

Chapter 13

Mitigation Measures

This section of the Environmental Impact Statement provides a brief description of all of the ameliorative measures which will, where appropriate, be used to mitigate the impacts of the proposed scheme. Full details can be found in the preceding Chapters.

13.1 Human Beings

Construction Phase

- The restriction of construction working hours, including the movement of construction traffic, to minimise the impact of noise levels on nearby noise sensitive areas;
- The imposition of restrictions on the use of some minor local roads to only non-construction vehicles to reduce adverse impacts on the local community;
- The implementation of appropriate temporary traffic management measures to minimise any adverse severance impact on the local community;
- The maintenance of cyclist and pedestrian routes along existing public roads to minimise any community severance.

Operational Phase

- Maintaining the continuity of the existing road network will minimise any severance impact of the scheme on the local community.

13.2 The Natural Environment

13.2.1 Terrestrial Ecology (Flora and Fauna)

Construction Phase

- Restriction on the use of the lands within the scheme adjacent to the Narraghmore Bog;
- Restrictions on the removal of hedgerows, trees, treelines, or areas of scrub during the months of March to August inclusive to avoid impacts on breeding birds; in particular best practice would be to avoid any clearance of vegetation during the period March to June where nests are present. An assessment of the presence of nests of breeding birds along the route will be undertaken prior to clearing the site.
- Restrictions on the working area around ecological sites, hedgerows and tree lines to minimise the area or length of these sites or habitats that will be lost;
- Ground levels should not be altered in any way within the canopy line of trees that are to be retained;
- New areas of semi-natural habitat should be created using native seed sources to compensate for the loss of this habitat resource;
- Hedgerows and treelines should be planted along new road margins where practical to reconnect severed hedgerows and treelines in order to create new networks of ecological corridors.
- Access tracks should be positioned to minimise the impacts on trees wherever possible, and tracks adjacent to small streams should be constructed to leave a strip of riparian habitat to minimise impacts.

- Where practical mammal passes / otter ledges with appropriate fencing should be provided to guide animals, and planting implemented to provide the necessary vegetation cover in the vicinity of mammal passes;
- Deer fencing will be erected along the margins of the conifer plantation at Turnerstown, Narraghmore Bog and the mixed broadleaf woodland at Burton Hall if deemed necessary following further investigation of deer activity.
- On discovery of a badger sett, the animals would either be moved or provisions made to create an underpass, if possible;
- On discovery of a bat roost in buildings or trees that are to be demolished, the mammals would be moved to an alternative habitat;
- Structures and trees to be demolished or cut down should be surveyed between mid-June and mid-August prior to demolition, to establish the presence of bats.

13.2.2 Aquatic Ecology and Water Quality

Construction Phase

- Construction activities close to sensitive watercourses should be programmed during drier months to minimise the risk of potential erosion;
- No vehicular or storage use should be made of the lands adjacent to the main water courses;
- The location of sites for use as storage areas, site offices or areas with other contamination possibilities should be sited at least 50 metres from the nearest watercourse. Bunds, siltation ponds and other pollution control measures will also be required, as appropriate, to control pollution and run-off. Secondary containment for fuel tanks and secured storage areas for construction chemicals should be provided to protect groundwater resources;
- Adequate protection measures should be put in place to ensure that all hydrocarbons and other toxic chemicals used during the construction phase are appropriately handled, stored and disposed of in accordance with recognized standards;
- Foul drainage from site offices should be contained and disposed of through suitable measures, and there should be no discharge from these facilities directly to the local environment;
- Avoidance of polluting discharges entering the watercourses. Any leakage or waste contaminants should be collected and removed from the site;
- Fuelling and lubrication of equipment should not be carried out within 50 metres of a watercourse;
- Periodic monitoring of water quality in the vicinity of works should be carried out during the construction phase to ensure that there are no unauthorised discharges and to ensure the effectiveness of procedures designed to prevent pollution;
- Run-off from the working site or any areas of exposed soil should be contained in a settlement pond or sediment trap before discharge to watercourse;
- Diversion of runoff away from denuded areas;
- All relevant works in the vicinity of watercourses should be conducted in consultation with the Southern / Eastern Regional Fisheries Board and Dúchas, the Heritage Service;

