



Chapter 15

Socio-economics

Regeneris Consulting

March 2018

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15 Socio-economics

15.1 Introduction

1. This chapter of the EIA Report presents an assessment of the potential socio-economic impacts arising from the construction, operation and decommissioning of the Project, as detailed in Chapter 4: Project Description.
2. The socio-economic assessment focuses only on the impacts related to the offshore elements of the Project, excluding commercial fisheries subject to a more focussed assessment in chapter 10. All onshore activities were assessed in a separate EIA which accompanied the planning application for the onshore transmission works (NnGOWL, 2012).
3. The assessment is based upon a combination of the understanding of the Project in terms of the potential for impact and the resultant effects on receptors in the identified study areas (as detailed in Section 15.3).
4. This chapter is comprised of the following elements:
 - A summary of relevant guidance, policy and legislation;
 - Details of the data sources used to characterise the Local Study Area;
 - A summary of the relevant consultations with stakeholders;
 - A description of the methodology for assessing the impacts of the Project, including details of the receptors and study areas, and approach to the assessment of potential effects;
 - A review of the baseline conditions;
 - A description of the worst case design scenario relevant to the socio-economic receptors;
 - An assessment of the likely significant effects for the construction, operation and decommissioning phases of the Project, including cumulative effects;
 - Identification of any further mitigation measures in respect of any significant effects; and
 - A summary of the residual impact assessment determinants taking account of any additional mitigation measures identified.

15.2 Legislation, Guidance and Policy Review

15.2.1 Legislation and Guidance

5. There is no specific Scottish Government legislation relevant to the assessment of the socio-economic impacts of offshore wind developments in Scotland.
6. HM Treasury guidance as set out in the Green Book (HM Treasury, 2013) will be used to assess the economic impacts resulting from the development of the Project.
7. The importance of economic benefit is identified in Scottish Planning Policy (Scottish Government, 2014a, P40) which states proposals for energy infrastructure development will need to consider *“net economic impact; including local and community socio-economic benefits such as employment, associated business and supply chain opportunities”*.

15.2.2 National Strategic Policy Context

15.2.2.1 Scottish Planning Policy (Scottish Government, 2014d)

8. One of the core values of the Scottish Planning Policy (SPP) is *“to play a key role in facilitating sustainable economic growth, particularly the creation of new jobs and the strengthening of economic capacity and resilience within communities”* (Scottish Government, 2014d). The Scottish Government’s vision is to achieve sustainable, distributable and fair growth without compromising *“the quality of environment, place and life”*, with an emphasis on reducing emissions.
9. Within the document, there are four planning outcomes, which underpin the vision. Two of which are of direct relevance to this chapter:
 - **Outcome 1: A successful, sustainable place** - Supporting sustainable economic growth and regeneration, and the creation of well-designed, sustainable places.
 - **Outcome 2: A low carbon place** - reducing our carbon emissions and adapting to climate change.
10. Sustainable development is widely encompassing, including infrastructure that focuses on net economic benefits but of most relevance to this chapter, those that support climate change mitigation and adaptation.

15.2.2.2 National Planning Framework (NPF) 3 (Scottish Government, 2014c)

11. One of NPF3’s aims is to support the diversification of the energy sector and identifies *“a low carbon place”* as one of four strategic objectives which define its vision for Scotland. The spatial strategy intends to reduce greenhouse gas emission and assist in adapting to climate change. This is in line with the Climate Change (Scotland) Act 2009, which targets a reduction of Scotland’s emissions by 42% by 2020, and 80% by 2050.
12. The role of offshore renewables in delivering this objective is recognised throughout NPF3, including:
 - The promotion of Scotland as a ‘world leader’ in offshore renewable energy;
 - Offshore renewables-related electricity transmission infrastructure development given the highest-tier ‘national development’ designation, recognising the national need for, and significance of, such development;
 - Similar national development designation for development at Dundee Waterfront, including that relating to a low carbon economy;
 - Cockenzie and the forth coast to Torness identified as an area of co-ordinated action with significant potential for renewables-related investment; and
 - Identification of the Fife Energy Corridor between Methil and Longannet as having potential for significant investment in energy-related business development.

15.2.2.3 Scottish Energy Strategy: The future of energy in Scotland (Scottish Government, 2017)

13. The vision, set out in the strategy, is one that focuses on the development of renewable energy to bring about socio-economic benefits: *“A strong low carbon economy – sharing the benefits across our communities, reducing social inequalities, and creating a vibrant climate for innovation, investment and high value jobs”*. A key part of the vision is delivering inclusive growth from secure, reliable, and affordable energy.
14. Specifically, with regard to the future development of offshore wind, there is a stated commitment to *“continue to support innovation and cost-reduction, through our Enterprise Agencies and partners”*.

15.2.2.4 Low Carbon Economic Strategy (Scottish Government, 2010a)

15. Similar to the Scottish Energy Strategy, the Low Carbon Economic Strategy also aims to deliver on the promises made in the Climate Change Act (Scotland) 2009, to attain sustainable growth, and to transition to a low carbon Scotland.
16. Offshore wind is highlighted as an area of strong potential to attract large investment and create jobs – *“The large scale development of offshore wind represents the biggest opportunity for sustainable economic growth in Scotland for a generation”* (P47) To enable the sector, the Scottish Government will aim to reduce barriers, change regulation, outline route maps, advocate innovation, and market the sector.

15.2.2.5 National Renewables Infrastructure Plan 1 - 2 (Scottish Enterprise & Highlands and Islands Enterprise, 2010b)

17. The National Renewables Infrastructure Plans’ aims are to develop an actionable framework to deliver on the growing offshore renewables sector.
18. The Stage 1 report maps out the existing and potential locations for renewable infrastructure, and highlights spatial areas of expertise (Scottish Enterprise & Highlands and Islands Enterprise, 2013a).
19. The Stage 2 report builds on this and explores an investment plan to deliver on the first phase, involving local community, enterprise and planning authority engagement, investment propositions, and identification of funding streams (Scottish Enterprise & Highlands and Islands Enterprise, 2013b).

15.2.2.6 2020 Routemap for Renewable Energy in Scotland (Scottish Government, 2011a) and Electricity Generation Policy Statement (Scottish Government, 2013)

20. The Routemap, an update on the Scottish Renewables Action Plan 2009, outlines a set of actions to meet 100% gross annual electricity consumption from renewable energy by 2020, with an interim target of 50% by 2015. As of 2014, nearly 50% of electricity consumption came from renewables (The Scottish Government, 2015). The Scottish Government’s 2020 Routemap and Electricity Generation Policy Statement note that, between 2010 and 2020, renewable energy in Scotland could provide:
 - Up to 40,000 jobs (Skills Development Scotland, 2011) and £30 billion investment to the Scottish economy; and
 - A transformational opportunity for local ownership and benefits.
21. Further, offshore wind represents the biggest opportunity for sustainable economic growth in Scotland for a generation, potentially supporting up to 28,000 directly related jobs and a further 20,000 indirect jobs and generating up to £7 billion for the Scottish economy by 2020.
22. Recent ONS (2017) estimates found there were approximately 31,000 direct jobs and 27,500 indirect jobs, totalling 58,500, in 2015, related to low carbon and renewable energy group activity.

15.2.2.7 Low Carbon Scotland: Meeting the Emissions Reduction Targets 2010-2022 (Scottish Government, 2011b)

23. The report outlines actions that can be taken to achieve greenhouse gas emission reduction targets as set out in the Climate Change (Scotland) Act 2009. It draws together existing policies and interventions and highlights those that will play a major role in driving Scotland to its carbon reduction target.
24. The potential economic benefits are as follows:
 - In 2008-09, Scotland’s low carbon market was worth around £8.8 billion and was forecast to rise to around £12 billion by 2015-16; and

- Jobs in the low carbon sector in Scotland could grow by 4% a year to 2020, rising by 70,000 jobs, which would account for over 5% of the Scottish workforce.

25. ONS (2017) estimated, in 2015, the total direct turnover in low carbon and renewable energy group activity within Scotland was worth £5.5bn and indirect turnover £5bn, in total £10.5bn.
26. It must be noted the majority of the Project impacts are likely to be realised beyond the target period as stated in the report; however the Project will affect successor policies.

15.2.2.8 Scotland's Offshore Wind Route Map (Offshore Wind Industry Group, 2013)

27. The Route Map highlights the aim of the Offshore Wind Industry Group, in partnership with the Scottish Government, national representative bodies and enterprises, to develop the industry to its full economic potential. It explains that since the publication of the 2010 road map, significant progress has been made on areas such as infrastructure, investment and innovation. However, the Route Map notes concerns that progress has been limited because of unclear sector-wide signals from the UK government and uncertainty surrounding key policies such as the electricity market reform.

15.2.2.9 2015-2018 Business Plan: Building Scotland's International Competitiveness (Scottish Enterprise, 2015)

28. The business plan contains a framework built around creating sustainable growth, the purpose of which is to create opportunities for all and, by doing so, reduce inequality. Scottish Enterprise will attempt to assist key sectors, including offshore wind, in taking advantage of global opportunities.

