to ensure it is suitable for its proposed end use.

If the proposed N6 GCRR is to be constructed in stages as per Section 7.4.2 above, then there will an overall surplus of 597,000m^3 in Stage A and overall deficit of 258,000m^3 in Stage B. Therefore, there will be a requirement to store excavated acceptable material from Stage A to balance the deficit in Stage 2. (Ref. Section 7.4.9.2). This material will be stored within the fenceline for the proposed N6 GCRR in identified material deposition areas shown on Figures 7.301 and 7.302. All wastes which are not suitable for reuse within the proposed N6 GCRR will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007 as amended.

All wastes from the Project will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996-2022. By only using facilities with the appropriate waste permits/licence, Galway County Council will condition the Contractor that they must comply with the objectives of the Waste Management Act and that any environmental emissions (noise, dust, water) are managed at the destination site and therefore are legally the responsibility of the owner/operator of the destination site. In this manner Galway County Council can be satisfied that the off-site spoil management aspect of the development is legally compliant with environmental and waste management legislation.

All traffic movements associated with the import or export of materials have been included in the construction traffic impact assessment and take account of the design modifications detailed in Chapter 5 of this updated EIAR. Materials required for the construction works will be sourced locally where possible. Materials required from quarries will only be sourced from quarries which are listed on the register maintained by the local authority. All material reused on site will be subject to testing to ensure it is suitable for its proposed end use.

There are operational quarries located in close proximity to the Project. There is potential to import bituminous material for paving from one of these quarries. Haul routes have been identified to these quarries and any potential impacts associated with these haul routes have been assessed in this updated EIAR.

Rock crushing may be undertaken on site in order to make the excavated rock suitable for reuse as general fill. Otherwise, it will be necessary to import crushed stone to site.

7.4.9.2 General Earthwork Quantities

In line with the principles of sustainable development, the Project will seek to minimise the amount of materials brought into the construction site. This will be achieved by re-using as much of the materials generated during construction of the Project. The Project will be subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use.

Over 99% of excavated material generated by Phase 2 of the Project, the proposed N6 GCRR, will be used to satisfy the necessary engineering, landscape and safety quantities required on the proposed N6 GCRR.

The anticipated material which will be encountered along the proposed N6 GCRR is provided below:

- **Acceptable Earthwork Material:** These can be categorised in accordance with TII Series 600 Table 6/1 Classes 1, 2, 6 and 8 (March 2013). They comprise the greater part of materials likely to be encountered, with their prescribed use provided in Table 6/1
- **Marginal Material:** Requires treatment such as addition of lime or air drying in order to meet acceptability requirements of TII Series 600 (March 2013). In terms of material being incorporated into the Works, the Contractor shall ensure, in advance, that the material is tested to ensure suitability for its proposed end use and that all pertinent legislation and guidelines are complied with. In addition, use of this material must be discussed with the Employers Representative in advance of any works
- **Topsoil:** Topsoil shall comply with requirements for Class 5 material as outlined in TII Series 600 Table 6/1 (March 2013)
- **Peat:** In accordance with TII Series 600 Cl 601.2 (March 2013), non-hazardous peat shall be categorised as Unacceptable U1 material
- **U1 Soil:** Non-hazardous soil which does not comply with the requirements outlined in TII Series 600 Cl 601.1 (March 2013), shall be categorised as Unacceptable U1 material
- **U1 Rock:** Non-hazardous rock which does not comply with the requirements outlined in TII Series 600 Cl. 601.1 (March 2013), shall be categorised as Unacceptable U1 material
- **Hazardous Material:** Hazardous material, as defined in TII Series 600 Cl 601.3 (March 2013). shall be categorised as Unacceptable U2 material

Further information regarding the excavated material and general geology of the Project can be found in Chapter 9, Soils and Geology.

A summary of the estimated quantities associated with the material requiring placement on-site and removal off-site are provided in Table 7.4. In addition to the material described in Table 7.4 some services will be removed during excavation works including disused sewers, drains, cables, ducts, pipelines, disused basements, cellars and gullies.

A summary of the estimated quantities associated with the material requiring placement on-site and removal off-site are provided in Table 7.4.

Table 7.4 Estimated Excavation Material Volumes generated across the Project and Associated Construction Traffic

	Category (note 1)	Estimated excavated material (m^3)	Estimated re-use within the proposed N6 GCRR (m^3)	Estimated surplus excavated material requiring recovery/ disposal off site (m^3)	Construction Traffic Generated (HGV Journeys)[3]
Phase 1	Classes 1, 2, 6 and 8	32,084	0	32,084	4,492
Phase 2					
Acceptable Earthworks Material	Classes 1, 2, 6 and 8	2,602,350	2,602,350	0	520,470
Marginal Material	Requires treatment in order to meet acceptability requirements	168,500	168,500	0	33,700
Topsoil	Class 5	151,450	151,450	0	22,718
Peat	Unacceptable category U1	76,000	76,000	0	11,400
U1 Soil: Non-peat	Unacceptable Category U1	147,500	191,300	0	14,750
U1 Rock: Non-peat	Unacceptable Category U1	43,800		0	4,380
Landscaping and habitat creation	Class 4 (Note 2)	0		0	0
Hazardous Material	Unacceptable Category U2	7,600	0	7,600	760
Total		**3,197,200**	**3,189,600**	**7,600**	**1,743**
Phase 3	Classes 1, 2, 6 and 8	12.444		12,444	1,743
Phase 4	Class 5	715	0	715	100
Phase 5	0	0	0	0	0

Note 1: TII Series 600 including Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Note 2: Landscape Fill in accordance with Class 4 of TII Series 600 including Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Note 3: Includes journeys to and from site either empty or full

In addition to the above excavation materials some services will be removed during excavation works including disused sewers, drains, cables, ducts, pipelines, disused basements, cellars and gullies.

A review has been undertaken of capacity at waste permitted and licenced facilities and this indicates that there is expected to be sufficient capacity within operational and planned waste management facilities to accept wastes generated by the Project.

7.4.9.3 Potential Haul Routes

Potential haul routes have been identified across the Project with aim of minimising interaction with the general public and creating as little disruption to the receiving environment as possible. Where possible haul routes will remain within the proposed fenceline for the proposed N6 GCRR with local road crossing points. However, there will be unavoidable periods where haul routes will require the use of public roads.