- Avoidance of works in watercourses that contain salmonids during the peak spawning period between the months of November to March inclusive;
- Culverts should preferably be installed by diverting the existing channel slightly 'off-line' and constructing the culvert in the dry channel bed. In other cases it may be necessary to construct the culvert beside the existing channel and then connect the upstream end to the channel;
- Concrete (including waste and wash-down water) should be contained and managed appropriately to prevent pollution of all watercourses. Pouring of concrete for aprons, sills, and other works should be carried out in the dry and allowed cure for 48 hours before re-flooding. Pumped or tremied concrete should be monitored carefully to ensure no accidental discharge;
- Retention of existing bankside vegetation where feasible by erecting fencing prior to the commencement of site works;
- If temporary or permanent diversion of the watercourse is required, this should be carried out prior to the removal of bankside vegetation;
- Diversions of watercourses should be designed to replicate a natural watercourse system, incorporating meanders, riparian vegetation and other features of a natural watercourse;
- New channels should be sinuous and meandering rather than uniformly straight;
- Excavation for watercourse diversions should be carried out in the dry and in isolation from the existing watercourse;
- Temporary stream diversions should be made on geotextile surfaces with a surface layer of coarse aggregate to hold it in place;
- Where permanent diversion of watercourses is required, existing vegetation should be removed for replanting on the new stream/river banks;
- Revegetation of denuded areas as well as the use of organic stabilisers to minimise erosion until the establishment of vegetation on sensitive soils.
- Where suitable spawning gravels occur within a watercourse at the site of a proposed crossing point, these gravels should be removed and stored for reinstatement on completion of the works;
- Where pumping of water is to be carried out, filters should be used at intake points and discharge will be through settlement ponds or sediment traps;
- Operation of machinery instream should be kept to an absolute minimum. All construction machinery operating instream should be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery should be steam-cleaned and checked prior to commencement of instream works;
- Fording of watercourses should only be considered where no alternative option exists and, any such access should be restricted to one crossing point under approval of the ERFB / SRFB. Instream and bankside preparation and rehabilitation will be required.

Operational Phase

- All surface water run-off from the new road to watercourses of fisheries value should be directed through pollution control measures such as hydrocarbon interceptors, Infiltration Basins, Surface Flow Wetlands and sedimentation ponds. These measures should be designed with adequate storage capacity and in a manner to facilitate maintenance and cleaning.
- Bridges should be designed with clear spans crossing the major watercourses, with the excavations for the foundations out of the river

channels. Where necessary temporary cofferdams should be installed to isolate the excavations.

- Use should be made wherever possible of arch or portal type culverts, leaving the stream-bed undisturbed and maintaining some natural river bank on both sides of the watercourse;
- All culverts will be designed in consultation with the ERFB / SRFB and should permit the passage of fish under all but extreme flow conditions;
- Culvert inverts should be set below bed-level;
- Where possible, the culvert should be laid at a level and grade which allow the upstream invert to remain drowned (by back-watering) under low-flow conditions (e.g. 100mm for trout, 150mm for salmon);
- Culvert widths should approximate to that of the natural channels, the use of multiple units of lesser width is not recommended;
- Fish-passes should be incorporated where necessary;
- Minimisation of habitat loss and where possible creation of new habitat;
- The outfall for each storm water discharge pipe would be specifically designed to ensure that scouring of either the bottom or the banks of the receiving watercourse would be minimal;
- Use should be made of natural bank protection techniques;
- The construction of interceptor ditches and channels with appropriate lining to prevent channel erosion;
- The Dangerous Substances Act 1972 (along with other amending legislation) addresses the provisions to be undertaken in the case of a major accidental spillage. Where possible the drainage system should be designed in such a way that the rapid sealing off of outfalls to watercourses is possible.

13.2.3 Noise and Vibration

Construction Phase

- The application of BS 5228: 1997 “Noise Control on Construction and Demolition Sites” in sensitive areas should minimise disturbance to local residents.
- Machinery compounds should be placed away from residential areas to avoid undue disturbance.
- Blasts in rock cuttings in the proximity of houses should be designed to avoid undue disturbance.
- The construction contract will be framed to impose maximum values for peak particle velocities at houses and other structures to ensure there is no material damage from blasting.