15.2.2.10 Oil and Gas 'Seize the Opportunity' Guide – Offshore Wind (Scottish Enterprise, 2016)

29. The guide's aim is to encourage diversification within the oil and gas industry into the offshore wind sector. Many of the infrastructure and resources used in oil and gas are similar to that used in offshore wind, whilst the skills developed are also transferrable.

15.2.3 Regional Strategic Policy Context

15.2.3.1 SESplan (and Proposed SESplan) (Strategic Development Planning Authority for Edinburgh and South East Scotland, 2013)

30. The Strategic Development Plan for South East Scotland ('SESplan') sets out strategic planning policy for South East Scotland, including City of Edinburgh, Fife (in part) and East Lothian Council areas. Sustainable economic development is a key component of the SESplan Vision.
31. At a number of points throughout the document, SESplan identifies the potential of the region to support the offshore wind sector, with ports and harbours including Leith and Rosyth identified as potential manufacturing locations. Furthermore, Policy 10 specifically identifies the role of offshore wind as part of a sustainable energy future, whilst also highlighting the potential economic development significance of associated supply chain developments.
32. The process to replace SESplan is underway, with consultation on a Proposed Strategic Development Plan ('Proposed SESplan') undertaken in October 2016. Proposed SESplan identifies the strategic role of a low carbon economy in the future of the areas, whilst also identifying "*serviceable ports to support offshore renewables*" as a specific economic development opportunity. At the time of writing, an Examination into Proposed SESplan is currently underway.

15.2.3.2 TAYplan (Strategic Development Planning Authority for Dundee, Angus, Perth and North Fife, 2017)

33. The TAYplan Strategic Development Plan for ('TAYplan') sets out strategic planning policy for the Dundee City Region, including Dundee City, Fife (in part) and Angus Council areas. As is the case with SESplan, the promotion of sustainable economic growth is fundamental to the delivery of TAYplan objectives.
34. TAYplan expects Dundee and Montrose Ports to contribute significantly towards the UK's east coast energy cluster and encourages such a role through the identification of strategic energy opportunities, including a series of hubs for development and investment in renewable energy. Policy 10 compels Local Development Plans to encourage and facilitate economic growth in offshore-renewables related ports and harbours development.

15.2.4 Local Policy Context

15.2.4.1 Angus Council

35. The Angus Local Development Plan (LDP) (Angus Council, 2016) supports the national and regional strategic policy vision of a low carbon economy. A specific policy, PV9, within the plan, emphasises the council's support for the development of renewable energy infrastructure.
36. Within Angus' Economic Development Strategy 2013-2020 (Angus Council, 2013), the council highlights the sector as one of three opportunity industries. Not only does the area have many local strengths, transferrable from the oil and gas industry, it has a strong potential to form supply chain clusters within the region. To fully realise the opportunity, the council plans to work with relevant stakeholders to develop awareness within the sector.

15.2.4.2 City of Edinburgh Council

37. Edinburgh's LDP (City of Edinburgh Council, 2016) sets out the policies guiding development in the area, in accordance with the SESplan Vision. It supports the Climate Change (Scotland) Act 2009 agreements and highlights Leith Docks as a prime location for the offshore renewable industry.
38. Edinburgh's first Sustainable Energy Action Plan (City of Edinburgh Council, 2015) has a clear aim of achieving a 42% reduction in carbon emissions by 2020, in line with the national target under the Climate Change (Scotland) Act 2009. The plan involves five programmes, which target a range of factors from energy efficiency to district heating. The renewables programme aims to increase the use of renewable energy across the economy. The council intends to publish new policies on renewables, and assess the potential for growth in the sector; however, the focus is on smaller scale projects.
39. The council's Economic Strategy for 2012-17 (City of Edinburgh Council, 2012) aims to generate growth and create jobs alongside improving quality of life. It envisions a strong, sustainable and prosperous future for the area, which can be achieved by tapping into the job potential in the renewable energy sector. One of their priority outcomes, for the 2012-17 period, is for Edinburgh and Fife to be established among Scottish centres of excellence in renewable energy and to support innovation from higher education spin-outs in the sector.
40. The Edinburgh and South East Scotland City Region Deal is a key component of Edinburgh's medium / long-term economic development strategy. As part of the City Region Deal, investment in infrastructure is recognised as an essential contributor towards a successful economy.

15.2.4.3 Dundee City Council

41. Pursuant to TAYplan, the Dundee City LDP (Dundee City Council, 2013) establishes a spatial strategy underpinning future development across the city to 2024. The LDP identifies renewable energy sector

as a key growth sector for the local authority, with a strong emphasis on developing and growing the offshore wind sector.

42. In the LDP, the Port of Dundee is defined as a Principal Economic Development Area, which is identified as being of city wide importance and safeguarded for specific development. The plan explicitly expresses the council's support for the production of energy from wind turbines.
43. A replacement Dundee LDP, Dundee LDP2, has reached Proposed Plan stage, with community consultation undertaken from August 2017. Dundee LDP2 is similarly supportive of investment in the renewable energy sector and continues to promote the Port of Dundee as a strategically significant location for the industry.
44. Dundee Partnership's (2013) Action Plan sets out its programme for development for the 2013-17 period. Outcome 1H of the report aims to make Dundee a leading centre for the offshore renewables industry in the UK.

15.2.4.4 East Lothian Council

45. The East Lothian Local Plan (East Lothian Council, 2008) is aged and pre-dates much of the offshore renewables-related activity which has taken place in the area over recent years. Notwithstanding, the economic development credentials of the Local Plan are underpinned by the promotion of sustainable economic development as one of three primary objectives.
46. A replacement plan, the East Lothian LDP, is currently being prepared pursuant to SESplan. Consultation on the Proposed LDP was undertaken in late-2016 and the Plan is currently the subject of Examination by Scottish Government Reporters. The Proposed LDP (East Lothian Council, 2016) identifies an Area of Co-ordinated Action between Cockenzie and Torness, which is considered to have significant potential to support the offshore renewables sector.
47. East Lothian Council's Economic Development Strategy for 2012-22 (University of Glasgow, 2012) aims to identify areas of strength and opportunity which can drive sustainable economic competitiveness. Within the document, it highlights renewable energy as a key sector and an area of opportunity. In total, there are six strategic projects, which will be used to achieve their goals. Strategy Project 1 is to agree and resource implementation plans for all key sectors. The renewables implementation plan will detail how best to work with South East Scotland local authorities and East Coast Renewables to develop an interlinked approach.

15.2.4.5 Fife Council

48. Fife Council's LDP, FIFEplan (Fife Council, 2017), outlines its support for investment in the Fife Energy Corridor, a series of coastal locations considered to have potential for future roles as part of the offshore renewables manufacturing and supply chains. FIFEplan recognises the regional significance of the Fife Energy Corridor to the offshore renewables sector and also the significance of the sector to the sustainable growth of the Fife economy.
49. Fife's Economic Strategy (Fife Council *et al.*, 2017) lists the renewable energy industry as a key sector to the local economy, a sector considered as important in achieving their vision for sustainable growth. The council plans to focus its efforts on internationalising, investing and encouraging innovation in the industry to continue building on Fife's competitive advantage.

15.3 Data Sources

50. The assessment considers the potential interaction between the Project, as described in Chapter 4: Project Description, and socio-economics receptors within the Local Study Area.
51. The Local Study Area under analysis in this chapter refers to those areas surrounding the Development Area that will be impacted by the construction, operations and maintenance, and decommissioning of

the Project. The Local Study Area in consideration is the combined local authorities of Angus, City of Edinburgh, Dundee, East Lothian and Fife, shown in Figure 5.1.

52. Impacts in a National (Scotland) Study Area for Scotland have also been assessed.
53. Baseline characterisation and model data has been collated combining a thorough desk-based study of extant data supplemented with a series of consultations with the various impacted local authorities and relevant enterprise organisations.

Table 15-1 Data Sources for Baseline

Data Source	Data Name	Overview
Office for National Statistics	Annual population survey (APS)	A UK household survey covering a range of socio-economic variables such as employment, housing, ethnicity, religion, health and education.
	Annual survey of hours and earnings, workplace and residence based	Data on levels and distribution of earnings and hours worked for UK employees in all industries and occupations.
	Business register and employment survey	Data on office based employee and employment estimates by geography and industry.
	Business demography	Annual publication covering business births and deaths, survival rates and stock.
	Claimant count by sex and age	Monthly measure of the number of people claiming unemployment related benefits.
	Mid-year population estimate	Annual population estimates for the UK by sex and age down to local authority levels.
	Regional GVA (Gross Value Added) (income approach) at current basic prices	Primary measure of GVA – value of the economy due to the production of goods and services.
Scottish Government	Scottish index of multiple deprivation	An index that identifies deprivation levels across a number of domains such as barriers to employment or access to local amenities.

15.4 Relevant Consultations

54. As part of the EIA process, NnGOWL has undertaken a number of consultations with various statutory and non-statutory stakeholders. A formal scoping opinion was requested from MS-LOT following submission of the Scoping Report. Ongoing consultation with stakeholders continued post-scoping

and responses have been used to develop an appropriate methodology and parameters for assessment.

