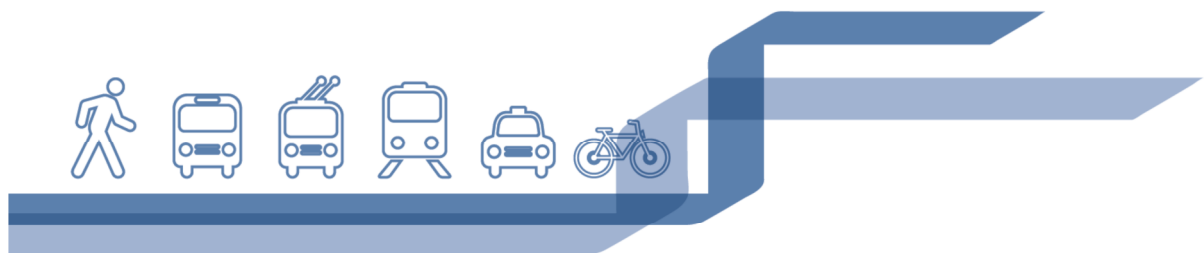


NTA Integrated Implementation Plan 2013-2018



Natura Impact Statement

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1. Introduction

This Report presents the results of Stage 2 of the Habitats Directive Appropriate Assessment (AA) of the National Transport Authority's (NTA), *Integrated Implementation Plan for the GDA*

The aim of Stage 2 of the Appropriate Assessment process, the 'Appropriate Assessment' itself, is to identify any significant negative impacts that a plan or project might have upon Natura 2000 sites; and to propose changes to the Plan that will avoid any such negative impacts, including the implementation of mitigation measures. The Plan should then be amended accordingly, thereby avoiding the need to progress to Stages 3 and 4 of the AA process, which would require the implementation of measures to mitigate or compensate for any residual significant negative impacts on Natura 2000 sites and/or to demonstrate 'Imperative Reasons of Overriding Public Interest' (IROPI) for the Plan to progress.

The Stage 2 assessment process involves the collection of data firstly on the Plan and secondly on the various Natura 2000 sites that might be impacted upon. The resultant information and assessment are presented in this document, the 'Natura Impact Statement' (NIS).

Department of the Environment, Community and Local Government (DoECLG) guidelines (DoECLG, 2009) state that the NIS should fulfil the following requirements:

- Describes the Plan in sufficient detail to make clear its size, scale and objectives;
- Describes the baseline conditions, conservation objectives, and relevant ecological and environmental issues in relation to the relevant Natura 2000 sites;
- Identifies potential adverse impacts of the Plan on the Natura 2000 sites;
- If possible, explains how the effects will be avoided through mitigation; and
- Sets out a timescale and identifies the mechanisms through which the mitigation measures will be secured, implemented and monitored.

The description of the Plan is covered in Section 2 of this NIS. Section 3 of this NIS identifies and discusses the potential significant impacts of the plan on the Natura 2000 sites and the mitigation measures that may be required to avoid these impacts.

2. Description of the Plan

2.1 Overview

The Government published its capital programme in November 2011 titled “*Infrastructure and Capital Investment 2012 – 2016: Medium Term Exchequer Framework*”. That programme set out the Government’s capital investment priorities over the five years of the programme. The total public transport investment set out in the programme is €1,428 million over the period 2012 to 2016.

Under that capital investment framework, the amount allocated to public transport infrastructure in the GDA is €715 million to the end of 2016. Within this plan there may be yearly adjustments to reflect Government decisions, particular expenditure timings and other factors.

While the Government’s “*Infrastructure and Capital Investment 2012 – 2016*” sets out investment for the years to the end of 2016, it is required that this Plan will extend to a six year period, to the end of 2018. In line with the provisions of Section 13(4) of the Dublin Transport Authority Act 2008, guidance has been obtained from the Department of Transport, Tourism and Sport indicating that projected figures may be used for proposed capital expenditure for 2017 and 2018. While no commitment has been given in relation to funding in those later years, the Plan has assumed a similar level of funding for those years to that proposed for 2016.

