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National Transport Authority

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Revised Draft Limerick | Shannon Metropolitan Area Transport Strategy (LSMATS)

Natura Impact Statement (NIS)

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National Transport Authority

Limerick Shannon Metropolitan Area Transport Strategy

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Executive Summary

The Revised Draft Limerick Shannon Metropolitan Area Transport Strategy 2040 (LSMATS) considers all land transport modes, with the objective of providing a long-term strategic planning framework for the integrated development of transport infrastructure and services in the Limerick Shannon Metropolitan Area (LSMA).

This Natura Impact Statement (NIS) was prepared in support of the Appropriate Assessment (AA) which identifies the potential for likely significant effects (LSE) on European Sites due to the implementation of the LSMATS. Where LSE have been identified for a European Site the NIS provides an assessment of adverse effects on site integrity and outlines proposed mitigation measures as appropriate to avoid negative effects

As detailed in Section 4, seven European sites, Lower River Shannon SAC, the Curraghchase Woods SAC, the Askeaton Fens Complex SAC, Tory Hill SAC, Ballyallia Lough SPA, Lough Derg (Shannon) SPA and River Shannon and River Fergus Estuaries SPA, have the potential to be affected by the LSMATS.

Assessment of the LSMATS against the conservation objectives of each European site has indicated that, with the implementation of mitigation measures, it is anticipated that the potential for adverse effects on site integrity as a result of the LSMATS would be avoided/eliminated. Throughout this plan-level assessment it has been highlighted that individual measures/projects resulting from the LSMATS will require further assessment at a project level to determine potential for LSEs and appropriate strategy to ensure that the conservation objectives of the sites are not compromised, and that site integrity can be preserved.

The conclusion of this NIS for the LSMATS is that, following detailed assessment and appropriate mitigation for protecting European sites, there will be no Adverse Effects on Site Integrity (AESI) for any European site(s), either alone or in-combination with other plans or projects.

1. Introduction and Background

1.1 Introduction

To prepare for future growth in population and employment; an overall increase in travel; and the changing demographic structure of Ireland, the Irish Government has developed the National Planning Framework (NPF). The NPF was published in February 2018 and provides the over-arching strategic policy framework for Ireland's social and economic development. The NPF establishes a macro spatial growth approach to promote balanced regional development, achieved through coordinated spatial planning, sustainable use of resources, protection of the environment and the Natura 2000 network of European sites. The NPF coordinates regional and national investment strategies with respect to housing, water services, communications, energy, health, education and transport infrastructure. The NPF replaced the National Spatial Strategy for Ireland 2002-2020 (NSS).

The National Transport Authority (NTA) is a public body set up under statute and established in December 2009. The role and functions of the NTA are set out in three Acts of the Oireachtas: the Dublin Transport Authority Act 2008, the Public Transport Regulation Act 2009 and the Taxi Regulation Act 2013. In August 2015, the Department of Transport, Tourism and Sport (DTTaS) published its policy document "Investing in our Transport Future - Strategic Investment Framework for Land Transport" (SIFLT). Action 4 of that framework states that: "*Regional transport strategies will be prepared by the NTA and provide an input to regional spatial and economic strategies*".

Having regard to its role in relation to transport, and the action placed upon it in the DTTaS policy document, the NTA, in collaboration with Limerick City and County Council (LCCC), Clare County Council (CCC) and Transport Infrastructure Ireland (TII), is developing a Transport Strategy for the Limerick Shannon Metropolitan Area (LSMA) covering the period 2019 to 2040. The LSMATS will provide a framework for the planning and delivery of transport infrastructure and services in the LSMA over the next two decades. It will also provide a planning policy with which other agencies can align their future policies and investment priorities.

1.2 LSMATS Scope and Contents

The Limerick Shannon Metropolitan Area Transport Strategy (LSMATS) considers all land transport modes, with the objective of providing a long-term strategic planning framework for the integrated development of transport infrastructure and services in the LSMA. It will be used to inform transport investment priorities over the short and long term and will inform sustainable integrated land use and transport policy formulation at the metropolitan and local level.

Each of the considerations below are included within the LSMATS:

- Public transport infrastructure and service proposals (rail, bus, public bikes and taxi);
- Measures to facilitate and promote walking;
- Measures to facilitate and promote cycling, including cycling infrastructure;
- Planning policies aimed at closer integration between land use development and sustainable transport;
- Traffic management policies including potential changes to traffic circulation in Limerick City centre;
- Demand management measures including policies related to parking and tolling;
- Behavioural change measures;
- Measures to promote integration between all modes;
- Policies related to the management of freight; and
- Road infrastructure.

Specifically, elements within the LSMATS are broken down into strategic measures based on the following:

- Walking;
- Cycling;
- Bus Connects;
- Rail;
- Land Use, Regeneration and Schools;
- Urban Design and Placemaking;
- Roads and Parking;
- Freight, Delivery and Servicing, and;
- Supporting Measures and Integration.

Appendix A provides details for each measure included in the LSMATS.

1.3 Purpose of the Report

The previous screening report produced by Jacobs in 2019 identified 23 Special Areas of Conservation (SAC) and five Special Protection Areas (SPA) within 15km of the outer-boundary of the LSMA (the Zone of Influence to which the LSMATS relates). The screening report was prepared in the absence of the detailed measures currently included within the LSMATS. Therefore, the total number of European sites affected were "screened in" for further assessment on a precautionary basis.

This Natura Impact Statement (NIS) repeats the screening process based on the current measures included in the LSMATS to identify likely significant effects (LSE) on European sites. Those elements of the LSMATS that may result in LSE are then assessed for potential adverse effects on site integrity (Appropriate Assessment) and mitigation to avoid such effects is proposed. The screening process has been repeated based on updated guidance on the Appropriate Assessment (AA) process produced the Office of the Planning Regulator (OPR)[1]. In particular this guidance updates the reliance on arbitrary distances (such as 15 km) as used in previous guidance for AA[2] when considering the zone of influence (ZoI) of a proposed project or plan. Legislative Context for Appropriate Assessment.

1.3.1 Natura 2000 Network

This NIS has been prepared having regard to the requirements of the EU Habitats Directive 92/43/EEC (the Habitats Directive) on the Conservation of Natural Habitats and of Wild Fauna and Flora in particular the provisions of Article 6(3), as transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) (hereafter referred to as the Habitats Regulations 2011) and Planning and Development Act 2000 (as amended).

The Habitats Regulations 2011 transposed into Irish law the Habitats Directive and Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (the Birds Directive), collectively referred to as "the Nature Directives", and lists natural habitats and species of Community importance for conservation and requiring protection. This protection is afforded in part through the designation of sites that represent significant examples (in a European context) of habitats and populations of species specified in the Nature Directives. Sites selected for bird species are SPAs and sites selected for other protected species (Annex II of the Habitats Directive) and/or habitats (Annex I of the Habitats Directive) are SACs. Together, SPAs and SACs comprise the Natura 2000 network of protected sites.

[1] Practice Note (PN) 01 Appropriate Assessment Screening for Development Management (Office of the Planning Regulator, 2021).
[2] Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010).

The Habitats Directive provides legal protection for habitats and species of European importance. Articles 3 to 9 provide the legislative means to protect habitats and species of Community interest through the establishment and conservation of a European Union–wide network of sites known as the "Natura 2000 network" (hereafter referred to as "European sites"[3]).

1.3.2 Appropriate Assessment

Article 6(3) and (4) of the Habitats Directive set out the legal decision-making tests for plans or projects likely to affect Natura 2000 sites. Article 6(3) establishes the requirement to screen all plans and projects and, where significant effects cannot be excluded, to carry out a further assessment. Article 6(3) states that:

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."

Article 6(4) deals with alternative solutions and allows proposed plans and projects having adverse effects on Natura 2000 sites to be approved only in very limited circumstances, i.e. where there are imperative reasons of overriding public interest, no alternatives remain and compensatory measures can be taken.

The European Court of Justice (ECJ) has made a relevant ruling in relation to when AA is required and its purpose[4]:

"Any plan or project not directly connected with or necessary to the management of the site is to be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives if it cannot be excluded, on the basis of objective information, that it will have a significant effect on that site, either individually or in combination with other plans or projects [and the plan or project may only be authorised] where no reasonable scientific doubt remains as to the absence of such effects."

The ECJ has also made a relevant ruling on what should be contained within an AA[5]:

"[The AA] cannot have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned."

The Irish High Court has also considered the application of the Habitats Directive and has provided clarity on how competent authorities should undertake valid and lawful AA[6], directing that the AA:

"Must identify, in the light of the best scientific knowledge in the field, all aspects of the development project which can, by itself or in combination with other plans or projects, affect the European site in the light of its conservation objectives. This clearly requires both examination and analysis."

"Must contain complete, precise and definitive findings and conclusions and may not have lacunae or gaps. The requirement for precise and definitive findings and conclusions appears to require examination, analysis, evaluation and decisions. Further, the reference to findings and conclusions in a scientific context requires both findings following analysis and conclusions following an evaluation of each in the light of the best scientific knowledge in the field."

[3] "European site" replaced the term "Natura 2000 site" under the European Union (Environmental Impact Assessment and Habitats) Regulations, 2011 (S.I. No. 473 of 2011).
[4] Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels *v.* Staatssecretaris van Landbouw, Natuurbeheer en Visserij (Waddenzee) [2004] C-127/02 ECR I-7405.
[5] Sweetman *v.* An Bord Pleanála [2013] Case C-258/11.
[6] Kelly *v.* An Bord Pleanála [2014] IEHC 422.

"May only include a determination that the proposed development will not adversely affect the integrity of any relevant European site where, upon the basis of complete, precise and definitive findings and conclusions made, the consenting authority decides that no reasonable scientific doubt remains as to the absence of the identified potential effects."

The LSMATS will be appraised in accordance with the provisions of the Habitat Regulations as a plan. The Habitats Regulations require an assessment to be undertaken for plans that are likely to have a significant effect on European sites, acting either alone or in-combination with other plans and projects. The management objective prescribed for European sites is the maintenance or restoration of the "*favourable conservation status*" of the habitats and species protected within European sites. Assessment is made against the conservation objectives provided for the European sites that define as targets the parameters for "*favourable conservation status.*" If screening determines LSE on a European site, then an Appropriate Assessment (AA) must be carried out for the plan. Information to inform the AA and the competent authority in its decision-making process must be presented in an NIS.

1.4 Application of the Appropriate Assessment (AA) Process at Plan Level Versus Project Level

The production of a plan itself does not adversely affect any European site. Neither does a plan usually authorise any project that could have such an effect. Most projects that may result from the provisions of a plan will require some form of consent or other authorisation; this is the case with LSMATS. As such, each individual project contained within the LSMATS will be subject to the requirements of the Planning and Development Act 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I.477/2011). Importantly, the key distinction between plan and project level AA relates to the:

- Geographic specificity (that is, from generally described regions in the plan to a defined and fixed location/route for the project); and
- Duration and timing of impacts (usually not known at the plan level).

Therefore, the scale and nature of the assessment is based on the best available information meeting the provisions and requirements of the Habitats Directive. At the plan level, the assessment will be undertaken at a higher level than would be the case for projects, noting that LSMATS does not provide consent for any future projects arising from this or future iterations of the LSMATS. Likewise, the AA for the plan does not provide consent for any future projects. However, any future project level AA screenings and/or NIS will have regard for this plan level NIS.

Guidance from the European Commission (EC), the judgment of the European Court of Justice in the case of EC v the UK, case C – 6/04 [7][8] and the opinion of the Advocate General in that case, are helpful in understanding how the EC believes plans could have a significant effect on a European site. Based on this guidance, a plan may affect a European site by:

- Proposing or resulting in particular types of change that are inherently damaging;
- Proposing or resulting in a magnitude of change that would be damaging because it would be so large;
- Proposing or resulting in a magnitude of change that in the proposed location would be damaging;
- Resulting in cumulative or combined effects that would be damaging, either from a programme of similar or different proposals within the LSMATS Plan itself, or a combination of such proposals in the LSMATS Plan and in other plans or projects;
- Blocking options for future plans and proposals;
- Providing the justification for damaging change; and

[7] http://curia.europa.eu/juris/showPdf.jsf;jsessionid=7CD79E3A4BEE4D280C8796CB6C235486?text=&docid=60655&pageIndex=0&doclang=EN&mode=lst&dir=&occ=first&part=1&cid=4309711
[8] http://curia.europa.eu/juris/showPdf.jsf;jsessionid=7CD79E3A4BEE4D280C8796CB6C235486?text=&docid=58359&pageIndex=0&doclang=en&mode=lst&dir=&occ=first&part=1&cid=4309711

- Failing to foresee damaging effects that would occur later in a programme.

2. Methodology

2.1 Stages of AA

The methodology in this report draws on, and has evolved from, European Commission (2002)[9] guidance and Irish guidance from the former Department of Environment, Heritage and Local Government[10] (2010)[11].

In addition, the Practice Note produced by the Office of the Planning Regulator, (OPR, 2021)[12] was used to inform the screening process.

The entire process can be broken down into four stages (European Commission, 2002), as outlined below. If at any stage in the process it is determined that there will be no implications for the European site in view of the site's conservation objectives, the process is effectively completed. The sequence is designed to test the potential effects of plans and projects on European sites and is outlined in Table 3.1 below:

Table 3.1: Stages in AA (European Commission, 2002)

Task	Outcome
Screening	Screening determines whether an AA is required by determining if the project or plan is likely to have a significant effect(s) on any European site(s) either alone or in-combination with other plans or projects. The test is of the "*likelihood*" of effects rather than the "*certainty*" of effects. In accordance with the Waddenzee Judgement[13], a likely effect is one that cannot be ruled out based on objective information. This is underpinned by the precautionary principle and the test of beyond reasonable scientific doubt as presented in the Habitats Directive. The same judgement also adds, "*where a plan or project not directly connected with or necessary to the management of the site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site*."
Appropriate Assessment	If the screening has determined that AA is required, the competent authority then considers the effect of the project or plan on the integrity of the European site(s). The AA considers the structure and function of European sites, their conservation objectives and effects from the project/plan both alone and in-combination with other projects or plans. Where adverse effects on site integrity are identified, mitigation measures are proposed as appropriate to avoid negative effects. The AA process is documented within a Natura Impact Statement (NIS). This is provided to the competent authority to facilitate an informed assessment of the plan or project.
Assessment of alternative solutions	Following AA, including mitigation proposals, if adverse effects on site integrity remain, or uncertainty remains, an Assessment of Alternative Solutions is required. This process examines the alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European site. This assessment may be carried out concurrently with the AA to find the most appropriate solution. If no alternatives exist, or all alternatives would result in adverse effects on the integrity of a European site, then either the process moves to the next stage Imperative Reasons of Overriding Public Interest (IROPI) (IROPI) or the project is abandoned.
Imperative Reasons of Overriding	In the event that an Assessment of Alternative Solutions fails to identify any suitable alternatives, then for a project or plan to be progressed it must meet the requirements of IROPI. In this case the provisions of Article 6(3) cannot be met and therefore the provisions of

[9] Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission, 2002)
[10] Formerly known as the Department of the Environment and Local Government.- renamed to the Department of the Environment, Community and Local Government..
[11] AA of Plans and Projects in Ireland: Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010
[12] Practice Note (PN) 01 Appropriate Assessment Screening for Development Management (Office of the Planning Regulator, 2021)
[13] [ECJ case C-127/02]

Task	Outcome
Public Interest (IROPI)	Article 6(4) are used. If in the light of an assessment of IROPI it is deemed that the project or plan should proceed, thus compensatory measures are implemented to maintain the coherence of the European site network in the face of adverse effects to the integrity of the site(s). It should be noted that, for European sites that include "*priority*" habitats or species (defined in Annex I and II of the Habitats Directive) as part of their Qualifying Interests (QIs)[14] or Species of Conservation Interest (SCIs)[15]. In cases where there are priority natural habitats or species affected by the development, the IROPI justification should be provided and must relate to either: ▪ human health, public safety or beneficial consequences of primary importance to the environment, or; ▪ having due regard to any opinion from the European Commission, any other imperative reasons of overriding public interest.

2.2 Guidance Documents in Relation to Appropriate Assessment

The AA requirements of Article 6 of the Habitats Directive follow a sequential approach, which is outlined in the following guidance documents:

- Practice Note (PN) 01 Appropriate Assessment Screening for Development Management (Office of the Planning Regulator, 2021);
- The strict protection of animal species of Community interest under the Habitats Directive (EC,2021)
- Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010);
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission, 2001);
- Communication from the Commission on the Precautionary Principle (European Commission, 2000);
- Guidance Document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of: Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission (European Commission, 2007);
- Marine Natura Impacts Statements in Irish Special Areas of Conservation. A working Document (Department of Arts, Heritage and the Gaeltacht, 2012); and
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Commission, 2018).

The following circulars also outline the AA requirements:

- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPW 1/10 and PSSP 2/10 (Department of Environment, Heritage and Local Government, 2010);
- Appropriate Assessment of Land Use Plans. Circular Letter SEA 1/08 & NPWS 1/08 (Department of Environment, Heritage and Local Government, 2008a);
- Compliance Conditions in respect of Developments requiring (1) Environmental Impact Assessment (EIA); or (2) having potential impacts on Natura 2000 sites. Circular Letter PD 2/07 and NPWS 1/07;

[14] Annex I habitats and Annex II species (other than birds).
[15] SPAs are designated for the conservation of Special Conservation Interest (SCI) Annex I birds and other regularly occurring migratory birds and their habitats.

- Guidance on Compliance with Regulation 23 of the Habitats Directive. Circular Letter NPWS 2/07 (Department of Environment, Heritage and Local Government, 2007); and
- Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments. Circular L8/08 Department of Environment, Heritage and Local Government (2008b).

2.3 Geographical Scale of the LSMATS

The geographical area of the LSMATS has been defined by the Department of Housing, Local Government and Heritage to include the continuous built-up area of Limerick City and Suburbs (as defined by the Central Statistics Office [CSO]) and Shannon in Co. Clare. It also includes the following settlements:

- Annacotty;
- Castleconnell;
- Patrickswell;
- Clarina;
- Mungret in County Limerick;
- Sixmilebridge;
- Ardnacrusha;
- Clonlara;
- Cratloe;
- Ballycannan; and
- Bunratty in County Clare.

The population of the LSMA is over 132,400 (CSO, 2016) and covers 387km^2. Limerick City is the largest urban centre in Ireland's Mid-West region and the country's third largest city. Shannon is a significant employment centre with assets such as Shannon International Airport and Shannon Free-Zone international business park. Limerick City and Shannon are interdependent upon each other, with their complementary functions contributing to a combined strength which is a key economic driver for the Mid-West Region.

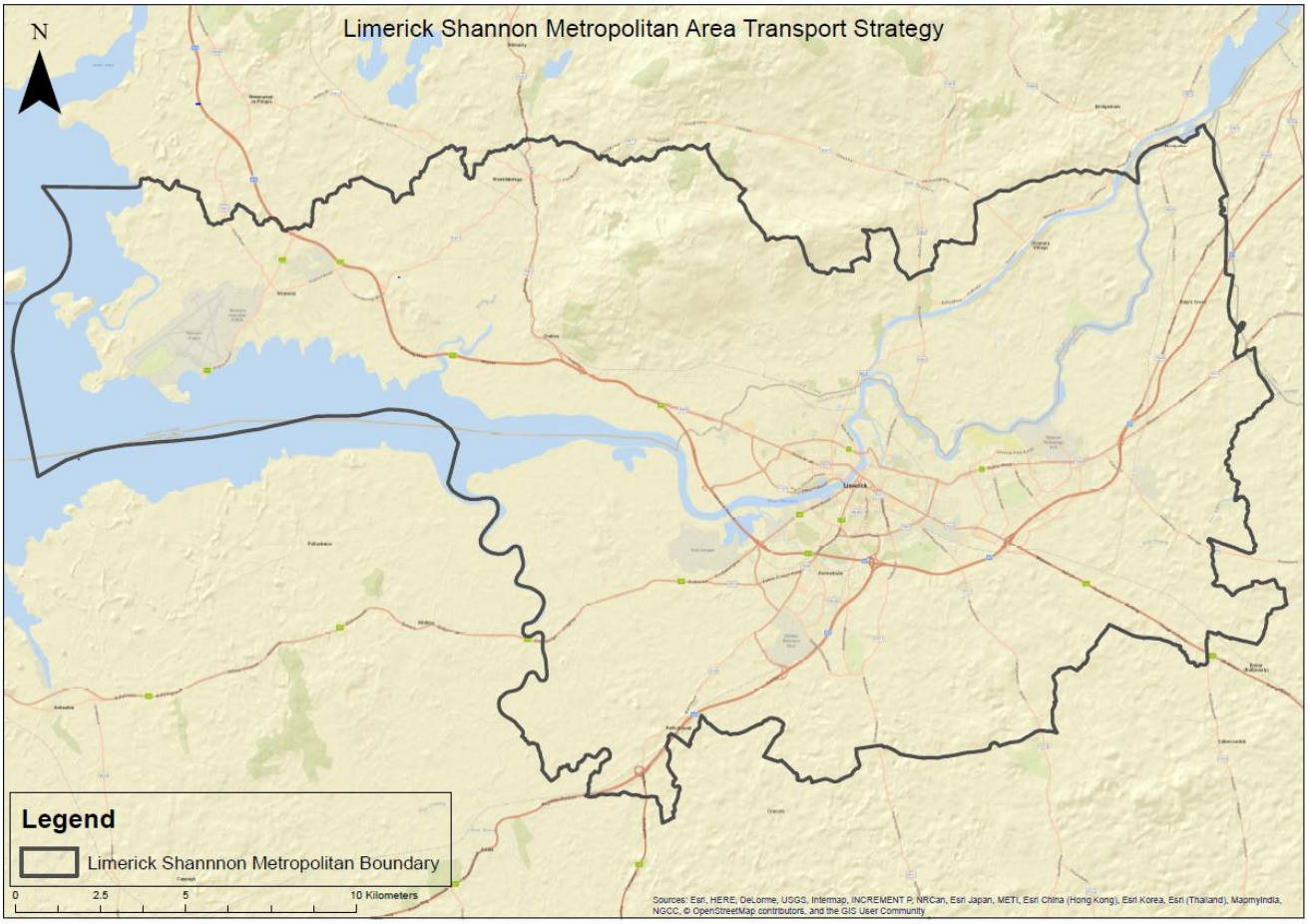

Figure 3.1 LSMA Boundary

Limerick City is home to two major third-level education institutions, University College Limerick (including Mary Immaculate College) which is located to the north-east of the City Centre and Limerick Institute of Technology (including Limerick School of Art and Design) which is located to the west of the City Centre. The City and its Metropolitan Area is served by commuter and intercity rail services; city, regional and expressway bus/ coach services; and Shannon International Airport is located approximately 20km to the north-west of the City Centre.