Operational Phase

- The construction of environmental barriers such as barriers or bunds would greatly reduce noise levels for nearby dwellings. Details of barriers and bunds adopted in the Preliminary Design are included in the tables in Section 7.4 of this EIS.
- Where the availability of land adjacent to the road is minimal, construction of a bund may be impractical. In such locations construction of a single sheet barrier or wall should be considered to mitigate noise.

13.2.4 Air Quality

The impact of the proposed scheme on air quality is considered to be negligible and no ameliorative measures are proposed.

13.2.5 Soils and Geology

In general, the impact of the proposed scheme on the soils and geology along the route will be negligible and amelioration measures are not necessary.

Landfill Site at Usk Little

- The soils excavated from the landfill site may require either treatment to reduce the contamination to non-hazardous levels or be exported for treatment / disposal. This will depend largely on the extent of the contamination within the landfill, the levels of contamination and whether or not these contaminants can readily migrate or leach from the excavated material to the surrounding ground and groundwater.
- Geotechnical measures will be put in place to isolate runoff water on site.

Hydrogeology

- Minimising of the depth of the drainage measures in the cuttings to ensure that the localised reduction in the groundwater table would be minimised.
- The introduction of appropriate planting to mitigate against the adverse effects of the localised lowering of the groundwater table on the existing flora.
- Where any cutting does impact on the ground water which would affect domestic water well abstraction, remedial measures would include the deepening or re-drilling of the well.
- Depending upon the results of the Main Site Investigation long-term monitoring may be required to ensure that the groundwater table at the localities of the cuttings predicted during the design process agree with the conditions on site.

Narraghmore Group Water Scheme

- Strict control will be imposed on all earthworks and drainage operations to prevent contamination of the water source.
- The topsoil should be retained under the road embankment between Ch. 66,800 to Ch. 66,940 to remove the risk of exposing the shallow gravel aquifer that feeds the well.
- Special embankment foundations, such as placing a geotextile layer under the embankment and use of fill materials excavated from the adjacent cuttings to form the body of the embankment, should be considered in the detailed design of this section of the road.
- The road drainage will be isolated from the source of the well by piping the surface water run-off from the road carriageway between Ch. 65,500 and Ch. 73,300 to the outfall at Ch. 67,200.
- Earth bunds will be included in the design of the road between Ch. 66,600 and Ch. 67,000 to contain any accidents and any consequential spillage of hydrocarbons and chemicals into the ground immediately upstream of the well.

Narraghmore Bog

- Provision of a wetland attenuation pond / pollution control measure at drainage outfall AO5 at Ch. 70,500.
- Protection of the stream running along the east side of the bog by adopting the measures described in Section 13.2.2 for protection of aquatic ecology. .
- The installation of settlement ponds and hydrocarbon interceptors during the construction stage.

13.2.6 Climate

- The climatic impact of the proposed scheme will be negligible and ameliorative measures are not required.

13.3 The Landscape

Construction Stage

- During the construction stage, contracts will be framed to ensure good working practices are adopted, to minimise any negative impacts arising from construction and to ensure that machinery operates within the scheme construction area.
- Storage areas will be located so as to avoid impacting further on existing residential properties, trees, hedgerows, drainage patterns etc. All such areas would be fully re-instated prior to or at the end of the construction contract.
- Construction works should be undertaken in a manner that does not damage trees and hedgerows that are intended to be conserved.
- The works should be monitored continuously to ensure adequate protection of the areas outside the site for the construction works.
- Where damage to trees or hedgerows, has occurred, specialist advice from a suitably qualified specialist should be sought immediately.

Operational Stage

- On completion of sections of the proposed scheme, side slopes including cuttings and embankments, verges and other soft areas will be prepared for soiling, and either seeded or planted with indigenous species according to landscape plans.
- Where the scheme encroaches on private garden areas, provision of new boundary similar to existing will be made in consultation with the property owner.
- Hedgerows and treelines should be planted along new road margins where practical to reconnect severed field boundaries.
- Woodland planting where appropriate to the existing landscape.
- Planting at sensitive locations, particularly close to residential and recreational amenities, will reduce the visual intrusion and mitigate against visual obstruction caused by the raising of the scheme on to embankments.
- Landscape areas within junctions and small areas of severed fields acquired for the construction of the proposed scheme will be varyingly treated including being planted in copse like fashion with native or semi-native woodland species to enhance the local landscape fabric.