Accordingly, the Authority has prepared this Plan on the basis of the following funding profile:

	2013	2014	2015	2016	2017	2018	Total
Funding (€ m)	140.6	149.2	145	150	150	150	884.8

2.2 Overall Programme Approach

The Infrastructure Investment Programme forms an integral and central part of the Plan. Over the six year period of the Plan, close to €900 million will be invested in public transport infrastructure and related cycling/walking infrastructure under this Plan. The overall Infrastructure Investment Programme is divided into four sub-programmes. These are:

1. Bus;
2. Light Rail;
3. Heavy Rail; and
4. Integration Measures and Sustainable Transport.

The table below indicates the total Infrastructure Investment Programme sub-divided into its constituent sub-programmes.

Sub-Programme	2013 (€m)	2014 (€m)	2015 (€m)	2016 (€m)	2017 (€m)	2018 (€m)
Bus	43.6	39.0	40.0	39.0	42.0	42.0
Light Rail	27.3	30.2	43.5	75.0	65.0	65.0
Heavy Rail	32.1	41.7	26.0	10.5	15.0	15.0
Integration Measures & Sustainable Transport	37.6	38.3	35.5	25.5	28.0	28.0
Yearly Totals	140.6	149.2	145	150	150	150

Each of these sub-programmes is addressed in turn in the following sections, with details provided on the objectives of the particular sub-programme and projects intended for delivery under that sub-programme.

2.3 Main Components of the Plan

2.3.1 Bus

The proposals in relation to Bus investment are encompassed in four investment areas:

- Bus Fleet Investment;
- Bus Stop and Shelter Provision;
- General Bus Network Improvements; and
- Bus Rapid Transit Schemes.

The area of most concern for the HDA is Bus Rapid Transit as this will require investment in infrastructure and will potentially have significant environmental impacts. It is proposed to progress the development of three BRT routes as part of this Plan. These are:

- Swords / Airport to City Centre;
- Blanchardstown to N11 (UCD); and
- Clongriffin to Tallaght.

It is envisaged that planning consent will be achieved for each of these projects in the early years of the Plan. Subsequent implementation of these schemes will be progressed on an incremental basis in accordance with available funding. At this stage, only indicative corridors have been identified, around which a more detailed route selection process will be undertaken during the lifetime of the plan.

2.3.2 Light Rail

The proposals in relation to light rail investment are encompassed in two investment areas:

- Luas Cross City; and

- Fleet and Network Enhancement.

The Luas Cross City scheme is the main focus of the HDA as it requires significant intervention in the environment of the City Centre and north west inner suburbs. This is the largest public transport project to be constructed during the period of the Plan. This scheme comprises a broadly north / south Luas line extending from St. Stephen's Green in the south to connect to the Maynooth Rail line at Broombridge in Cabra at its northern end. With an overall length of approximately 5.6km, it will have thirteen stops along its route, including serving the major new DIT campus at Grangegorman.

Luas Cross City was approved by An Bord Pleanála in 2012 and construction commenced in June 2013. It has been through the Environmental Impact Assessment and Appropriate Assessment processes but it was felt prudent, nevertheless, to incorporate this project into this plan and HDA process as it comprises a significant proportion of the expenditure over the plan period.

2.3.3 Heavy Rail

The proposals in relation to heavy rail investment are encompassed in seven investment areas:

- City Centre Resignalling Project;
- Phoenix Park Tunnel Link;
- Level Crossing Programme;
- Ticketing / Revenue Systems;
- Central Traffic Control;
- Station Improvement / Other Enhancements Programme
- Network Development.

Of these proposals, the critical ones in terms of environmental impact are the re-use of the Phoenix Park tunnel, construction of new stations and some network development projects. Enhancements such as the City Centre Resignalling programme and other developments in terms of the promotion of rail will be taken into account by the generalised assessment of the impact of increased rail frequency and associated potential increases in passenger numbers.