2.4 Identification of European Sites

European sites have been identified based on the guidance document produced by the Office of the Planning Regulator (OPR Practice Note PN01, 2021). The ZoI of a proposed project or plan is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework[16] and not by arbitrary distances (such as 15 km)[17] as used in previous guidance for AA.

[16] Practice Note (PN) 01 Appropriate Assessment Screening for Development Management (Office of the Planning Regulator, 2021).
[17] Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010).

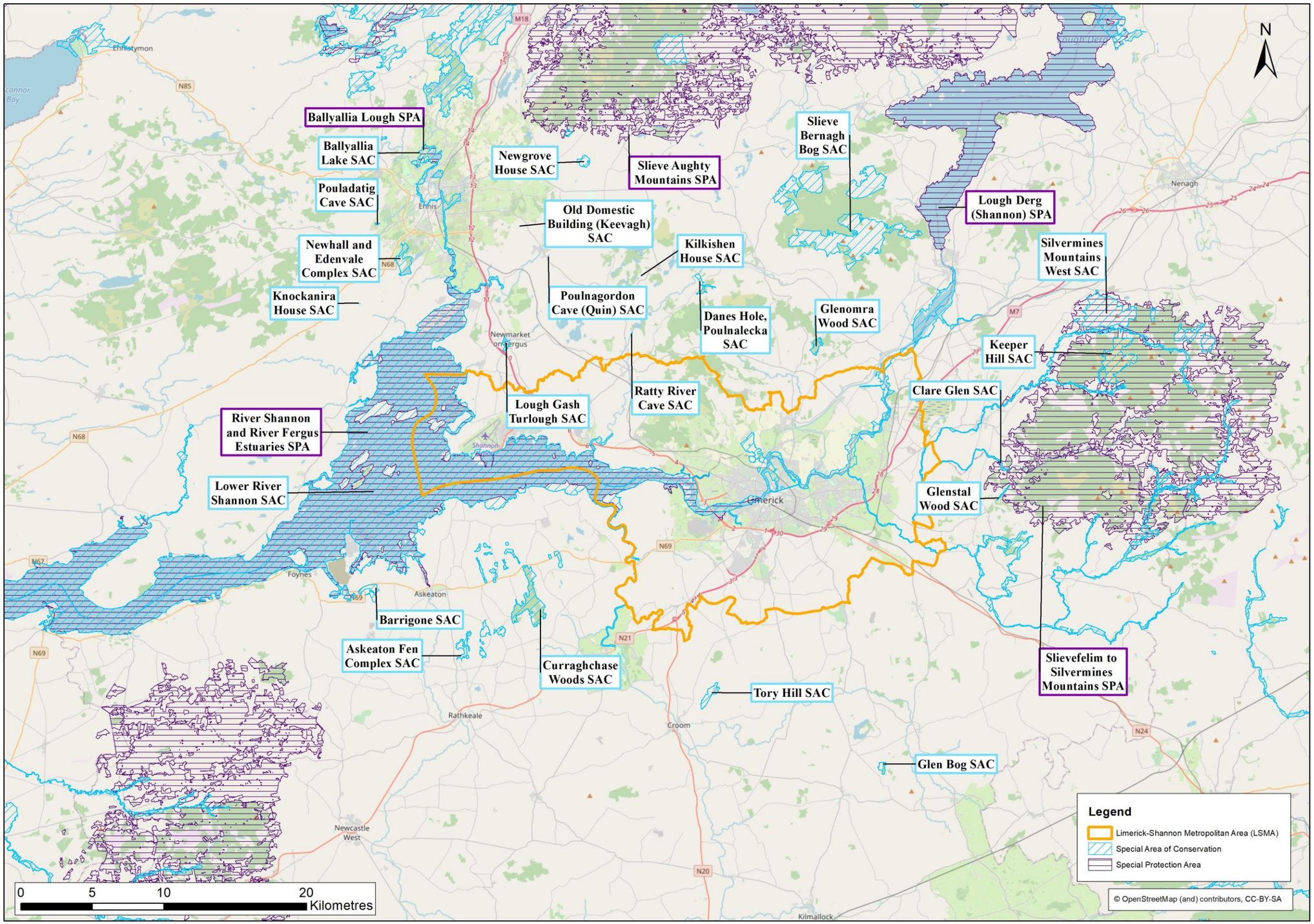

Figure 3.2 European Sites within the LSMATS Study Area Assessment of Site Integrity

2.4.1 Assessment of Site Integrity

If screening has determined there are LSE from the plan/project either alone or in-combination with other plans and projects on European site(s), the implications for European sites are further assessed in the context of the implications for their conservation objectives and the potential for Adverse Effects on Site Integrity (AESI) analysed. If it is determined on further analysis and data gathering that the plan/project will not adversely affect the integrity of the relevant European site(s) then the AA can conclude no AESI. However, if there are potential issues identified for the conservation objectives of the European site(s) and AESI are identified, mitigation measures are proposed as required to avoid compromising the integrity and Conservation Objectives of the European site(s). The AESI analysis is re-run and considers the structure and function of European sites, their Conservation Objectives and effects from the project/plan both alone and in-combination with other plans or projects. The information and data to inform the AA process is documented within an NIS. This is provided to the competent authority to facilitate their AA determination of the plan or project.

2.5 Conservation Objectives

The overall aim of the Habitats Directive (Article 2 and 3) is to develop a coherent ecological network of designated sites (SACs and SPAs) across Europe through the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States, and to maintain or restore the favourable conservation status of annexed habitats and species (QIs/SCIs) of Community interest for which an SAC or SPA has been designated. The Conservation Objectives (COs) for a European site are set out to ensure that the QIs/SCIs of that site are maintained or restored to a favourable conservation condition. Maintenance of a favourable conservation condition of habitats and species at a site level in turn contributes to maintaining or restoring favourable conservation status of habitats and species at a national level and, ultimately, at the Natura 2000 network level.

Detailed site synopses for each European site are available from the National Parks and Wildlife Service (NPWS) website[18]. In Ireland, "*generic*" COs have been prepared for all European sites, while "*site-specific*" COs have been prepared for a number of individual sites to take account of the specific QIs/SCIs of those sites. Both the generic and the site-specific COs define the requirements for favourable conservation condition for habitats and species at the site level[19]. Generic COs which have been developed by NPWS encompass the spirit of site-specific COs in the context of maintaining and restoring favourable conservation condition as follows (NPWS, 2016):

- For SACs: "*To maintain or restore the favourable conservation condition of the Annex I habitats and/or Annex II species for which the SAC has been selected*"; and
- For SPAs: "*To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for the SPA*".

Following from this, favourable conservation status (or condition, at a site level) of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing;
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and
- The conservation status of its typical species is "*favourable*".

The favourable conservation status (or condition, at a site level) of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats; and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

[18] https://www.npws.ie/protected-sites (accessed June 2018)
[19] http://www.irishstatutebook.ie/eli/2011/si/477/made/en/pdf (accessed May 2018).

A full list of the COs and QIs/SCIs that each European site is designated for, as well as the attributes and targets to maintain or restore the QIs/SCIs to a favourable conservation condition, are available on the NPWS website[20].

2.6 Favourable Conservation Status

Article 1(e) of the Habitats Directive defines the "*conservation status of a natural habitat*" as the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as "favourable" when all of the following criteria are met:

- Its natural range and areas it covers within that range are stable or increasing;
- The specific structure and functions that are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and,
- The conservation status of its typical species is favourable.

Article 1(i) defines the "*conservation status of a species*" as the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. It will be taken as "*favourable*" when all of the following criteria are met:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and,
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The overall aim of the Habitats Directive is to restore and maintain the favourable conservation status of habitats and species of Community interest, i.e. those listed in the Nature Directives and for which Natura 2000 sites are designated. EU and domestic legislation place a collective obligation on Member States to restore and maintain the favourable conservation status of these habitats and species. The Government and its agencies, as well as the local authorities, are responsible for the implementation and enforcement of measures to ensure the integrity of these sites.

2.7 Source - Pathway - Receptor

Consideration of LSE should be based on the Source-Pathway-Receptor risk assessment principle[21]. If there is no ecological pathway or functional link between the measures included within the LSMATS and the European site, there is no potential for impact and the specific measure(s) with the LSMATS can be screened out. Ecological pathways can be physical, for example, water or air in the case or airborne pollutants (e.g. ammonia from intensive agricultural installations). Functional pathways occur, for example, where the application site is used as foraging for a QI of a SAC or SPA. In this context, the role of the pathway is critical to the screening process. If there is no pathway, then the proposed development can be screened out with confidence. Similarly, if the QIs of the European site are not vulnerable (either directly or indirectly) to any impact resulting from the proposed development, then a LSE can also be ruled out through the screening process.

When assessing the ZoI the 'source-pathway-receptor' model is applied taking consideration of all potential impact pathways connecting elements of the proposed works to European sites in view of their conservation objectives.

[20] https://www.npws.ie/protected-sites/conservation-management-planning/conservation-objectives (Access April 2018)
[21] Practice Note (PN) 01 Appropriate Assessment Screening for Development Management (Office of the Planning Regulator, 2021).

The source-pathway-receptor conceptual model is a standard tool in environmental assessment. In order for an effect to occur, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism means that there is no likelihood for the effect to occur (e.g. no potential for LSE).

The ZoI is the area over which effects could occur to ecological features from the proposed works. The determination of a ZoI for a project should be identified on a case by case basis as there may be an effect on European sites that are at a distance from the works. For example, where there is a hydrological link between the development site and a European site.

2.8 Consideration of Likely Significant Effects in Combination

Under Article 6(3) of the Habitats Directive, an assessment of in-combination effects with other plans and projects is required. The assessment encompasses projects or plans that have been completed, approved but not completed or proposed (but not yet approved). The assessment used the best available information at the time of writing. Effects can include, but are not limited to, multiple effects of the same or similar type from a number of developments on the same receptor/resource.

In line with the relevant guidance (European Commission, 2000b), considering of in-combination effects was undertaken using a stepwise approach, as follows:

- Identify plans/projects that might act in combination;
- Identify the types of LSE that might occur;
- Define boundaries of the assessment;
- Identify pathways for effects; and
- Prediction and assessment.

The plans and policies considered as part of the AA Process is as follows;

- Limerick County Development Plan 2010-2016 (as extended);
- Limerick City Development Plan 2010-2016 (as extended);
- Clare County Development Plan 2017-2023: [incl. Shannon Municipal District – Volume 3 (b)];
- Adare Local Area Plan (LAP) 2015-2021;
- Rathkeale Local Area Plan 2012-2018 (As Extended);
- Askeaton Local Area Plan 2015-2021, and;
- Limerick 2030 – An Economic and Spatial Plan for Limerick (2013).

Given the strategic nature of the LSMATS, including information on spatial location, detailed design and timescales, it is not possible to identify and assess every potential for 'in combination' effects at the plan level. Project level assessments would be carried out at the planning stage which would consider effects alone and effects in combination with other relevant plans and projects.

3. Updated Outcome of Stage 1 Screening

The previous screening report produced by Jacobs in 2019 identified 23 SACs and five SPAs within the ZoI of the LSMATS with the potential for LSE. This screening exercise was based on a 15km buffer of the outer-boundary of the Limerick Shannon Metropolitan Area (the ZoI to which LSMATS relates). This section provides a screening matrix that updates the findings of the screening exercise undertaken in 2019 in light of updated guidance on the approach to screening for Appropriate Assessment (OPR Practice Note PN01, 2021) and amendments to the draft LSMATS.

Potential effect pathways from likely measures included in the LMATS to the sensitive receptors of each site were investigated and a determination made as to the potential effects of implementing LSMATS. These considerations were supported by a review of information on qualifying interests for the sites and site-specific vulnerabilities and sensitivities.

Where mitigation was required to discount LSE, such as habitat loss or large-scale disturbance, then a site was "*screened in*" and taken forward to Stage 2 (AA) in accordance with the decision reached by the Court of Justice of the European Union (CJEU) in People Over Wind and Sweetman v Coillte Teoranta (C-323/17).

3.1 Elements of the LSMATS with Potential to Give Rise to Likely Significant Effects

The purpose of this section is to '*screen*' the LSMATS to identify elements for which a LSE on a European site cannot be ruled out.

The mechanisms by which European sites could be affected would be via the measures within the LSMATS that direct the future development of transport infrastructure. Many of the policies and measures will have no effect on European sites, such as policies including demand management measures, policies related to parking and tolling and behavioural change measures.

Policies that reduce car use and increase public transport would have some environmental benefits. The suite of non-infrastructural supporting measures is also unlikely to result in significant effects. As measures within the LSMATS would be primarily public transport based or include measures to encourage other transport modes such as cycling, and are primarily based on improving existing infrastructure, it is also likely that much of the envisaged development will take place on previously developed land. Therefore, the operational phase of the LSMATS would likely be consistent with current land uses within the LSMA.

However, the LSMATS contains measures to progress infrastructure projects that require bridge crossings or the redevelopment of existing crossings of the River Shannon. Such measures would have the potential to cause LSE in relation to construction and transport related emissions to air, soil and water. As the detailed location of such measures is currently unknown, the potential for such development to affect European sites is considered.

In the absence of scheme-specific information, it is necessary to adopt a precautionary approach to AA screening at the plan level and assume an impact where there is uncertainty. Projects arising as a result of the LSMATS would be subject to project-level assessment where potential effects on European sites can be explored in detail.

3.1.1 Types of Potential Effects and Changes

The construction of new transport infrastructure can result in environmental changes which can have potential implications for European sites, either directly or indirectly. The specific sensitivities and susceptibility of QIs and functional supporting habitat for an individual European site determine the existence and strength of a potential impact pathway and therefore not all potential effects discussed will apply to all sites.

To establish which aspects of the LSMATS might lead to LSE the following activities listed in EC Guidance (2002) as having the potential to affect European sites were reviewed in light of the LSMATS provisions:

- Land take;

- Resource requirements;
- Emissions (Water or Air);
- Excavation requirements;
- Transportation requirements; and,
- Duration of construction, operation, decommissioning.

The guidance further articulates that the following effects could result:

- Loss/reduction of habitat area;
- Disturbance to key species;
- Habitat or species fragmentation; and
- Reduction in species density.

With reference to the LSMATS, the following effects were considered potentially pertinent to the assessment. Each is discussed further in Section 4.2. below:

- Habitat loss and/or fragmentation;
- Disturbance (noise, vibration, visual, lighting);
- Species mortality;
- Air Quality, and;
- Water Quality.

3.2 Characterising Potential Significant Effects

3.2.1 Habitat Loss and/or Fragmentation

Direct loss of habitat would only be likely to significantly affect a European site if any of the projects arising from the LSMATS relate to development (e.g. new roads, bus routes, cycle ways) within the boundary of a European site. However, new infrastructure projects or maintenance/upgrading of existing roads and other transport infrastructure have the potential to introduce barriers that may restrict the movement of species and cause fragmentation of habitats. Measures to extend infrastructure could also increase the risk of fragmentation of habitats.

3.2.2 Disturbance (Noise, Vibration, Visual, Lighting)

Development associated with the measures included within the LSMATS could result in disturbance of QI species. This disturbance may include, but not be limited to, noise, vibration, movement (of people and/or vehicles) and lighting.

Disturbance may lead to the abandonment of habitats or resting sites by QI species, which could include designated or supporting habitats outside of a European site[22]. Any potential sources of disturbance would be objectively quantified through an assessment of the effects of construction and operation works, traffic and human noise and disturbance.

[22] The need to consider use of habitat areas outside of an SPA by SCI bird species is set out in the Conservation Objectives Supporting Documents for a number of SPAs. For example, the River Shannon and River Fergus Esuaries SPA Conservation Objectives Supporting Documents Version 1 (NPWS, 2012b) states: "*Ex-situ factors: several of the listed waterbird species may at times use habitats situated within the immediate hinterland of the SPA or in areas outside of the SPA but ecologically connected to it. The reliance on these habitats will vary from species to species and from site to site*." Where SPAs do not have site specific conservation objectives, this is the approach taken.

3.2.3 Species mortality

Depending on the type and location of new infrastructure, species mortality could occur through interactions with plant and material during the construction of infrastructure, pollution of watercourses during construction or due to interactions with traffic on roads.

3.2.4 Air quality

The development of strategic roads and improved transport links could lead to an increase in vehicles within the LSMA. Vehicles, particularly those with diesel engines (IAQM, 2019) are a contributor to air pollution and can result in changes to local air quality through emission of nitrogen oxides (NO_x). Air pollution is most likely to affect European sites where habitats and watercourses are the qualifying features, but some qualifying animal species may also be affected, either directly or indirectly, by any deterioration in habitat.

3.2.5 Water quality

Transport activities can have an impact on hydrological conditions and water quality. Fuel, chemicals from cars, trucks and trains or from port and airport terminal operations can contaminate the environment, if managed incorrectly. New infrastructure projects could contribute towards pollutants, such as in surface water run off during construction. Surface run-off of poor-quality water from roads with elevated levels of pollutants, nutrients and salinity could affect Annex I habitats and supporting habitats for Annex II species. If sensitive habitats within European sites are situated downriver of a development area, an assessment of likely drainage and pollution sources from the development would need to be undertaken to determine the nature of hydrological effect pathways and the potential dispersal of sediments and pollutants. Water pollution impacts would only occur where there is hydrological connectivity between new transport infrastructure and European sites.

3.3 Identification of Potential Effects and Screening

There are 23 SACs and five SPAs within the ZoI to which LSMATS relates. These sites are presented in Figure 2.1. The screening matrix is provided in Table 4.2.

Table 4.1 examines, broadly, how measures anticipated in LSMATS might interact with European sites. Screening also considers the sensitivity of the sites potentially exposed to plan-directed effects. Higher sensitivity means there is a higher chance of LSE, no sensitivity discounts the possibility of effects.

Table 4.1 – Measures anticipated in LSMATS and how each might interact with European sites.

Type of Measure Included Within the LSMATS	Assessment of Potential Implications to European Sites
Public transport infrastructure and service proposals (rail, bus, public bikes and taxi).	Some activities within this broad category of measures have the potential to deliver a net positive impact on biodiversity. However, construction and operational impacts and increased visitor numbers and fragmentation could affect QIs of European sites.
Measures to facilitate and promote walking.	Measures to promote walking could include increased access to recreational areas. This could leave to increased disturbance to qualifying interests of European sites, in particular birds.
Measures to facilitate and promote cycling, including cycling infrastructure.	Measures to facilitate/promote the development of cycling infrastructure in close proximity to a European site that could have construction/operational related effects on qualifying interests.
Planning policies aimed at closer integration between land use development and sustainable transport.	Measures that connect land development to sustainable transport would result in reduced traffic emissions in areas of new development. Effects are only anticipated if such integration required new infrastructure (e.g. new cycle paths, bus lanes, footpath bridges) then

Type of Measure Included Within the LSMATS	Assessment of Potential Implications to European Sites
	European sites might experience effects during construction, or from increased visitor numbers.
Traffic management policies including potential changes to traffic circulation in Limerick City Centre.	The implications of increasing traffic volumes in new areas should be considered with reference to European sites, in particular SAC habitats with particular sensitivities to nitrogen deposition.
Demand management measures including policies related to parking and tolling.	No effects on European sites anticipated.
Behavioural change measures.	No effects on European sites anticipated.
Measures to promote integration between all modes.	No effects on European sites anticipated.
Policies related to the management of freight; and road infrastructure.	Changes to how freight and road infrastructures are managed could be beneficial to the environment by increasing efficiency of the network, thereby reducing congestion (and related emissions). However, the potential for increased traffic volumes in new areas should be considered, for example enhanced connectivity to ports and traffic related impacts along those routes. An increase in heavy duty vehicles (HDVs) may result in significant effects on European sites.