- Disturbed sections of hedgerow in areas acquired for drainage outfalls, pollution control, attenuation will be replanted to match the existing. Where such works acquire larger plots for attenuation ponds and pollution control, these will be landscaped and planted to mitigate the visual impacts.
- Noise barriers in the form of earthen bunds / embankments will be grassed / planted to provide landscaped screening.
- Where the scheme encroaches on private garden areas, a schedule of existing planting and boundaries affected will be prepared and reinstated on completion of the works in consultation with the property owner.
- Fully horizontal cut-off light fittings will be used, which in combination with the landscaping proposed, will minimise any light spill effect outside the road corridor.
- The specific landscape mitigation measures adopted in the Preliminary Design are included in Tables 8.6.1, 8.6.2, 8.6.3 and 8.6.4 in Section 8.5.2 of this report.

13.4 Material Assets

13.4.1 Agriculture

Construction Phase

- Maintaining good communication with the landowners to allow movement of vulnerable livestock away from the construction works during critical times;
- Where dust could be hazardous mitigation measures, such as watering of access routes, could be enforced to ensure non-contamination of milk;
- Maintenance of access to severed parcels of land;
- Precautions will be taken by the contractor to control noise;
- Precautions should be taken by the contractor to control vibration on and off site, particularly in the vicinity of housing and sensitive animals such as horses and dairy cattle;
- Advance notice should be given to farmers to enable livestock to be moved prior to any blasting;
- Temporary measures should be taken to collect waters from areas of impeded drainage until such time as the permanent measures have been installed.

Operational Phase

- The main ameliorative measure which will be adopted is the provision of new access points on farms. These will vary from simple gateways to provision of new access roads from Regional and Local roads.
- Access to severed lands is essential if they are to continue to be farmed. Direct access over or under the new road may be required for certain farms while for other operations the provision of alternative access from the local Regional and Local road network will provide a satisfactory level of access to severed lands.
- The reinstatement of farm services such as water supplies, roadways and animal handling facilities to severed lands may also be necessary to facilitate the continued farming of lands affected by the proposed scheme.

13.4.2 Residential Property

- Erection of boundary treatment similar to that currently found at the site.
- Where an access to a property is affected the access would be reinstated to match the existing.

13.4.3 Commercial Property

- The amelioration and mitigation for the loss of commercial and industrial property would be agreed in a similar way to residential property (See section 13.4.2).
- Agreement would be sought with the owner of the property regarding changes in the access arrangements
- Erection of boundary treatment similar to that currently found at the site.

13.4.4 Recreational Areas

- The amelioration and mitigation for the loss of recreational areas would be agreed in a similar way to residential property (See section 13.4.2).
- Agreement would be sought with the owner of the property regarding changes in the access arrangements
- Erection of boundary treatment similar to that currently found at the site.

13.5 Architectural, Archaeological and Cultural Heritage

13.5.1 Pre-Construction Phase

It is recommended that the following mitigation measures be undertaken in advance of the construction phase. This is aimed at allowing a satisfactory time frame in which the mitigation can be conducted and the results assessed without causing delays to the construction programme:

Non-invasive Assessment.

- **Aerial Survey**
Additional low-level, oblique aerial photographic survey work (height c.1000 ft) is recommended to aid in interpreting the archaeological landscape, in advance of a programme of invasive testing.
- **Topographical Survey.**
Topographical survey is recommended in selected areas to aid in interpreting the archaeological landscape, in advance of a programme of invasive testing. Topographical Survey is recommended for site A10 and C7.
- **Geophysical Survey**
Geophysical survey is recommended at Sites B20, B25, and D9.
- **Underwater Inspection & Survey**
Underwater inspection is recommended for the following significant waterbodies that will be directly impacted by the proposed route: Sites RA4, RB2, RB4, RC2, RC3, RD1, RD2 and RD3.
- **Architectural Recording / Survey**
Architectural Recording / Surveys are recommended at Sites AA13, BA4, BA16, BA17, BIA4, CA22, CA23, CA26, CIA7 and DA13.

- **Photographic Recording**
Photographic Recording is recommended for all townland boundaries and Sites AA1, AA2, AA6, AA9, AA13, AA14, AA18, AA20, AA21, BA4, BA8, BA9, BA11, BA12, BA13, BA14, BIA6, CA9, CA10, CA11, CA12, CA15, CA22, CA23, CA26, CA30, CIA2, CIA3, CIA5, CIA6, CIA7, DA3, DA6, DA8, DA9, DA10, DA12, DA16, DA19, DA20 and DIA1.