Under the current configuration of the Irish Rail network, rail services entering Dublin City on the Kildare line terminate in Heuston Station. These services include a mix of inter-city trains from Cork, Waterford, Limerick and Galway, as well as commuter services from Kildare, Carlow, Newbridge and Portlaoise. Heuston station lies some 3km from the commercial core of the city and in excess of 3km from the area of highest density employment in the south eastern quadrant of the city. Hence, passengers currently using the Kildare line and wishing to access the commercial core of the city by public transport must transfer to bus or to the Luas Red line at Heuston station.

A rail connection between Heuston and Connolly stations currently exists and the completion of the City Centre Resignalling project will provide extra train paths through Connolly Station. It is intended to utilise a portion of these additional train paths to facilitate

the use of the Phoenix Park Tunnel for the running of through services from the Kildare line to Connolly and through to Grand Canal Dock. The completion of those major signalling works, together with other engineering works, is anticipated to allow commuter services to commence using the Phoenix Park Tunnel Link in late 2015 or early 2016.

Given the funding needs of other investment areas in the overall programme, it is unlikely that any significant network development will be completed during the period of the Plan. However, planning and design work will be progressed on certain rail projects with a view to those projects being available for commencement should additional funding become available for such schemes.

The relevant projects are:

- Electrification and Resignalling from Malahide to Balbriggan; and
- Maynooth Line Electrification and Resignalling.

The electrification and resignalling of the northern line between Malahide and Balbriggan, together with a turnback facility at Balbriggan, would enable DART services to be extended northwards to Balbriggan. This is an integral project of the overall DART Underground programme.

In relation to the Maynooth Line Electrification and Resignalling project, this is a scheme which is also associated with the DART Underground programme. It would see the electrification of the Maynooth line from Connolly to Maynooth. Taken together, these improvements would allow through running of DART trains from Maynooth to Greystones on the South-Eastern Line, which is a fundamental feature of the revised DART service following the completion of DART Underground.

2.3.4 Integration and Sustainable Transport Investment

This investment sub-programme spans the provision of walking, bus and cycling infrastructure to safety improvements and sophisticated traffic control systems. It also includes supporting initiatives for public transport customers such as travel information provision. Through all its elements it supports the use of the overall public transport system and enhances the accessibility, convenience, and attractiveness of the public transport offering as well as directly providing for the cycling and walking modes of travel.

The main objective is to encourage the continuation of modal shift to cycling, walking and public transport. Within that overall objective, key priorities include:

- Cycling/Walking, including:
 - Development of regional cycle network, including both commuting and recreational routes;
 - Provision of cycle parking facilities, including at public transport interchange points;
 - Expansion of bike sharing schemes;
 - Pedestrianisation and pedestrian improvement schemes; and
 - Pedestrian / cycle / tourist signage.

- Traffic Management, including:
 - Traffic management schemes;
 - Development of bus/cycling/walking transport corridors;
 - Traffic re-routing projects in urban areas, to enhance facilities for shoppers, pedestrians and cyclists; and
 - Traffic control and information schemes, including public transport prioritisation systems; and
 - Development of parking facilities.

- Safety, including;
 - Removal of accident black spots;
 - Provision of pedestrian crossings; and
 - Junction safety improvement schemes.

- Integration Projects, including:
 - Real Time Passenger Information ;
 - Integrated Ticketing ;
 - Integrated Journey Planner; and
 - Other transport Information systems.

2.3.5 An Integrated Service Plan

Over time and as the impacts of investment in the transport system are felt, the aim is that less people will use private motorised transport to access goods, services and amenity and more people will use public transport. An integrated service plan, identifying the key objectives and outputs to be pursued by the Authority in relation to public passenger transport services, is essential to influence decision-making and secure this modal shift.

An integrated network of public transport services needs to provide:

- Appropriate coverage of the area by the public transport network, so that an increasing proportion of the conurbation lives within a reasonable walking distance of public transport;
- Frequent, direct, easily understood and comfortable services to major travel destinations throughout the region, offering predictability to users throughout their daily activities; and
- Easy to use payment systems and information systems both to plan and to react en-route to unforeseen events.