Table 4.2: Screening for Appropriate Assessment and In Combination Assessment

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
Special Areas of Conservation (SACs)				
Askeaton Fen Complex SAC	**Distance from LSMA:** 4.5km **QIs:** Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* Alkaline fens. (NPWS, 2018a).	• Habitat Loss • Habitat Disturbance • Habitat Fragmentation • Water Quality	Yes: Askeaton Fen Complex SAC is in proximity to the proposed N69/M21 Foynes to Limerick Road (including Adare Bypass) which is included as part of LSMATS Measure RS4: National Roads. Hydrological/Hydrogeological connectivity between the SAC and the proposed N69/M21 Foynes to Limerick Road (including Adare Bypass) has been identified due to its proximity to the of fen habitat in tandem with the underlying karstified limestone geology along the proposed road alignment, therefore potential for LSE on both QI fen habitats.	Yes: Work undertaken for the Clare County Development Plan and Limerick County Development Plan has also screened in this European site in for further assessment on significant effect on European site(s) integrity in relation to fen habitats.
Ballyallia Lake SAC	**Distance from LSMA:** 13km **QIs:** Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation (NPWS, 2017a).	• Water Quality • Air Quality	No: Although there are hydrological linkages to the LSMA via the River Fergus there are currently no measures/projects included within the LSMATS that would present a functional pathway for LSE in relation to water quality. Ballyallia Lake SAC is c.13km from the nearest measures /project included within the LSMATS. Based on the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA, 2011) there is no anticipated LSE with regards to air quality.	No:

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
Barrigone SAC	**Distance from LSMA:** 5km **QIs:** *Juniperus communis* formations on heaths or calcareous grasslands Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) Limestone pavements *Euphydryas aurinia* (Marsh Fritillary) (NPWS, 2019).	• Functional habitat loss • Habitat fragmentation • Disturbance	No: Despite the proximity of this SAC 0.5km to the measures included within the LSMATS (specifically the N69/M21 Foynes to Limerick Road (including Adare Bypass) there are no potential functional pathways likely to result in LSE. The Qualifying Interests of this site are not groundwater-dependent and there is no potential for direct or indirect LSE on this European site.	No:
Clare Glen SAC	**Distance from LSMA:** 4km **QIs:** Old sessile oak woods with Ilex and Blechnum in the British Isles *Trichomanes speciosum* (Killarney Fern (NPWS, 2018b).	• Loss of functional habitat • Habitat Disturbance • Habitat Fragmentation	No: The LSMATS will not have any LSE on this European site in view of its Conservation Objectives.	No:
Curraghchase Woods SAC	**Distance from LSMA:** 5km **QIs:** Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae).* *Taxus baccata* woods of the British Isles. *Vertigo moulinsiana* (Desmoulin's Whorl Snail).	• Disturbance • Habitat Fragmentation	Yes: Due to the movement of Lesser Horseshoe Bat across the landscape and the potential for proposed road developments included with the LSMATS to intersect flight paths and thus result in habitat fragmentation, there is LSE on this QI. No pathways for LSE on other Qis listed for this site (Desmoulin's Whorl Snail, Alluvial forests and *Taxus baccata* woods). LSMATS Measure RS4: National Roads is relevant to this site as it includes the commitment to construct the N69/M21 Foynes to Limerick Road (including Adare Bypass) and is the closest project to the SAC.	Yes: Screening assessment undertaken for the Clare County Development Plan and Limerick County Development Plan has screened in this European site for further assessment on significant effects on the European site(s) integrity in relation to lesser horseshoe bats.

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
	Rhinolophus hipposideros (Lesser Horseshoe Bat) (NPWS, 2018c)			
Danes Hole, Poulnalecka SAC	**Distance from LSMA:** 4.2km **QIs:** Caves not open to the public. Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles. *Rhinolophus hipposideros* (Lesser Horseshoe Bat).	• Disturbance • Habitat Fragmentation	No: No areas of either of the two Annex I habitats for which this site is selected are within the ZoI of measures/projects included with the LSMATS. Lesser Horseshoe Bats forage in woodlands within 2.5km of their roosts (Bontadina et al., 2002) and, based on this, the Bat Conservation Trust has established a Core Sustenance Zone of 2km for this species (BCT, 2016). The Measures and projects included with the LSMATS occur outside the core sustenance zone of lesser horseshoe bat based on a review of the conservation objectives for the SAC[23]. Therefore, implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives.	No:
Glen Bog SAC	**Distance from LSMA:**11km **QIs:** Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) (NPWS, 2017b).	• Water Quality • Air Quality	No: No hydrological links between the European site and the measures/projects included within the LSMATS have been identified that would present a functional pathway for LSE in relation to water quality. Glen Bog SAC is over 10km from the nearest measure/project included within the LSMATS. Based on the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA, 2011) there is no anticipated LSE with regards to air quality.	No:
Glenomra Wood SAC	**Distance from LSMA:** 0.85km **QIs:**	• Loss of functional habitat	No:	No:

[23] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000030.pdf

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
	Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles.		No areas of the Annex I habitat for which this site is selected is within the ZoI of measures/projects included with the LSMATS. Therefore, implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives.	
Glenstal Wood SAC	**Distance from LSMA:** 7.5km **QIs:** *Trichomanes speciosum* (Killarney Fern) (NPWS, 2018f).	• Water Quality	No: The Killarney Fern grows at sites that maintain damp conditions and high humidity mainly cliffs, caves or the floor of damp woodlands[24]. No hydrological or links between the European site and the measures /projects included within the LSMATS have been identified that would present a functional pathway for LSE in relation to water quality. It can be concluded beyond reasonable scientific doubt the implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives.	No:
Keeper Hill SAC	**Distance from LSMA:** 13.3km **QIs:** Northern Atlantic wet heaths with *Erica tetralix* Blanket bogs (* if active bog) (NPWS, 2017c)	• Water Quality • Air Quality	No: Keeper Hill SAC is upstream of the LSMA via the River Mulkear. There are currently no measures within the LSMATS that would present a functional pathway for LSE in relation to water quality. Keeper Hill SAC is c.17km from the nearest measure included within the LSMATS that could present a functional pathway for LSE. Based on the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA, 2011) there is no anticipated LSE with regards to air quality.	No:
Kilkishen House SAC	**Distance from LSMA:** 6.6km	• Disturbance • Habitat Fragmentation	No	No:

[24] https://www.npws.ie/sites/default/files/publications/pdf/IWM%2082%20Killarney%20Fern.pdf

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
	QIs: *Rhinolophus hipposideros* (Lesser Horseshoe Bat) (NPSW, 2018g)		Lesser Horseshoe Bats forage in woodlands within 2.5km of their roosts (Bontadina et al., 2002) and, based on this, the Bat Conservation Trust has established a Core Sustenance Zone of 2km for this species (BCT, 2016). The Measures and projects included with the LSMATS occur outside the core sustenance zone of lesser horseshoe bat based on a review of the conservation objectives for the SAC[25]. Therefore, implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives.	
Knockanira House SAC	**Distance from LSMA:** 8.7km **QIs:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) (NPSW, 2018h)	• Disturbance • Habitat Fragmentation	No: Lesser Horseshoe Bats forage in woodlands within 2.5 km of their roosts (Bontadina et al., 2002) and, based on this, the Bat Conservation Trust has established a Core Sustenance Zone of 2 km for this species (BCT, 2016). The Measures and projects within LSMATS lie outside the core sustenance zone of lesser horseshoe bat based on a review of the site's conservation objectives[26]. Therefore, implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives.	No:
Lough Gash Turlough SAC	**Distance from LSMA:** 2.6km QIs: Turloughs Rivers with muddy banks with *Chenopodion rubri* p.p. and Bidention p.p. vegetation (NPWS, 2017d)	• Water Quality	No: Although there are possible hydrological linkages to the LSMA via the River Fergus there are currently no measures/projects included within the LSMATS that would present a functional pathway for LSE in relation to water quality.	No:
Lower River Shannon SAC	**Distance from LSMA:** 0km (partially located with the LSMA)	• Habitat Loss • Disturbance • Habitat Fragmentation • Water Quality	Yes: A number of measures/projects included with the LSMATS include elements that directly affect the	Yes: Screening assessment undertaken for the Clare County Development Plan and Limerick County Development Plan screened

[25] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000030.pdf
[26] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002318.pdf

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
	QIs: *Margaritifera* (Freshwater Pearl Mussel) *Petromyzon marinus* (Sea Lamprey) *Lampetra planeri* (Brook Lamprey) *Lampetra fluviatilis* (River Lamprey) *Salmo salar* (Atlantic Salmon) *Tursiops truncatus* (Common Bottlenose Dolphin) *Lutra lutra* (Otter) Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation Sandbanks which are slightly covered by sea water all the time Estuaries Mudflats and sandflats not covered by seawater at low tide Coastal lagoons Large shallow inlets and bays Reefs Perennial vegetation of stony banks Vegetated sea cliffs of the Atlantic and Baltic coasts		Lower River Shannon SAC either via new crossings or redevelopment of existing crossings. Measures within the LSMATS that are relevant to the SAC include: **Measure f: Limerick City Strategic Pedestrian Projects** – This measure includes the proposals to realise the potential of the World Class Waterfront Project (including a new pedestrian/cycle bridge over the River Shannon is proposed as an element of this project, as well as bridges over the Abbey River). **Measure WK4: Local Amenity and Rural Routes** – This measure includes the proposals to progress the redevelopment of the Black Bridge in Limerick and crossings of the River Blackwater. **Measure CC2: Shannon River Crossing** – This measure includes the proposals to provide significantly enhanced cycle infrastructure across the River Shannon in Limerick City Centre, via the upgrading of existing bridges and the provision of a new crossing dedicated to pedestrians and cyclists. **Measure RS4: National Roads** – This measure includes the proposals to construct the N69/M21 Foynes to Limerick Road (including Adare Bypass) to TEN-T standard. Construction of this scheme would require a new crossing of the River Maigue – a tributary of the River Shannon. **Measure LU7: Thomond Weir** – This measure includes the proposals to redevelop the Thomond Weir to directly link St. Mary's Park westwards enhancing connectivity to the north west of Limerick City, including Technological University of the Shannon and Thomond Park. Construction of	in this European site for further assessment on significant effects on the European site(s) integrity.

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
	Salicornia and other annuals colonising mud and sand Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) Mediterranean salt meadows (*Juncetalia maritimi*) Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)(especially Knockalisheen Marsh NHA that forms part of the Lower Shannon SAC). Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae*) (NPWS, 2012a)		this scheme would require a new crossing of the River Shannon. A review of the conservation objectives for the SAC [27] identified that pathways LSE through either habitat loss/ fragmentation, species disturbance and/or hydrological linkages exist for the following QIs: • Lamprey species. • Atlantic Salmon. • Otter. • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*). • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae*). It is considered that there are no measures /projects included in the LSMATS that would present a functional pathway for LSE on coastal/marine habitat or species QI's. The above list of QI's aligns with those screened in for further assessment on site integrity within the Limerick County Development Plan and the Clare County Development Plan.	
Newgrove House SAC	**Distance from LSMA:** 14.5km **QIs:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) (NPWS, 2018i)	• Disturbance • Habitat Fragmentation	No: Lesser Horseshoe Bats forage in woodlands within 2.5km of their roosts (Bontadina et al., 2002)[28] and, based on this, the Bat Conservation Trust has established a Core Sustenance Zone of 2km for this species (BCT, 2016). The measures and projects within LSMATS lie outside the core sustenance zone of lesser horseshoe bat based on a review of	No:

[27] https://www.npws.ie/protected-sites/sac/002165
[28]

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
			the sites conservation objectives [29]. Therefore, implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives.	
Newhall and Edenvale Complex SAC	**Distance from LSMA:** 7.5km **QIs:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	• Disturbance • Habitat Fragmentation	No: Lesser Horseshoe Bats forage in woodlands within 2.5km of their roosts (Bontadina et al., 2002) and, based on this, the Bat Conservation Trust has established a Core Sustenance Zone of 2km for this species (BCT, 2016). The measures and projects within LSMATS lie outside the core sustenance zone of lesser horseshoe bat based on a review of the site's conservation objectives [30]. Therefore, implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives.	No:
Old Domestic Building (Keevagh) SAC	**Distance from LSMA:** 11.8km **QIs:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) (NPWS, 2018j)	• Disturbance • Habitat Fragmentation	No: Lesser Horseshoe Bats forage in woodlands within 2.5km of their roosts (Bontadina et al., 2002) and, based on this, the Bat Conservation Trust has established a Core Sustenance Zone of 2km for this species (BCT, 2016). The measures and projects within LSMATS lie outside the core sustenance zone of lesser horseshoe bat based on a review of the sites conservation objectives[31]. Therefore, implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives.	No:
Pouladatig Cave SAC	**Distance from LSMA:** 11.8km **QIs:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) Caves not open to the public (NPWS, 2018n)	• Disturbance • Habitat Fragmentation	No: Lesser Horseshoe Bats forage in woodlands within 2.5 km of their roosts (Bontadina et al., 2002) and, based on this, the Bat Conservation Trust has established a Core Sustenance Zone of 2 km for this species (BCT, 2016). The measures and projects included within the LSMATS lie outside the core sustenance zone of lesser horseshoe bat. Therefore, implementation of the LSMATS will not	No:

[29] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002157.pdf
[30] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002157.pdf
[31] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002157.pdf

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
			have any LSE on this European site in view of its Conservation Objectives[32].	
Poulnagordon Cave (Quin) SAC	**Distance from LSMA:** 6.4km **QIs:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) Caves not open to the public (NPWS, 2018o)	• Disturbance • Habitat Fragmentation	No: Lesser Horseshoe Bats forage in woodlands within 2.5km of their roosts (Bontadina et al., 2002) and, based on this, the Bat Conservation Trust has established a Core Sustenance Zone of 2km for this species (BCT, 2016). The measures and projects within the LSMATS lie outside the core sustenance zone of Lesser Horseshoe bat. Therefore, implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives[33].	No:
Ratty River Cave SAC	**Distance from LSMA:** 1.9km **QIs:** *Rhinolophus hipposideros* (Lesser Horseshoe Bat) Caves not open to the public (NPWS, 2018p)	• Disturbance • Habitat Fragmentation	No: No area of the Annex I habitat for which this site is selected is within the ZoI of measures/projects included with the LSMATS. Lesser Horseshoe Bats forage in woodlands within 2.5km of their roosts (Bontadina et al., 2002) and, based on this, the Bat Conservation Trust has established a Core Sustenance Zone of 2km for this species (BCT, 2016). The Measures and projects included with the LSMATS occur outside the core sustenance zone of lesser horseshoe bat based on a review of the conservation objectives for the SAC[34]. Therefore, implementation of the LSMATS will not have LSE on this European site in view of its Conservation Objectives.	No:
Silvermines Mountains West SAC	**Distance from LSMA:** 11.4km **QIs:**	• Water Quality • Air Quality	No: No hydrological or links between the European site and the measures/projects included within the LSMATS have been identified that would present a	No:

[32] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000037.pdf
[33] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000064.pdf
[34] https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000030.pdf

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
	Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Calaminarian grasslands of the *Violetalia calaminariae* (NPSW, 2017e)		functional pathway for LSE in relation to water quality. Silvermines Mountains West SAC is c.13km from the nearest measures/projects included within the LSMATS. Based on the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA, 2011) there is no anticipated LSE with regards to air quality.	
Slieve Bernagh Bog SAC	**Distance from LSMA:** 8.9km **QIs:** Northern Atlantic wet heaths with *Erica tetralix* European dry heaths Calaminarian grasslands of the *Violetalia calaminariae* (NPSW, 2017e)	• Water Quality • Air Quality	No: No hydrological linkages to the LSMA have been identified and there are currently no measures/projects included within the LSMATS that would present a functional pathway for LSE in relation to water quality. Slieve Bernagh Bog SAC is c.8.9km from the nearest measures /projects included within the LSMATS. Based on the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (NRA, 2011) there is no anticipated LSE with regards to air quality.	No:
Tory Hill SAC	**Distance from LSMA:** 3.9km **QIs:** Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* Alkaline fens (NPWS, 2018r)	• Loss of functional habitat • Habitat Fragmentation • Water Quality	Yes: Hydrological/Hydrogeological connectivity between the SAC and the proposed N/M20 Cork to Limerick Scheme has been identified due to its proximity to the of fen habitat in tandem with the underlying karstified limestone geology along the proposed road alignment, therefore potential for LSE on both QI fen habitats.	Yes: Screening assessment undertaken for the Clare County Development Plan and Limerick County Development Plan has screened in this European site for further assessment on significant effects on the European site(s) integrity.

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
Special Protection Areas (SPAs)				
Ballyallia Lough SPA	**Distance from LSMA:** 14.4km **QIs:** Wigeon (*Anas penelope*) Gadwall (*Anas strepera*) Teal (*Anas crecca*) Mallard (*Anas platyrhynchos*) Shoveler (*Anas clypeata*) Coot (*Fulica atra*) Black-tailed Godwit (*Limosa limosa*) Wetland and Waterbirds (NPWS, 2018s)	• Loss of functional habitat • Disturbance/habitat fragmentation	Yes: No pathways for direct effects on the QIs of the SPA have been identified. However, the need to consider use of habitat areas outside of an SPA by Species of Conservation Interest (SCI) bird species is set out in the Conservation Objectives Supporting Documents for the SPA. This states that: "*A single wetland site seldom meets all the ecological requirements of a diverse assemblage of waterbirds (Ma et al. 2010). Although some waterbird species will be faithful to specific habitats within the SPA, many will at times use habitats situated within the immediate hinterland of the site or in areas ecologically connected to the SPA. These areas may be used as alternative high tide roosts, as a foraging resource or, be simply flown over, either during migration or on a more frequent basis throughout the non-breeding season as waterbirds move between different areas used (e.g. commuting corridors between feeding and roosting areas)*". Therefore, there is potential for LSE for all QIs.	Yes: Screening assessment undertaken for the Clare County Development Plan has screened in this European site for further assessment on significant effects on the European site(s) integrity.
Lough Derg (Shannon) SPA	**Distance from LSMA:** 6.8km **QIs:** Cormorant (*Phalacrocorax carbo*) Tufted Duck (*Aythya fuligula*) Goldeneye (*Bucephala clangula*) Common Tern (*Sterna hirundo*) Wetland and Waterbirds (NPWS, 2018t)	• Loss of functional habitat. • Disturbance/habitat fragmentation • Water Quality/Hydrology • Air Quality •	Yes: No pathways for direct LSE on the QIs of the SPA have been identified. However, the need to consider use of habitat areas outside of an SPA by SCI bird species is set out in the Conservation Objectives Supporting Documents for the SPA. This states that: "*A single wetland site seldom meets all the ecological requirements of a diverse assemblage of waterbirds (Ma et al. 2010). Although some waterbird species will be faithful to specific habitats within the SPA, many will at times use habitats situated within the immediate hinterland of the site or in areas ecologically connected to the SPA. These areas may be used as alternative high tide roosts, as a foraging resource or, be simply flown over, either during migration or*	Yes: Screening assessment undertaken for the County Clare Development Plan has screened in this European site for further assessment on significant effects on the European site(s) integrity.

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
			on a more frequent basis throughout the non-breeding season as waterbirds move between different areas used (e.g. commuting corridors between feeding and roosting areas)". Therefore, there is LSE for all QIs.	
River Shannon and River Fergus Estuaries SPA	**Distance from LSMA:** 0km (partially located with the LSMA) **QIs:** Cormorant (*Phalacrocorax carbo*) Whooper Swan *(Cygnus cygnus*) Light-bellied Brent Goose (*Branta bernicla hrota*) Shelduck (*Tadorna tadorna*) Wigeon (*Anas penelope*) Teal (*Anas crecca*) Pintail (*Anas acuta*) Shoveler (*Anas clypeata*) Scaup (*Aythya marila*) Ringed Plover (*Charadrius hiaticula*) Golden Plover (*Pluvialis apricaria*) Grey Plover (*Pluvialis squatarola*) Lapwing (*Vanellus vanellus*) Knot (*Calidris canutus*) Dunlin (*Calidris alpina*) Black-tailed Godwit (Limosa limosa) Bar-tailed Godwit (Limosa lapponica) Curlew (*Numenius arquata*)	• Direct habitat loss • Loss of functional habitat • Disturbance • Habitat Fragmentation	Measures within the LSMATS include projects/proposals that would require new crossings or redevelopment of existing crossing over the River Shannon and its tributaries. Therefore, further assessment is required as part of the Appropriate Assessment to identify LSE on the integrity of the European Site. Relevant measures within the LSMATS include: **Measure WK2: Limerick City Strategic Pedestrian Projects** – This measure includes the proposals to realise the potential of the World Class Waterfront Project (including a new pedestrian/cycle bridge over the River Shannon is proposed as an element of this Project, as well as bridges over the Abbey River). **Measure WK4: Local Amenity and Rural Routes** - This measure includes the proposals to progress the redevelopment of the Black Bridge in Limerick and crossings of the River Blackwater. **Measure CC2: Shannon River Crossing** – This measure includes the proposals to provide significantly enhanced cycle infrastructure across the River Shannon in Limerick City Centre, via the upgrading of existing bridges and the provision of a new crossing dedicated to pedestrians and cyclists. **Measure RS4: National Roads** - This measure includes the proposals to construct the N69/M21 Foynes to Limerick Road (including Adare Bypass) to TEN-T standard. Construction of this scheme	Yes: Screening assessments undertaken for the County Clare Development Plan and Limerick County Development Plan has screened in this European site for further assessment on significant effects on the European site(s) integrity.

Site Name	Distance from LSMA Area and QIs	Potential pathways for effects on qualifying interests at Screening Stage	LSE of Measures included in LSMATS alone?	Effect in combination with other Plans/ Projects?
	Redshank (*Tringa totanus*) Greenshank (*Tringa nebularia*) Black-headed Gull (*Chroicocephalus ridibundus*) Wetland and Waterbirds (NPWS, 2012b)		would require a new crossing of the River Maigue – a tributary of the River Shannon. **Measure LU7: Thomond Weir** – This measure includes the proposals to redevelop the Thomond Weir to directly link St. Mary's Park westwards enhancing connectivity to the north west of Limerick City, including Technological University of the Shannon and Thomond Park. Construction of this scheme would require a new crossing of the River Shannon.	
Slieve Aughty Mountains SPA	**Distance from LSMA:** 15km **QIs:** Hen Harrier (*Circus cyaneus*) Merlin (*Falco columbarius*) (NPWS, 2018u)	• Disturbance • Habitat Fragmentation	No: Hen Harrier and Merlin are supported by upland habitat present within this SPA. Given the lack of this habitat type within the LSMA and the distance to measures /projects included within the LSMATS there is no feasible source /pathway for LSE.	No:
Slievefelim to Silvermines Mountains SPA	**Distance from LSMA:** 9.3km **QIs:** Hen Harrier (*Circus cyaneus*) Merlin (*Falco columbarius*) (NPWS, 2018v)	• Disturbance • Habitat Fragmentation	No: Hen Harrier and Merlin are supported by upland habitat present within this SPA. Given the lack of this habitat type within the LSMA and the distance to measures /projects included within the LSMATS there is no feasible source /pathway for LSE.	No:

3.4 Screening Assessment Summary

Based on the scope and scale of the measures included with the LSMATS the updated screening assessment has determined that seven European sites would be taken forward to the next stage of Appropriate Assessment to determine Adverse Effects on Site Integrity (AESI). These sites are:

- Askeaton Fen Complex SAC;
- Curraghchase Woods SAC;
- Lower River Shannon SAC;
- Tory Hill SAC;
- Ballyallia Lough SPA;
- Lough Derg (Shannon) SPA, and;
- River Shannon and River Fergus Estuaries SPA.