Haul routes along public roads have been identified taking cognisance of their current use, Average Annual Daily Traffic (AADT), non-motorised users (NMUS) such as pedestrians and cyclist and the current condition, width and alignment, in addition to their proximity to sensitive receptors. Where necessary flag men will operate at crossing points of junctions along haul routes to ensure safety of access and egress from the site of the Project and site compounds. All haul routes along public roads will undergo a pre-structural assessment and any remediation works required will be put in place in advance of construction. Haul routes along public roads will be monitored for deterioration throughout construction and a structural assessment will be carried out to determine any sites requiring remediation work post construction. The use of haul route HR 15/02 from the entry to Ballybrit Business Park to Racecourse Avenue and onto Racecourse Avenue into the Galway Racecourse is restricted access for the entirety of Phase 2 and will be used for delivery of materials only and will not be permitted for hauling excavated materials during Phase 2. This arrangement has been successful in similar road schemes in the west such as the M17/M18 motorway scheme. A summary of the main haul routes are listed in Table 7.5 below. Refer Figures 7.101 to 7.124 for haul route locations.

Table 7.5 Haul Routes

Haul Route ID	Location & Chainage		Road Name(s)	Approximate Width	Road Description
	From	To			
HR 00/01	0+000 R336	1+150 Troscaigh Thiar	R336 and Bearna to Moycullen Road	6m within the proposed fenceline for the N6GCRR, 6m on Bearna/Moycullen Road and 9m on R336	The R336 is a regional road which runs through the village of Bearna. The road is in moderate-good condition and includes a footpath to the south for the length of the haul route and one footpath to the north in the village. The haul route identified along the R336 will then join the L-1321 Bearna to Moycullen Road at the signalised junction in Bearna Village. The L-1321 Bearna to Moycullen Road is a local road in moderate condition and includes footpaths within the Bearna Village environs.
HR 01/01	1+550 Troscaigh Thiar	4+440 Cappagh Road	Bearna/Moycullen Road, R336 and Cappagh Road	6m within the proposed fenceline for the N6GCRR, 6m on Bearna/Moycullen Road, 9m on R336 and 4.7 - 7.3m on Cappagh Road	The L-1321 Bearna to Moycullen Road is a local road in moderate condition and includes footpaths within the Bearna Village environs. The haul route along the L-1321 will join the R336 at the signalised junction in Bearna Village. The haul route continues along the R336, a regional road which runs through the village of Bearna, passing Bearna National School, towards Galway City. The road is in good condition and includes a footpath to the south for the length of the haul route and one footpath to the north in the village. The haul route joins Cappagh Road at the T-junction between Cappagh Road and the R336. Cappagh Road is a local road which is 7.3m wide and in good condition up to the Cappagh Road/Western Distributor Road Roundabout. From 100m north of the roundabout the road narrows to 4.3m and the road condition worsens. The southern section of Cappagh Road runs through a residential area and includes footpaths on either side. The northern section has footpaths on either side for the first 100m.
HR 04/01	4+450 Cappagh Road	8+500 N59 Dangan	Crossing Cappagh Road, Ballymoneen Road, Rahoon Road, Letteragh Road and access to N59	6m within the proposed fenceline for the N6GCRR	To be constructed within the proposed fenceline for the N6GCRR.
HR 04/02	4+450 Cappagh Road	11+450 Kirwan Roundabout	R336, R337, R338 Bishop O'Donnell Road, R338 Seamus Quirke Road and existing N6	6m on R336 and R337 9m on R338 Bishop O'Donnell Road. 15m on R338 Seamus Quirke Road. 15m on existing N6	This haul route links all haul routes to the west of the River Corrib with the haul routes on the east. The R336 is a regional road which runs towards Galway City. The road is in moderate-good condition and includes a footpath to the north for the length of the haul route. The R336 links into the R337 on Kingston Road.

Haul Route ID	Location & Chainage		Road Name(s)	Approximate Width	Road Description
	From	To			
					The R337 is a regional road which runs towards Galway City. The road is in moderate-good condition and includes a footpath to the north for the length of the haul route. The R337 links into the R338 Bishop O'Donnell Road at the signalised junction at the top of Threadneedle Road. The R338 Bishop O'Donnell Road is a regional road which runs towards the existing N6 national primary road. The road is in good condition and includes footpaths and cycle lanes on either side for the duration of the haul route. The R338 Bishop O'Donnell Road links into the R338 Seamus Quirke Road at the signalised junction with Circular Road. The R338 Seamus Quirke Road is a regional road which runs towards the existing N6 national primary road. The road is in good condition and includes footpaths, bus lanes and cycle lanes on either side for the duration of the haul route. The R338 Seamus Quirke Road ties into the existing N6 at Browne Roundabout. The existing N6 is a national primary route which includes two traffic lanes, raised cycle lanes and footpaths in either direction. The route is in good condition and links into the eastern haul routes at the Kirwan Roundabout.
HR 06/01	0+350 N59 Link	2+100 N59 Link	Crossing Letteragh Road and on Rahoon Road. Links into Bishop O'Donnell Road	6m inside proposed fenceline for the proposed N6 GCRR. 9m on Rahoon Road	To be constructed within the proposed fenceline for the proposed N6 GCRR. Rahoon Road is a local road with footpaths on both sides for the length of the haul route. The road is in good condition for the length of the haul route.
HR 08/01	0+300 N59 Northern Link	9+250 Dangan	N59	9.2m on N59 6m inside the fenceline for the proposed N6 GCRR mainline to River Corrib Bridge and on the N59 Link Road North	To be constructed within the proposed fenceline for the proposed N6 GCRR. The N59 is a national secondary route with footpaths on either side of the identified haul route. The road is in good condition for the length of the haul route.
HR 09/01	9+400 Menlough & River Corrib Crossing	11+450 Coolough & Lackagh Quarry	Coolough Road	4.26 - 5.045m on Coolough Road 6m inside the fenceline for the proposed N6 GCRR mainline from River Corrib Bridge to Lackagh Quarry	To be constructed within the proposed fenceline for the proposed N6 GCRR. Coolough Road is a local road which narrows north of Lackagh Quarry. The road is in poor condition with restricted views.