This particular element of the plan will only lead to significant impacts on the environment in combination with the infrastructural elements outlined above and, as such, its assessment is implicit in the assessment of the plan in its entirety.

2.3.6 Integration and Accessibility

The Authority will seek the following improvements in terms of integration and accessibility:

- Expansion of Leap card;
- Further Real Time Passenger Information roll-out;
- On-going Journey Planner development;
- Restructuring of Fares;
- Optimising Interchange; and
- Further development of the Public Transport Brand.

These particular elements of the plan will only lead to significant impacts on the environment in combination with the infrastructural elements outlined above and, as such, their assessment is implicit in the assessment of the plan in its entirety.

2.3.7 Integration of Land Use and Transport

While the statutory responsibility for land use rests with the local authorities, transport planning can only be successful if it is integrated with land use planning. Transport policies aimed at reducing both the need to travel and distances travelled can only be delivered if there are complementary spatial policies locating future populations closer to their employment, education and shopping opportunities. The location of schools, jobs, shops, local services and other land uses relative to the location of residential development, is a critical determinant of the need to travel, the distances to be travelled and the modes of travel chosen.

Additionally, provision of high capacity public transport and walking and cycling infrastructure can only be effective if matched with appropriate development patterns which support and facilitate their use. Accordingly, it is vital that land use planning and transport planning are fully aligned, both spatially and over time. Land use policy, as such, will comprise a key determinant in transport investment decisions at both the strategic and local level over the lifetime of this plan.

As part of this plan, the Authority promotes and seeks to implement the following:

- High volume, trip intensive developments, such as offices and retail, should primarily be focussed into Dublin City Centre and the larger Regional Planning Guidelines higher order centres within the GDA;
- The role and function of district centres and neighbourhood centres should be supported and promoted in order to exploit the levels of accessibility offered by public transport, walking and cycling at these locations. This relates to providing for an appropriate scale of development in these centres which would not undermine development potential in Dublin City Centre or the larger Regional Planning Guidelines higher order centres;
- Except in limited circumstances such as specific physical requirements, trip intensive developments or significant levels of development should not occur in locations not well served by high quality public transport;
- All non-residential development proposals in the GDA should be subject to maximum parking standards. These should be set by the local authorities in the GDA

in consultation with the Authority and should vary spatially on the basis of centrality and the level of public transport provision;

- In locations where the highest intensity of development occurs, an approach that caps car parking on an area-wide basis should be applied; and
- For all major employment developments and all schools, travel plans should be conditioned as part of planning permissions and be carried out in a manner consistent with existing guidance
- Residential development located proximate to high capacity public transport should be prioritised over development in less accessible locations in the GDA;
- To the extent practicable, residential development should be carried out sequentially, whereby lands which are, or will be, most accessible by walking, cycling and public transport – including infill and brownfield sites – are prioritised; and
- The strategic transport function of national roads, including motorways, should be maintained by limiting the extent of development that would give rise to the generation of local car traffic on the national road network
- Planning at the local level should promote walking, cycling and public transport by maximising the number of people living within walking and cycling distance of their neighbourhood or district centres and public transport services;
- New development areas should be fully permeable for walking and cycling and the retro-fitting of walking and cycling facilities should be undertaken where practicable in existing neighbourhoods in order to give competitive advantage to these modes;
- Development proposals should exploit opportunities to enhance the effectiveness of transport investment;
- The density of employment development should maximise the potential for walking, cycling and public transport;
- Where possible, developments should provide for filtered permeability which provides for walking, cycling, public transport and private vehicle access but which restricts or discourages private car through trips; and
- To the extent practicable, proposals for right of way extinguishments should only be considered where these do not result in more circuitous trips for local residents accessing public transport or local destinations.