55. In response to NnGOWL's request, MS-LOT issued a Scoping Opinion identifying a number of receptors that could not be scoped out of the assessment at this stage following review of the Scoping Report. The comments to be considered further within this EIA, in respect of the socio-economics assessment, are summarised in Table 15-2.

Table 15-2 Summary of consultations related to socio-economics

Date and consultation phase / type	Key Stakeholder comments	Section where comment addressed
Scoping Opinion (September 2017)	<p>The Scoping Report recommended the socio-economic impact on tourism be scoped out as the baseline from the Original EIA remained valid and any effects from the Project, for up to 54 turbines, compared to up to 125 turbines in the previous application, would be lessened as a result.</p> <p>The Scottish Ministers agree that the effect on tourism can be scoped out.</p>	This comment does not need to be addressed further – the baseline and impacts on tourism have been scoped out
Scoping Opinion (September 2017)	Scottish Ministers agree with the proposed approach to assessing the potential effects on GVA and employment.	This comment is addressed in Section 15.5 'Impact Assessment Methodology'
Consultation with Angus Council (July 2017)	<p>Angus Council representative feels that the area possesses a port and a strong civil engineering core, which can assist in and benefit from the development of the Project.</p> <p>Distance from Development Area may mean local supply chain may not be engaged, many of whom are sceptical and unaware of the opportunities that are available. History of wind farm development in the North Sea have not seen many opportunities realised.</p> <p>The Project is a positive for the environment and is a strong contributor to meeting carbon emission targets. It further acts as an opportunity for skills and sector development.</p>	This comment is addressed in Section 15.7.1 'Embedded Mitigation'.
Consultation with City of Edinburgh Council	NnGOWL, and their technical consultants, were unable to schedule a consultation with a representative of the strategy team from the City of Edinburgh Council after initial contact was made through email.	N/A

Date and consultation phase / type	Key Stakeholder comments	Section where comment addressed
Consultation with Dundee City Council (August 2017)	<p>Dundee City Council’s representative stated that Dundee is an ideal location from which to centre development. There is the port, which already services the wider energy sector; strong history in engineering; local to higher and further education institutions providing strong future labour supply and R&D; and proximity to other developing wind farms.</p> <p>With the gradual downturn in oil and gas industry, the effects of which have impacted Dundee, the wind farm sector is well received and supported, with many local skills gained in the traditional energy sector transferrable to renewables. There are schemes such as Energy Training East and Tayside Engineering network, which are readily identifying the future skills needs and addressing these gaps to meet future demand and support local growth.</p> <p>There are a host of businesses ready to seize on the potential opportunities arising from the Project. Recent supply chain events, hosted by Mainstream Renewable Power (MRP), have raised awareness of the availability of opportunities but more can be done to engage the local supply chain (tier three) in specifically outlining where they can support the higher tier firms.</p>	This comment is addressed in Section 15.7.1 ‘Embedded Mitigation’.
Consultation with East Lothian Council (July 2017)	<p>East Lothian is predominantly comprised of small and medium sized enterprises (SME). There are some growing companies, which would be interested in partaking in the development of the Project.</p> <p>The Council is keen to take advantage of the growing number of opportunities in the offshore wind sector – the sector plays a major role in local plans. There is a need to make businesses more aware of these opportunities and provide support in the tender process to improve success rate of winning contracts. Developers can assist in this process by hosting supply-chain events.</p> <p>More work can be done to align the needs of the sector with the skills and education taught at schools and universities in the local area.</p>	This comment is addressed in Section 15.7.1 ‘Embedded Mitigation’.

Date and consultation phase / type	Key Stakeholder comments	Section where comment addressed
Consultation with Fife Council (August 2017)	<p>Fife is the home of many large energy companies, which have a supply chain ready to play a part at every stage of a wind farm's lifecycle. Many of these have already won contracts and are in a good position for future contract winning. It follows that the renewable energy sector is of significant importance to Fife. There are several schemes in Fife aimed at delivering a strong labour supply including delivery of offshore wind apprenticeships.</p> <p>Challenges faced by local firms in securing contracts include knowing where the opportunities are and obtaining the opportunity to showcase their capabilities. Developers can assist by improving the contact between tier-one suppliers and the local supply chain.</p>	This comment is addressed in Section 15.7.1 'Embedded Mitigation'.
Consultation with Scottish Enterprise (July 2017)	<p>Concerned with supply chain companies not investing in technology because it is not effective to do so when the pipeline of wind farm work is so intermittent.</p> <p>Developers are more risk averse in the wind farm industry and as a result spread risk further down the supply chain, which inversely affects supply chain willingness to engage.</p> <p>More feedback to local supply chain is felt to be required from the developer. Otherwise, there is strong support from Scottish Enterprise, consistent with their desire to encourage innovation in the renewable energy sector. Scotland has specialisms across the board of activities in the energy sector; many businesses have diversified from the traditional oil and gas sector to renewables.</p> <p>The Project is seen as very beneficial to Scotland.</p>	This comment is addressed in Section 15.7.1 'Embedded Mitigation'.

15.5 Impact Assessment Methodology

56. This assessment considers the potential impacts associated with the construction, operation (including maintenance) and decommissioning of the Project and the effects on socio-economic receptors in the study area. The impact assessment process and methodology follows the principles and general approach outlined in Chapter 6: EIA Methodology. The methodology and parameters assessed have also taken into account issues identified through consultation with stakeholders as detailed in Section

15.4 and the understanding of baseline conditions informed by the data sources referenced in Section 15.3.

57. The Project Description (Chapter 4) and the project activities for all stages of the project life cycle (construction, operation and decommissioning) have been assessed against the environmental baseline to identify the potential interactions between the Project and the environment. These are known as the potential impacts and are then assessed to determine a level of significance of effect upon the receiving environment.

15.5.1 Receptors

58. Table 15-3 lists the receptors under assessment and the study areas within which they will be assessed.

Table 15-3 Study area for each of the receptors identified for the Project

Receptors	Study Area(s)
Direct and indirect employment creation in the construction, O&M and decommissioning supply chain	<ul style="list-style-type: none"> ▪ Local Study Area - combined local authorities ▪ Scotland study area
Direct and Indirect GVA creation in the construction, O&M, and decommissioning supply chain	

15.5.2 Methodology for Assessing Employment and GVA Impact

59. The absolute scale of economic impacts were calculated using an approach consistent with the methods for economic impact assessment as set out in HM Treasury's Green Book (2013).
60. The analysis of employment and GVA impacts focuses on direct and indirect economic impacts at each lifecycle phase, outlined below:
- **Construction** – the direct economic impacts relate to the direct employees of NnGOWL and the jobs and GVA associated with the first round of capital expenditure (i.e., what NnGOWL will spend directly with its supplier). The indirect economic impacts refer to the jobs and GVA generated within the chains of suppliers of goods and services to the direct activities; and
 - **Operation and Maintenance** – the direct economic impacts relate to the direct employees of NnGOWL and the jobs and GVA associated with the first round of operational expenditure (i.e. what NnGOWL will spend directly to operate and maintain the Project). The indirect economic impacts refer to the jobs and GVA generated within the chains of suppliers of goods and services to the direct activities.
61. In addition to direct and indirect effects, there will be additional employment and wealth creation arising from the expenditure of personal income by those whose jobs are supported directly or indirectly by the Project. However, compared with the direct and indirect economic impacts, there is typically greater uncertainty about the scale, sectoral distribution and geographical spread of these impacts, so these have not been included in this assessment.
62. Direct employment and GVA impacts are estimated using costing and sourcing assumptions. Based on the cost and geographic sourcing assumptions for each of the development scenarios (outlined below), benchmark figures (from Regeneris Consulting's in-house Input-Output model, based on UK Input-Output tables, 2005) have been applied to estimate the number of jobs and associated GVA that would be created in each study area.

63. To assess indirect employment and GVA impacts, Regeneris's Input-Output model has been used to model the way in which the direct expenditure with tier-one suppliers would lead to indirect employment and GVA effects further down the supply chain.
64. Temporary employment supported during the construction period is assessed and presented in terms of full-time equivalent (FTE) person years of employment. Average annual FTE impacts during the construction phase have also been estimated to allow for the magnitude of potential change against baseline levels of employment to be assessed.
65. Job creation arising from O&M activity is presented as direct and indirect FTE jobs and GVA effects presented as annual impacts.