4. Stage 2 – Appropriate Assessment

4.1 Site Descriptions

The subsections that follow contain descriptions of each of the European sites identified within the likely zone of influence of the LSMATS. These descriptions are taken from the published Site Synopses.

4.1.1 Askeaton Fen Complex SAC

Askeaton Fen Complex consists of a number of small fen areas to the east and southeast of Askeaton in Co. Limerick. This area has a number of undulating hills, with a series of fens/reedbeds/loughs at the base of the hills, often in association with marl or peat deposits. The site is selected for the following habitats listed on Annex I of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]*; and
- Alkaline fens [7230].

The site-specific Conservation Objectives (Cos) relate to maintaining favourable conservation status for fen habitats located within the SAC. The COs and a detailed site synopsis for the SAC can be viewed here: https://www.npws.ie/protected-sites/sac/002279

4.1.2 Curraghchase Woods SAC

This site is situated approximately 7km east of Askeaton in Co. Limerick. The area is characterised by glacial drift deposits over Carboniferous limestone. The site consists largely of mixed woodland and a series of wetlands. The site is a SAC selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Alluvial Forests[91E0] *;
- Yew Woodlands* [91J0];
- Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016]; and,
- Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303].

The site-specific COs (which appear not to include Desmoulin's Whorl Snail) relate to restoring favourable conservation status for Annex I/II habitats and species for which the SAC is designated. COs for this SAC and can be viewed here: https://www.npws.ie/protected-sites/sac/000174

4.1.3 Lower River Shannon SAC

This very large site stretches *c.* 120km along the Shannon valley from Killaloe in Co. Clare to Loop Head/Kerry Head. It includes the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Rivers within the sub-catchment of the Mulkear include the Killeenagarriff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia.

This SAC is selected for the following habitats and species listed on Annexes I and II of the E.U. Habitats Directive (* = priority; numbers in brackets = Natura 2000 codes):

- Sandbanks which are slightly covered by sea water all the time [1110];
- Estuaries [1130];
- Mudflats and sandflats not covered by sea water at low tide [1140];

- Coastal lagoons*[1150];
- Large shallow inlets and bays [1160];
- Reefs [1170];
- Perennial vegetation of stony banks [1220];
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230];
- Salicornia and other annuals colonising mud and sand [1310];
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330];
- Mediterranean salt meadows (*Juncetalia maritimi*) [1410];
- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260];
- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410];
- Alluvial forests with *Alnus glutinosa* and Fraxinus excelsior (*Alno-Padion, Alnion incanae, Salicion albae*)* [91E0];
- Freshwater Pearl Mussel (*Margaritifera margaritifera*) [1029];
- Sea Lamprey (*Petromyzon marinus*) [1095];
- Brook Lamprey (*Lampetra planeri*) [1096];
- River Lamprey (*Lampetra fluviatilis*) [1099];
- Atlantic Salmon (*Salmo salar*) [1106];
- Bottle-nosed Dolphin (*Tursiops truncatus*) [1349], and;
- European Otter (*Lutra lutra*) [1355].

The site-specific COs relate to maintaining or restoring favourable conservation status for Annex I/II habitats and species for which the SAC is designated. Conservation objectives for this SAC and can be viewed here: https://www.npws.ie/protected-sites/sac/002165.

4.1.4 Tory Hill SAC

Tory Hill is an isolated, wooded limestone hill situated about 2 km north-east of Croom, Co. Limerick. It represents an important feature of the surrounding countryside and is a prime example of a limestone hill set amongst a region of volcanic intrusions of differing shape and geology. The SAC is selected for the following habitats and/or species listed on Annex I of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

- Orchid-rich Calcareous Grassland[6210]*;
- Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210]*; and;
- Alkaline Fens [7230].

The site-specific COs relate to maintaining or restoring favourable conservation status for Annex I habitats for which the SAC is designated. Conservation Objectives for this SAC and can be viewed here: https://www.npws.ie/protected-sites/sac/000439

4.1.5 Ballyallia Lough SPA

Ballyallia Lough is a relatively small lake located on the River Fergus, a little north of Ennis town, Co. Clare. It is a shallow system but can rise substantially during winter floods. The lake is used for a range of recreational activities.

QIs for the SPA are:

- Wigeon (*Anas penelope*) [A050];
- Gadwall (*Anas strepera*) [A051];
- Teal (*Anas crecca*) [A052];
- Mallard (*Anas platyrhynchos*) [A053];
- Shoveler (*Anas clypeata*) [A056];
- Coot (*Fulica atra*) [A125];
- Black-tailed Godwit (*Limosa limosa*) [A156], and;
- Wetland and Waterbirds [A999].

The generic COs and a detailed site synopsis can be found at the following location: https://www.npws.ie/protected-sites/spa/004041

4.1.6 Lough Derg (Shannon) SPA

Lough Derg lies within counties Tipperary, Galway and Clare and is the largest of the River Shannon Lakes, being some 40km long. QIs for the SPA are:

- Cormorant (*Phalacrocorax carbo*) [A017];
- Tufted Duck (*Aythya fuligula*) [A061];
- Goldeneye (*Bucephala clangula*) [A067];
- Common Tern (*Sterna hirundo*) [A193]; and
- Wetland and Waterbirds [A999].

The generic COs and a detailed site synopsis can be found at the following location: https://www.npws.ie/protected-sites/spa/004058

4.1.7 River Shannon and River Fergus Estuaries SPA

This site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry. The site has vast expanses of intertidal flats which contain a diverse macroinvertebrate community, which provides a rich food resource for wintering birds. Saltmarsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. The site is of special conservation interest for the following (numbers in square brackets = Natura 2000 codes):

- [A017] Cormorant (*Phalacrocorax carbo*);
- [A038] Whooper Swan (*Cygnus cygnus*);
- [A046] Light-bellied Brent Goose (*Branta bernicla hrota*);
- [A048] Shelduck (*Tadorna tadorna*);
- [A050] Wigeon (*Anas penelope*);
- [A052] Teal (*Anas crecca*);

- [A054] Pintail (*Anas acuta*);
- [A056] Shoveler (*Anas clypeata*);
- [A062] Scaup (*Aythya marila*);
- [A137] Ringed Plover (*Charadrius hiaticula*);
- [A140] Golden Plover (*Pluvialis apricaria*);
- [A141] Grey Plover (*Pluvialis squatarola*);
- [A142] Lapwing (*Vanellus vanellus*);
- [A143] Knot (*Calidris canutus*);
- [A149] Dunlin (*Calidris alpina*);
- [A156] Black-tailed Godwit (*Limosa limosa*);
- [A157] Bar-tailed Godwit (*Limosa lapponica*);
- [A160] Curlew (*Numenius arquata*);
- [A162] Redshank (*Tringa totanus*);
- [A164] Greenshank (*Tringa nebularia*);
- [A179] Black-headed Gull (*Chroicocephalus ridibundus*); and,
- [A999] Wetlands and Waterbirds.

The site-specific COs relate to maintaining favourable conservation status and a detailed site synopsis can be found at the following location: https://www.npws.ie/protected-sites/spa/004077

4.2 Potential Adverse Effects on Site Integrity

4.2.1 Potential Impacts on QIs/Site Integrity

Based on the outcome of the screening exercise presented in Table 4.2 and a review of existing project/plan level information available for other projects and plans [35,36,37,38,39], in light of the COs of the European sites within the likely ZoI, it was determined that there are LSE for the following QIs or SCIs in seven European Sites:

- Askeaton Fen Complex SAC:
  - Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*, and;
  - Alkaline fens.
- Curraghchase Woods SAC
  - *Rhinolophus hipposideros* (Lesser Horseshoe Bat).
- Tory Hill SAC
  - Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*, and;
  - Alkaline fens.
- Lower River Shannon SAC:

[35] Clare County Development Plan 2017–2023.
[36] Variation no. 3 to the Clare County Development Plan 2011-2017 Natura Impact Report To incorporate the preferred route of the Limerick Northern Distributor Road.
[37] Limerick County Development Plan 2010-2016 (including variations).
[38] Foynes to Limerick Road (including Adare Bypass) Natura Impact Statement.
[39] N/M20 Cork to Limerick Scheme Interactive Mapping Tool - https://experience.arcgis.com/template/150636d811e34939979fc933bd3ac091

- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*);
- Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- Floating River Vegetation - Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation;
- River Lamprey, Sea Lamprey and Brook Lamprey;
- Atlantic Salmon, and
- European Otter.

- Ballyallia Lough SPA (All SCI);
- Lough Derg (Shannon) SPA (All SCI), and
- River Shannon and River Fergus Estuaries SPA (All SCI).

The NPWS has published detailed site-specific COs for most of the European sites screened in for further assessment. Generic COs have been published for Ballyallia Lough SPA and Lough Derg SPA that state: "*To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA".*

These have been reviewed in order to assess the potential for AESI on the COs, as defined by the Attributes and Target used to define them in Tables 5.1 to 5.7.

Table 5.1: Review of Conservation Objectives as Defined by the Attributes and Targets for Askeaton Fen Complex SAC

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measure: RS4: National Roads: includes the delivery of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* **CO**: To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** in Askeaton Fen Complex SAC, which is defined by the following list of attributes and targets'	Habitat area	Area stable or increasing, subject to natural processes	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology may cause either excessive drying out or inundation that would alter the habitat area of Calcareous fen. Changes in species composition specific to Calcareous fen may also occur.
	Habitat distribution	No decline, subject to natural processes	**Yes** The potential for hydrological change in the SAC due to proposed road development included in the LSMATS may cause AESI due to increased or decreased water levels affecting water dependent Calcareous fen habitat. Overall, this may result in a reduction of fen habitat distribution.
	Ecosystem function: peat formation	Maintain active peat formation, where appropriate	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation. Excessive drying out of the SAC would inhibit the formation of peat.
	Ecosystem function: hydrology – groundwater levels.	Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation that would alter the overall habitat area and ecosystem function of Calcareous fen. Changes in species composition specific to Calcareous fen may also occur.

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measure: RS4: National Roads: includes the delivery of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
	Ecosystem function: hydrology - surface water flow	Maintain, or where necessary restore, as close as possible to natural or semi-natural drainage conditions	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation that would alter the overall habitat area and ecosystem function of Calcareous fen. Changes in species composition specific to Calcareous fen may also occur.
	Ecosystem function: water quality	Maintain appropriate water quality, particularly nutrient levels, to support the natural structure and functioning of the habitat.	**Yes** AESI would result if a change in hydrology /drainage within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in the hydrology and drainage regime could result in increased runoff which may alter nutrient levels within the SAC. This could alter species composition and cover of Calcareous fen habitat.
	Vegetation structure: typical species	Maintain vegetation cover of typical species including brown mosses and vascular plants	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition specific to Calcareous fen.
	Vegetation composition: native negative indicator species	Cover of native negative indicator species at insignificant levels	No Potential pathways for AESI in relation increased cover of native species not characteristic of the habitat type are not considered to exist as a result of the implementation of the LSMATS.
	Vegetation composition: non-native species	Cover of non-native species less than 1%	No Potential pathways for AESI in relation spread of non-native species are not considered to exist as a result of the implementation of the LSMATS.

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measure: RS4: National Roads: includes the delivery of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
	Vegetation composition: trees and shrubs	Cover of scattered native trees and shrubs less than 10%	No Potential pathways for AESI in relation increased tree and shrub cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Physical structure: disturbed bare ground	Cover of disturbed bare ground not more than 10%. Where tufa is present, disturbed bare ground not more than 1%	No Potential pathways for AESI in relation increased bare ground cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Indicators of local distinctiveness	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology may cause either excessive drying out or inundation that would alter the habitat cover of Calcareous fen. In addition, changes in species composition specific to Calcareous fen may also occur. Combined distribution or population sizes of rare, threatened or scarce species associated with Calcareous fen.
Alkaline Fen **CO:** To maintain the favourable conservation condition of Alkaline fens in Askeaton Fen Complex SAC	Habitat area	Area stable or increasing, subject to natural processes	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology may cause either excessive drying out or inundation that would alter the habitat area of Alkaline fen. Changes in species composition specific to Alkaline fen may also occur.
	Habitat distribution	No decline, subject to natural processes	**Yes**

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measure: RS4: National Roads: includes the delivery of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
			The potential for hydrological change in the SAC due to proposed road development included in the LSMATS may cause AESI due to increased or decreased water levels affecting water dependant Alkaline fen habitat. Overall, this may result in a reduction of Alkaline fen habitat distribution.
	Ecosystem function: soil nutrients	Maintain soil pH and nutrient status within natural ranges	**Yes** AESI would result if a change in hydrology /drainage within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in the hydrology and drainage regime could result in increased runoff which may alter nutrient levels within the SAC. This could alter species composition and cover of Alkaline fen habitat.
	Ecosystem function: peat formation	Maintain active peat formation, where appropriate	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation. Excessive drying out of the SAC would inhibit the formation of peat.
	Ecosystem function: hydrology - groundwater levels	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation that would alter the overall habitat area and ecosystem function of Alkaline fen. Changes in species composition specific to Alkaline fen may also occur.
	Ecosystem function: hydrology - surface water flow	Maintain, or where necessary restore, as close as possible to natural or semi-natural drainage conditions	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measure: RS4: National Roads: includes the delivery of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
			excessive drying out or inundation that would alter the overall habitat area and ecosystem function of Alklaine fen. Changes in species composition specific to Aklaine fen may also occur.
	Ecosystem function: water quality	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	**Yes** AESI would result if a change in hydrology /drainage within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in the hydrology and drainage regime could result in increased runoff which may alter nutrient levels within the SAC. This could alter species composition and cover of Alkaline fen habitat.
	Community diversity	Maintain variety of vegetation communities, subject to natural processes	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition specific to Alkaline fen.
	Vegetation composition: brown mosses	Maintain adequate cover of typical brown moss species	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition specific to Alkaline fen.
	Vegetation composition: typical vascular plants	Maintain adequate cover of typical vascular plant species	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition specific to Alkaline fen.

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measure: RS4: National Roads: includes the delivery of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
	Vegetation composition: negative native indicator species	Collective cover of native negative indicator species on exposed pavement not more than 1%	No Potential pathways for AESI in relation to spread of negative native indicator species are not considered to exist as a result of the implementation of the LSMATS.
	Vegetation composition: non-native species	Cover of non-native species less than 1%.	No Potential pathways for AESI in relation spread of non-native species are not considered to exist as a result of the implementation of the LSMATS.
	Vegetation composition: native trees and shrubs	Cover of scattered native trees and shrubs less than 10%	No Potential pathways for AESI in relation increased tree and shrub cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Vegetation composition: soft rush and common reed cover	Total cover of soft rush (*Juncus effusus*) and common reed (*Phragmites australis*) less than 10%	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition/cover of reed and rushes.
	Vegetation structure: litter	Total cover of litter not more than 25%	No Potential pathways for AESI in relation increased litter cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Physical structure: disturbed bare ground	Cover of disturbed bare ground not more than 10%	No

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measure: RS4: National Roads: includes the delivery of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
			Potential pathways for AESI in relation increased bare ground cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Physical structure: tufa formations	Disturbed proportion of vegetation cover where tufa is present is less than 1%	No Potential pathways for AESI in relation tufa formation within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Indicators of local distinctiveness	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes.	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology may cause either excessive drying out or inundation that would alter the habitat cover of Alkaline fen. In addition, changes in species composition specific to Calcareous fen may also occur. Combined distribution or population sizes of rare, threatened or scarce species associated with Alkaline.

Table 5.2: Review of Conservation Objectives as Defined by the Attributes and Targets for Curraghchase Woods SAC

QIs and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measure: RS4: National Roads - construction of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
Lesser Horseshoe Bat ***Rhinolophus hipposideros*** **CO:** To restore the favourable conservation condition of Lesser Horseshoe Bat in Curraghchase Woods SAC	Population per roost	Minimum number of 100 bats for the summer roost (linked roost ids 659 and 852 in NPWS database); minimum number of 81 bats for the winter roost (roost id. 659)	**Yes** AESI may occur as a result of the implementation of proposed road developments included in the LSMATS. Interference with flight paths between Curraghchase Woods and other Lesser Horseshoe Bat roosts and the likely use of the surrounding areas for roosting and feeding by these bats could result in the reduction of numbers of roosting bats.
	Winter roosts	No decline	No No winter roost would be affected therefore potential pathways for AESI are not considered to exist as a result of the implementation of the LSMATS.
	Summer roosts	No decline	No No summer roosts would be affected therefore potential pathways for AESI are not considered to exist as a result of the implementation of the LSMATS.
	Number of auxiliary roosts	No decline	**Yes** AESI may occur as a result of the implementation of proposed road developments included in the LSMATS. Auxiliary roost may occur beyond the boundary of the SAC. Loss of these roosts may occur due to vegetation clearance as a result of proposed road developments included in the LSMATS (specifically, N69/M21 Foynes to Limerick Road (including Adare Bypass).
	Extent of potential foraging habitat	No significant decline within 2.5km of qualifying roosts.	**Yes**

QIs and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measure: RS4: National Roads - construction of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
			AESI may occur as a result of the implementation of proposed road developments included in the LSMATS. Site clearance during the construction phase of any new scheme would reduce the extent of suitable foraging are for Lesser Horseshoe bat.
	Linear features	No significant loss, within 2.5km of qualifying roosts.	**Yes** AESI may occur as a result of the implementation of proposed road developments included in the LSMATS. Interference/severance of flight paths along linear features within 2.5km of qualifying roosts may result during the construction phase of the N69/M21 Foynes to Limerick Road (including Adare Bypass).
	Light pollution	No significant increase in artificial light intensity adjacent to named roosts or along commuting routes within 2.5km of those roosts.	**Yes** AESI may occur as a result of the implementation of proposed road developments included in the LSMATS due to increased lighting of commuting routes within 2.5km of qualifying roost.

Table 5.3: Review of Conservation Objectives as Defined by the Attributes and Targets for Tory Hill SAC

QIs and COs	Attribute	Target	Potential AESI Relevant Measure: RS4: National Roads – delivery of the N/M20 Cork to Limerick Scheme.
Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* CO: To maintain the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae** in Tory Hill SAC	Habitat area	Area stable or increasing, subject to natural processes	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology may cause either excessive drying out or inundation that would alter the habitat area of Calcareous fen. Changes in species composition specific to Calcareous fen may also occur.
	Habitat distribution	No decline, subject to natural processes	**Yes** The potential for hydrological change in the SAC due to proposed road development included in the LSMATS may cause AESI due to increased or decreased water levels affecting water dependant Calcareous fen habitat. Overall, this may result in a reduction of fen habitat distribution.
	Ecosystem function: peat formation	Maintain active peat formation, where appropriate	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation. Excessive drying out of the SAC would inhibit the formation of peat.
	Ecosystem function: hydrology – groundwater levels	Maintain appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation that would alter the overall habitat area of Calcareous fen. Changes in species composition specific to Calcareous fen may also occur.

QIs and COs	Attribute	Target	Potential AESI Relevant Measure: RS4: National Roads – delivery of the N/M20 Cork to Limerick Scheme.
	Ecosystem function: hydrology - surface water flow	Maintain, or where necessary restore, as close as possible to natural or semi-natural drainage conditions	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation that would alter the overall habitat area and ecosystem function of Calcareous fen. Changes in species composition specific to Calcareous fen may also occur.
	Ecosystem function: water quality	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat.	**Yes** AESI would result if a change in hydrology /drainage within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in the hydrology and drainage regime could result in increased runoff which may alter nutrient levels within the SAC. This could alter species composition and cover of Calcareous fen habitat.
	Vegetation structure: typical species	Maintain vegetation cover of typical species including brown mosses and vascular plants	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition specific to Calcareous fen.
	Vegetation composition: native negative indicator species	Cover of native negative indicator species at insignificant levels	No Potential pathways for AESI in relation increased cover of native species not characteristic of the habitat type are not considered to exist as a result of the implementation of the LSMATS.
	Vegetation composition: non-native species	Cover of non-native species less than 1%	No Potential pathways for AESI in relation spread of non-native species are not considered to exist as a result of the implementation of the LSMATS.

QIs and COs	Attribute	Target	Potential AESI Relevant Measure: RS4: National Roads – delivery of the N/M20 Cork to Limerick Scheme.
	Vegetation composition: trees and shrubs	Cover of scattered native trees and shrubs less than 10%	No Potential pathways for AESI in relation increased tree cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Physical structure: disturbed bare ground	Cover of disturbed bare ground not more than 10%. Where tufa is present, disturbed bare ground not more than 1%	No Potential pathways for AESI in relation increased bare ground cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Indicators of local distinctiveness	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology may cause either excessive drying out or inundation that would alter the habitat cover of Calcareous fen. In addition, changes in species composition specific to Calcareous fen may also occur. Combined distribution or population sizes of rare, threatened or scarce species associated with Calcareous fen.
Alkaline Fen	Habitat area	Area stable or increasing, subject to natural processes	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology may cause either excessive drying out or inundation that would alter the habitat area of Alkaline fen. Changes in species composition specific to Alkaline fen may also occur.
	Habitat distribution	No decline, subject to natural processes	**Yes** The potential for hydrological change in the SAC due to proposed road development included in the LSMATS may cause AESI due to increased or decreased water levels affecting water dependant Alkaline fen habitat. Overall, this may result in a reduction of Alkaline fen habitat distribution.