Haul Route ID	Location & Chainage		Road Name(s)	Approximate Width	Road Description
	From	To			
HR 11/01	11+450 Lackagh Quarry	12+550 N84 Junction	Coolough Road and N84	Coolough Road – 7.8m N84 – 8.5m	Coolough Road is a local road with footpaths on either side. The road was previously used by HGVs from Lackagh Quarry as a link to the national road network. The road is in moderate condition from Lackagh Quarry to the Kirwan Roundabout. The N84 is a national secondary route with footpaths on both sides for the majority of the identified haul route. The road is in good condition for the length of the haul route.
HR 11/02	11+450 Headford Road	13+150 School Road, Castlegar	Crossing N84	6m within the proposed fenceline for the proposed N6 GCRR	To be constructed within the proposed fenceline for the proposed N6 GCRR.
HR 11/03	12+550 N84 Junction	13+900 N83 Tuam Road	Coolough Road, N6 Bóthar na dTreabh and N83 Tuam Road	Coolough Road – 7.8m, N6 Bóthar na dTreabh – 14.2m N83 Tuam Road – 11.6m	Coolough Road is a local road with footpaths on either side. The road was previously used by HGVs from Lackagh Quarry as a link to the national road network. The road is in moderate condition from Lackagh Quarry to the Kirwan Roundabout. The existing N6 is a national primary route which includes two traffic lanes, raised cycle lanes and footpaths in either direction. The route is in good condition. The N83 is a national secondary route with footpaths on both sides for the majority of the identified haul route. The road is in good condition for the length of the haul route.
HR 13/01	13+150 School Road, Castlegar	14+950 N83 Junction & Racecourse Tunnel	Crossing N83 and N83	6m within the proposed fenceline for the proposed N6 GCRR including the Parkmore Link Road N83 Tuam Road – 11.6m	To be constructed within the proposed fenceline for the proposed N6 GCRR. The N83 is a national secondary route with footpaths on both sides for the majority of the identified haul route. The road is in good condition for the length of the haul route.
HR 14/01	14+000 N83 Tuam Road	17+450 Coolagh Junction	N6 Bóthar na dTreabh – 14.2m	N6 Bóthar na dTreabh – 14.2m	The existing N6 is a national primary route which includes two traffic lanes in each direction. There are raised cycle lanes and footpaths in either direction up to the Morris Junction. The route is in good condition.
HR 15/01	15+000 Ballybrit	17+450 Coolagh Junction	Crossing R339	6m within the proposed fenceline for the proposed N6 GCRR	To be constructed within the proposed fenceline for the proposed N6 GCRR.

Haul Route ID	Location & Chainage		Road Name(s)	Approximate Width	Road Description
	From	To			
HR 15/02	R339/Parkmore Junction	Proposed N6 GCRR tie in with Racecourse Avenue	Monivea Road Parkmore Road	6 metres with pavements either side of roadways	Proposed haul route on public road, starting on Monivea Road going to Parkmore Road noting that a section of it is with restricted access during Phase 2 of the Project
HR 15/03	15+500 Briarhill	15+950 Coolagh	Briarhill Business Park Road, Ballybrit Crescent and crossing R339	Briarhill Business Park Road - 7.1m Ballybrit Crescent - 10.6m	The Briarhill Business Park Road is a commercial road which includes footpaths on either side. The road is in good condition and connects to Ballybrit Crescent at a T-junction. Ballybrit Crescent is a local road which includes footpaths on either side. The road is in good condition and terminates at the signalised junction at its intersection with the R339. Access along this route will be restricted to deliveries only.

7.4.9.4 Potential Site Compounds and Depots

Potential site compounds have been identified at strategic locations across the Project to minimise the distance for site construction traffic and personnel to travel. Sites identified have been chosen taking cognisance of proximity to major structures, excavations and embankments, proximity to residential properties, environmental constraints and current land use and ownership. Where possible site compound locations have been identified within the permanent proposed fenceline for the proposed N6 GCRR. There is one location which has been identified as a temporary acquisition for the purposes of construction and with ownership returned to the landowner post construction (SC 07/01). Larger area compounds have the potential for material stockpiling, crushing, regrading and delivery in tandem with site offices. No excavation works will be undertaken in site compounds in the granite area. Refer to Table 7.6 below and Figures 7.101 to 7.124 for potential site compound locations.

Table 7.6 Potential Site Compound Locations

Phase	Site No.	Location	Service Range (Chainage)		Approx. Site Area (ha)	Access	Main Construction Activities	Staff Numbers to compound	Traffic (LGV Journeys)*
			From	To					
1	SC 14/05	Galway Racecourse Infield	N/A	N/A	0.3	Racecourse Avenue	Temporary stables construction	50	100
2	SC 00/01	R336 Baile Nua	Ch. 0+000	Ch. 2+750	0.6	R336	Western tie-in for proposed N6 GCRR	56	116
	SC 04/01	Aille	Ch. 2+750	Ch. 4+100	0.4	Aille /Cappagh Road	Aille Cutting, Rock Crushing Plant	23	46
	SC 05/01	Ballymoneen	Ch. 5+250	Ch. 6+300	1.0	Cappagh Road	Aille Cutting, Letteragh and Rahoon Road Overbridges	23	46
	SC 07/01	Letteragh	Ch. 6+300	Ch. 9+350	3.3	N59 Moycullen Road	Major cut at Letteragh Junction and River Corrib Bridge (western section) Rock Crushing & Regrading Plant	23	46
	SC 08/01	Dangan (Aughnacurra)	Ch. 8+550	Ch. 9+350	0.4	N59 Moycullen Road	River Corrib Bridge (western section). Used for storage only.	23	46
	SC 09/01	Menlo (East of River Corrib)	Ch. 9+350	Ch. 10+450	0.9	Coolough Road	River Corrib Bridge (eastern section) & Menlough Viaduct	27	55

Phase	Site No.	Location	Service Range (Chainage)		Approx. Site Area (ha)	Access	Main Construction Activities	Staff Numbers to compound	Traffic (LGV Journeys)*
			From	To					
	SC 11/01	Lackagh Quarry	Ch. 10+450	Ch. 13+900	9.0	Coolough Road	Lackagh Tunnel and potential for concrete batching plant, crushing and regrading of material.	27	55
	SC 14/01	Twomiledit ch (N83 Junction)	Ch. 13+900	Ch. 14+700	1.6	N83 Tuam Road	N83/Parkmore Junction Rock Crushing Plant	20	40
	SC 14/02	Twomiledit ch (N83 Junction)	Ch. 13+900	Ch. 14+700	0.9	Parkmore Link Road	N83/Parkmore Junction	20	40
	SC 14/03	Twomiledit ch (N83 Junction)	Ch. 13+900	Ch. 14+700	0.8	Parkmore Link Road	N83/Parkmore Junction	20	40
	SC 14/04	Western Racecourse Tunnel Portal	Ch. 14+700	Ch. 15+200	1.2	N83 Tuam Road	Galway Racecourse Tunnel (western section)	20	40
	SC 15/01	Coolagh / Briarhill	Ch. 15+200	Ch. 16+100	0.5	R338 Monivea Road	Galway Racecourse Tunnel (eastern section)	12	24
	SC 16/01	Coolagh	Ch. 16+100	Ch. 17+500	1.3	R338 Monivea Road	Coolagh Junction	20	40
3	SC 14/05	Galway Racecourse Infield	N/A	N/A	0.3	Racecourse Avenue	Permanent stables construction	50	100
4	SC 14/05	Galway Racecourse Infield	N/A	N/A	0.3	Racecourse Avenue	Repurposing the temporary stableyard	10	20
5	N/A	N/A					N/A	N/A	N/A

7.4.9.5 Construction Materials and associated Traffic

An assessment was carried out in order to vehicular movements required to transport the materials to and from construction zones and the associated volume of traffic. It should be noted that only registered vehicles will be allowed on public roads. Table 7.7 below gives a summary of the construction and demolition traffic comprised of HGVs, while Table 7.9 outlines an assessment of the traffic generated by workers coming to and from site, assumed to be undertaken by LGVs. The figures in both tables are then combined in Table 7.10 to give an indication of the increase in AADTs caused by the construction of the Project, based on the updated AADTs detailed in Chapter 6 of this updated EIAR.