15.5.2.1 Scenario Analysis

66. The assessment of potential socio-economic effects is subject to various sources of uncertainty, in particular:
 - There is greater certainty for constructions costs rather than costs further in the future, for example decommissioning will be undertaken using best practice at the time;
 - The likelihood of ports in the local and Scotland study areas being selected for the construction, and the range of functions they might serve; and
 - The location of the main tier-one and tier-two suppliers, which will be used, and their associated supply chains, and therefore the extent to which this influences the retention of supply chain expenditure within the Local and Scotland Study Areas.
67. In light of these uncertainties, the methodology has involved estimating construction and O&M costs using sector benchmarks from The Crown Estate (2012), and three scenarios to demonstrate the likely range of geographical sourcing patterns, including different assumptions about the location of the construction port base.
68. Note that no estimate is made for costs and impact of decommissioning, as this activity is considered too difficult to forecast with accuracy and too far into the future to allow for meaningful analysis. The assessment of employment and GVA impacts for this phase is therefore dealt with qualitatively.
69. The sourcing assumptions for each scenario have been informed by:
 - A review of published studies examining the economic impact of offshore wind farms in Scotland;
 - An analysis of the economic sectors in which the study areas have particular strengths; and
 - Discussions with NnGOWL concerning the procurement process and the potential for local and Scottish suppliers to secure supply chain opportunities.

15.5.2.1.1 Construction Phase Scenarios

70. The scenarios below show the sourcing assumptions under low, medium and high sourcing scenarios for the construction phase. The categories of expenditure include:
 - Design and development – the pre-construction phase including activities associated with the development of the Project such as sea bed surveys, engineering / design studies, ecology surveys, wind measurement surveys, environmental impact assessments and coastal processes surveys;
 - Wind turbine manufacture;
 - Balance of plant activities (i.e. all components of the Project except the turbines), so including manufacture of cables, foundations and substations; and
 - Installation and commissioning.

71. The high scenario is based on the assumption that where there are suitably qualified firms in Scotland or the Local Study Area that could secure tier-one contracts, these firms would be successful. It is therefore an upper bound of expected impact.
72. The low scenario is based on an assumption that the majority of tier one contracts would not be secured by Scottish firms, however that various lower tier contracts would still be won, being highly unlikely that such lower tier contracts could be won competitively by a firm outside of Scotland or the local area. This therefore represents a lower bound of expected impact.
73. The medium scenario assumes some but not all tier one contracts would be won by firms from Scotland or the Local Study Area.
74. The actual impact will depend on the procurement decisions made. The impacts assessed in this chapter are separate to those set out in the analysis by the Fraser of Allander Institute at University of Strathclyde (2017). In terms of overall jobs and economic impact, the figures from the University of Strathclyde match most closely with the medium scenario for construction.

Low Impact Construction Scenario

75. Under the low impact scenario, it is assumed that the construction port for the Project would be outside Scotland and that no large contract would be won by Scottish supply chain firms and is therefore considered as the worst case scenario.
76. The main impacts would be in the design and development phase and lower tier contracts relating to balance of plant and installation. These assumptions are summarised in Table 15-4.

Table 15-4 Sourcing assumptions under the low impact construction scenario (Source: Regeneris Consulting)

Phase	Estimated value (£ million)	% of total value sourcing from the Local Study Area	% of total value sourced from within Scotland
1. Design and development	£100.5	18%	51%
2. Wind turbine manufacture	£500.0	0%	0%
3. Balance of plant	£473.0	4%	4%
4. Installation and commissioning	£365.0	0%	10%
Total	£1,438.5	2%	7%

Medium Impact Construction Scenario

77. Under the medium impact scenario, it is assumed that the construction port would be within Scotland but not in the Local Study Area. This is considered to be a more reasonable set of assumptions as it is likely that some of the larger contracts will be won by local or at the minimum Scottish firms.
78. The main impacts would be in design and development and some more substantial contracts won relating to wind turbine towers, balance of plant items and installation. These assumptions are summarised in Table 15-5.

Table 15-5 Sourcing assumptions under the medium impact construction scenario (Source: Regeneris Consulting)

Phase	Estimated value (£ million)	% of total value sourcing from the Local Study Area	% of total value sourced from within Scotland
1. Design and development	£100.5	18%	75%
2. Wind turbine manufacture	£500.0	0%	5%
3. Balance of plant	£473.0	37%	37%
4. Installation and commissioning	£365.0	0%	46%
Total	£1,438.5	14%	31%

High Impact Construction Scenario

79. Under the high impact scenario, it is assumed that a construction port within the Local Study Area is used and many large contracts won by Scottish firms. The main impacts would be in major contracts won relating to the supply of wind turbine towers, foundations, array cables, substations and installation. These assumptions are summarised in Table 15-6.
80. This scenario assumes that the contracts, for which Scotland has appropriate capabilities, are won by Scottish firms. As such, this scenario represents a maximum scenario for Scotland based on its current supply chain.

Table 15-6 Sourcing assumptions under the high impact construction scenario (Source: Regeneris Consulting)

Phase	Estimated value (£ million)	% of total value sourcing from the Local Study Area	% of total value sourced from within Scotland
1. Design and development	£100.5	18%	84%
2. Wind turbine manufacture	£500.0	0%	10%
3. Balance of plant	£473.0	75%	75%
4. Installation and commissioning	£365.0	14%	100%
Total	£1,438.5	29%	59%

15.5.2.1.2 Operation and Maintenance Phase Scenarios

81. The scenarios below show the sourcing assumptions under low, medium and high sourcing scenarios for the O&M phase. The categories of expenditure include:
- Technician and component replacements – incorporating turbine supply contract and post warranty activity;
 - Professional services, business rates, insurances, administrative overheads;
 - Port and travel costs; and
 - Other costs, including Crown Estate lease costs.

82. As with the construction phase, the high scenario is based on the assumption that where there are suitably qualified firms in Scotland or the Local Study Area that could secure major contracts, these firms would be successful. It is therefore an upper bound of expected impact.
83. The low scenario is based on an assumption that the majority of major contracts would not be secured by Scottish firms, however that various lower tier contracts would still be won at this level. This therefore represents a lower bound of expected impact.
84. The medium scenario assumes some but not all major contracts would be won by firms from Scotland or the Local Study Area.
85. The medium scenario can be considered as the most likely scenario; however, the actual impact will depend on the procurement decisions made. The impacts set out under all three scenarios are considered to be realistic estimates.
86. The impacts assessed in this chapter are separate to those set out in the analysis by the Fraser of Allander Institute at University of Strathclyde. In terms of overall jobs and economic impact, the figures from the University of Strathclyde match most closely with the low scenario for O&M.

Low Impact O&M Scenario

87. Under the low impact scenario, considered as the minimum to be expected, it is assumed that the O&M port would be in Scotland, but not in the Local Study Area. As such, the overall sourcing in the Local Study Area would be limited, with the main impacts at national level being related to activity at the O&M port. These assumptions are summarised in Table 15-7.

Table 15-7 Sourcing assumptions under the low impact O&M scenario (Source: Regeneris Consulting)

Phase	Estimated value (£ million)	% of total value sourcing from the Local Study Area	% of total value sourced from within Scotland
1. Technician and Component Replacements	£568.2	0%	19%
2. Professional services, business rates, insurances, administrative overheads.	£363.8	2%	40%
3. Port and Travel Costs	£19.7	55%	91%
4. Other	£105.6	54%	54%
Total	£1,057.3	7%	31%

Medium Impact O&M Scenario

88. Under the medium impact scenario, it is assumed that the O&M port will be within the Local Study Area. As such, the overall sourcing in the Local Study Area would be larger, relating to O&M technicians, transportation and port related activity. These assumptions are summarised in Table 15-8.

Table 15-8 Sourcing assumptions under the medium impact O&M scenario (Source: Regeneris Consulting)

Phase	Estimated value (£ million)	% of total value sourcing from the Local Study Area	% of total value sourced from within Scotland
1. Technician and Component Replacements	£568.2	19%	21%
2. Professional services, business rates, insurances, administrative overheads.	£363.8	55%	60%
3. Port and Travel Costs	£19.7	91%	91%
4. Other	£105.6	54%	54%
Total	£1,057.3	36%	39%

High Impact O&M Scenario

89. Under the high impact scenario, it is assumed that the O&M port will be within the Local Study Area. As well as technician, transportation and port related activity, this scenario assumes a higher proportion of other O&M supporting contracts would be captured in the Local Study Area. These assumptions are summarised in Table 15-9.

Table 15-9 Sourcing assumptions under the high impact O&M scenario (Source: Regeneris Consulting)

Phase	Estimated value (£ million)	% of total value sourcing from the Local Study Area	% of total value sourced from within Scotland
1. Technician and Component Replacements	£568.2	19%	26%
2. Professional services, business rates, insurances, administrative overheads, etc.	£363.8	75%	80%
3. Port and Travel Costs	£19.7	91%	91%
4. Other	£105.6	54%	54%
Total	£1,057.3	43%	49%

15.5.3 Assessment and Assignment of Significance

90. The sensitivities of the receptors are defined by their potential vulnerability to an impact from the Project, their recoverability and the value or importance of the receptor. Definitions of terms relating to the receptors are detailed in Table 15-10. The method for determining the sensitivity of each of the receptors takes account of the importance attached to each receptor in local and national economic development and regeneration policy, together with professional judgement relating to the scale of socio-economic challenges.