QIs and COs	Attribute	Target	Potential AESI Relevant Measure: RS4: National Roads – delivery of the N/M20 Cork to Limerick Scheme.
	Ecosystem function: soil nutrients	Maintain soil pH and nutrient status within natural ranges	**Yes** AESI would result if a change in hydrology /drainage within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in the hydrology and drainage regime could result in increased runoff which may alter nutrient levels within the SAC. This could alter species composition and cover of Alkaline fen habitat.
	Ecosystem function: peat formation	Maintain active peat formation, where appropriate	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation. Excessive drying out of the SAC would inhibit the formation of peat.
	Ecosystem function: hydrology - groundwater levels	Maintain, or where necessary restore, appropriate natural hydrological regimes necessary to support the natural structure and functioning of the habitat	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation that would alter the overall habitat area and ecosystem function of Alkaline fen. Changes in species composition specific to Aklaine fen may also occur.
	Ecosystem function: hydrology - surface water flow	Maintain, or where necessary restore, as close as possible to natural or semi-natural drainage conditions	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Essentially changes in hydrology regime may cause either excessive drying out or inundation that would alter the overall habitat area and ecosystem function of Alklaine fen. Changes in species composition specific to Alkaline fen may also occur.
	Ecosystem function: water quality	Maintain appropriate water quality, particularly pH and nutrient levels, to support the	**Yes**

QIs and COs	Attribute	Target	Potential AESI Relevant Measure: RS4: National Roads – delivery of the N/M20 Cork to Limerick Scheme.
		natural structure and functioning of the habitat	AESI would result if a change in hydrology /drainage within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in the hydrology and drainage regime could result in increased runoff which may alter nutrient levels within the SAC. This could alter species composition and cover of Alkaline fen habitat.
	Community diversity	Maintain variety of vegetation communities, subject to natural processes	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition specific to Alkaline fen.
	Vegetation composition: brown mosses	Maintain adequate cover of typical brown moss species	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition specific to Alkaline fen.
	Vegetation composition: typical vascular plants	Maintain adequate cover of typical vascular plant species	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition specific to Alkaline fen.
	Vegetation composition: negative native indicator species	Collective cover of native negative indicator species on exposed pavement not more than 1%	No Potential pathways for AESI in relation to spread of negative native indicator species are not considered to exist as a result of the implementation of the LSMATS.
	Vegetation composition: non-native species	Cover of non-native species less than 1%.	No

QIs and COs	Attribute	Target	Potential AESI Relevant Measure: RS4: National Roads – delivery of the N/M20 Cork to Limerick Scheme.
			Potential pathways for AESI in relation spread of non-native species are not considered to exist as a result of the implementation of the LSMATS.
	Vegetation composition: native trees and shrubs	Cover of scattered native trees and shrubs less than 10%	No Potential pathways for AESI in relation increased tree and shrub cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Vegetation composition: soft rush and common reed cover	Total cover of soft rush (*Juncus effusus*) and common reed (*Phragmites australis*) less than 10%	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology regime may cause either excessive drying out or inundation that would alter species composition/cover of reed and rushes.
	Vegetation structure: litter	Total cover of litter not more than 25%	No Potential pathways for AESI in relation increased litter cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Physical structure: disturbed bare ground	Cover of disturbed bare ground not more than 10%	No Potential pathways for AESI in relation increased bare ground cover within the SAC are not considered to exist as a result of the implementation of the LSMATS.
	Physical structure: tufa formations	Disturbed proportion of vegetation cover where tufa is present is less than 1%	No Potential pathways for AESI in relation tufa formation within the SAC are not considered to exist as a result of the implementation of the LSMATS.

QIs and COs	Attribute	Target	Potential AESI Relevant Measure: RS4: National Roads – delivery of the N/M20 Cork to Limerick Scheme.
	Indicators of local distinctiveness	No decline in distribution or population sizes of rare, threatened or scarce species associated with the habitat; maintain features of local distinctiveness, subject to natural processes.	**Yes** AESI would result if a change in hydrology within the SAC occurs the due to proposed road developments included in the LSMATS. Changes in hydrology may cause either excessive drying out or inundation that would alter the habitat cover of Calcareous fen. In addition, changes in species composition specific to Calcareous fen may also occur. Combined distribution or population sizes of rare, threatened or scarce species associated with Alkaline fen.

Table 5.4: Review of Conservation Objectives as Defined by the Attributes and Targets for Lower River Shannon SAC

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the Lower River Shannon SAC **CO:** To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the Lower River Shannon SAC	Habitat area	Stable or increasing, subject to natural processes	No There will be no land-take in any area of this habitat type.
	Habitat distribution	No decline, subject to natural processes	No There will be no alteration to the distribution of this habitat type arising from the LSMATS.
	Hydrological regime: river flow	Maintain appropriate hydrological regimes	No The hydrological regimes in the River Shannon, River Mulkear or any associated water bodies will not be altered by the proposed LSMATS in such a way that it would affect the favourable conservation status of *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the lower River Shannon. All watercourse crossings will be designed and constructed in accordance with NRA (2006) and IFI (2016).
	Hydrological regime: tidal influence	Maintain natural tidal regime	No There will be no development within any area under tidal influence arising from the proposed variation.
	Hydrological regime: freshwater seepages	Maintain appropriate freshwater seepage regimes	No Freshwater seepages will not be altered as a result of the proposed variation.

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
	Substratum composition: particle size range	Substratum dominated by particle size ranges appropriate to habitat sub-type	**Yes** Sedimentation may occur during construction, potentially altering the substratum character.
	Water quality: nutrients	Nutrient concentration sufficiently low to prevent changes in species composition or habitat condition	**Yes** Potential for runoff from construction or the operation phase of LSMATS projects crossing the River Shannon may increase nutrient concentrations and adversely affect species composition or habitat condition of the QI.
	Vegetation composition: typical species	Typical species of habitat sub-type present and in good condition	**Yes** Species composition may be affected by impacts on water quality.
	Floodplain connectivity	Maintain area of active floodplain at and upstream of habitat	**Yes** The total area of the floodplain may be reduced due to land-take therein.
	Riparian habitat	Maintain area of riparian woodland at and upstream of bryophyte-rich sub-type	**Yes** Some riparian woodland may be permanently lost at the proposed watercourse crossings.
Molinia meadows on calcareous, peaty or clayey silt-laden soils (Molinion caeruleae) **CO:** To maintain the favourable conservation	Habitat area	Stable or increasing, subject to natural processes	**Yes** The potential for hydrological impact, reducing habitat area, cannot be excluded.
	Habitat distribution	No decline, subject to natural processes	**Yes** The potential for hydrological impact, altering distribution, cannot be excluded.

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
condition of Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) in the Lower River Shannon SAC	Vegetation structure: broadleaf herb: grass ratio	Broadleaf herb component of vegetation between 40 and 90%	**Yes** Hydrological impacts may alter vegetation structure.
	Vegetation structure: sward height	30-70% of sward 10-80 cm high	**Yes** Hydrological impacts may alter vegetation structure.
	Vegetation composition: typical species	≥ 7 positive indicator species present, including 1 "high quality" species	**Yes** Potential hydrological impact may alter vegetation composition.
	Vegetation composition: notable species	No decline, subject to natural processes	**Yes** Potential hydrological impact may alter vegetation composition.
	Vegetation composition: negative indicator species	Collectively ≤ 20%, with any single species < 10%; non-native invasive species absent or under control	**Yes** The spread of non-native species within this habitat type cannot be ruled out.
	Vegetation composition: negative indicator moss species	Bog mosses (*Sphagnum* spp.) ≤ 10% cover; hair mosses (*Polytrichum* spp.) ≤ 25% cover	**Yes** Potential hydrological impact may alter vegetation composition.
	Vegetation structure: woody species and Bracken (*Pteridium aquilinum*)	Cover of woody species and bracken ≤ 5% cover	**Yes** Hydrological impacts may alter vegetation structure.
	Physical structure: bare ground	≤ 10% bare ground	No

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
			The cover of bare ground will not increase.
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) **CO:** To restore the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) in the Lower River Shannon SAC	Habitat area	Area stable or increasing, subject to natural processes	No There will be no anticipated land-take in any area of this habitat type.
	Habitat distribution	No decline	No There will be no anticipated land-take in any area of this habitat type.
	Woodland size	Stable or increasing; where possible, "large" woods ≥ 25 ha and "small" woods ≥ 3 ha	No There will be no anticipated land-take in any area of this habitat type.
	Woodland structure: cover and height	Diverse structure with a relatively closed canopy containing mature trees; subcanopy layer with semi-mature trees and shrubs; well-developed herb layer	No There will be no anticipated land-take in any area of this habitat type.
	Woodland structure: community diversity and extent	Maintain diversity and extent of community types	No There will be no anticipated land-take in any area of this habitat type.
	Woodland structure: natural regeneration	Seedlings, saplings and pole age-classes in adequate proportions to ensure canopy survival	No There will be no anticipated land-take in any area of this habitat type.
	Hydrological regime: flooding depth/height of water table	Appropriate hydrological regime for maintenance of alluvial vegetation	No

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
			The hydrological regimes in the River Shannon or any associated water bodies will not be altered by the LSMATS.
	Woodland structure: dead wood	≥ 30 m^3/ha fallen timber >10 cm diameter; 30 snags/ha; both categories including stems > 40 cm diameter (> 20cm in the case of Alder)	No The proposed policies/measures within the LSMATS will not alter the structure of any woodland.
	Woodland structure: veteran trees	No decline	No The proposed policies/measures within the LSMATS will not alter the structure of any woodland.
	Woodland structure: indicators of local distinctiveness	No decline	No The proposed policies/measures within the LSMATS proposed variation will not alter the structure of any woodland.
	Vegetation composition: native tree cover	No decline; native tree cover ≥ 95%	No The proposed policies/measures within the LSMATS would not reduce the cover of native trees in areas of woodland.
	Vegetation composition: typical species	A variety of typical native species present, depending on woodland type, including Alder, willows (*Salix* spp.) and, locally, Oak (*Quercus robur*) and Ash	No The proposed policies/measures within the LSMATS would not alter the vegetation composition of typical species from areas of woodland.
	Vegetation composition: negative indicator species	Negative indicator species, particularly non-native invasive species, absent or under control	Yes

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
			Disturbance during construction activity may facilitate the spread of invasive alien species.
Sea Lamprey **CO:** To restore the favourable conservation condition of Lamprey in the Lower River Shannon SAC	Distribution: extent of anadromy	>75% of main stem length of rivers accessible from estuary	No All watercourse crossings will be designed and constructed in accordance with NRA (2006) and IFI (2016).
	Population structure of juveniles	≥ 3 age/size groups present	Yes Disturbance during construction cannot be ruled out.
	Juvenile density in fine sediment	≥ 1 m^2	Yes Disturbance during construction cannot be ruled out.
	Extent and distribution of spawning habitat	No decline	Yes Sedimentation during construction cannot be ruled out.
	Availability of juvenile habitat	>50% sample sites positive	Yes Disturbance during construction cannot be ruled out. In addition, the projects to be implemented as part of the LSMATS involve new or regenerated crossings of the Lower River Shannon SAC. As a result, pathways for AESI exist in relation to habitat loss.
Brook/River Lamprey **CO:** To maintain the favourable conservation	Distribution	Access to all watercourses down to 1° streams	No All watercourse crossings will be designed and constructed in accordance with NRA (2006) and IFI (2016).

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
condition of Brook Lamprey and River Lamprey in the Lower River Shannon SAC	Population structure of juveniles	≥ 3 age/size groups present	Yes Disturbance during construction cannot be ruled out.
	Juvenile density in fine sediment	≥ 2 m^2	Yes Disturbance during construction cannot be ruled out.
	Extent and distribution of spawning habitat	No decline	Yes Sedimentation during construction cannot be ruled out.
	Availability of juvenile habitat	>50% sample sites positive	Disturbance during construction cannot be ruled out. In addition, the projects to be implemented as part of the LSMATS involve new or regenerated crossings of the Lower River Shannon SAC, and as a result, potential pathways for AESI exist in relation to habitat loss.
To restore the favourable conservation condition of Atlantic Salmon in the Lower River Shannon SAC	Distribution: extent of anadromy	100% of river channels down to 2° accessible from estuary	No All watercourse crossings will be designed and constructed in accordance with NRA (2006) and IFI (2016).
	Adult spawning fish	Conservation Limit for each system consistently exceeded	Yes The projects to be implemented as part of the LSMATS involve new or regenerated crossings of the Lower River Shannon SAC, and as a result, pathways for AESI exist in relation to adverse effects on adult spawning fish.
	Salmon fry abundance	Maintain or exceed mean catchment-wide 0+ fry abundance threshold value,	Yes Disturbance and accidental pollution events during construction cannot be ruled out.

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
		currently set at 17 fry per 5 min sample	
	Out-migrating smolt abundance	No significant decline	Yes The projects to be implemented as part of the LSMATS involve new or regenerated crossings of the Lower River Shannon SAC, and as a result, pathways for AESI exist in terms of any in-channel works during the construction phase causing barriers to migration.
	Number and distribution of redds	No decline due to anthropogenic causes	Yes Sedimentation during construction cannot be ruled out.
	Water quality	≥ Q4 at all sites sampled by the EPA	Yes Accidental pollution events during construction and operation cannot be ruled out.
To restore the favourable conservation condition of European Otter in the Lower River Shannon SAC	Distribution	No significant decline	Yes Range restriction may occur as a result of habitat fragmentation during construction and operation.
	Extent of terrestrial habitat	No significant decline	Yes Terrestrial habitat likely to be used by European Otter is included in the preferred route corridor and may be permanently lost.
	Extent of marine habitat	No significant decline	No No areas of marine habitat will be lost as a result of the proposed policies/measures within the LSMATS.

QIs and COs	Attribute	Target	Potential AESI Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
	Extent of freshwater (river) habitat	No significant decline	No – No areas of river habitat will be lost as a result of the proposed policies/measures within the LSMATS.
	Extent of freshwater (lake/lagoon) habitat	No significant decline	No No areas of lake/lagoon habitat will be lost as a result of the proposed policies/measures within the LSMATS.
	Couching sites and holts	No significant decline	Yes Riparian habitat likely to be used by European Otter is included in the preferred route corridor and may be permanently lost.
	Fish biomass available	No significant decline	Yes Sedimentation of spawning habitat, disturbance and accidental pollution events may reduce fish biomass available.
	Barriers to connectivity	No significant increase	No All watercourse crossings will be designed and constructed in accordance with NRA (2006) and IFI (2016).

Table 5.5: Review of Conservation Objectives as Defined by the Attributes and Targets for Ballyallia Lough SPA

QIs and COs	Attribute	Target	Potential AESIs **Relevant LSMATS Measures:** - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
To maintain the favourable conservation condition of Wigeon in Ballyallia Lough SPA - Wigeon; - Gadwall; - Teal; - Mallard; - Shoveler; - Coot; and, - Black-tailed Godwit.	No specific attributes identified in the COs for this SPA	The favourable conservation status of a species is achieved when: - population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and; - the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and; - there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.	Yes Potential for AESI exists for SCI bird species – Measures included within the LSMATS have the potential to adversely affect the distribution of species. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (wetland/arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain or restore the favourable conservation condition of the wetland habitat at Ballyallia Lough SPA as a resource for the regularly occurring migratory waterbirds that utilise it.	Habitat Area	To maintain or restore the favourable conservation condition of the wetland habitat at Ballyallia Lough SPA as a resource for the regularly occurring migratory waterbirds that utilise it	No No potential pathway for AESI given there are no measures/projects included within the LSMATS that would adversely affect the favourable conservation status of the SPA.

Table 5.6: Review of Conservation Objectives as Defined by the Attributes and Targets for Lough Derg (Shannon) SPA

QIs and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA: - Cormorant; - Tufted Duck; - Goldeneye, and; - Common Tern.	No specific attributes identified in the COs for this SPA	The favourable conservation status of a species is achieved when: - population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and; - the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and; - there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.	Yes Potential for AESI exist for SCI bird species – Measures included within the LSMATS have the potential to adversely affect the distribution of species. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain or restore the favourable conservation condition of the wetland habitat at Lough Derg (Shannon) SPA as a resource	Habitat Area	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 32,261 hectares, other than that	No

QIs and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
for the regularly-occurring migratory waterbirds that utilise it.		occurring from natural patterns of variation.	No potential pathway for AESI given there are no measures/projects included within the LSMATS that would adversely affect the favourable conservation of wetland habitat or the area occupied by permanent wetland of the SPA.

Table 5.7: Review of Conservation Objectives as Defined by the Attributes and Targets for River Shannon and River Fergus Estuaries SPA

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
To maintain the favourable conservation condition of Cormorant in River Shannon and River Fergus Estuaries SPA	Breeding population abundance: apparently occupied nests (AONs)	No significant decline	No Measures included within the LSMATS would not adversely affect the long-term population trends for Cormorant within the LSMA.
	Productivity rate	No significant decline	No Measures included within the LSMATS are not anticipated to adversely affect the productivity rate of cormorants or lead to a significant decline in their population.
	Distribution: breeding colonies	No significant decline	No Measures included within the LSMATS are not anticipated to adversely affect the distribution of breeding colonies.
	Prey biomass available	No significant decline	No Measures included within the LSMATS are not anticipated to adversely affect available prey biomass.
	Barriers to connectivity	No significant decline	No Measures included within the LSMATS are not anticipated to cause barrier to connectivity.
	Disturbance at the breeding site	Human activities should occur at levels that do not adversely affect the breeding cormorant population	No Measures included within the LSMATS are not anticipated to cause disturbance at cormorant breeding sites.

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS are not anticipated to cause adverse effects on the long term population trend for cormorant.
	Distribution	There should be no significant decrease in the range, timing or intensity of use of areas by cormorant other than that occurring from natural patterns of variation	No Measures included within the LSMATS are not anticipated to adversely affect the distribution of cormorant.
To maintain the favourable conservation condition of Whooper Swan in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Whooper Swan in the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Whooper Swan, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Whooper Swan. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Light-bellied Brent Goose in	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Light-bellied Brent Goose within the LSMA.

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
River Shannon and River Fergus Estuaries SPA	Distribution	No significant decrease in the range, timing or intensity of use of areas by Light-bellied Brent Goose, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Light-bellied Brent Goose. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Shelduck in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Shelduck within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Shelduck, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Shelduck. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Wigeon within the LSMA.

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
Wigeon in River Shannon and River Fergus Estuaries SPA	Distribution	No significant decrease in the range, timing or intensity of use of areas by Wigeon, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Wigeon. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Teal in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Teal within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Teal, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Teal. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Pintail in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Pintail within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Pintail, other than	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Pintail. Owing to the potential use of ex-situ functional habitat

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
		that occurring from natural patterns of variation	outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Shoveler in River Shannon and River Fergus Estuaries SPA.	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Shoveler within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Shoveler, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Shoveler. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Scaup in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Scaup within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Scaup, other than that occurring from natural patterns of variation	No Measures included within the LSMATS would not adversely affect distribution trends for Scaup within the LSMA.

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
To maintain the favourable conservation condition of Ringed Plover in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Ringed Plover within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Ringed Plover, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Ringed Plover. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Golden Plover in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Golden Plover within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Golden Plover, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Teal. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Grey Plover in River Shannon	Population trend	Long term population trend stable or increasing	No Measures included within the LSMATS would not adversely affect the long-term population trends for Grey Plover within the LSMA.

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
and River Fergus Estuaries SPA	Distribution	No significant decrease in the range, timing or intensity of use of areas by Grey Plover, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Measures included within the LSMATS have the potential to adversely affect the distribution of Grey Plover. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Lapwing in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures and proposals included within the LSMATS would not adversely affect the long-term population trends for Lapwing within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Lapwing, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Projects included within the LSMATS have the potential to adversely affect the distribution of Lapwing. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Knot in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures and proposals included within the LSMATS would not adversely affect the long-term population trends for Knot within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Knot, other than that	No

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
		occurring from natural patterns of variation	Knot are mainly a coastal based species therefore it is considered that no pathway for AESI exist in relation to distribution of this species as a result of the measures and proposals included within the LSMATS.
To maintain the favourable conservation condition of Dunlin in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures and proposals included within the LSMATS would not adversely affect the long-term population trends for Dunlin within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Dunlin, other than that occurring from natural patterns of variation	No Dunlin are mainly a coastal based species therefore it is considered that no pathway for AESI exist in relation to distribution of this species as a result of the measures and proposals included within the LSMATS.
To maintain the favourable conservation condition of **Black-tailed Godwit in River Shannon and River Fergus Estuaries SPA**	Population trend	Long term population trend stable or increasing	No Measures and proposals included within the LSMATS would not adversely affect the long-term population trends for Teal within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Black-tailed Godwit Light-bellied Brent Goose, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Projects included within the LSMATS have the potential to adversely affect the distribution of Black-tailed Godwit. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (wetland/arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
To maintain the favourable conservation condition of Bar-tailed Godwit in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures and proposals included within the LSMATS would not adversely affect the long-term population trends for Bar-tailed Godwit within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Bar-tailed Godwit, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Projects included within the LSMATS have the potential to adversely affect the distribution of Bar-tailed Godwit. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (wetland/arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Curlew in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Objectives and proposals included within the LSMATS would not adversely affect the long-term population trends for Curlew within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Curlew, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Projects included within the LSMATS have the potential to adversely affect the distribution of Curlew. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Redshank in River Shannon	Population trend	Long term population trend stable or increasing	No Measures and proposals included within the LSMATS would not adversely affect the long-term population trends for Redshank within the LSMA.