3. Potential Impacts on Natura 2000 Sites and Assessment of significance

The Screening report for this assessment presented details of all of the Natura 2000 sites within the Implementation Plan area (Counties Wicklow, Dublin, Meath and Kildare) or close enough to the boundary of the region that impacts were considered to be a possibility. Tables 3.1 and 3.2 of the Screening Report presented details, including the Qualifying Features, of all Natura 2000 sites located within 15km of any Implementation Plan proposal.

3.1 Sites Where Impacts are Possible

The screening exercise identified two sites where direct impacts could potentially occur and no sites where indirect or in-combination impacts could occur. The sites where potential direct impacts were identified were at Rogerstown and Broadmeadow/Swords Estuaries. The description of these sites and their qualifying interests are set out below:

Site Code – 4025

Name – Broadmeadow/Swords Estuary

Annex 1 Species – Golden Plover, Bar-tailed Godwit and Ruff

Other Features – Wintering Waterfowl and Waders

Non-Annex 1 Species – Brent Goose

This site is of high importance for wintering waterfowl and supports a particularly good diversity of species. It has an internationally important population of Brent Goose (956) or 4.8% of the national total (figures given here and below are average maximum counts for the five winters 1995/96-1999/00) and nationally important populations of a further 12 species as follows: Shelduck (439), Pintail (58), Goldeneye (215), Red-breasted Merganser (105), Oystercatcher (1,493), Golden Plover (1,843), Grey Plover (201), Knot (915), Dunlin (1,594), Black-tailed Godwit (409), Redshank (581) and Greenshank (38).

A range of other species occur in numbers of regional importance, including Great Crested Grebe, Mute Swan, Pochard, Ringed Plover, Lapwing, Bar-tailed Godwit, Curlew and Turnstone. The high numbers of diving ducks reflects the lagoon-type nature of the inner estuary, and this is one of the few sites in eastern Ireland where substantial numbers of Goldeneye can be found.

The estuary also attracts on a regular basis migrant wader species such as Ruff, Curlew Sandpiper, Spotted Redshank, Green Sandpiper and Little Stint. These occur mainly in autumn, though occasionally in spring and winter.

Breeding birds of the site include Ringed Plover, Shelduck and Mallard. Up to the 1950s there was a major tern colony at the southern end of Malahide Island. Grey Herons breed nearby and feed regularly within the site.

The inner part of the estuary is heavily used for water sports, which causes disturbance to the bird populations. A section of the outer estuary has recently been in-filled for a marina and housing development.

Broadmeadow/Swords Estuary SPA is a fine example of an estuarine system, providing both feeding and roosting areas for a range of wintering waterfowl. The lagoonal nature of the inner estuary is of particular value as it increases the diversity of birds which occur. The site is of high conservation importance, with an internationally important population of Brent Goose and nationally important populations of a further 12 species. Three of the species which occur regularly (Golden Plover, Bar-tailed Godwit and Ruff) are listed on Annex I of the E.U. Birds Directive.

Site Code – 4015

Name – Rogerstown Estuary

Annex 1 Species – Golden Plover, Ruff

Other Features – Wintering Waterfowl and Waders

Non-Annex 1 Species – Brent Goose

Rogerstown Estuary is an important winter waterfowl site and supports a population of Pale-bellied Brent Goose of international importance (1194 - all counts given are average peaks over the five winters 1996/97 – 2000/01). A further 14 species have populations of national importance as follows: Greylag Goose 87, Shelduck 78, Shoveler 72, Oystercatcher 1794, Ringed Plover 188, Grey Plover 343, Knot 2159, Sanderling 89, Dunlin 3128, Redshank 674, Lapwing 2166, Black-tailed Godwit 212, Greenshank 26 and Turnstone 188. The Greylag Geese are part of a larger population which spends most of the winter on Lambay Island.