Table 15-10 Sensitivity/ importance of the socioeconomic receptors

Receptor sensitivity / importance	Description / justification
High	The receptor is identified as a policy priority (as a result of economic potential and/or need). There is evidence of sizable socio-economic challenges, underperformance and vulnerability for the receptor in the study area.
Medium	The receptor is not identified as a policy priority (as a result of economic potential and/or need). There is evidence of considerable socio-economic challenges or underperformance and vulnerability for the receptor in the study area.
Low	The receptor is not identified as a policy priority (as a result of economic potential and/or need). There is evidence that the receptor is resilient and there are few weaknesses or challenges for the receptor in the study area.
Negligible	The receptor is not identified as a policy priority (as a result of economic potential and/or need). There is evidence that the receptor is resilient and no particular weaknesses or challenges for the receptor in the study area.

91. The magnitude of impact is defined by a series of factors including the spatial extent of any interaction, the likelihood, duration, frequency and reversibility of a potential impact. Definitions of the levels of magnitude used in this assessment in respect of the receptors are described in Table 15-11.

Table 15-11 Magnitude of the impact of the socio-economic receptors

Magnitude of Impact	Description
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (adverse). Large scale or major improvement or resource quality; extensive restoration or enhancement; major improvement of attribute quality (beneficial).
Medium	Loss of resource, but not adversely affecting integrity of resource; partial loss of/damage to key characteristics, features or elements (adverse). Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (beneficial).
Low	Some measurable change in attributes, quality or vulnerability, minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (adverse). Minor benefit to or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (beneficial).

Magnitude of Impact	Description
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (adverse). Very minor benefit to, or positive addition of, one or more characteristics, features or elements (beneficial).
No change	No loss or alteration or characteristics, features or elements; no observable impact in either direction.

92. The assessment of the magnitude of the impacts is underpinned by an analysis of the potential economic impacts supported by the construction and O&M of the Project. The magnitude of impact on most receptors is primarily driven by the increased level of economic activity in the area as a result of the Project going ahead.
93. The assessment considers the potential economic impact of the Project in light of the cost of constructing and operating the Project, the location of the development, and the expected geography of the Project's supply chain.
94. The magnitude of the impact is correlated against the sensitivity of the receptor to provide a level of significance. For the purposes of this assessment any effect that is considered major or moderate in Table 15-12, is considered significant in EIA terms.

Table 15-12 Significance of potential effects

		Magnitude			
		High	Medium	Low	Negligible
Sensitivity	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

15.5.4 Uncertainty and Technical Difficulties Encountered

95. As outlined in the methodology at Section 15.5, the main areas of uncertainty in undertaking the technical assessment of socio-economic impacts are around longer term costs, construction and O&M port to be used, and geographic sourcing of goods and services.
96. Section 15.5.2.1 details how this uncertainty has been dealt with in our methodology through the use of high, medium and low impact scenarios, to provide a range of likely potential impacts.

15.6 Baseline Description

97. This section presents an overview of the key social and economic indicators within the local and Scotland study areas. The key sources of data used to assess the baseline environment in the Local Study Area include relevant national datasets from the ONS, which provide intelligence on population, labour market and employment base conditions.
98. The analysis draws on the most up-to-date sources of data available in July 2017 for all key socio-economic indicators, although the year that the data relates to varies according to the release calendar for each dataset. The baseline year will therefore vary slightly across the indicators considered in the baseline. This is referenced throughout this report.

15.6.1GVA

99. The Local Study Area's GVA in 2015 was £31.8bn, equating to 25% of total GVA in Scotland. Within the Local Study Area, the highest GVA generating district was the City of Edinburgh with £18.4bn, with the lowest being East Lothian with £1.5bn. This disparity is reflected in the productivity levels, GVA per head has been used as a proxy, of each district at £40,000 and £14,800 per head, once again representing the highest and lowest with the Local Study Area.

Table 15-13GVA performance, 2015 (Source: ONS, 2017, Regional gross value added (income approach) at current basic prices. Accessed July 2017)

Relevant geographical areas	Gross value added (£m)	GVA per head (£)
Local Study Area	£31,849	£25,788
Angus	£1,969	£16,844
City of Edinburgh	£18,437	£36,963
Dundee City	£3,230	£21,795
East Lothian	£1,528	£14,827
Fife	£6,685	£18,162
Scotland	£127,260	£23,685

15.6.2Population Structure

100. As summarised in Table 15-14, the Local Study Area is home to a population of around 1.25 million people, of which 785,000 (or approximately 63%) are of working age (WAP - refers to males aged 16 to 64 and females aged 16 to 59); a larger proportion than national levels (62%).

Table 15-14 Total and working age population (WAP), 2016 (Source: ONS (2016), 'Mid-Year Population Estimates'. Accessed July 2017).

Relevant geographical areas	Total population (000s)	WAP (000s)	% WAP
Local Study Area	1,246	785	63.0%
Angus	117	67	57.2%
City of Edinburgh	507	342	67.3%
Dundee City	148	95	63.8%
East Lothian	104	61	59.0%
Fife	370	221	59.6%
Scotland	5,405	3,325	61.5%

15.6.3Labour Market Indicators

101. Table 15-15 below highlights the performance of the study area's labour market in comparison with the national average. Overall, the Local Study Area has slightly fewer economically active working age individuals - i.e. either in employment or actively looking for work – with 76% of working age individuals active, compared to the national rate of 77%.

Table 15-15 Headline performance on key labour market indicators, 2017 (Source: ONS (Apr 2016 -Mar 2017), 'Annual Population Survey'. Accessed July 2017).

Relevant geographical areas	Economically active		In employment		Economically inactive ¹	
	No. (000s)	% WAP	No. (000s)	% WAP	No. (000s)	% WAP
Local Study Area	608	75.8%	583	72.7%	194	24.2%
Angus	55	79.5%	53	76.8%	14	20.5%
City of Edinburgh	260	75.4%	251	72.8%	85	24.6%
Dundee City	66	68.6%	63	65.4%	30	31.4%
East Lothian	50	78.8%	48	75.0%	14	21.2%
Fife	177	77.4%	168	73.7%	52	22.6%
Scotland	2,626	76.9%	2,505	73.4%	787	23.1%

102. Despite an unemployment rate that is below the national average (4.1% compared to 4.6%), Table 15-16 indicates, there are still around 25,000 unemployed residents across the Local Study Area.

Table 15-16 Unemployment rate, 2016 (Source: ONS (Apr 2016 - Mar 2017), 'Annual Population Survey'. Accessed July 2017).

Relevant geographical areas	Number unemployed (000s)	Unemployment rate
Local Study Area	25	4.1%
Angus	2	3.4%
City of Edinburgh	9	3.4%
Dundee City	3	4.7%
East Lothian	2	4.8%
Fife	9	4.8%
Scotland	121	4.6%

103. Illustration 15-1 shows the number of people claiming benefits (principally for the reason of being unemployed), and includes all out of work Universal Credit claimants as well as all Job Seeker's Allowance claimants. It shows that overall, the claimant rate in the Local Study Area has been consistently below or level to the national claimant rate. The claimant rate in the study area has declined by around half over the past four years, from 4.0% in June 2013 to 2.2% by June 2017.

¹ Economically Inactive – "consists of people aged 16 and over without a job who have not sought work in the last 4 weeks and/or are not available to start work in the next 2 weeks. The main economically inactive groups are students, people looking after family and home, long-term sick and disabled, temporarily sick and disabled, retired people and discouraged workers." - <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/aguidetolabourmarketstatistics>

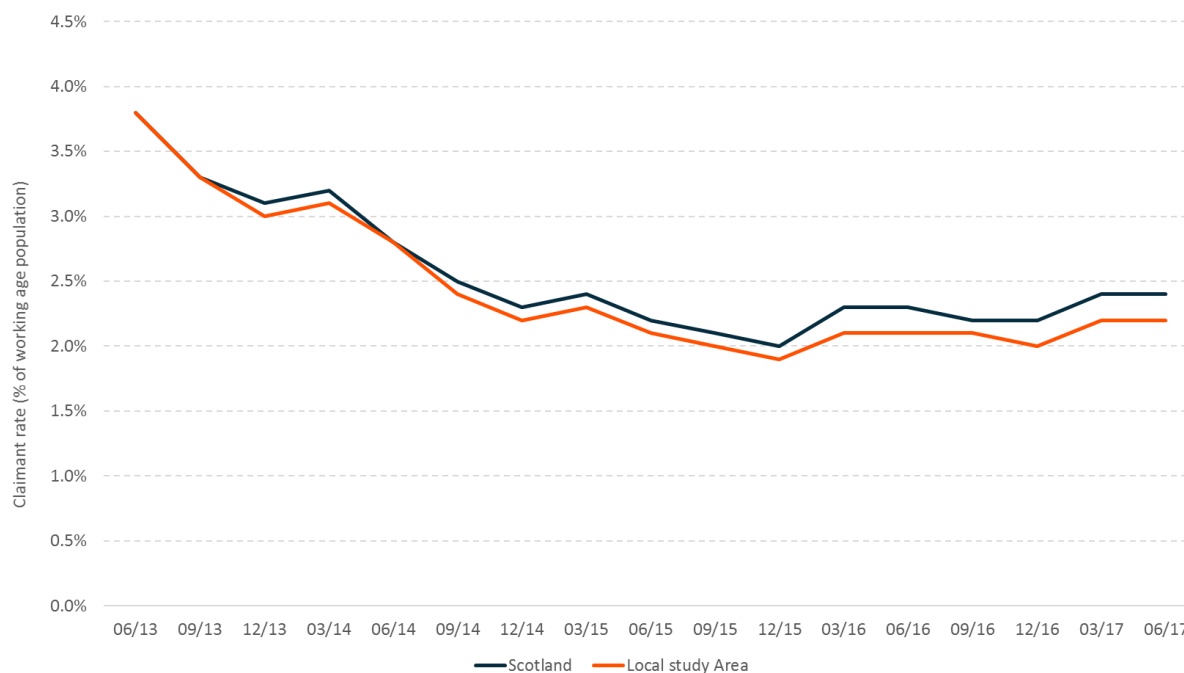


Illustration 15-1: Change in claimant rate for the study area and Scotland, 2013-17 (Source: ONS (Jun 2013 – Jun 2017), 'Claimant count by sex and age'. Accessed July 2017).