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
and River Fergus Estuaries SPA	Distribution	No significant decrease in the range, timing or intensity of use of areas by Light-bellied Brent Goose, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Projects included within the LSMATS have the potential to adversely affect the distribution of Redshank. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Greenshank in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures and proposals included within the LSMATS would not adversely affect the long-term population trends for Greenshank within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Greenshank, other than that occurring from natural patterns of variation	Yes Potential for AESI exist for this SCI - Projects included within the LSMATS have the potential to adversely affect the distribution of Greenshank. Owing to the potential use of ex-situ functional habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of Black-headed Gull in River Shannon and River Fergus Estuaries SPA	Population trend	Long term population trend stable or increasing	No Measures and proposals included within the LSMATS would not adversely affect the long-term population trends for Black-headed Gull within the LSMA.
	Distribution	No significant decrease in the range, timing or intensity of use of areas by Light-bellied Brent Goose, other than that occurring	Yes Potential for AESI exist for this SCI - Projects included within the LSMATS have the potential to adversely affect the distribution of Black-headed Gull. Owing to the potential use of ex-situ functional

QIS and COs	Attribute	Target	Potential AESIs Relevant LSMATS Measures: - WK2: Limerick City Strategic Pedestrian Projects. - WK4: Local Amenity and Rural Routes. - CC2: Shannon River Crossing. - LU7: Thomond Weir.
		from natural patterns of variation	habitat outside of the SPA within the floodplain (arable/pastoral farmland) of the River Shannon and its tributaries for foraging and sheltering.
To maintain the favourable conservation condition of wetland habitat in River Shannon and River Fergus Estuaries SPA as a resource for the regularly occurring migratory waterbirds that utilise it.	Habitat Area	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 32,261 hectares, other than that occurring from natural patterns of variation.	No No potential pathway for AESI given there are no Measures/projects included within the LSMATS that would adversely affect the favourable conservation of wetland habitat or the area occupied by permanent wetland of the SPA.

The review of detailed Attributes and Targets of the COs for the European sites confirms that there is potential for adverse effects on site integrity as a result of possible impacts on the QIs of these sites as a result of the implementation of the LSMATS. These are as follows:

- Direct and indirect impacts on freshwater, riparian and wetland Annex I habitats for which the sites are selected;
- Impacts on the water quality affecting Annex I habitats and Annex II species for which the site was selected; and,
- Impacts on Annex II species through potential loss of habitat connectivity and disturbance.

These impacts, therefore, require additional mitigation measures to ensure that the implementation of the LSMATS does not have an adverse effect on the integrity of European sites. These measures are described in Section 5 of this NIS.

5. Mitigation

5.1 Introduction

This section outlines both the mitigation which is currently in the LSMATS to safeguard the integrity of European sites through a number of dedicated Policies and Measures, as well as the specific measures which have been developed to mitigate against the impacts that may arise from the proposed measures contained within the LSMATS.

This NIS has shown that, in the absence of appropriate mitigation measures, the implementation of the LSMATS could result in adverse effects on site integrity for the Lower River Shannon SAC, Curraghchase Woods SAC, Askeaton Fens Complex SAC, Tory Hill SAC, Ballyallia Lough SPA, Lough Derg (Shannon) SPA and River Shannon and River Fergus Estuaries SPA in view of their Conservation Objectives. In order for LSMATS to eliminate the possibility of these effects occurring or being significant with regard to the integrity of these sites, additional mitigation measures are required. These measures must address the following:

- Potential direct impacts on the Annex I priority habitat Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) and Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation within the Lower River Shannon SAC. This would potentially occur as a result of the proposed River Shannon crossings for the for walking/cycle routes, River Maigue crossing north of Adare village as part of the N69/M21 Foynes to Limerick Road (including Adare Bypass) and the re-development of Thomond Weir;
- Potential impacts on ground water levels and flows during the construction and operation of the N69/M21 Foynes to Limerick Road (including Adare Bypass) and N/M20 Cork to Limerick Scheme, which would be likely to cause significant indirect impacts on the water levels in the Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* and Alkaline Fens within the Askeaton Fens Complex SAC and Tory Hill SAC respectively;
- Potential impacts on Lesser Horseshoe Bats within Curraghchase Woods SAC through habitat loss and fragmentation, loss of foraging/flight paths and potential disturbance due to light pollution;
- Potential impacts on water quality (due to sedimentation and/ or pollution events) during the construction and operation of a proposed crossings over the River Shannon and River Maigue, which would be likely to cause significant indirect impacts on Lamprey (all species) and Atlantic Salmon;
- Potential impacts on European Otter through habitat loss and fragmentation, as well as secondary impacts arising from impacts on water quality affecting availability of prey species; and,
- Potential impacts on SCI bird species (Ballyallia Lough SPA, Lough Derg (Shannon) SPA and River Shannon and River Fergus Estuaries SPA) utilising SPA functional habitat within the LSMA through foraging, and habitat loss and fragmentation.

Table 7.1 below identifies mitigation measures to be implemented as part of the LSMATS delivery process. These align with the mitigation measures implemented/secured through the Policies and Objectives contained within the Limerick County Development Plan 2010 - 2016 and the Clare County Development Plan 2017 - 2023.

Table 6.1: High Level Mitigation to be Implemented as part of the LSMATS

Ref	Detail of Recommended Mitigation Measure	
General (design-level) measures		
G1	This NIS provides the information to inform the AA of the measures/projects to be delivered as part of the LSMATS at the plan level. However, should issues arise under Article 6(3) of the Habitats Directive at the design stage and the assessment at that stage determines that there are likely to be adverse effects on the integrity a European site, an alternative solution shall be required.	
G2	In selecting the exact watercourse crossing locations within the preferred route corridor, there shall be full compliance with Article 6(3) and, if necessary, Article 6(4), including compensatory measures, of the Habitats Directive.	
G3	Baseline surveys shall be conducted by suitably qualified ecologists to ensure that the design-stage AA has a sufficient level of scientific data to inform the assessment.	
G4	As required a full suite of geomorphological, hydrological and topographical surveys shall be required and provided at project design stage to inform the project-level AA.	
G5	The Construction Method Statement shall form part of the overall project design together with the development of an Environmental Construction Management Plan (ECMP), which together shall be subject to AA as part of the overall project assessment.	
G6	All permits and consents required as part of the project shall be addressed at project design stage and incorporated as part of the overall AA.	
G7	Ongoing monitoring to assess the real-time environmental impact of all site preparation, construction and post-construction works shall be undertaken by suitably qualified ecologists.	
G8	The design of any in-stream structure shall not lead to any alteration of the channel morphology, flow regime, depositional patterns or interfere with habitat continuity.	
G9	Crossings of the River Shannon will be constructed at a sufficient height to allow for the development of riparian habitats.	
Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation - Lower River Shannon SAC		
WC1	Direct physical loss/damage to habitat	At the project design stage, all works shall be carefully designed to ensure no direct loss of habitat.

Ref	Detail of Recommended Mitigation Measure	
WC2	Indirect disturbance	Detailed, targeted surveys will be required and shall be provided to determine the extent of this habitat type and inform working areas/development footprints in order to maintain or increase (subject to natural processes) the overall habitat area and distribution within the SAC.
WC3	Indirect disturbance or loss of habitat	Any potential impacts on water quality which may lead to an indirect effect on the concentration of nutrients or the typical vegetation composition shall be avoided through best practice construction methods as detailed in Section 5.2 below.
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) **– Lower River Shannon SAC**		
MM1	Direct physical loss/damage to habitat	At the project design stage, all works shall be carefully designed to ensure no direct loss of habitat.
MM2		Detailed, targeted surveys will be required and shall be provided to determine the extent of this habitat type and inform working areas/development footprints in order to maintain or increase (subject to natural processes) the overall habitat area and distribution within the SAC, particularly in areas which were previously unmapped.
MM3	Invasive Non-native Species	Invasive species surveys (for species listed on Schedule 3 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011)) will be undertaken. If invasive species are found to be present, an Invasive Species Management Plan will be prepared to outline the control and or removal measures. These measures will ensure such species are not spread during construction or operation of measures outlined within the draft LSMATS. All works relating to invasive species will be implemented in line with relevant national guidelines.
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) – Lower River Shannon SAC.		
AF1	Direct physical loss/damage to habitat	At the project design stage, all works shall be carefully designed to ensure no direct loss of the Annex I priority habitat.
AF2	Indirect disturbance	For areas with the potential to develop into this habitat type, measures shall be taken at both design and project implementation stages to ensure that it will continue to develop as such, subject to natural processes.

Ref	Detail of Recommended Mitigation Measure	
AF3	Indirect disturbance or loss of habitat	There shall be no alteration to the hydrological regime necessary for maintenance of alluvial vegetation. Periodic flooding is essential to maintain this habitat type.
AF4	Biological disturbance	The project design stage shall ensure that negative indicator species, particularly non-native invasive species, remain absent or under control.
Calcareous and Alkaline Fens - Askeaton Fens Complex SAC and Tory Hill SAC		
CAF1	Direct physical loss/damage to habitats	Detailed hydrological studies surveys shall be required and provided for in order to fully understand and mitigate for this risk at design stage. Mitigation measures set out in Section 5.2 below will minimise the risk of changes in ground water flows and quality.
CAF2	Indirect disturbance or loss of habitat	Detailed hydrological studies surveys shall be required and provided for in order to fully understand and mitigate for this risk at design stage. There shall be no alteration to the hydrological regime necessary for maintenance of fen vegetation.
Sea Lamprey, Brook Lamprey and River Lamprey – Lower River Shannon SAC		
LA1	Direct physical loss/damage to habitat	The mitigation measures set out in Sections 5.2 and 5.3 below and the implementation of best practice measures outlined in NRA (2006) and IFI (2016) will minimise the risk of harmful ecological effects arising from habitat loss and deterioration, in particular that arising from pollution and sedimentation.
LA2	Loss of habitat connectivity	On all lower order watercourses, all culverts shall be designed in accordance with NRA (2006) and IFI (2016) so as not to impede distribution and accessibility.
LA3	Indirect disturbance or loss of habitat	Any potential impacts on water quality that may lead to an indirect effect on the extent and distribution of spawning or juvenile habitat shall be avoided. Juvenile habitat may occur in marginal areas of the River Shannon at the proposed crossing point: appropriate surveys shall be undertaken at the crossing location prior to construction works to establish the presence or absence of this species and, where necessary, these areas shall be salvaged.

Ref	Detail of Recommended Mitigation Measure	
Atlantic Salmon – Lower River Shannon SAC		
AS1	Direct physical loss/damage to habitat	The mitigation measures set out in Section 5.2 below and the implementation of best practice measures outlined in NRA (2006) and IFI (2016) will minimise the risk of harmful ecological effects arising from habitat loss and deterioration, in particular that arising from pollution and sedimentation.
AS2	Loss of habitat connectivity	On all lower order watercourses, all culverts shall be designed in accordance with NRA (2006) and IFI (2016) so as not to impede distribution and accessibility.
AS3	Indirect disturbance or loss of habitat	Any impacts on water quality that may lead to an indirect effect on the extent and distribution of spawning habitat shall be avoided.
AS4	Direct Disturbance	The use of high noise emission activities such as impact pilling and blasting (should it be required) shall be minimised. In-stream works using machinery and machinery working in watercourses shall be minimised.
European Otter – Lower River Shannon SAC		
EO1	Direct physical loss/damage to habitats	Detailed surveys shall be required and provided for in order to fully understand and mitigate for this risk at design stage.
EO2	Direct physical damage to mobile species	Temporary mammal-proof fencing shall be erected around the construction envelope to prevent Otters from entering the works area. A riparian corridor for Otter movement shall be maintained at all times during construction.
EO3	Indirect disturbance or loss of habitat	The use of high noise emission activities such as impact pilling and blasting (should it be required) shall be minimised. Speed limits shall be enforced for all plant used during construction. A Code of Conduct shall be enforced to avoid disturbance to this species at construction sites and in transit to construction areas.
EO4	Direct disturbance	Given the need for movement of this species along riverbanks, any temporary obstruction to connectivity during construction works between the main Shannon and Mulkear rivers and the Tailrace Canal, where commuting routes may occur, should be alleviated through the installation of appropriately designed mammal passes, which shall be routinely checked throughout the duration of the works.

Ref	Detail of Recommended Mitigation Measure	
Lesser Horseshoe Bats - Curraghchase Woods SAC		
LHB1	Direct physical loss/damage to habitats	Surveys conducted to date have shown that the proposed route will not have any impact on known Lesser Horseshoe Bat roosts. Where there is the potential or actual bat movement in the area of the proposed route, provision will be made to avoid impeding bat flight paths by the design of appropriate vegetative landscaping and underpasses.
LHB2	Indirect disturbance or loss of habitat	LHBs avoid areas of high human activity. During the construction phase the use of high noise emission activities such as impact pilling and blasting (should it be required) shall be minimised. Lesser Horseshoe Bats avoid artificial lighting and therefore all project related lighting should be turned off at night if not required. During operation lighting should be designed to reduce impact on bat activity. A Code of Conduct shall be enforced to avoid disturbance to this species at construction sites.
LHB3	Direct disturbance	Given the need for movement of this species along vegetation lines of hedgerows and trees, any temporary obstruction to connectivity during construction works can be mitigated by the erection of temporary bat bridges/lines. During operation, where Lesser Horseshoe Bat flight-lines are interrupted, all embankments and river crossings, shall incorporate appropriate underpasses with vegetated approaches to assist bats in commuting between foraging, roosting and breeding sites.
Disturbance/displacement of Special Conservation Interest Bird Species - Ballyallia Lough SPA, Lough Derg (Shannon) SPA and River Shannon and River Fergus Estuaries SPA		
B1	Disturbance/displacement effects associated with any element of a proposed development	At the project level it will be a requirement for any future development included within the LSMATS that has the potential to result in adverse effects to the populations of special conservation interest bird species of an SPA, that an appropriate level of assessment (AA) and survey will be required to identify if, and how, such bird species utilise habitat areas potentially affected by disturbance/displacement effects associated with any element of a proposed development.
B2		Where disturbance or displacement effects are predicted, appropriate mitigation measures as outlined in Section 5.2 below will be required to ensure that development will not adversely affect the conservation status of special conservation interest bird species and

Ref	Detail of Recommended Mitigation Measure	
		the integrity of related SPAs, either alone or in-combination with any other plans or projects, via this impact pathway.
B3		If, despite the implementation of mitigation measures, there remains a risk that disturbance or displacement at a project level then the project will not be progressed unless an alternative solution can be implemented which avoids/reduces the impact to a level that the integrity of the related SPA remains unaffected.

5.2 Mitigation Measures and Best Practice for Road Infrastructure Projects

As well as the measures referred to above, the mitigation measures listed below will also apply to any further assessment of projects taken forward that are included in the LSMATS where watercourse crossing are required (i.e. the pedestrian/cycling routes River Shannon Crossings). The LSMATS shall also have due regard of the following guidance documents:

- TII Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority, Dublin. (NRA 2006a);
- IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters. Inland Fisheries Ireland, Dublin;
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (National Roads Authority (NRA), 2008a);
- Guidelines for the treatment of otters prior to the construction of national road schemes (NRA, 2008b); and
- Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, During and Post Construction of National Road Schemes. (NRA, undated).

At project stage, the proposed works shall comply with the following best practice water pollution prevention measures taken from IFI (2016) and guidance documents published by the former Regional Fisheries Boards:

- All fuels, oils, greases and hydraulic fluids shall be stored in bunded areas well away from watercourses.
- Refuelling of machinery etc. shall be carried out in bunded areas.
- Site run-off shall be routed via suitably designed and sited settlement ponds and filter channels and not shall not enter watercourses directly.
- Settlement ponds shall be inspected on a regular basis and maintained appropriately.
- Wherever possible, the banks of watercourses shall be left intact. Site measures will be implemented to prevent sediment from entering watercourses.
- In-stream works using machinery shall be minimised. Machinery working in watercourses shall be protected against leakages or spillage of fuels, oils greases and hydraulic fuels. In-stream earthworks shall be carried out in a manner such that mobilisation of the sediment/substratum is minimised or avoided.
- In-stream works and clearance of bank-side habitat shall be minimised and control measures to reduce/avoid risk of siltation shall be implemented. These measure would include: bunding and diversions of run-off to settlement ponds, surfacing of the site with granular material and covering of temporary stockpiles.

- All construction machinery operating in-stream should be mechanically sound to avoid leaks of oils, hydraulic fluid etc. Machinery should be sanitised and checked prior to commencement of in-stream works.
- All watercourses and drains shall be temporarily culverted prior to construction commencing to avoid movement of vehicles across watercourses.
- Site surface drainage and silt control measures shall be established prior to the commencement of construction. Run-off from the site shall be channelled and intercepted at regular intervals for discharge to silt traps or lagoons with over-flows directed to land rather than to a watercourse.
- The risk of siltation of watercourses from crossing point locations would be avoided through the installation of silt traps with associated buffer strips. Silt-traps shall be maintained and cleaned regularly during construction.
- A maintenance schedule and operational procedure shall be established by the Contractor for silt and pollution control measures during construction. This shall be undertaken in consultation with the relevant statutory authorities.
- Sites activities such as pouring of concrete shall be monitored carefully to ensure accidental discharge into the watercourse does not occur. Under no circumstances shall mixer washings or excess concrete be discharged to surface water.
- Oil storage tanks and associated fuel filling areas and distribution pipework shall be located at least 10m from watercourses (rivers, lakes, and streams, field drains) and at least 50m from wells or boreholes.
- Storage tanks shall have secondary containment provided by means of an above ground bund to capture any oil leakage irrespective of whether it arises from leakage of the tank itself or from associated equipment such as filling and off-take points, sighting gauge etc., all of which shall be located within the bund. Bund specification should conform to the current best practice for oil storage (Enterprise Ireland, BPGCS005).
- Oil booms and oil soakage pads shall be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge.
- Abstraction of water from watercourses for dust control should be from dedicated watering points, preferably from silt lagoons located on-site or from an excavated site, replenished by ground infiltration and not by stream infiltration. No abstraction should occur on small watercourses.

5.3 Invasive Alien Plant Species

There is the potential for both terrestrial and aquatic non-native invasive species to be present across the LSMA. If present, these could potentially be spread to habitats within SACs/SPAs during the implementation of the measures within the LSMATS. The introduction of invasive species into a European site can affect the conservation objectives for QI habitats or species, potentially adversely affecting the integrity of the European site (for example, affecting vegetation composition of an Annex I QI habitat, affecting species distribution and abundance and/or out-competing native species).

Pre-construction invasive species surveys (for species listed on Schedule 3 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011)) will be undertaken for any measures implemented through the LSMATS in accordance with the TII manual The Management of Invasive Alien Plant Species on National Roads (TII 2020). If invasive species are found to be present, an Invasive Species Management Plan will be prepared to outline the control and or removal measures. The management plan would also include measure to monitor the effectiveness of the control measures prescribed.

5.4 Responsibility for Mitigation Measures

The responsibility for implementing the proposed LSMATS lies solely with the Planning Authority through the Planning Consent process. Applicants who intend to develop within the LSMA area are obliged to ensure that their application is consistent with the Measures and requirements within the Plan. The statutory requirement for the Planning Authority to carry out screening for appropriate assessment for all planning applications is not affected

by any of the statements in this NIS. All applications must be tested for the potential for LSE. However, such effects are not likely to occur if the Measures in the LSMATS and the requirements are adhered to as outlined in Technical Guidance, where appropriate. Applicants must provide information to allow the Planning Authority to screen the application and decide if a Natura Impact Statement is required.

5.5 Monitoring Implementation of Policies

Whilst there is no legal requirement to monitor the outputs of the AA process, there is an obligation to monitor the implementation of the LSMATS through the SEA Directive as implemented in Ireland. Contingency measures may have to be applied if there is evidence that Policies and Measures cannot be implemented successfully. The *European Communities (Environmental Liability) Regulations 2008* will also apply in the event of any environmental damage to habitats and species both within and outside of the European sites.

6. In Combination Effects

6.1 In-Combination Effects from Other Relevant Plans

A key requirement of the Habitats Directive is to determine whether the LSMATS is likely to have a significant effect when considered in combination with other plans and projects. An effect which is not significant due to LSMATS alone, could be significant when combined with effects (significant or not significant) due to other projects or plans that are underway or planned for the future. For example, the effects of a plan on water quality may be insignificant when considered alone, but when combined with the effects of increased pollution from other plans or projects, may lead to AESI.

With strategic mitigation in place no AESI is predicted from the LSMATS. Each individual measure/project taken forward as appropriate under the LSMATS will be subject to further AA and refinement of mitigation measures to ensure no AESI as a result of these projects. Cumulative effects from projects within the LSMATS, such as multiple river crossings, will be assessed in the in-combination assessment of individual projects, when information is available of the design and location of each project.

Table 7.1 below shows the risk of significant in-combination effects of the LSMATS with other relevant plans on European sites.