Other species which occur regularly in significant numbers include Wigeon 411, Teal 379, Mallard 267, Redbreasted Merganser 22, Golden Plover 159 and Curlew 245. The numbers of Golden Plover and Lapwing can at times be considerably higher than the averages given above. The presence of Golden Plover is of note as this species is listed on Annex I of the E.U. Birds Directive. Large numbers of gulls, mostly Herring, Great Blackbacked and Black-headed, are attracted to the area, partly due to the presence of an adjacent local authority landfill site. Some of the wader species also occur on passage, notably Black-tailed Godwit with numbers often exceeding 300 in April.

The estuary is a regular staging post for scarce migrants, especially in autumn when Green Sandpiper, Ruff, Little Stint, Curlew Sandpiper and Spotted Redshank may be seen. Shelduck breed within the site.

Rogerstown Estuary is an important link in the chain of estuaries on the east coast. It supports an internationally important population of Brent Goose and a further 14 species in numbers of national importance. Bird populations have been well-monitored since the 1980s and the site is counted at monthly intervals each winter (September to March) as part of the Irish Wetland Bird Survey (I-WeBS). The site is a statutory Nature Reserve and a candidate Special Area of Conservation under the E.U. Habitats Directive.

The potential impact on both these sites arises from the electrification of the northern rail line from Malahide to Balbriggan. The existing Northern Rail Line bisects both Rogerstown Estuary SPA and the Broadmeadow/Swords Estuary SPA. It is proposed, if additional funding becomes available, to electrify this line. This involves the extension of the DART infrastructure from Malahide to Balbriggan comprising overhead cables and supports, identical to that at Booterstown, part of the South Dublin Bay Special Protection Area. The

NTA engaged ERM to undertake this Stage 2 Appropriate Assessment and the results are set out in the following sections.

3.2 Potential Impacts and Pathways Of Effect

Overhead powerlines associated with railways transmit power at typically 10,000 to 15,000 Volts. This corresponds to the medium-voltage range powerlines of the electricity industry, and poses similar risks to birds. Although little research relates directly to overhead cabling for railways, known as the catenary, the effects on wildlife are essentially similar to those associated with low and medium voltage lines. The lack of research in relation to railway electrification is surprising as there are documented cases of disruption to passengers either from collisions with wire or birds being electrocuted by forming a circuit with the wires whilst perching.

There are three main effects associated with overhead power cables:

- Electrocution
- Collision
- Displacement

In relation to effects on the SPA there would also be potential disturbance associated with both the construction (a temporary short term effect) and the maintenance of the catenary (a regular and long term effect).

3.2.1 Electrocution

This is particularly a risk for large birds that perch on tower arms and gantries, especially on poorly designed poles where birds are able to form a contact between wires. Impacts are mainly associated with raptors, storks, eagle owls that perch or nest on wires, rather than waders and wildfowl. Losses from electrocution can be significant at the population level, and as a consequence improvements in design and retrofitting of protection in countries such as Germany, Spain and Hungary have been introduced.

3.2.2 Collision

High losses (some studies have reported in excess of 500 casualties per kilometre of power line per year) have been reported from lines with multi-level arrangements, and with thin and low-hanging wires in sensitive areas. Most impacts appear to be at heights of 20m to 50m (although this height would be above the height of most catenaries).

Species such as bustards, rails, waders, cranes, and waterfowl have been particularly associated with collision mortality. Risk situations identified in studies include:

- areas with high bird populations and a high percentage of migratory birds, especially during migration; particularly high losses are reported where powerlines cut across important flyways and migration corridors, such as river valleys, valleys between mountains, straits, etc.;
- wetlands, marshes, coastal areas, steppes, especially in staging and wintering areas, in particular when above ground powerlines separate resting areas and feeding

areas or are otherwise in the flight approach of important staging and feeding areas, in particular close to water;

- migrating birds, when powerlines are perpendicular to their flight path;
- birds that migrate or move at night are at highest risk, with most incidents being reported at night and at dawn and dusk;
- impacts can be exacerbated by unfavourable weather conditions such as fog, precipitation, strong head winds. These conditions tend to concentrate bird migration at a lower height – often level with overhead cables, as well as reducing visibility and manoeuvrability of flying birds.