For the purposes of this assessment volumes were divided into seven zones along the proposed N6 GCRR:

- Zone 1 Ch. 0+000 - 3+900
- Zone 2 Ch. 3+900 - 7+750

- Zone 3 Ch. 7+750 - 9+300
- Zone 4 Ch. 9+300 - 11+140
- Zone 5 Ch. 11+140 - 14+140
- Zone 6 Ch. 14+140 - 16+200
- Zone 7 Ch. 16+200 - 17+550

The proposed development at Galway Racecourse is included within Zone 6. In calculating this the following assumptions were made:

- 8 wheeler lorry for all road movements (capacity of 20 Tonne)
- 38 Tonne dumper for bulk earthworks
- Trucks used to transport earthworks and other bulk materials have a load capacity of 20 tonnes/8m^3
- Flat-bed trucks used to transport pre-cast concrete items have a load capacity of 20 tonnes
- No programme of works estimated – i.e. the number of estimated movements would be distributed over the construction period, which was taken to be 888 days, or roughly 3 years
- Import of non-site won material included e.g. concrete, pavement, Information Communication Technology (ICT)
- The construction period is 5 years in total, albeit it will not be a continuous period of construction, as the construction for the temporary stables and permanent stables will span either side of the proposed N6 GCRR construction, but will comprise 1 year for Phase 1, 3 years for Phase 2, with the construction period for zones 1 to 3 is one year and for Zones 4 to 7 is three years, and 1 year to complete Phases 3 and 4

As Phases 1, 3, 4 and 5 of the Project is in one localised area, namely Galway Racecourse and its surrounding lands, the added traffic volumes due to construction works of these phases will mainly impact on the surrounding local roads, including Racecourse Avenue (or Ballybrit Crescent), the Monivea Road, Parkmore Road, the R339, Bóthar na dTreabh, and the Tuam Road (N83), and the haul routes previously identified in Section 7.4.9.3. During the construction works of Phase 2, construction traffic will travel on the approved haul routes as well as along the line of the fenceline for the proposed N6 GCRR.

Table 7.7 sets out the total construction traffic arising from movement of materials for construction and waste materials from any scheduled demolition, as well as additional earthworks material needed for the Project. The calculation of traffic was based on volumes of materials to be transported, as well as the return of vehicles from site, in order to more accurately predict the volume of traffic which will have an effect on the local road network.

The estimated breakdown of traffic numbers associated with the transportation of materials throughout the phases of the Project is outlined in the following:

- In Phase 1 the construction of the temporary stables within the infield of Galway Racecourse involves the removing of cut material from site as identified in Section 7.4.8.2 and the bringing of construction materials to site. It is assumed that these journeys will be completed via Racecourse Avenue and the Parkmore Road connection onwards to the national road network.
- The journeys of Phase 2 will be made to remove demolished material from site accounted for above in Table 7.1, to bring construction materials to site, site movements along the corridor of the proposed N6 GCRR, again occurring along Racecourse Avenue and Parkmore Road, as well as the haul routes identified in Section 7.4.9.3.
- Phase 3 will involve bringing all materials to site for construction of the permanent stables and stableyard. These journeys will likely take place on Racecourse Avenue, now re-routed, and the Parkmore Road, as well as possibly the proposed N6 GCRR which will be operational at that stage.

- The demolition of the temporary stables taking place in Phase 4 will remove demolished material and bring any necessary landscaping materials to site. The roads primarily in use will be same as outlined in Phase 3.

It is estimated that the journeys necessary for the construction of the Project and any associated works will primarily be contained on the roads to the east of Galway Racecourse; Racecourse Avenue and the Parkmore Road, while also utilising the proposed N6 GCRR when completed (from Phase 3 onwards) and the existing N6.

Table 7.7 Journeys Generated by Project Earthworks and Demolition Activities

Construction and Demolition Traffic			
Zone Reference	Material Type	Estimated Volume (t)	Construction Traffic (HGV Journeys)
Zone 1	Earthworks cut	12,862	28,895
	Earthworks fill	15,258	
	Demolitions	134	
Zone 2	Earthworks cut	9,191	86,903
	Earthworks fill	76,616	
	Demolitions	80	
Zone 3	Earthworks cut	90,734	99,283
	Earthworks fill	5,176	
	Demolitions	215	
Zone 4	Earthworks cut	2,210	47,765
	Earthworks fill	42,587	
	Demolitions	54	
Zone 5 – Phase 2 of Project (Proposed N6 GCRR)	Earthworks cut	13,097	37,796
	Earthworks fill	19,596	
	Demolitions	207	
Zone 5 – Phase 1, 3 and 5 of Project (proposed development at Galway Racecourse)	Earthworks cut	6,234	12,285
	Earthworks fill	255	
	Demolitions	2,084	
Zone 6	Earthworks cut	26,499	45,564
	Earthworks fill	14,077	
	Demolitions	467	
Zone 7	Earthworks cut	58,465	61,966
	Earthworks fill	3,318	
Total Construction and Demolition Material Transportation			**420,457**

Table 7.8 Transportation of Construction Materials

Phase	Material Type	Estimated volume (m^3)	Construction Traffic (HGV Journeys)*
Phase 1	Precast stables	1383	332
	Roofing (All)	319	19
	Other concrete, pavement and flooring	2493	571
	In-situ Concrete	355	85
	Associated works	9,960	1,674
Phase 2 of Project (Proposed N6 GCRR)	Concrete (incl. steel)	127,680	33,385
	Pavement	218,360	52,406
Phase 3	Precast stables	1372	329
	Roof panels	1,096	8
	Other concrete, pavement and flooring	1478	330
	Concrete	219	52
	Associated works	10,090	1,695
Phase 4	N/A	N/A	N/A
Phase 5	N/A	N/A	N/A

Table 7.9 Traffic Generated by Workers Across the Project

Zone	No. Journeys
Zone 1	110,822
Zone 2	109,402
Zone 3	44,045
Zone 4	52,285
Zone 5	85,248
Proposed Galway Racecourse Development	380
Zone 6	58,248
Zone 7	36,941
Total No. Journeys made by workers	**497,660**