Table 7.1: Relevant Plans and Programmes That Have Been Considered During the AA Process

Plan	Purpose of Plan	In-Combination Effect
Project Ireland: National Planning Framework (NPF) 2040	The NPF is a strategic development framework that sets out the long-term context for Ireland's physical development and associated progress in economic, social and environmental terms until 2040	The NPF is a strategic plan which sets the framework for, and relies to a significant degree on, other policy, strategy and plan initiatives to achieve its objectives. These other plans have been or will be subject to AA and will have identified mitigation measures to ensure no AESI. The measures committed to in these other plans will be essential to ensuring that the objectives of the NPF are met and that the NPF does not have adverse effects on any European site. Given the mitigation measures set out in Section 7, Table 7-1 of the NPF NIS and those included in Section 6 of this NIS, and with the requirement for project level assessments for any project arising from the plans, no AESI in light of a European site's conservation objectives are predicted as a result of in-combination effects. Therefore, it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**

Plan	Purpose of Plan	In-Combination Effect
Project Ireland: National Development Plan (NDP) 2018 – 2027	The NDP sets out the investment priorities that will underpin the implementation of the National Planning Framework. It is a 10- year, €116 billion programme to upgrade State infrastructure in anticipation of the population increase.	The NDP identifies the strategic priorities for public capital investment for all sectors. In the first five years of the plan, almost €10bn will be invested in transport. The plan is fully integrated with the NPF and therefore presents the same potential for in-combination effects. Therefore, it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
National Investment Framework for Transport in Ireland (NIFTI) (Department of Transport, 2021)	NIFTI is the Department of Transport (DoT) high-level, strategic framework for future investment in the land transport network. NIFTI, in the short to medium term, will support the land transport element of the Government's National Development Plan (NDP) 2018-2027, and, over the longer term, will provide a strategic framework for decision-making on the appropriate public expenditure on land transport in light of the National Policy Objectives established in the National Planning Framework: Project Ireland 2040 (NPF).	The NIS for NIFTI concluded that "*any project(s) arising from the implementation of NIFTI shall be required to conform to the mitigation measures and key principles for protecting European sites identified within this NIS. In addition, all projects arising from the implementation of NIFTI will themselves be subject to Screening for AA/AA when details of locations and design become known. It is considered that the implementation of NIFTI will contribute to improvements in air quality over the next two decades and is therefore consistent with the aims of the Habitat Directive to conserve natural habitats and wild fauna and flora species. The conclusion of this NIS for NIFTI is that, following detailed assessment and appropriate mitigation for protecting European sites and their associated species and habitats, there will be no adverse effects on the integrity of any European site(s), either alone or in-combination with other plans or projects.* Given the mitigation measures set out in Section 8, Table 8.1 of the NIFTI NIS and those included in Section 6 of this NIS, and with the requirement for project level assessments for any project arising from the plans, no AESI in light of a European site's conservation objectives are predicted as a result of in-combination effects. Therefore, it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**

Plan	Purpose of Plan	In-Combination Effect
Clare County Development Plan 2017-2023	This Clare County Development Plan 2017- 2023 sets out an overall strategy for the proper planning and sustainable development of the functional area of Clare County Council over a 6 year period.	In accordance with Articles 6(3) and (4) of the Habitats Directive the Clare County Planning Authority undertook Screening for AA and an assessment of Adverse Effects on Site Integrity. The Clare County Development Plan 2017-2023 contains a number of objectives and mitigation measures that were considered to remove the potential for AESI for European sites. Measures included in the plan were a range of design criteria, assessment processes and best practice construction methods to be applied to safeguard QIs of European Sites. European Sites considered within the Clare County Development Plan with significant overlap with the LSMATS include: Lower River Shannon SAC, Curraghchase Woods SAC, Askeaton Fen Complex SAC and Tory Hill SAC. Both the Clare County Development Plan 2017-2023 and the Limerick County Development Plan 2010 - 2016 (see below) consider AESI in relation to European sites and have incorporated policies and mitigation measures to ensure there are no adverse effects of site integrity for European sites. With the successful adoption of these measures plus those set out in Section 6 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
Limerick County Development Plan[40] 2010-2016 (As Extended)	This County Development Plan sets out Limerick County Council's overall strategy for the proper planning and sustainable development of the County to 2016 and beyond and has been formulated following a period of consultation on issues to be included in the Plan.	Limerick County Development Plan 2010-2016 contains a number of objectives and mitigation measures that were considered to remove the potential for AESI for European sites to remove the likelihood of significant effects on European sites. In accordance with Articles 6(3) and (4) of the Habitats Directive the Planning Authority undertook Screening for AA and an assessment of Adverse Effects om Site Integrity same area.

[40] The Draft Limerick Development Plan 2022-2028 has been published but at time of writing was not adopted?
https://www.limerick.ie/council/services/planning-and-property/limerick-development-plan/limerick-development-plan-2022-2028

Plan	Purpose of Plan	In-Combination Effect
	The plan seeks to develop and improve, in a sustainable manner, the social, economic, cultural and environmental assets of the County.	The Limerick County Development Plan AA concluded that, subject to the full and proper implementation of the Policies and Objectives contained within the Plan itself and the mitigation measures detailed in the plan there will be no adverse effects on the integrity of any Natura 2000 site as a result of the adoption of the plan, either individually or in combination with other plans and projects, and that no reasonable scientific doubt remains in this regard. With the successful adoption of the policies and mitigation measures included with the Limerick County Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
Limerick City Development Plan 2010-2016 (As extended)	The Limerick City Development Plan 2010-2016 sets out the former Limerick City Council's policies for the development of Limerick City to 2016 and beyond. It provides policies and objectives for the delivery of development within the city limits. The River Shannon runs through the centre of the city and, within the city limits, the SAC includes the canal and part of King's Island.	The AA screening for this plan introduced and amended a number of policies and objectives (where potential impacts were identified for the Lower River Shannon SAC) within the plan to specifically ensure the protection of the Lower River Shannon SAC and it concluded that there could be no significant effects thereon. The Limerick City Development Plan concluded that there are no policies, objectives or zonation's of the Limerick City Development Plan 2010-2016 that could result in -combination effects. This agrees with the findings of the AA completed for the Clare County Development Plan 2011-2017, which also concluded that there would be no in-combination effect with the Limerick City Development Plan 2010-2016. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
Adare Local Area Plan (LAP) 2015-2021	The Adare LAP establishes a framework for the planned, coordinated and sustainable development of the village of	In accordance with Articles 6(3) and 6(4) of the Habitats Directive the Planning Authority undertook an Appropriate Assessment Screening Report of the plan. With the insertion of the following text it was

Plan	Purpose of Plan	In-Combination Effect
	Adare, including the conservation and enhancement of its natural and built environment over the period 2015 – 2021.	concluded that the plan would have no significant effects on European sites. 'No projects which will be reasonably likely to give rise to significant adverse direct or indirect or secondary impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives arising from reduction in species diversity, shall be permitted on the basis of this plan (either individually or in combination with other plans or projects).' **No potential for in-combination effects** are envisaged as plan will not impact any European sites.
Rathkeale Local Area Plan 2012-2018 (As Extended to 2022)	The Rathkeale LAP establishes a framework for the planned, coordinated and sustainable development of the town of Rathkeale, including the conservation and enhancement of its natural and built environment over the period 2012 – 2018 (as extended to 2022).	In accordance with Articles 6(3) and (4) of the Habitats Directive the Planning Authority undertook an AA Screening Report of the plan With the insertion of the following text it was concluded that the plan would have no significant effects on European sites. 'No projects which will be reasonably likely to give rise to significant adverse direct or indirect or secondary impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives arising from reduction in species diversity, shall be permitted on the basis of this plan (either individually or in combination with other plans or projects).' **No potential in-combination effects** are envisaged as plan will not impact any European sites.
Askeaton Local Area Plan 2015-2021	The aim of the LAP is to establish a framework for the planned, coordinated and sustainable development of the town of Askeaton, including the conservation and enhancement of its natural and built environment over the next six years and beyond.	Objective EH7 set out how designated sites will be protected and states the following: 'No projects which will be reasonably likely to give rise to significant adverse direct or indirect or secondary impacts on the integrity of any Natura 2000 sites having regard to their conservation objectives arising from reduction in species diversity, shall be permitted on the basis of this plan (either individually or in combination with other plans or projects).' **No potential in-combination effects** are envisaged as plan will not impact any European sites.

Plan	Purpose of Plan	In-Combination Effect
Limerick 2030 – An Economic and Spatial Plan for Limerick (2013)	This plan sets a framework for public sector action and private sector investment until 2030 comprising an Economic Strategy for the city, a Spatial Plan focused on revitalising and redeveloping Limerick City Centre and a Marketing Plan.	The NIS for the draft LSMATS has highlighted the need for additional project level environmental assessments, while high-level mitigation measures have been outlined in Section 6 of this NIS. Mitigation required will be developed and delivered as options are advanced which will protect European sites from in-combination effects that could lead to Adverse Effects on Site Integrity (AESI). Given the overarching strategies and objectives within the spatial plan for Limerick to protect the environment, and with the implementation of mitigation measures, including project level AA, no AESI in light of European sites' conservation objectives are predicted as a result of in-combination effects. Therefore, **no potential in-combination effects** are envisaged as plan will not impact any European sites.

6.2 In-Combination Effects from Other Relevant Projects

In addition to relevant plans, major projects located within the ZoI of the LSMATS were assessed in terms of their potential to affect the integrity of European sites in-combination with those impacted by the LSMATS using the Project Ireland Planning Portal[41]. The major projects identified as having potential in-combination effects include:

Table 6.2: Relevant Projects Considered for In-Combination Effects

Project	Description	In-combination effect
King's Island Flood Relief Scheme (FRS) at King's Island in Limerick city	Works will enhance and fortify the existing measures in place around King's Island and its environs to be able to withstand the likely increased frequency and severity of future flooding events. The works have been designed and developed with a primary focus to protect the affected areas against fluvial and tidal flooding	The NIS for Kings island FRS concluded that: "*Following a comprehensive evaluation of the potential direct, indirect and cumulative impacts on the qualifying interests and conservation objectives for the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA and ensuring that avoidance and mitigation measures are implemented as proposed, it has been concluded by the authors of this report that the*

[41] https://geohive.maps.arcgis.com/apps/MapSeries/index.html?appid=f05a07c5a0324b1a887cd9d5d7103e22

Project	Description	In-combination effect
		proposed King's Island Flood Relief Scheme will have ***No adverse effects on the integrity of the above Natura 2000 sites.***" Given the mitigation measures set out in Section 8, of the King's Island FRC NIS and those included in Section 6 of this NIS, and with the requirement for project level assessments for any project arising from the plans, no AESI in light of a European site's conservation objectives are predicted as a result of in-combination effects. Therefore, it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
Limerick City and Environs Flood Relief Scheme	Upgrade of existing flood defences to consist of the following; extension to an existing flood defence berm along the Shannon and Mulkear riverbanks; the upgrade and rerouting of the existing surface water drainage system; provision of attenuation ponds; and improvements to the existing storm water sewer system	The proposed Limerick City and Environs FRS upgrade is currently at the 'Further Information' stage of its planning application. Therefore, no assessment in relation to LSE or AESI has been undertaken to date. At this stage, no detailed assessment of likely in-combination effects can be made.
Limerick Smarter Travel[42]	Limerick was awarded the title of Ireland's first Smarter Travel Demonstration City in a national competition funded by the Department of Transport, Tourism and Sport (DTT&S) and co-funded by the European Regional Development Fund (ERDF) under the Southern & Eastern Regional Assembly (SERA) Operational Programme 2007-2013. The initiative was run between 2012 and 2016 in partnership with University of Limerick. €9 million was awarded for the project which saw a host of infrastructural and behavioural change measures being rolled out in the four project area hubs; Castletroy; Corbally; Southside Regeneration Area; and the City Centre.	The potential impacts on European sites have been examined as part of the AA for the Limerick Smarter Travel scheme. The only site directly affected by the proposed development is the Lower River Shannon SAC. The proposed cycleway/pathway and associated works such as bridges will require limited works along a linear route within and adjacent to the SAC. Mitigation measures to protect the Lower River Shannon SAC are detailed in the Natura Impact Statement (NIS) for the Limerick Smarter Travel Route and include measures to minimise the impact of heavy machinery on the site, protecting wet ground and avoiding the pouring or transportation of wet concrete within the SAC boundary. The fitting of information posts with a range of information on natural heritage and the local ecology also form part of the mitigation measures along the

[42] https://www.limerick.ie/council/services/community-and-leisure/sports-and-fitness/limerick-smarter-travel/about-limerick

Project	Description	In-combination effect
		walkway. These highlight information on the sensitivity of the aquatic and riparian habitats and provide information on the lesser-known migratory species such as Lamprey. Construction- and operational-phase mitigation has also been included to ensure no adverse impacts on any of the Qualifying Interests of the site. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
Poultry Farm (12/181) – Camas, Newcastle West	The construction of a poultry house, a soiled water tank, the use of existing entrance and all associated site works - An EIS has been submitted with this application.	The proposed development is required by the planning authority to implement best practice to prevent and minimize impacts due to surface water run-off during construction and operation. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
Poultry Farm (12/688) – Monlena, Newcastle West	The extension of existing poultry house, the construction of a poultry house, soiled water tank and associated site works (this application relates to development which comprises or is for the purposes of an activity requiring an integrated pollution management plan.	The proposed development is required by the planning authority to implement best practice to prevent and minimize impacts due to surface water run-off during construction and operation. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
Greenstar Environmental Services Ltd Ballykeeffe, Dock Road Limerick (13/300)	An increase in the amount of waste accepted annually to 130,000 tonnes. The proposed increase does not require the construction / provision of any new buildings or structures. The development will require a revision of the Waste Licence granted by the Council which will ensure management and control of water run-off and other environmental impacts.	The proposed development is in a discrete geographical area and required by the planning authority to implement best practice to prevent and minimize impacts due to surface water run-off during construction and operation. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no**

Project	Description	In-combination effect
		potential for in-combination effects to arise as a result of the implementation of the LSMATS.
CPL Fuels Ireland Ltd (14/603) – Lands at Durnish, Internal Shannon Foynes Port, Foynes	Alterations and extension to the existing industrial building, erection of new buildings and new hardcore area for external storage, to accommodate the storage, screening, processing, binding and packaging of solid fuel briquettes by CPL.	The proposed development is required by the planning authority to implement best practice to prevent and minimize impacts due to fuel pollution of surface waters and prevent surface water run-off during construction and operation. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
Hanrahan Farms Ltd. Kilmore, Granagh (14/889)	Construction of a Mill and Feed store building to cover and update existing facilities. This application related to a development which is for the purposes of an activity requiring an IPPC Licence under part IV of the EPA Licensing Regulations 1994 to 2008.	The proposed development is in a discrete geographical area and required by the planning authority to implement best practice to prevent and minimize impacts due to pollution of surface water run-off during construction and operation. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**.
Bord Na Mona Fuels Limited (15/468) – Durnish, International Port Road, Shannon Foynes Port	Project involves the ongoing smokeless and bio-mass based solid fuel manufacturing and packaging facility at and adjacent to existing coal storage and baggage facility. The development includes the demolition of existing buildings and storage structures, the upgrading, extension and refurbishment of existing buildings.	The proposed development is required by the planning authority to implement best practice to prevent and minimize pollution of surface water run-off impacts during construction and operation. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**
Adare Manor Hotel & Golf Resort (15/920) - Tizzard Holdings Ltd	Large-scale refurbishment of existing hotel and golf club including internal refurbishment of the existing hotel; revisions to internal layout of lower ground floor level of hotel comprising rearrangement and upgrade of the hotel.	In light of the mitigation measures proposed in the EIS there will be no impact on the mammalian interests of the Natura 2000 sites in the area. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-**

Project	Description	In-combination effect
		combination effects to arise as a result of the implementation of the LSMATS.
Poultry Farm (15/815) – Ballintubber East, Newcastle West	The project involves the construction of a new poultry house, meal bins wash water collection tank and associated site works (the development comprises of an activity in relation to which an Industrial Emissions Directive Licence (formerly IPPC Licence) currently operate).	The proposed development is required by the planning authority to implement best practice to prevent and minimize impacts due to surface water run-off during construction and operation. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**.
Irish Cement Limited (16/345) – Limerick Cement Works, Castlemungret	This project includes an application for 10 year permission for development to allow for the replacement of fossil fuels through the introduction of lower carbon alternative fuels and to allow for the use of alternative raw materials in their Limerick Cement Works.	The proposed development is required by the planning authority to implement best practice to prevent and minimize impacts due to hydrocarbon and fuel pollution of surface water run-off during construction and operation. With the successful adoption of the policies and mitigation measures included with the Limerick City Development Plan plus those set out in Section 7 of this NIS it is concluded that there is **no potential for in-combination effects to arise as a result of the implementation of the LSMATS.**

6.3 Results of the In-Combination Assessment

Following the in-combination assessment it has been concluded that there is no potential for adverse effects arising as a consequence of the implementation of any element of the LSMATS acting in-combination with any other plan or projects located within the zone of influence of the LSMATS. This conclusion is reached based on the following reasons:

- Any plan or project must adhere to the overarching policies and objectives of the Limerick County Development Plan 2010 – 2016 (as extended) and Clare County Development Plan 2017 – 2023 as these will ensure the protection of European sites within the ZoI and stipulates the requirement for an AA to demonstrate that the plan or project will not significantly affect the integrity of European sites. It should be noted that during the lifetime of the LSMATS Limerick County Plan is due to be replaced by the Limerick Development Plan 2022 – 2028 and that the Clare County Plan 2017-2023 replaced by the emerging Clare County Development Plan 2022 – 2028.
- Regional or local plans contain specific policies and objectives ensuring the protection of European sites from significant effects on site integrity.
- No adverse effects on the integrity of the European sites will arise from specific projects due to the project-specific mitigation measures detailed in their respective NIS.

In conclusion, no adverse effects on the integrity of the European sites will arise from the LSMATS acting in-combination with any plans or projects located within the ZoI of the LSMATS.

7. NIS Conclusion

The LSMATS considers all land transport modes, with the objective of providing a long-term strategic planning framework for the integrated development of transport infrastructure and services in the LSMA.

As detailed in Section 4, seven European sites, Lower River Shannon SAC, the Curraghchase Woods SAC, the Askeaton Fens Complex SAC, Tory Hill SAC, Ballyallia Lough SPA, Lough Derg (Shannon) SPA and River Shannon and River Fergus Estuaries SPA, have the potential to be affected by the LSMATS.

Assessment of the LSMATS against the conservation objectives of each European site has indicated that, with the implementation of mitigation measures, it anticipated that the potential for adverse effects on site integrity as a result of the LSMATS would be avoided/eliminated. Throughout this plan-level assessment it has been highlighted that individual measures/projects resulting from the LSMATS will require further assessment at a project level to determine potential for LSEs and appropriate strategy to ensure that the conservation objectives of the sites are not compromised, and that site integrity can be preserved.

The conclusion of this NIS for the LSMATS is that, following detailed assessment and appropriate mitigation for protecting European sites, there will be no AESI for any European site(s), either alone or in-combination with other plans or projects.

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Appendix A. Measures Included within the LSMATS

Modes of Travel/Land Allocation	Measures
Walking	▪ **Measure WK1: Improvements to the Pedestrian Environment** - It is the intention of the NTA and the local authorities to: Develop a primary pedestrian network throughout Limerick City, Shannon and other Metropolitan towns; Retrofit neighbourhood infrastructure to enhance walkability and increase the attractiveness of walking such as permeability and passive surveillance; Lower traffic speeds to improve pedestrian safety in residential areas; Improve junctions and pedestrian crossings through measures such as pedestrian countdowns, longer crossing times and crossings that align with desire lines; and remove unnecessary signage, advertising and other obstacles which impede pedestrian movement. ▪ **Measure WK2: Limerick City Strategic Pedestrian Projects** - It is the intention of the NTA and the local authorities to: Upgrade the quality of the pedestrian environment in Limerick City Centre, including the pedestrianisation of selected city centre streets. Secure improvements to the walking network in tandem with the implementation of BusConnects to prioritise multi-modal travel. Realise the potential of the World Class Waterfront Project (inclusion of a new pedestrian/cycle bridge over the River Shannon is proposed as an element of this Waterfront Project, as well as bridges over the Abbey River). ▪ **Measure WK3: Metropolitan Town and Village Centres** - It is the intention of the NTA and the local authorities to: Complete the improvements to the pedestrian environment set out in the Shannon Town and Environs LAP; and complement the consolidation of development around existing LSMA town and village centres with public realm improvements that facilitate a greater level of safer walking trips. ▪ **Measure WK4: Local Amenity and Rural Routes** - It is the intention of the NTA and the local authorities to: Upgrade walking facilities linking green spaces, the River Shannon and other recreational areas to create green-blue corridors to promote positive physical and mental well-being, including progressing the redevelopment of the Black Bridge in Limerick and crossings of the River Blackwater; Provide and / or improve footpaths on rural roads where demand for pedestrian movement is identified. ▪ **Measure WK5: Supporting Measures for Walking** - It is the intention of the NTA and the local authorities to: Develop and implement a pedestrian wayfinding system for Limerick City Centre and Shannon; Ensure pedestrian infrastructure is inclusive and accessible for all individuals of all abilities and ages using Universal Design principles and collaboration between a diverse range of stakeholders; Deliver permeability projects throughout urban areas which reduce the distance required to travel on foot to key destinations and to public transport services. In select locations, a package of permeability projects will be developed as part of local area plans or masterplans; Undertake walkability audits at locations where demand for pedestrian activity is high and where deficiencies in the network have been identified; and continue to implement behavioural change initiatives that promote walking provided through workplaces and schools, e.g. Smarter Travel, and initiatives such as Safe Routes to School and School Streets.
Cycling	▪ **Measure CC1: Develop a Comprehensive Strategic Cycling Network** - It is the intention of the NTA and the local authorities to: Build upon the existing *Limerick Metropolitan Cycle Network Study and Shannon and Environs Local Area Plan* to deliver a comprehensive cycle network for the LSMA, in a manner consistent with the