104. The study area's skills profile performs strongly against the national average. Table 15-17 shows that around half of the areas working age population have Scottish Vocational Qualifications (SVQ) level four or above qualifications, whilst nationally this stands at 44%. This aggregate performance across the Local Study Area masks variations amongst the local authority areas making up the Local Study Area however, with Dundee City below the national equivalent.

105. The proportion of working age residents with no qualifications in the Local Study Area (7.6%) is significantly below that seen nationally (at 9.9%).

Table 15-17 Education qualifications of working age adults by SVQ level, other and no qualifications, 2016 (Source: ONS (Apr 2016 -Mar 2017), 'Annual Population Survey'. Accessed July 2017).

Relevant geographical areas	NVQ 4 and above ²		Other qualifications ³		No qualifications	
	No. (000s)	%	No. (000s)	%	No. (000s)	%
Local Study Area	400	50.0%	39	4.9%	61	7.6%
Angus	29	42.0%	4	5.4%	6	7.9%
City of Edinburgh	203	59.2%	16	4.6%	19	5.5%
Dundee City	39	40.9%	6	6.0%	12	12.2%
East Lothian	29	46.0%	3	3.9%	5	7.4%
Fife	100	43.6%	12	5.0%	20	8.7%
Scotland	1,488	43.7%	207	6.1%	336	9.9%

106. The above average qualifications performance of the Local Study Area is reflected in the type of occupations the area's residents are engaged in. From Table 15-18 below, it can be seen there is a

² Level 4 NVQ are: certificate of higher education, higher apprenticeship, higher national certificated for a complete list of NVQ levels see - <http://www.gov.scot/Topics/Statistics/Browse/Lifelong-learning/StudyLevels>

³ Those with entry level qualifications, for more information see <http://www.gov.scot/Topics/Statistics/Browse/Lifelong-learning/StudyLevels>

relatively higher representation of employment in higher managerial and professional occupations (Group 1-3) in the area than what is seen nationally. Again, however, there is variation across the five local authorities with significantly fewer in Dundee City and Angus.

Table 15-18 Employment by standard occupation classification, 2017 (Source: ONS (Apr 2016-Mar 2017), 'Annual Population Survey'. Accessed July 2017).

Relevant geographical areas	Group 1 - 3 (Management)		Group 4 - 5 (Administration)		Group 6 - 7 (Support workers)		Group 8 - 9 (Elementary occupations)	
	No.	%	No.	%	No.	%	No.	%
Local Study Area	286	47.3%	117	19.4%	107	17.7%	91	15.0%
Angus	22	38.3%	13	23.2%	10	17.9%	12	20.4%
City of Edinburgh	145	56.2%	41	15.8%	37	14.4%	34	13.1%
Dundee City	25	37.9%	13	19.3%	16	24.2%	12	18.3%
East Lothian	23	46.4%	11	22.9%	10	20.0%	5	10.7%
Fife	72	41.0%	39	22.4%	34	19.4%	29	16.3%
Scotland	1,105	42.6%	543	20.9%	479	18.4%	455	17.5%

15.6.4 Sectoral Structure of the Employment Base

107. Data from the ONS indicates that, in 2015, there were just under 600,000 people employed within the Local Study Area. The City of Edinburgh accounts for more than half of total employment in the Local Study Area, and together with Fife, they represent over three-quarters of all employment.

108. Employment density (i.e. the number of jobs per 1,000 working age residents) can be used to compare the Local Study Area's performance with that of the nation. At 761 jobs per 1,000 working age residents, job density in the area is marginally lower than the national average of 764. Employment density ranges from around 460 jobs per 1,000 working age residents in East Lothian to around 950 jobs per 1,000 working age residents in the City of Edinburgh.

Table 15-19 Total employment and employment density in the Local Study Area (Source: ONS (2016), 'Business Register and Employment Survey'. Accessed July 2017).

Relevant geographical areas	Total employment (000s)	Employment density (jobs per 1,000 WAP residents)
Local Study Area	597	761
Angus	35	524
City of Edinburgh	324	949
Dundee City	75	793
East Lothian	28	462
Fife	135	613
Scotland	2,541	764

109. Concentrations of employment in key sectors that exist in the Local Study Area (compared with the national employment base) are highlighted in Illustration 15-2 below. Like Scotland, the Local Study Area's employment base is heavily reliant on service sector activities.

110. Location quotients (LQs) measure the industrial specialisation relative to Scotland, where a LQ greater than 1.0 means the Local Study Area has a higher concentration of a particular sector than that of Scotland, using ONS' BRES data. With around 35,000 jobs, manufacturing is the 9th largest sector across the Local Study Area and represents just under six percent of all jobs in the Local Study Area. In

comparison, the manufacturing sector employs around seven percent of all jobs in Scotland. This means that the Local Study Area has a lower concentration (or LQ of 0.8) of manufacturing jobs when compared with the national average. There are around 6,000 jobs in the transport and storage sector, representing just over three percent of all jobs across the Local Study Area, resulting in a low LQ of 0.8 (ONS, 2016: Business Register and Employment Survey).

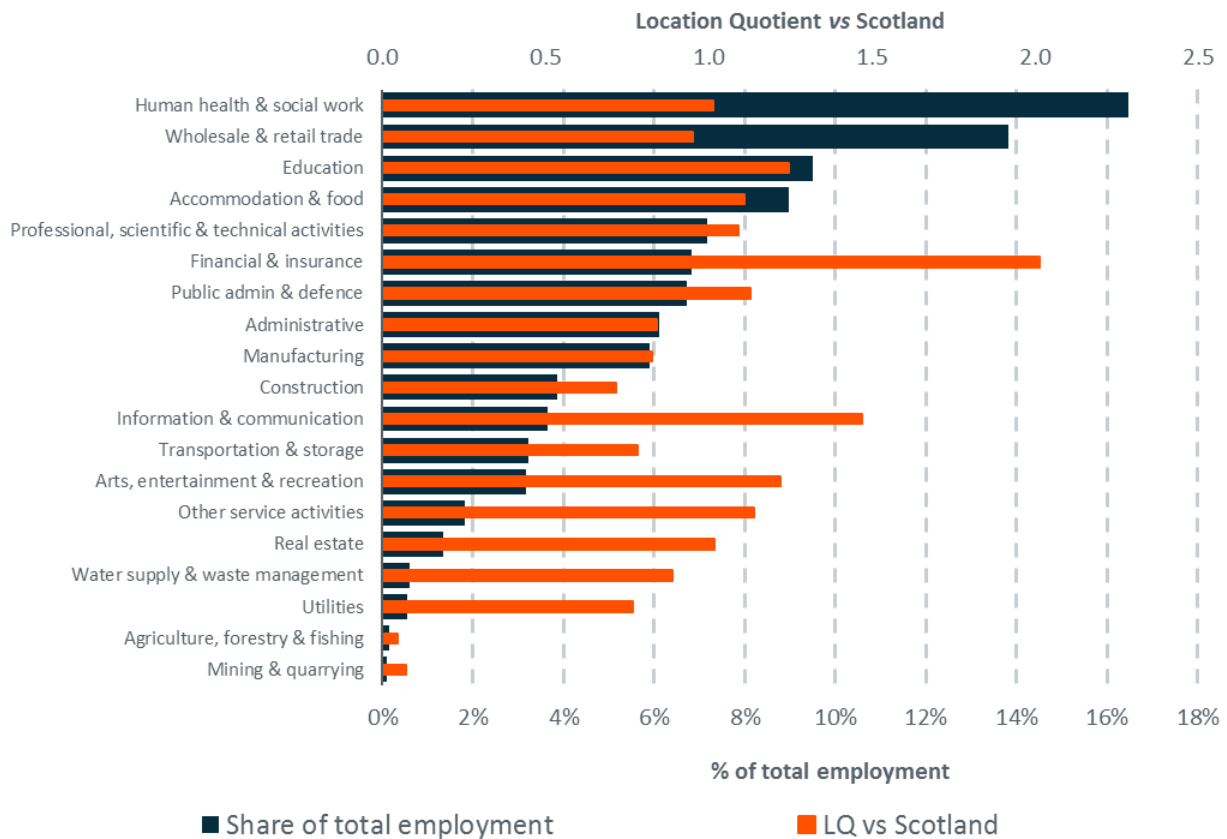


Illustration 15-2 Sectoral employment profile in the Local Study Area, 2015 (Source: ONS (2016), 'Business Register and Employment Survey'. Accessed July 2017).