Table 7.10 Increase in HGV Percentage by Zone

Zone Reference	Location Reference	Existing Daily HGV's 2031	Additional daily HGV's over construction period 2031	Daily construction related AADT over construction period 2031
Zone 1	R336	246	7	132
Zone 1	Bearna to Moycullen Road L1321	1	7	132
Zone 2	Cappagh Road	1	10	133
Zone 2	Seamus Quirke Road	476	17	265
Zone 2	Kingston Road	164	17	265
Zone 3	N59 at Hazel Park	158	10	60
Zone 3	N59 at Chestnut Lane	382	10	60
Summary of West	Quincentenary Bridge	1024	27	325
Zone 4	Bóthar Nua	21	52	111
Zone 5	N84 Headford Road at Ballinfoyle	531	10	58
Zone 5	N83 Tuam Road at City North Business Park	732	10	58
Zone 5	N6 Bóthar na dTreabh between N83 Tuam Road Junction and Morris Junction	819	100	552
Zone 5	N6 Bóthar na dTreabh between N84 Headford Road Junction and N83 Tuam Road Junction	727	89	542
Zone 6	Parkmore Link Road South of Business Park Junction 2	0	167	233
Zone 6	N6 Bóthar na dTreabh between Morris Junction and Lynch Junction	1416	132	650
Zone 7	N6 Bóthar na dTreabh at Ardaun	1489	136	696

Note: the above AADT figures are based on the updated transport modelling undertaken for this updated EIAR and include all construction related traffic such as demolition works, construction activities, and delivery of goods. The journeys above represent movements to and from site.

7.4.9.6 Traffic Safety

All construction works will be undertaken in a clearly delineated site area which will have specific entry and exit points for construction related traffic onto the public road network. Boundary treatment in the form of a fence will be erected prior to the commencement of construction and will define the extent of the construction site.

Where works are to be undertaken adjacent to the existing roads, temporary traffic barriers will be erected to separate the construction works from the public, to create a safe working space for the contractor and to clearly define the areas within which construction will be undertaken.

As has been stated above, traffic management will be required on the existing road networks during the construction of roads and structures. The contractor will be required to ensure safe operation of traffic at all times during the construction phase. Refer to the updated Construction Traffic Management Plan in the CEMP in Appendix A.7.5.

7.4.10 Services and Utility Requirements for Construction

7.4.10.1 Electricity

In liaison with the ESB Networks, a temporary transformer served from local supplies will be installed to provide the necessary power required at the various site compounds identified.

7.4.10.2 Water Supply

The construction activities requiring water during the construction phase will vary depending on the activity type. The initial estimate of demand is approximately $3m^3$ per day in Phase 1, primarily based on the demand requirement for 50 construction workers and the associated support facilities, which will increase to $5m^3$ per day in Phase 2 based on 80 construction workers and decrease to $3m^3$ per day again in Phase 3 for 50 construction workers and reduce further to $10m^3$ per day in Phase 4. However additional demand of water supply will be required for wheel washing facilities and requirements for construction activities such as drill and blast. In agreement with Irish Water, water will be sourced from the existing watermains at the most convenient point.

7.4.10.3 Storm Water and Foul Water Disposal

Storm water will be treated and managed carefully during construction. Storm water east of the River Corrib will be infiltrated to ground via silt traps and managed soakaways in the absence of public storm sewers. Storm water west of the River Corrib will be treated before being discharged to existing watercourses. 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 (ref. Chapter 10, Hydrogeology and Chapter 11, Hydrology).

Prior to commencement of the main construction activities, a dedicated holding tank for storage of construction foul effluent will be constructed at compounds where welfare facilities are provided. This holding tank will be sealed to avoid any potential risk of spillage and contamination of the groundwater within this area. The effluent will be regularly disposed of off-site by tanker by a licensed contractor to an approved licenced facility (ref. CEMP in Appendix A.7.5).

7.4.11 Employment and Welfare

Through each Phase of the Project there will be some variation in the numbers of staff working on site. It is anticipated there will be 250 - 270 staff directly employed on site for Phase 2, rising to 300 staff at peak construction, with up to 50 staff in Phases 1, 3 and 4. 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 included in the CEMP in Appendix A.7.5 includes designated traffic routes, timings and parking arrangements to be updated by the contractor prior to the commencement of construction.

The site start time will ensure that construction workers arrive to site prior to the morning peak hour for traffic on the local network.

Typical working hours during the construction phase will be:

Start	Finish	
0700	1900	Monday – Friday
0700	1600	Saturday (if required)

It will be necessary to work overtime (including weekends) and night shifts at certain critical stages during the Project. There may be some periods where 24 hour work and supervision is required. Consideration of safety, weather or sub-contractor availability is likely to necessitate working outside normal hours. Over the expected 60-month construction period there will be up to 10 weeks of night-time working. Heavy or noisy construction activities will be avoided outside normal hours and the amount of work outside normal hours will be strictly controlled.

7.4.12 Construction Health and Safety

7.4.12.1 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 Regulations, a Health and Safety Plan will be formulated which will address health and safety issues from the design stages through to the completions of the construction and maintenance phases. This plan will be reviewed as the development progresses. The contents of the Health and Safety Plan will follow the requirements of the Regulations.

In accordance with the Regulations, a “Project Supervisor Design Process” has been appointed and “Project Supervisor Construction Stage” will be appointed as appropriate.

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.

7.4.12.2 Fire Safety and Egress Design Strategy

The fire safety objectives adopted in the design will achieve compliance with the Building Regulations, particularly reference to Part B (Fire).

7.4.12.3 Construction Site Management and Security

There will be a contract management team on site for the duration of the construction phase. The team will supervise the construction of the works including monitoring the contractor’s performance to ensure that the proposed construction phase mitigation measures are implemented and that construction impacts and nuisance are minimised.

7.4.12.4 Incident & Emergency Response Provisions

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 the CEMP in Appendix A.7.5.

The objective of this IRP is to:

- Ensure the health and safety of workers and visitors along the site
- Minimise any impacts to the environment and ensure protection of the water quality and the aquatic species dependent on it
- Minimise any impacts on properties, services etc.
- Establish procedures that enable personnel to respond to incidents with an integrated multi-departmental effort and in a manner that minimises the possibility of loss and reduces the potential for affecting health, property, and the environment
- Ensure resilience of the Project to safeguard its continued operation from the impacts of climate change

7.4.12.5 Site Security

The primary function of the site's 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 and ID card. ID Cards will only be issued to operatives that have attended the site induction and (if relevant) a medical examination.

7.4.13 Commissioning Phase

The temporary stableyard and the associated works will be commissioned at the end of Phase 1 of the Project.

For Phase 2, if an east to west build is adopted, then it is likely that partial sections will be commissioned in stages e.g. N6 Coolagh Junction to N59 Letteragh Junction as part of Phase 2 Stage A and N59 Letteragh Junction to R336 west of Bearna as part of Phase 2 Stage B (Refer Section 7.4.2 above).

Some sections could also be commissioned as part of an advance works contract e.g. Parkmore Link Road or the N59 Link Road North and South to alleviate existing traffic congestion problems. However, it is noted that if Parkmore Link Road were to be constructed separately as an advanced contract the cutting and overbridge structure for the mainline will need to be completed at the same time as it would be difficult to implement post construction with live traffic on the link road. At the end of Phase 2, construction of Phase 2 of the Project will be complete and fully commissioned.