Modes of Travel/Land Allocation	Measures
	National Cycle Manual; To deliver an integrated, fully connected high-quality cycle network linking all major origins and destinations within the LSMA; develop an Inter-Urban network connecting Limerick City, Shannon, the Metropolitan town centres and Ennis; Develop a high-quality cycle network within the Metropolitan Towns of the LSMA; Identify local opportunities for permeability and feeder routes to improve links to the primary, secondary and greenway network and enhance the attractiveness of cycling for short trips; Maintain and enhance existing infrastructure to a high standard and Cooperate with An Garda Síochána in relation to the enforcement road traffic laws as they apply to cycle tracks and lanes. ▪ **Measure CC2 Shannon River Crossing**: It is the intention of the NTA and Limerick City and County Council to: Provide significantly enhanced cycle infrastructure across the River Shannon in Limerick City Centre, via the upgrading of existing bridges and the provision of a new crossing dedicated to pedestrians and cyclists. At the project level, a full Appropriate Assessment will be carried out and will seek to ensure that the project will not adversely affect the integrity of a European site or sites and that each stage of the AA process is undertaken in full according to the Habitats Directive and all transposing legislation ▪ **Measure CC3: Bicycle Sharing Schemes** - It is the intention of the NTA and the local authorities to: Maintain the Limerick City Bicycle Sharing Scheme and expand the service where feasible based on identified potential patterns of demand; and consider the feasibility of a Dockless Bicycle Sharing Scheme in Limerick and Shannon. ▪ **Measure CC4: Long-Stay Cycle Parking** - It is the intention of the NTA and the local authorities to: Deliver high-quality on-street bicycle parking; secure sheltered public bicycle parking; and to ensure that sheltered and secure bicycle parking is provided as part of any development proposals in line with the standards set out in the *National Cycle Manual* as a minimum. ▪ **Measure CC5: End-of-Trip Facilities** - It is the intention of the NTA and the local authorities to: Ensure the provision of end-of-trip supporting facilities such as showers and lockers in new developments. ▪ **Measure CC6: Behavioural Change and Promotion** - It is the intention of the NTA and the local authorities to: Continue to foster a cycling culture in the LSMA through promotional events and behavioural change initiatives as part of the NTA's Smarter Travel Workplaces and Campuses and the An Taisce / NTA Green Schools Travel Programmes. ▪ **Measure CC7: Micro Mobility** - It is the intention of the NTA and local authorities to: Facilitate and promote the use of scooters, e-scooters and emerging personal mobility modes of travel, once legislation regularising their use is passed. This includes exploring a scooter rental scheme for Limerick City.
Bus Connects	▪ **Measure BC1: BusConnects Limerick** - It is the intention of the NTA and the local authorities to develop and deliver the BusConnects Limerick Programme. This will consist of: Changes to the service network to include: ▪ A 'branch and spine' network; ▪ Orbital routes; ▪ Additional Radial routes; ▪ Increased capacity and frequency; and

Modes of Travel/Land Allocation	Measures
	▪ Demand Responsive Transport in locations where public transport patronage is low. Greater levels of bus priority leading to shorter journey times and greater reliability, as follows: ▪ Continuous bus lanes on main radials where practicable; ▪ Bus gates in certain locations whereby only public transport vehicles and cyclists will be allowed on certain parts of the road network; ▪ Other traffic management arrangements which provide bus priority; and ▪ New bus-only links. ▪ **Measure BC1 (continued..): BusConnects Limerick** - It is the intention of the NTA and the local authorities to develop and deliver the BusConnects Limerick Programme. This will consist of: ▪ •Conversion of public transport fleet to zero carbon vehicles; and ▪ •Improvements to fares, ticketing and interchange services and infrastructure. ▪ **Measure BC3: O'Connell Street** - It is the intention of the NTA and Limerick City and County Council to remove general traffic from O'Connell Street in order to eliminate delays to bus services, and to facilitate the redevelopment of Limerick City Centre by maximising accessibility to the core. ▪ **Measure BC4: Sarsfield Bridge** - It is the intention of the NTA and Limerick City and County Council examine the feasibility of removing general traffic from Sarsfield Bridge in order to reduce delays to strategic bus services from Clare, including Shannon Airport. and North West Limerick City. ▪ **Measure BC5: Thomond Bridge and Shannon Bridge** - It is the intention of the NTA and Limerick City and County Council to examine the feasibility of providing priority for bus services using Thomond and Shannon Bridge. ▪ **Measure BC6: Bus Only Link at Colbert Station** - It is the intention of the NTA, Bus Éireann and the local authorities to examine the feasibility of a bus-only link behind Colbert Station on Roxboro Road. ▪ **Measure BC7: Short-Term Bus Network Review** - It is the intention of the NTA, Bus Éireann and the local authorities to undertake a review and implement changes to the Limerick Metropolitan Bus Service Network as part of BusConnects Limerick in order to maximise the effectiveness and efficiency of the city's public transport system. ▪ **Measure BC8: Bus Service Network Monitoring and Review -** It is the intention of the NTA, Bus Éireann to continually monitor the demand for bus services in the LSMA throughout the lifetime of the LSMATS and enhance or amend the service network as appropriate. ▪ **Measure BC9: Regional Bus Networks** - It is the intention of the NTA and the local authorities to: Maintain and enhance regional bus networks in line with the Connecting Ireland programme. ▪ **Measure BC10: Shannon Bus Connectivity** - It is the intention of the NTA and the local authorities to: Improve local and regional bus connectivity to Shannon town centre, employment areas and Airport. ▪ **Measure BC11: Local Link Services** - It is the intention of the NTA and the local authorities to: Maintain and enhance Local Link services where required.

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	▪ **Measure BC12: Local Link Services** - It is the intention of the NTA and the local authorities to: Examine the need for bus priority in Metropolitan Towns and Villages across the LSMA and provide for it where required. ▪ **Measure BC13: Bus Stops and Shelters** - It is the intention of the NTA and the local authorities to Continue to roll-out the program of bus stop and shelter provision, and to monitor potential for further expansion and upgrade during the lifetime of the strategy. ▪ **Measure BC14: Coach Management Strategy** - It is the intention of the NTA and the local authorities to: Produce a Coach Management Strategy to support growing visitor numbers. ▪ **Measure BC15: Supporting Measures** - It is the intention of the NTA and the local authorities to: Deliver supporting measures to complement the implementation of BusConnects Limerick and improved regional services.
Rail	▪ **Measure RL1: InterCity Services** - It is the intention of the NTA and the local authorities to work in collaboration with Iarnród Éireann and other relevant stakeholders to: Improve InterCity services, particularly journey times between Dublin, Limerick Junction and Cork. ▪ **Measure RL2: Dual Track from Limerick Colbert to Limerick Junction** - It is the intention of the NTA, Iarnród Eireann and both local authorities to work in collaboration to: Provide a dual-track between Limerick Colbert and Limerick Junction to facilitate improved national and regional connectivity and improve service frequency in line with increased demand. ▪ **Measure RL3: Limerick Commuter Rail Network** - It is the intention of the NTA, in conjunction with Irish Rail, Southern Regional Assembly, Limerick City and County Council and Clare County Council, to: Provide investment in the Phase 1 Rail Network for the LSMA as follows: ▪ A new rail station at Moyross as demand for travel increases in line with the regeneration of this area; ▪ A new rail station at Ballysimon, including Park and Ride; ▪ Review the potential for additional stations on an on-going basis; ▪ Improve the frequency of services on the Ennis Rail Line to provide for an efficient and effective commuter rail service in the long term; and, ▪ Improve the frequency of services on the Nenagh-Ballybrophy line as demand for travel increases. Undertake the following in relation to the provision of the Phase 2 Rail Network for the LSMA: ▪ In cooperation with the Southern Regional Assembly and the local authorities, seek to develop land use policies for implementation via the RSES and Development Plans which focus development in the LSMA, and the wider region, on the rail network in order to deliver Transit-Oriented Development and support further investment in suburban rail; and, ▪ Examine the feasibility of providing the full commuter rail network for the LSMA, including the re-use of the Foynes and Mungret lines; a new line to Shannon; and new stations at appropriate locations integrated with high density Transit-Oriented Development.

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	▪ **Measure RL4: Foynes Line and Rail Freight** - It is the intention of the NTA and Iarnród Eireann to: Reinstate the Limerick to Foynes railway line to provide a freight service. ▪ **Measure RL5: Rail-Based Park and Ride** - It is the intention of the NTA and the local authorities to work in collaboration with Iarnród Éireann and other relevant stakeholders to: Provide a rail-based Park and Ride station at Ballysimon to reduce traffic levels on the N24 approach to Limerick City in line with the provision of increased service frequencies; and Investigate the potential for further Park and Ride facilities where the strategic road network meets high-frequency rail services. ▪ **Measure RL6: Colbert Station Redevelopment** - It is the intention of the NTA and the local authorities to work in collaboration with Iarnród Éireann and other relevant stakeholders to: Complete the redevelopment of Colbert rail and bus station to provide a more attractive, secure and comfortable experience for passengers, in line with the project developed by Irish Rail and the NTA; and Examine the feasibility of a bus-only link behind Colbert Station on Roxboro Road and enhanced improved pedestrian, cycle and bus connectivity to the City Centre. ▪ **Measure RL7: Supporting Rail Infrastructure** - It is the intention of the NTA, Iarnród Eireann and other relevant stakeholders to: Enhance the attractiveness and efficiency of LSMA rail services through improvements to Sixmilebridge and Castleconnell stations, signalling improvements and completing the National Train Control Centre. ▪ **Measure RL8: Flood Management at Ballycar** - It is the intention of the NTA and the local authorities to work in collaboration with Iarnród Éireann and other relevant stakeholders to: Resolve the localised flooding issue on the Limerick-Ennis line at Ballycar. ▪ **Measure RL9: Electrification and Alternative Fuelling** - It is the intention of the NTA and the local authorities to work in collaboration with Iarnród Éireann and other relevant stakeholders to: Progress the electrification of the Rail Network in line with the Climate Action Plan 2019; and transition to electric/hybrid train fleet for the provision of lower emission train services. ▪ **Measure RL10: Rail Lines and Greenways** - It is the intention of the NTA and the local authorities to work in collaboration with Iarnród Éireann and other relevant stakeholders to: Examine the feasibility of the provision of new greenways either within disused rail lines or immediately adjacent to existing or proposed rail corridors.
Land Use, Regeneration and Schools.	▪ **Measure LU1: Colbert Lands** - It is the intention of the NTA and Limerick City and County Council to: Collaborate closely with Bus Éireann, Iarnród Éireann and the landowners such as the HSE and LDA, in maximising the development potential of the lands at Colbert Station. ▪ **Measure LU2: City Centre Revitalisation** - It is the intention of the NTA to: Support and facilitate the revitalisation of Limerick City Centre as the regional focus for economic, social and cultural activity and as a location for high density residential development. ▪ **Measure LU3: Principles for the Integration of Land Use and Transport Planning** - In order to promote public transport, walking and cycling across the LSMA, it is the intention of the local authorities to: Consolidate development into town and village centres in accordance with the 15-minute city and neighbourhood concept; Consolidate development around existing and proposed public transport services and facilities; Increase densities in future residential and employment developments; Prioritise mixed-use development which reduces the need to travel; Ensure that all new development areas will be fully permeable for pedestrians and cyclists through

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	the application of the principle of filtered permeability whereby through traffic by private car is discouraged; Deliver schemes to improve permeability for walking and cycling in existing developed areas; and Ensure that the layout of new developments will prioritise walking and cycling and enable the efficient provision of public transport services. ▪ **Measure LU4: Public Transport for Regeneration Areas** - It is the intention of the NTA, in collaboration with Limerick City and County Council and other stakeholders, to identify and deliver improvements to the public transport offer in the regeneration areas, including: Service improvements; Public transport information enhancement; Improvements to waiting facilities; Measures to enhance personal security; and Closer engagement with local communities. ▪ **Measure LU5: Walking and Cycling in Regeneration Areas** - It is the intention of the NTA, in collaboration with Limerick City and County Council and other stakeholders, to identify and deliver specific improvements to walking and cycling infrastructure in regeneration areas, based on those measures identified in the Regeneration Framework Plan, including: Cycle tracks; Greenways; Opening up of new walking and cycling links to improve permeability within regeneration areas and between regeneration areas and surrounding neighbourhoods; and Cycle parking at retail outlets, public transport stops, and other services. ▪ **Measure LU6: New Roads to serve Regeneration Areas** - The NTA and Limerick City and County Council will seek to: Deliver new road schemes in regeneration areas to cater for enhanced public transport where requirements are identified, or where there is a socio-economic imperative to provide such connections. ▪ **Measure LU7: Thomond Weir** - It is the intention of the NTA and Limerick City and County Council to: Redevelop the Thomond Weir to directly link St. Mary's Park westwards enhancing connectivity to the north west of Limerick City, including Limerick institute of Technology and Thomond Park. At the project level, a full Appropriate Assessment will be carried out and will seek to ensure that the project will not adversely affect the integrity of a European site or sites and that each stage of the AA process is undertaken in full according to the Habitats Directive and all transposing legislation. ▪ **Measure LU8: Links to Moyross** - It is the intention of the NTA and Limerick City and County Council to: Significantly improve pedestrian and cycle accessibility at various points between Moyross and Cratloe Road. ▪ **Measure LU10: Location of New Schools** - The local authorities will endeavour to ensure that Development Plans and Local Area Plans provide for the development of new schools only in locations where access for pupils is maximised by walking and cycling. ▪ **Measure LU11: Design of New Schools** - The local authorities will ensure that the detailed design of new schools will be undertaken in a manner which maximises the priority for pedestrians and cyclists in terms of access arrangements, and the location and quantum of car and bicycle parking. ▪ **Measure LU12: Green Schools Travel** - The NTA will continue to: Expand the Green Schools Travel Module in conjunction with An Taisce in order to promote alternatives to the private car for school travel across the LSMA through their broad range of behavioural change initiatives, such as walking buses, walkability audits, park and stride, cycle training, cycling days and so on.

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	▪ **Measure LU13: Other Behavioural Change Initiatives** - The NTA and the local authorities will: Support organisations seeking to implement other behavioural change initiatives in the LSMA, such as the Limerick Cycle Bus, and take their feedback into account in decisions around infrastructural investment. ▪ **Measure LU14: NTA Safe to School Programme** - Under our National Safe Routes to School programme, the NTA and the local authorities will prepare a programme of works aimed specifically at providing safe walking and cycling environments to schools in the LSMA, including School Streets; School Zones; Reduced Speed limits; Park and Stride; and Additional cycle and scooter parking.
Urban Design and Placemaking	▪ **Measure UD1: Supporting Sustainable Mobility** - It is the intention of the NTA, and the local authorities to: Reallocate road space in Limerick, Shannon and other Metropolitan Centres to prioritise walking, cycling and public transport use; Manage the road network to discourage through-traffic in built-up areas; and Prioritise the placemaking functions of the urban street network in line with the hierarchy outlined in DMURS. ▪ **Measure UD2: Traffic Management in Limerick City and Metropolitan Centres** - It is the intention of the NTA and the local authorities to: Manage the road network to discourage through-traffic in built-up areas; Prioritise the placemaking functions of the urban street network in line with the hierarchy outlined in DMURS; Undertake public realm improvements in Limerick City Centre in tandem with a City Centre Traffic Management Plan and the emerging City Centre Public Realm Strategy, that are sensitive to their historic setting; Undertake public realm improvements in Metropolitan town and provide bus priority. ▪ **Measure UD3: Accessibility and Inclusion** - It is the intention of the NTA and the Local Authorities to: Ensure that all transport schemes incorporate high-quality urban realm design that is attractive, safe, comfortable, and accessible for all individuals. ▪ **Measure UD4: Legibility and Wayfinding** - It is the intention of the NTA and the local authorities to: Ensure high-quality public realm and streetscape design that is attractive, comfortable, and accessible for all individuals; and Enhance the wayfinding systems in Limerick (preparation of Strategy has commenced), Shannon and other key destinations throughout the LSMA.
Roads and Demand Management	▪ **Measure RS1: Road and Street Network** - It is the intention of the NTA, TII and the local authorities to: Maintain, manage and operate the existing road infrastructure in a more efficient manner. ▪ **Measure RS2: Supporting Sustainable Mobility** - It is the intention of the NTA, TII and the local authorities to: Better manage the road network to protect the function of the strategic road network and to minimise use of the private car for short journeys. ▪ **Measure RS3: Principles for the Provision of New Roads** - It is the intention of the NTA, TII and the local authorities that: Subject to the feasibility and environmental assessment process, new roads, where provided, will be developed in accordance with the principles and measures outlined in this chapter. ▪ **Measure RS4: National Roads** - It is the intention of the NTA, TII and the local authorities to: Retain and protect the strategic function of the National Road network; Complete the appraisal process and deliver the N/M20 Cork to Limerick Scheme; Reduce peak time congestion on the N18/N19 network at Shannon and progress the upgrade of the N19; Construct the N69/M21 Foynes to Limerick Road (including Adare Bypass) to TEN-T standard. Complete the feasibility and route selection process

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	and seek to progress the appraisal and delivery of a transport solution for the N24 corridor. ▪ **Measure RS5: Limerick Northern Orbital Transport Corridor** - It is the intention of the NTA and local authorities to: Reserve the alignment of the Limerick Northern Distributor Road for future potential use as a Northern Orbital Transport Corridor. ▪ **Measure PK1: Strategic Park and Rides** - It is the intention of the NTA and local authorities to: Implement a network of strategic Park and Ride facilities, served by high-frequency public transport services, and walking and cycling networks. ▪ **Measure PK2: Mobility Hubs** - It is the intention of the NTA and local authorities to: Determine the feasibility of mobility hubs to support Public Transport Orientated Development and low car regeneration sites. ▪ **Measure PK3: Parking Management** - It is the intention of the NTA and the local authorities to better manage parking in the following ways: Implement maximum car parking standards for all new developments; Seek car-free and low car development in central and accessible areas; Repurpose car parking areas to support bus priority, cycle lanes, footpath widening, street trees and placemaking features; Support the gradual reduction of long-stay on-street parking in urban centres; Support the redevelopment of off-street parking for higher value uses including residential and employment; and Examine the case for a Workplace Parking Levy and charges on internet shopping deliveries and out-of-town shopping centres.
Freight Delivery and Servicing	▪ **Measure FDS1: HGV Restrictions** - It is the intention of the NTA and the local authorities to: Identify specific lorry routes and/or time restrictions, to reduce peak-time HGV movements through Limerick City and neighbourhoods. ▪ **Measure FDS2: Local Freight Management** - It is the intention of the NTA and the local authorities to: Examine the feasibility of consolidation centres and break-bulk facilities outside of the National Road network in the medium-term, to facilitate smaller vehicles delivering to Limerick City Centre. ▪ **Measure FDS3: Rail Freight** - It is the intention of the NTA and the local authorities, in conjunction with Irish Rail and Shannon Foynes Port Company, to: Investigate the feasibility of rail freight from the Port of Foynes to Limerick and further afield over the lifetime of the LSMATS. ▪ **Measure FDS4: Regional Freight Strategy** - It is the intention of the NTA, Southern Regional Assembly and the local authorities to: Support the development of a Regional Freight Strategy to accelerate the decarbonisation of the freight sector, integrate smart technologies in logistics management and reinforce the important role that the strategic rail and road network play in efficiently moving freight. ▪ **Measure FDS5: Delivery and Servicing Strategy** - It is the intention of the NTA and the local authorities to: Reduce the amount of 'last mile trips' being made by motorised vehicles; Facilitate the transition to zero-emission delivery vehicles such as cargo bikes, solar powered and electric vehicles; and Support local 'Click and Collect' facilities where appropriate to minimise trips to individual homes and workplaces.
Supporting Measures and Integration	▪ **Measure SM1: Local Transport Plans** - It is the intention of the NTA and the local authorities to: Develop Local Transport Plans to translate LSMATS at city or Metropolitan town centre level based on the NTA/TII ABTA guidance note. ▪ **Measure SM2: Regional Transport Hubs** - It is the intention of the NTA and the local authorities to: Support Ennis, Nenagh and Tipperary Town as a Regional Transport Hubs.

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	▪ **Measure SM3 - Walking and Cycling Officers** - It is the intention of the NTA and the local authorities to: Appoint a dedicated Walking and Cycling Officer within each Local Authority. ▪ **Measure SM4: Behavioural Change and Smarter Travel** - It is the intention of the NTA and the local authorities to: Continue to implement behavioural change initiatives and marketing campaigns to support LSMATS objectives. ▪ **Measure SM5: Technology for Sustainable Transport** - It is the intention of the NTA and the local authorities to: Investigate the potential for Mobility as a Service (MaaS) systems to facilitate sustainable transport; Examine the case for innovation and increased provision of car clubs to reduce the need for private car ownership; Investigate the feasibility of dynamic parking and loading systems; Facilitate the transition to Electric Vehicles and other low emission vehicles; and Monitor the evolution of Autonomous Vehicles; assess the benefits (or otherwise) of their likely impact on street space, public transport provision, legislation requirements, and the desirability of prioritising Active Travel. ▪ **Measure SM6: Small Public Service Vehicles** - It is the intention of the NTA, local authorities and other stakeholders to: Investigate the growing use of smartphone technology to consider the need for permanent taxi ranks; Prioritise the conversion of public service vehicles to low or zero emission technology; Provide better integration with the public transport network; and Ensure that new public service vehicles are fully accessible. ▪ **Measure SM7: Late Night Transport** - It is the intention of the NTA, the local authorities and other stakeholders to: Review existing public transport timetables and expand late night service offerings; and Improve the taxi system including the facilitation of new technologies. ▪ **Measure SM9: Interchange** - It is the intention of the NTA, the local authorities and other relevant stakeholders to: Deliver high-quality interchange points throughout the LSMA to enable seamless transfer between different modes and services. ▪ **Measure SM10: Information** - It is the intention of the NTA and the local authorities to: Provide clear and legible information regarding the transport network, including timetables, RTPI, and wayfinding interchange locations; and Investigate the potential for Mobility as a Service (MaaS) systems to facilitate sustainable transport. ▪ **Measure SM11: Smart Ticketing** - It is the intention of the NTA and the local authorities to: Upgrade and integrate the ticketing system across public transport in tandem with BusConnects Limerick; and Investigate the possibility of integrating Leap card with other transport modes such as Limerick Bikes and Car Clubs. ▪ **Measure SM12: Public Transport Fares** - It is the intention of the NTA and the local authorities to: Review the public transport fare structure in tandem with the implementation of BusConnects Limerick. ▪ **Measure SM13: Transport Equity** - It is the intention of the NTA, in collaboration with local authorities and other stakeholders, to identify and deliver improvements to ensure transport equity in the LSMA, including: Ongoing engagement with local communities; Improvements to walking, cycling and public transport infrastructure and services in regeneration areas and improved connectivity to the wider region; and Continuing to improve the interface between the transport system and persons of all ages and abilities in line with universal access design principles.