15.6.5 Business Births and Deaths

111. Illustration 15-3 plots a time-series of the difference between enterprises births and deaths each year. The net number of enterprises in the Local Study Area between 2010 and 2015 has grown, but at a slower rate to that of Scotland as a whole. This peaked in 2013 with around 1,800 enterprises but growth slowed to 1,200 net new enterprises in 2015.

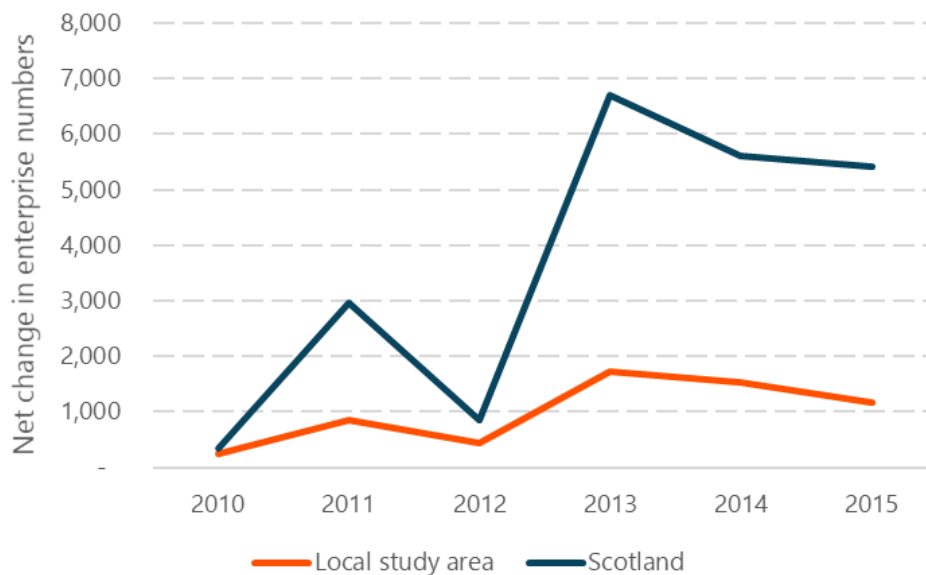


Illustration 15-3 Net change in enterprise births and deaths (Source: ONS (2016), 'Business demography'. Accessed July 2017).

15.6.6 Earnings and Wealth Generation

112. Table 15-20 highlights the gap that exists between the average yearly earnings of those employed in the Local Study Area and Scotland as a whole. There are large differences within the Local Study Area, with the average salary ranging from £28,200 in Angus to £39,300 in the City of Edinburgh, compared to the national average of £33,400.

Table 15-20 Annual average gross pay for full time employees and residents for the LAs that make up the Local Study Area, 2017 (Source: ONS (2017), 'Annual Survey of Hours and Earnings, Workplace and Residence Based'. Accessed July 2017).

Relevant geographical areas	Workplace resident's average annual gross pay
Angus	£28,200
City of Edinburgh	£39,300
Dundee City	£30,800
East Lothian	£30,800
Fife	£30,200
Scotland	£33,400

113. Table 15-21 below shows that in 2015 the Local Study Area had an overall GVA output of just under £32 billion. GVA per head for the Local Study Area is around £25,800. Within this area only the City of Edinburgh outperforms the national average, and significantly so, at around £37,000 GVA per head.

Table 15-21 Total GVA and GVA per head, 2015 (Source: ONS (2016), 'Regional GVA (income approach) at current basic prices'. Accessed July 2017).

Relevant geographical areas	Total GVA (£ million)	GVA per head (£)	GVA per head index (UK = 100)
Study area	31,849	25,788	101.7
Angus	1,969	16,844	66.4
City of Edinburgh	18,437	36,963	145.8
Dundee City	3,230	21,795	86.0
East Lothian	1,528	14,827	58.5
Fife	6,685	18,162	71.6
Scotland	127,260	23,685	93.4

15.6.7 Quality of Life

114. The Scottish Index of Multiple Deprivation (SIMD) ranks all local authorities' data zones by different domains, which include income, employment, health, education, housing, access to services, and crime.
115. Compared to Scotland, as a whole, Edinburgh has more areas among the most deprived, while for the Local Study Area as a whole, levels of deprivation are similar to those for Scotland as a whole.
116. All of the local authorities in the Local Study Area score relatively highly on income and most on the employment domain, while some score relatively low on housing and crime domains.

15.6.8 Key Supply Chain Sectors

117. The table below provides a more detailed breakdown of the current level of employment in the sectors (and sub-sectors) which would be more likely to benefit from construction, O&M and decommissioning of the proposed development. The main sector benefits can be summarised as follows:

- **Manufacturing and engineering sectors:** in particular, the manufacture of fabricated metal products (for example as part of the supply chain for the turbine towers and foundations), electric wires and cables, electric motors, generators (for example to supply components for substations) and turbines;
- **Construction sectors:** the more specialist construction sectors, and those relating to construction of floating structures, ships and boats are most likely to be affected by the development of the Project;
- **Land and marine-based transport sectors:** sea and coastal water transport as well as ancillary services will be key sectors along with other land-based forms of transport;
- **Accommodation and food services:** these sectors are likely to experience an increase in demand to cater for workers coming into the area from elsewhere, during the construction period in particular; and
- **Professional services:** a range of technical consultancy services will be required throughout the construction, O&M and decommissioning of the development (which includes remotely monitoring the Project once completed).

Table 15-22 Individuals in employment in sectors which would most likely benefit from the construction, O&M, and decommissioning of the Project (Source: ONS (2016), 'Business Register and Employment Survey'. Accessed July 2017).

Individuals in Employment			
	Scotland (000s)	Local Study Area (000s)	LQ Study area vs Scotland
Key manufacturing sectors listed below	10.3	3.0	1.2
259: Fabricated metal products	2.5	0.7	1.1
271: Motors, generators, transformers, etc.	1.4	0.1	0.2
273: Wiring and wiring devices	1.4	0.9	2.8
281: General purpose machinery	5.0	1.4	1.2
Key construction sectors listed below	19.0	3.0	0.7
301: Building of ships and boats	6.5	2.0	1.3
429: Other civil engineering projects	12.5	1.0	0.3
Key transport sectors listed below	38.9	6.2	0.7
494: Freight transport by road	17.5	2.1	0.5
502: Sea and coastal freight water transport	0.4	0.1	0.5
522: Support activities for transportation	21.0	4.0	0.8
Key professional services listed below	19.0	4.9	1.1
702: Management consultancy activities	5.0	1.0	0.8
711: Architectural and engineering consultancy	11.5	3.5	1.3
749: Other professional, scientific and technical	2.5	0.5	0.8
Other sectors listed below	101.2	25.3	1.1
55: Accommodation	89.0	23.5	1.1
56: Food and beverage service activities	0.2	0.1	2.6
351: Electric generation, transmission and distribution	12.0	1.6	0.6
Total	188.4	42.3	
Total excluding "other" sectors	87.2	4.7	

15.6.9 Transport and Infrastructure

118. In total, there are six main ports within the Local Study Area, each of which are owned by Forth Ports, these are located in Leith, Dundee, Methil, Rosyth, Burntisland, and Kirkcaldy. There are also two commercial airports located in the Local Study Area: Edinburgh, and Dundee.
119. Three ports have been identified as potential construction port options for the Project (Department of Energy and Climate Change (DECC) 2015). Only one of these (the port of Dundee) sits within the Local Study Area, with Nigg Energy Park (owned by Global Energy Solutions) and ABLE Seaton Port (owned by Able Ports) making up the remaining two options. There are a number of O&M port options available and a tendering exercise will select the preferred port. Port of Dundee and Eyemouth Harbour have been assessed in the past, but new entrants are not precluded from assessment. Characteristics of each of these ports are outlined below:
- **Port of Dundee** – the port’s portfolio already consists of energy sector work. Currently it provides services in inspection, repair and maintenance of jack-up and semi-submersible drilling rigs and support vessels for the North Sea oil and gas industry. Construction has begun on a £10 million re-development to create a new quayside for berthing and land capacity with industry-leading ‘heavy lift’ capabilities, coupled with a significant onshore operational area at the port. This is expected to be completed by the end of 2017, before commencement of Project works, if approved. In 2010, Scottish Enterprise identified the Port of Dundee as one of Scotland’s top locations for renewable manufacturing (Scottish Enterprise & Highlands and Islands Enterprise, 2013). Furthermore, it is located in the Scottish Government’s Low Carbon Renewables East Enterprise Area.
 - **Nigg Energy Park** – is the Moray Firth’s largest port facility. With over 900m of deep-water quayside, it is capable of hosting some of the largest vessels available, and with 700,000m² of laydown and storage, it is able to manage the erection, assembly and installation of wind turbines.
 - **ABLE Seaton Port** – possesses one of the world’s largest dry docks at 10 hectares. The infrastructure and planning consents are in place for offshore wind manufacturing activities and is suitable for a wide range of activities from blade manufacturing and testing to offshore wind turbine component pre-assembly.
 - **Eyemouth Harbour** – is located near a number of offshore wind development sites. For the purposes of O&M, the port offers a wide range of facilities, including 24/7 access and unrestricted access to deep-water berths, alongside a host of support services, such as boat builders and marine engineers. If required there is also land to expand upon including 1 hectare of quayside and port land, and 8.5 hectares of other land near the main harbour building.