The permanent stables constructed as part of Phase 3 of the Project will be commissioned at the end of Phase 3. Once Phase 3 commissioning is complete, the Phase 4 decommissioning can commence.

7.4.14 Construction Site Decommissioning

On completion of construction, all construction facilities and equipment such as plant, materials, signage, contractors' offices and laydown areas, etc. will be removed from site. All ground will be reinstated to an appropriate standard.

7.5 Potential Construction Impacts

The potential impacts identified in this section represent the "worst case" scenario predicted in the absence of any mitigation.

Potential construction impacts include emissions to air such as dust, noise and vibration, construction traffic (including oversized deliveries), surface water runoff from the site, leaks or spills from construction plant and equipment, construction waste and disruption to road users during the road upgrade. Additional traffic on the road network will be generated by the construction works. These potential impacts are assessed in the relevant chapters of this updated EIAR as outlined below.

There is also the potential for impacts on major existing services during construction such as the gas distribution main at Rahoon, gas transmission main at School Road, Castlegar, the 110kV overhead cables at Ballybrit and Coolagh, Briarhill, the IDA sewer at Parkmore and other services that are in conflict with the Project. There will be temporary outages and disruption to the services as new connections are made and/or

services are relocated. Refer to Chapter 15, Material Assets (Non-agricultural) for further information in relation to these potential impacts.

Potential impacts associated with the construction activities outlined above and in Section 7.4 are also considered in other chapters of this updated EIAR as follows:

- Flora and fauna (ref. Chapter 8, Biodiversity)
- Soils and geology (ref. Chapter 9, Soils and Geology)
- Hydrogeology (ref. Chapter 10, Hydrogeology)
- Hydrology (ref. Chapter 11, Hydrology)
- Visual impacts (ref. Chapter 12, Landscape and Visual)
- Archaeological, architectural and cultural heritage (ref. Chapter 13, Archaeological, Architectural & Cultural Heritage)
- Material Assets (ref. Chapter 14, Material Assets Agriculture and Chapter 15, Material Assets Non-Agriculture)
- Air quality (ref. Chapter 16, Air Quality)
- Climate (ref. Chapter 17, Climate)
- Noise and vibration (ref. Chapter 18, Noise and Vibration)
- Population and human health (ref. Chapter 19, Population and Human Health)

Specific construction mitigation measures are described in the individual chapters and general mitigation measures are described below.

7.6 Mitigation Measures

7.6.1 Construction Environmental Management Plan

Every effort will be made to ensure that any negative environmental effects will be avoided, prevented or reduced during construction.

A Construction Environmental Management Plan (CEMP) has been prepared and is included in Appendix A.7.5 which will be updated and finalised by the Contractor prior to construction commencing. The CEMP comprises all of the construction mitigation measures, which are set out in this updated EIAR, and will be updated with any additional measures which are required by the conditions attached to An Bord Pleanála's decision. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum. The plan has regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, *Environmental Good Practice on Site Guide, 5th Edition* (CIRIA 2023)[1]. The plan also has regard to the TII Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan.

A construction management team shall be appointed for the duration of the construction phase. This team will supervise the construction of the Project, including monitoring the performance of the contractors to ensure that the proposed construction phase mitigation measures are implemented and that construction impacts and nuisance are minimised. The construction management team will liaise with neighbours and the general community during the construction phase to ensure that any disturbance is kept to a minimum.

The CEMP summarises the overall environmental management strategy that will be adopted and implemented during the construction phase of the Project. 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

[1] Kwan, Dickinson & MacLeod, 2023. Environmental Good Practice on Site Guide (fifth edition) (C811). Available at: https://www.ciria.org/ItemDetail?iProductCode=C811&Category=BOOK&WebsiteKey=17be687b-0441-4487-b752-43d52261e129

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 Project. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum.

The CEMP has been prepared in conjunction with the Environmental Impact Assessment (EIA) Report and Natura Impact Statement (NIS), having regard to consultations with a range of specialists and environmental organisations, in particular, the National Parks and Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI). The CEMP supports the information already provided in this updated EIAR and must be read in conjunction with the information already provided in this updated EIAR.

The information included in the CEMP are presented below:

- General Project Details
- Contact Sheets
- Reference Documents
- Organisational Structure/Duties and Responsibilities
- Environmental Commitments and Environmental Control Measures
- Site Specific Method Statements/Management Plans
  - Construction and Demolition Waste Management Plan
  - Sediment, Erosion and Pollution Control Plan
  - Non-native Invasive Species Management Plan
  - Incident Response Plan
  - Construction Traffic Management Plan
  - Environmental Awareness Training Strategy
  - Communications Strategy
  - Inspections, Auditing and Monitoring Compliance Strategy
  - Final Handover

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 this CEMP will be implemented in full by the Contractor and its finalisation by the Contractor will not affect the robustness and adequacy of the information presented and relied upon in this updated EIAR. Some information (such as project details and the schedule of environmental commitments from the updated EIAR) has already been provided in this updated EIAR and is not repeated in the version of the CEMP in Appendix A.7.5. However, it will be included in the CEMP which is finalised by the Contractor.

In addition to the items listed above, the following information will also be provided by the Contractor when finalising the CEMP:

- Planning permission - If planning permission is granted for the Project, the entire contents of the planning permission will be included in the CEMP
- Comprehensively incorporate all Environmental Commitments set out in the Contract documents (in particular the Works Requirements), those presented in this updated EIAR and any additional commitments which may arise as part of the development consent process up to and including the Oral Hearing. The CEMP will include the complete suite of Environmental Commitments together with the relative specification, evidence and responsibilities of how each commitment will be met

- Relevant Environmental Performance Criteria prescribed in environmental legislation and in Contract documents
- Register of all applicable legislation, including relevant standards, Codes of Practice and Guidelines
- Description of the Environmental Management System of the Project, which shall be devised according to the criteria of ISO 14001:2004 – Environmental Management Systems. The CEMP will be complemented by General Procedures, Work Procedures and Operations Instructions. These documents will be in place within the site administration offices and appropriate site locations during works

The CEMP is a dynamic document, and the Contractor will ensure that it remains up to date for the duration of the construction period. The CEMP may need to be altered during the lifecycle of the construction period to take account of monitoring results, legislative changes, outcomes of third-party consultations etc. Additional appendices may be added to the CEMP to accommodate monitoring results, permits etc. However, the finalisation of the CEMP by the Contractor will not affect the robustness and adequacy of the information presented here and relied upon in this updated EIAR.