3.2.3 Displacement

Birdlife International (2007) provide evidence of the complete loss of lekking sites of great bustard in the vicinity of powerlines due to males repeatedly striking wires. Of more relevance to the NTA proposal is a finding of displacement of up to 100 metres from power lines of brent geese leading to a functional loss of feeding area. This was a larger structure than that proposed for rail electrification. Prinsen et al 2011 concluded that the findings of such displacement studies were contradictory and inconsistent and urged further research.

3.2.4 Construction and Maintenance

Direct disturbance would result from the building of the catenary and ancillary structures, and this may be exacerbated if any boat work is required around the viaducts. Studies from the Humber would indicate a functional disturbance zone of up to 275m for waders although 500m is often used for geese. The same study did indicate elements of habituation in some species and variations in response within species.

Maintenance work is less likely to cause disturbance as it is unlikely to be as prolonged and unless major repairs are needed noise and activity levels are likely to be lower. However during maintenance potentially an area of 275-500m may be subject to functional displacement (i.e. birds are unable to forage or roost effectively). The likelihood of such functional disturbance being greater than existing disturbance would need to be judged in the context of current heavy use of the line, existing maintenance regimes, and particularly at the Malahide estuary, the existence of considerable water sports activity including a marina at the southern edge of the bridge.

3.3 Impacts On SPA Populations

Both SPAs are designated for a similar suite of species, notably nationally important numbers of waders and wildfowl, with both carrying internationally important concentrations of wintering light-bellied brent geese.

The waders and ducks present, such as wigeon, golden plover, and lapwing have been identified as species potentially at risk from collision with power cables, particularly nocturnal species such as ducks and plovers. Recent studies in Netherlands assessing the impact of a large HV line in proximity to a polder SPA using radar and carcass searching estimated a collision risk of 0.067% for ducks and a corrected average casualty rate of 0.58

birds (all species) per km of powerline per day. The structures surveyed in that study (and in most others) were higher and presented a larger risk area than the overhead systems associated with electric trains so impacts from rail electrification may be lower.

Both SPAs are also bisected across their channels by the existing rail bridge and electrification of these structures is likely to be perpendicular to wader flight lines associated with tidal movements in particular. In addition, effects may arise for wildfowl if the catenary crosses feeding areas either side of the estuaries. Without knowledge of such flightlines and detailed understanding of the relationship between roosts and feeding areas effects on site integrity are difficult to establish and would be a priority for any Appropriate Assessment undertaken at the planning application stage.

Similarly the key feeding areas for birds and their relationship to the rail route would be important in predicting the functional disturbance that may arise from construction and maintenance. Given the relatively small size of the estuaries there is potential for populations to be affected by such works. This could lead to displacement of populations, although there is uncertainty about the likelihood and intensity of such an impact given current levels of disturbance.

Electrocution risks posed by the proposed electrification are unlikely to have a significant effect given the qualifying species present, as these are not adapted for perching on electric wires.

The conservation objectives for both SPAs are similar and can be summarised as the a stable or increasing long term population trend and the maintenance of the range, timing and intensity of use by qualifying species other than that occurring from natural patterns of variation.

The type of species present (waders and waterfowl), flight behaviour, regular presence of migratory birds, the distribution of the feeding and resting sites, frequent poor weather conditions, the alignment of the proposed catenary across the tidal flow all indicate the possibility of effects on site integrity in relation to the stated conservation objectives of the SPAs arising primarily from collision risk and displacement associated with the proposed catenary.

The likelihood of such impacts is uncertain however, as even assuming casualty rates in line with that found by Prinsen and Smit (2009) population effects are unlikely to be sufficient to drive population level changes. Similarly birds on both SPAs are subject to considerable existing disturbance and habituation levels may be high. Construction disturbance from the proposed electrification is likely to be temporary and, unlikely to add considerably to background disturbance levels.

3.4 Mitigation

Given the possibility of effects on site integrity, particularly from collision and to a lesser extent displacement, the use of mitigation to reduce any such effects to non-significant levels may be required. Key areas for mitigation would therefore be to reduce collisions and displacement.