Invasive Assessment.

All archaeological excavation works will be carried out under licence from the Minister of Environment, Heritage and Local Government.

- **Site Specific Test Trenching**
Site specific archaeological investigative test trenching is recommended for the following sites of archaeological potential within the proposed scheme: A2, A3, A5, A6, A7, A9, A10, B1, B7, B8, B9, B10, B11, B12, B16, B17, B20, B24, B25, BIA2, BIA4, BIA5, C1, C2, C4, C5, C7, C8/9, C10, C18, C19, C20, C21, C22, CA16, CIA1, CIA8, D2, D4, D5, D6, D9, DA10 and DIA2.
- **Archaeological Test Trenching**
It is recommended that test trenching be conducted in the areas of archaeological potential AA4, AAP1 – AAP16, BAP1 – BAP13, CAP1 – CAP10, and DAP1 – DAP12, and other areas as required.
- **Preservation by Record**
Preservation by record, in the form of archaeological excavation and recording, is recommended for sites where initial investigation has yielded evidence of archaeologically significant material or structures, and where preservation *in situ* is not feasible.

13.5.2 Construction Phase

Mitigation measures at construction phase will be undertaken in compliance with national policy guidances and statutory provisions for the protection of the archaeological, architectural and cultural heritage. This may include archaeological monitoring of the topsoil stripping if deemed appropriate following assessment of the pre-construction investigations.

- **Discovery of Archaeological Material**
In the event of potential archaeological deposits being uncovered during the construction phase, initial assessment will determine the nature, extent and significance of the archaeology present. As a result of the assessment, decisions on the most appropriate mitigation strategy will be taken with the approval of the Department of Environment, Heritage and Local Government.

Section 23 of the National Monuments Acts 1930 (as amended) provide that finding of an archaeological object must be reported to the Director of the National Museum or the Garda Síochána within 96 hours of discovery.

- **Preservation in situ**
Any proposal for preservation in situ will be carried out to the approval of the Department of Environment, Heritage and Local Government.
- **Property Boundaries**
Where a property boundary is impacted by the scheme, where practical, the boundary will generally be replicated along the frontage facing onto the Regional/Local Road only. This is recommended for sites AA1, AA2, AA6,

AA9, AA18, AA20 and AA21, BA8, BA9, BA11, BA12, BA13, BA14, CA11, CA12, CA15, CA22, CA23, CA26, DA12 and DA19.

- Landscaping against Visual Impact to Architectural Buildings
This is recommended for sites AA5, AA6, AA10, AA12, AA14, AA15, AA17, AA20, AA21, AA24, BA3, BA5, BA10, BA13, BA14, BA15, CA7, CA8, CA11, CA12, CA14, CA15, CA16, CA17, CA18, CA19, CA20, CA24, CA25, CA27, CA29, DA4, DA12, DA15, DA18 and DA20.

13.6 Construction Phase

The principle mitigation measures required during the Construction Phase are outlined in the previous sections of the report. The highlights of the main measures are contained below:

- Cofferdams or other approved methods should be used when working in watercourses; where this is not possible diversion of the watercourse is a feasible alternative.
- All measures possible should be undertaken to ensure that surface water run-off is free of suspended solids and other pollutants.
- All storage areas of hazardous materials should be in bunded compounds away from watercourses.
- Regular maintenance and servicing of machinery and plant should be a policy.
- The contractor must strive to prevent dirt from being released onto public roads. In the event that site traffic uses public roads, then the contractor would be required to clean all the roads regularly.
- The contractor must provide toilets and washroom facilities for the workforce, with appropriate facilities for storage and disposal of waste.
- Construction techniques should be carefully selected for piling operations to avoid pollution of groundwater.
- The contractor will be required to work generally within the hours listed within Table 11.1 and only in exceptional circumstances and with the prior written approval of the Local Authority will he be permitted to work outside these times.
- The contractor will be required to manage the works so that the noise limits stated within Table 11.1 are not exceeded at any residential property.
- Local Roads leading to principal site compounds are to be assessed for the use of heavy vehicles. The road pavement may be widened and strengthened as required.
- All surface water run-off from site compounds is to be channelled into a collection pond and disposed of so that no contamination of the watercourses can occur.