In order to help ensure the successful development, implementation and maintenance of the CEMP, the Contractor will be obliged to appoint an Environmental Manager (EM). The EM will possess sufficient training, experience and knowledge appropriate to the nature of the task to be undertaken, a Level Eight qualification recognised by the Higher Education and Training Awards Council (HETAC), or a University equivalent, or other qualifications acceptable to the Employer, in Environmental Science or Environmental Management, or other subjects acceptable to the Employer. In particular, the EM will require suitably qualified ecological experts to oversee ecologically sensitive elements of the construction works, ecological derogation licensing requirements and ecological monitoring. Further details on the roles and responsibilities of the EM are provided throughout the CEMP in Appendix A.7.5.

The key Site Specific Method Statements/Management Plans of relevance to this updated EIAR are described below.

A **Construction & Demolition (C&D) Waste Management Plan (WMP)** has been prepared as part of the CEMP to ensure that waste arising during the construction and demolition works for the Project on site will be managed and disposed of in a way that ensures compliance with the provisions of the Waste Management (Amendment) Act, 1996-2024 and associated Regulations (1996-2024) to ensure that optimum levels of reduction, re-use and recycling are achieved and to ensure that waste management does not impact on any European sites.

The **Sediment, Erosion and Pollution Control Plan (SEPCP)** summarises the procedures and technical practices for implementing effective sediment, erosion and pollution control through a variety of delivery methods for the construction phase of the Project. The purpose of this SEPCP is to demonstrate at this stage, how the proposed construction works can be delivered in a logical, sensible and safe sequence with the incorporation of specific sediment, erosion and pollution control measures relevant to construction works of this nature.

A **Non-native Invasive Species Management Plan (NISMP)** has been prepared to outline the strategy that will be adopted during the construction and operation of the Project in order to manage and prevent the spread of the non-native alien invasive plant species to any European sites. Refer to Section 7.6.6 for further details.

The focus of including all of the stringent measures in this CEMP is on prevention of the incident arising in the first place. However, an **Incident Response Plan (IRP)** has been prepared to ensure that in the unlikely event of an incident, response efforts are prompt, efficient, and suitable for particular circumstances. The IRP describes the procedures, lines of authority and processes that will be followed to ensure that incident response efforts are prompt, efficient, and suitable for particular circumstances. The IRP details the procedures to be undertaken in the event of the release of any sediment into a watercourse, serious spillage of chemical, fuel or other hazardous wastes (e.g. concrete), non-compliance incident with any permit or license, or other such risks that could lead to a pollution incident, including flood risks.

All of the Contractor's site staff will receive relevant and appropriate training to ensure that they have the appropriate knowledge to successfully implement the CEMP.

The CEMP also outlines the communications strategy which will be adopted during construction which ensures that awareness, education and information sharing procedures are adopted and implemented. Finally, the CEMP outlines the inspections, auditing and monitoring compliance strategy that will be adopted by the Contractor.

7.6.2 Dust

Emissions to air during earthmoving and construction will occur, although the prevailing weather, the size of the site and its distance from sensitive receptors will assist in facilitating the management of any effects. The focus of the control procedures will therefore be to reduce the generation of airborne material.

The assessment of potential construction impacts includes for the implementation of 'standard dust control measures', as stated in the TII guidance. This shall include the following measures:

- Spraying of exposed earthwork activities and site haul roads during dry weather
- Provision of wheel washes at exit points
- Control of vehicle speeds and speed restrictions. It is proposed that site traffic is restricted to 20km/hr. This will help to minimise the occurrence of dust re-suspension
- Sweeping of hard surface roads

Additional measures, including dust screens will be implemented at locations where there is the potential for air quality impacts during the construction phase (Ref. Chapter 16, Air Quality). Employee awareness is also a most important way that dust may be controlled on any site. Staff training and the vigilant management of operations ensure that all dust suppression methods are implemented and continuously inspected.

Dust deposition monitoring will be conducted at a number of locations in the vicinity of the Project. At least one month of dust deposition monitoring will be carried out in advance of the commencement of works to determine a baseline.

Refer to Chapter 16, Air Quality and the Sediment, Erosion and Pollution Control Plan in the CEMP in Appendix A.7.5, of this updated EIAR.

7.6.3 Debris

The following are some of the measures that will be taken to ensure that the construction 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 construction 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 construction 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

7.6.4 Noise and Vibration

Construction noise will be kept to a minimum in accordance with BS 5228 (2009). Potential construction noise impacts are addressed in Chapter 18, Noise and Vibration of this updated EIAR.

The contract documents will clearly specify that the contractor, undertaking the construction of the works, will be obliged to comply with the construction noise and vibration limits included in the updated EIAR. This will require specific noise abatement measures in line with the best practice measures outlined in British Standard BS 5228 – 1: 2009 +A1 2014: *Code of practice for noise and vibration control on construction and open sites – Noise* and the NRA (now TII) guidelines *Good Practice Guideline for the Treatment of Noise during the planning of National Road Schemes* (NRA 2014).

There will be areas of potential impacts due to construction noise on neighbouring residences. Prior to the construction works commencing on site, environmental noise monitors will be installed at the selected locations. Refer to Chapter 18, Noise and Vibration of this updated EIAR for further details.

It is anticipated that potential vibration will be generated during the construction phases of the Project in areas of excavation which require drill and blasting. Prior to the construction works commencing on site, environmental vibration monitors will be installed at the selected locations. Refer to Chapter 18, Noise and Vibration of this updated EIAR for further details.

Piling is also likely to be required during the construction of the Project. It will utilise methods that will minimise the risk of vibration being generated and will only be undertaken in daytime. Rock breaking, where required will use methods that will minimise noise and vibration. It will be necessary to conduct monitored trial blasts in the same bedrock formation as the proposed blast locations as part of the blast design assessment. The trial blasts will calibrate the blast design to site specific designs and will refine and validate the blast design properties. Trial blasts will not exceed the limitations of the local sensitive receptors. A liaison officer will be appointed by the contractor to notify residents and business in proximity to all blast sites in advance of this work. Locations of potential blasting are included on Figures 7.201 to 7.202.

7.6.5 Existing Services

The existing services running within and adjacent to the site and the Project 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 consultation with the owners of the services and 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. Refer to Chapter 15, Material Assets Non-Agricultural for further details.

Service users will be notified in advance of any temporary disruption or outages necessitated by the construction works. The disruption to services or outages will be carefully planned so the duration is minimised.

7.6.6 Non-native Invasive Plant Species

Ecological surveys undertaken for this updated EIAR recorded the locations of invasive plant species at various locations along the route of the Project (ref. Chapter 8, Biodiversity).

- Himalayan knotweed - *Persicaria wallichii*
- Japanese knotweed - *Fallopia japonica*
- Rhododendron - *Rhododendron ponticum*

Refer to Figure 8.22.1 to 8.22.14 for location details.