Although electrocution effects have largely been ruled out as having an effect on SPA site integrity, the adoption of bird safe designs should be employed as a matter of good practice. Many such systems are now widely available.

Detailed before, after and if possible of control site surveys would be valuable in predicting impacts and verifying such predictions and the efficacy of mitigation. Such Before, After and Control (BACI) studies are recommended by Birdlife (2007).

3.4.1 Mitigating Collision

The first form of mitigation would be to explore alternative options such as third rail technology that avoids the need for overhead lines at all. Currently such systems are unpopular due to perceived health and safety issues and practical considerations such as the need to ensure the line is turned off prior to evacuating a train. There are also cost and energy efficiency implications. Additionally, ERM understand that there are aspirations to have a future cycle and walkway added to the rail bridge and third-rail technologies may preclude such future sustainable transport options. However this and other technology may be an option in the future, depending on the future design requirements and objectives of the rail bridge.

The alignment of the wires so that they are more visible, i.e. bunched in a horizontal plane and combined with other lines and infrastructure has been associated with decreased collisions (Prinsen et al 2011). Deflectors fitted to wires have been tested more rigorously. As a follow-on from Bureau Waardenburg's radar and mortality searches, Prinsen et al conducted research into the efficacy of new wire markers now widely deployed in Germany. They found that even at night they had a significant effect and reduced duck mortality by up to 80%, with radar studies confirming changes in flight behaviour.

At the Eden Estuary, Fife, Scotland the installation of street lamps on a bridge crossing the estuary caused a significant decrease in road traffic collisions with swans and geese. Birds adjusted their flight heights in response to the presence of lamps during the day and crossed the bridge above the traffic. (Fife Ranger Service). This visually less intrusive measure would suggest that the design of the gantries carrying the overhead cables could be used to increase flight heights.

The creation of alternative roosting and feeding areas could be undertaken to manipulate flight lines away from collision risk areas although delivery of such mitigation may be dependent on agreement with other stakeholders and therefore contains some uncertainty.

The selection of viable mitigation measures needs to be informed by detailed information being gathered on bird movements and land use, supplemented by consultation with NPWS and BirdWatch Ireland.

Notwithstanding the lack of this site-specific information, ERM would provisionally recommend that alignment of wires and the use of deflectors are the most viable forms of mitigation.

3.4.2 Mitigating Displacement

Gathering site-specific information on key feeding and roosting areas would allow effects to be better predicted and inform work schedules.

The key mitigation would be avoidance of construction and maintenance in such areas during sensitive periods when birds are likely to be present (e.g. winter and passage). Where this is not possible reducing disturbance by avoiding night work, minimising the work area and movements to and from it could be incorporated into any construction plan.

Currently disturbance from other sources including illegal hunting (Rogerstown) and water users (Malahide) is reported by NPWS as having a detrimental effect on SPA populations. Where construction disturbance may occur investment to reduce such impacts (increased wardening, access management, signing) elsewhere may be possible to offset displacement effects arising from electrification.

The provision of alternative feeding areas on a temporary or permanent basis through arrangements with local landowners could also be used to offset displacement effects.

3.5 Conclusion

There is potential for likely significant effects arising from electrification and it is possible these could lead to effects on site integrity. In the absence of detailed information about how birds use the estuary, particularly in relation to flight paths, feeding and foraging areas there is uncertainty over whether such effects would be significant. Detailed survey work to inform an AA would be required once a fully worked up project design was submitted.

Mitigation, including looking at alternative methods of electrification, is available and evidence indicates that these can be effective in reducing impacts to below significant levels.

As a consequence the proposal for electrification of the Northern railway line should be included within the strategic plan as, with the application of mitigation, it is reasonable to assume significant adverse effects on site integrity can be avoided.

At the EIA and planning application stage a further Appropriate Assessment will be required based on site specific survey information and consultation, and incorporating the mitigation measures provided in this NIS.