Japanese knotweed and Himalayan knotweed dispersal typically occurs through rhizome fragments being transported in soil by humans or to a lesser extent, through passive mechanical means such as in floodwaters. Dispersal is also achieved through vegetative reproduction from plant fragments. The plant typically occurs along roadsides, riverbanks and waste ground in Ireland where it forms dense, monotypic stands. During the winter, the brown stalks remain standing even though the plant dies back to the rootstock. Japanese knotweed causes a range of problems due to its prolific and dense growth habit including blocking sightlines on roads, damage to paving and structures, erosion of riverbanks and flood defence structures, damage to

archaeological sites, loss and displacement of native habitats and species. Japanese knotweed is widespread throughout Ireland and is spreading rapidly.

Rhododendron ponticum is invasive in Ireland. It can spread via seed or can also occur by vegetative means where plants sucker or throw up new sprouts from roots as well as branches. It can withstand considerable shade and thrives as an understorey species in woodland, though it also tolerates open conditions in suitable acid soils. Its dense tangle of stems can block pathways, smother watercourses and encroach on roadways thereby impinging on sight-lines. The foliage of rhododendron contains various compounds that appear to have an allelopathic action on other species (inhibiting their growth) which may further inhibit plants from growing within close proximity.

At present, there are no specific legislative provisions that directly govern Japanese knotweed control or removal in Ireland. Every effort shall be made by the Local Authority to eradicate the non-native invasive species prior to award of the construction contract.

The contractor will have to put in place a management plan to treat/remove any invasive plant species which may require resurveying prior to construction in accordance with the CEMP in Appendix A.7.5. There is also the potential for non-native invasive plant species to be inadvertently brought onsite in imported fill or on the wheels/tracks of construction vehicles. The supplier of fill will be required to provide a guarantee that the fill to be imported does not contain non-native invasive plant species. In addition, the fill will be inspected for signs of non-native invasive plant species, prior to importation to site. The UK Environmental Agency's publication *Managing Japanese knotweed on development sites - The Knotweed Code of Practice* (EA 2013), states that inspection of topsoil brought into the site, should be carried out using the guidance in appendix I-IV of the code BS 3882:2007 *The British Standard Specification for topsoil and requirements for use*. This Standard was replaced subsequently by BS3882:2015 *Specification for Topsoil.* The inspection of fill will be carried out according to this Standard.

The contractor will be required to inspect vehicles before using them on site, and will pay particular attention to caterpillar tracks and where trucks and dumpers are stowed.

A management plan for the control of non-native invasive plant species on the site during construction is included in the CEMP in Appendix A.7.5 and was developed with reference to the following codes of practice and guidelines:

- Best Practice Management Guidelines Japanese knotweed Fallopia japonica (2008) - prepared for NIEA and NPWS as part of Invasive Species Ireland
- NRA Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2008)
- Managing Japanese knotweed on development sites - The Knotweed Code of Practice produced by the Environmental Agency

The implementation of the above measures will minimise the risk of Japanese Knotweed being spread within the site or to lands outside the site during the construction phase of the Project.

A Non-native Invasive Species Management Plan is included in the CEMP in Appendix A.7.5.

7.6.7 Biodiversity

Potential impacts of the construction phase on biodiversity are addressed in Chapter 8, Biodiversity of this updated EIAR. Air and water pollution control measures are addressed in Chapter 10, Hydrogeology, Chapter 11, Hydrology and Chapter 16, Air Quality.

7.6.8 Soil, Surface Water and Groundwater

The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off or groundwater. The Construction Industry Research and Information Association (CIRIA) in the UK has issued a guidance note on the control and management of water pollution from construction sites, Control of Water Pollution from Construction Sites, guidance for consultants and contractors (Masters-Williams et al 2001). Additional guidance is provided in the CIRIA technical guidance

on Control of Water Pollution from Linear Construction Projects (Murnane et al 2006) and TII Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes.

Site activities considered in the guidance include the following:

- Excavation
- Earthmoving
- Concreting operations
- Spreading of topsoil
- Road surfacing
- Site drainage, and the control and discharge of surface water runoff from the site
- Oil and fuel delivery and storage
- Plant maintenance

Measures, as recommended in the guidance above, that will be implemented to minimise the risk of spills and contamination of soils and waters, include:

- Training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures
- Careful consideration will be given to the location of any fuel storage facilities. These will be designed in accordance with guidelines produced by CIRIA, and will be fully bunded
- All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site
- Where feasible, soil excavation will be completed during dry periods and undertaken with excavators and dump trucks. Topsoil and subsoil will not be mixed together
- Ensure that all areas where liquids are stored or cleaning is carried out are in a designated impermeable area that is isolated from the surrounding area, e.g. by a roll-over bund, raised kerb, ramps or stepped access
- Use collection systems to prevent any contaminated drainage entering surface water drains, watercourses or groundwater, or draining onto the land
- Minimise the use of cleaning chemicals
- Use trigger-operated spray guns, with automatic water-supply cut-off
- Use settlement lagoons or suitable absorbent material such as flocculent to remove suspended solids such as mud and silt
- Ensure that all staff are trained and follow vehicle cleaning procedures. Post details of the procedures in the work area for easy reference.

Refer also to the Sediment, Erosion and Pollution Control Plan included in the CEMP in Appendix A.7.5, Chapter 10, Hydrogeology and Chapter 11, Hydrology.

7.7 Residual Impacts

There will be little or no residual impacts as a result of the proposed construction activities. As described above the main impacts will be during the construction period. Any residual impacts to the existing environment such as deterioration of public roads used as haul routes will be repaired. Any structural damage caused to buildings/structures/wells as a result of the construction will undergo a full stabilisation and rehabilitation works. The residual impacts of the other construction related activities of the Project are assessed in the relevant chapters of this updated EIAR.

7.8 Summary

The addition of extra phases adds time to the overall programme of construction which is a change since 2018. An overall construction period of 60 months is anticipated for the construction of all phases of the Project, albeit that it will not be a continuous period of construction, as the construction for the temporary stables and permanent stables will span either side of the proposed N6 GCRR N6 Galway City Ring Road construction, which itself has a duration of up to 36 months. The Project will be constructed in phases during this time, one year for Phase 1, three years for Phase 2 and one year to complete Phases 3 and 4. Potential haul routes and site compound locations have been identified taking cognisance of potential impacts to existing environment and proximity to major structures associated with the Project. Construction methods employed will be in accordance with best practice standards and guidelines. All necessary precautions and mitigation measures to reduce the potential impacts of the construction activities to the environment will be implemented. Management plans will be put in place to mitigate impacts such as dust, debris, noise and vibration, service diversions, non-native invasive plant species and waste.

The Inspector's Report confirmed the adequacy of each of the management plans outlined in this chapter to control construction activities and concludes as follows:

> *There will be construction impacts on the community, but I am satisfied that the applicant has demonstrated that mitigation measures will be taken to minimise disruption and inconvenience. I am also satisfied that the commitments given in the Schedule of Environmental Commitments are enforceable and will serve to mitigate the impacts to an acceptable level for the duration of construction.*

7.9 References

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