15.7 Realistic Worst Case Scenario

120. The worst case scenario for NnG is considered to be that with the worst effect on the receptor in question. In relation to socio-economic effects, the receptors are: *Direct and indirect employment creation in the construction, O&M and decommissioning supply chain* for both the Local and National (Scotland) Study Areas.
121. Three scenarios have been considered for potential socio-economic effects i.e. Low, Medium and High Impact Scenarios. The low scenario, whilst beneficial, has the least benefit to the above receptors and is therefore the worst case. However, it is not considered to be a realistic outcome of the Project. The Medium Scenario is considered to be a realistic worst case scenario and it is therefore the basis for the socio-economic impact assessment.

15.7.1 Embedded Mitigation

122. Unlike other topics within this EIA Report, expected consent conditions are not anticipated in relation to socio-economic effects and therefore these are not considered as embedded mitigation here. Embedded mitigation measures that have been identified and adopted into the Project design as the design envelope has evolved and that are relevant to socio-economics are set out below.
123. For the purposes of socio-economic assessment, as many of the receptors relate to positive impacts (such as employment and GVA creation), mitigation can be more usefully interpreted as enhancement of positive impacts.
124. NnGOWL has interacted with the supply chain in the Local Study Area. They have done this by:
- **Encouraging a competitive procurement process** - To ensure strong local supply is fully informed, NnGOWL has hosted numerous engagement events in partnership with local enterprise agencies.
 - **Support new entrants** - NnGOWL have sought to engage many new entrants to the offshore wind farm sector. Nearly one in two contractors who were approached for wind turbine generation and balance of plant procurement have been newcomers.
 - **Improve awareness** – NnGOWL have attempted to engage with local suppliers through a variety of events and partnerships:
 - Since 2010, NnGOWL have undertaken an extensive programme of public exhibitions with attendance at 30 public community events;
 - In collaboration with Scottish Enterprise, they have hosted three supply chain events with tier-one contractors in Dunbar, Fife, and Dundee. There are plans to re-run such events in the near future alongside diversification events for the local fisherman and ex-RAF. They have also conducted regional roadshow events to promote opportunities; and
 - NnGOWL are engaged with the Offshore Renewables Catapult, Universities and Skills Development Scotland to explore greater opportunities to engage with the local supply chain.

15.8 Impact Assessment

15.8.1 Construction Phase Impacts

125. The impacts resulting from the construction of the Project have been assessed on socio-economic receptors identified within the local and Scotland study areas. A discussion of the likely significance of each effect resulting from each impact is presented below.

15.8.1.1 Direct and indirect construction related employment creation

126. The assessment of this receptor focuses on the potential impacts of the construction phase on employment in the construction supply chain in each study area.

15.8.1.1.1 Scotland Study Area

Sensitivity of Receptor

127. Job creation is a central strategic priority in national and local economic policies and strategies. It is a vital component in the government's plan to create sustainable and equitable growth. As highlighted in the strategic policy review (Section 15.2.3), there is an emphasis on opportunity sectors, one of which is the renewable energy sector.
128. In light of the continued strategic importance attached to the creation of employment, this receptor is deemed to be of high value. The sensitivity of the receptor is therefore considered to be high.

Magnitude of Impact

129. Table 15-23 below sets out the predicted levels of direct and indirect employment that the Project would deliver across Scotland during the construction phase, based on the methodology and assumptions as set out in Section 15.5.

Table 15-23 Summary of predicted levels of employment during construction of the Project for the Scotland Study Area (Source: Socio-economic impact calculations by Regeneris Consulting, 2017. Please note, job figures have been rounded to the nearest 5 jobs. Totals might not add up due to rounding).

Impact type	Person years of employment			Average annual employment impact during construction period (FTEs)		
	Low scenario	Medium scenario	High scenario	Low scenario	Medium scenario	High scenario
Direct	1,005	3,000	5,360	335	1,000	1,785
Indirect	630	2,215	4,120	210	740	1,375
Total	1,635	5,215	9,480	545	1,740	3,160

130. At the Scotland-level, the potential employment impact, taking into account direct and indirect effects ranges from 1,635 person years of employment for the lowest impact scenario to 9,480 person years of employment for the highest impact scenario.

131. The average annual number of FTEs supported during the construction phase is a more useful figure to use to assess the magnitude of impacts on baseline conditions. The annual average can be readily compared to the current baseline level of employment in the Scotland study area. It should, however, be noted that while the average annual figures are helpful, the actual level of employment supported is likely to fluctuate across the construction activity required at any one time.

132. On average, during the construction period, it is estimated that the Project would support an average annual employment impact of between 545 FTEs per year under the lowest scenario to 3,160 FTEs under the highest impact scenario.

133. As outlined in the baseline section of this chapter, the direct employment effects can reasonably be expected to be concentrated in a relatively small number of employment sectors, namely:

- **Manufacturing and engineering sectors:** particularly the manufacture of fabricated metal products, electric motors, wiring, and general-purpose machinery;
- **Construction sectors:** particularly the building of ships and boats, and civil engineering projects;
- **Transport sectors:** particularly freight transport by road, sea and coastal freight, and support activities for transportation;
- **Professional services:** notably management consultancy activities, architectural and engineering consultancy, and other professional, scientific and technical sectors; and
- **Other sectors:** which include accommodation, food and beverage service activities, as well as electric generation, transmission and distribution.

134. As set out in the baseline section of this chapter, there are currently 188,400 individuals in employment within these sectors nationally. During the construction period, the maximum average annual direct employment impact in these sectors would be 1,785 (under the high impact scenario) which would represent 0.9% of the current baseline level of employment in these sectors nationally.

135. The indirect effects would be spread across a much wider set of sectors. Under the highest impact scenario, the indirect employment effects (1,375 FTEs per year on average) would represent less than 0.1% of national employment.

136. Given the small percentage changes that the direct and indirect effects would stimulate, even under the highest impact scenario, the construction of the Project is expected to result in little overall change in baseline conditions within the Scotland study area. The impact is predicted to be of a national spatial extent, medium term duration and temporary. The magnitude is assessed to be low for all scenarios.

Significance

137. With sensitivity assessed as high, but magnitude of impact as low, the effect will therefore be of moderate beneficial significance which is considered significant in EIA terms.

15.8.1.1.2 Local Study Area

Sensitivity of Receptor

138. Sub-regionally (i.e. local authority strategies within the Local Study Area), all emphasise the ambition for new jobs to be created in their own local authority boundaries. The socio-economic baseline shows in absolute terms, that there remains capacity in the labour market. Furthermore, the claimant rate in the study has been gradually increasing, since it reached its low of 1.9% towards the end of 2015.

139. In light of the strategic importance attached to the creation of employment in regional and local strategy, the construction employment receptor is deemed to be of high value. The sensitivity of the receptor is therefore considered high.

Magnitude of Impact

140. Table 15-24 below sets out the predicted levels of direct and indirect employment that the proposed development would deliver across the Local Study Area during the construction phase, based on the methodology and assumptions set out in Section 15.5.2.1.

Table 15-24 Summary of predicted levels of employment during construction of the Project at the Local Study Area level (Source: Socio-economic impact calculations by Regeneris Consulting, 2017. Please note, job figures have been rounded to the nearest 5 jobs. Totals might not add up due to rounding).

Impact type	Person years of employment			Average annual employment impact during construction period (FTEs)		
	Low scenario	Medium scenario	High scenario	Low scenario	Medium scenario	High scenario
Direct	255	1,230	2,895	85	410	965
Indirect	45	180	400	15	60	135
Total	300	1,410	3,295	100	470	1,100

141. Across the Local Study Area, the total potential employment impact, taking into account the direct and indirect effects, ranges from 300 person years under the lowest impact scenario to 3,295 person years under the highest impact scenario.

142. To assess the magnitude of the impact on baseline conditions for this receptor, the average annual number of FTEs supported during the construction phase is a more useful figure, as this can be readily compared to the current baseline level of employment in the study area. It should however be noted that, while the average annual figures are helpful, the actual level of employment support is likely to fluctuate across the construction period in accordance to the scheduling of the programme and the intensity of construction activity required at any one time.

143. During the construction period, the development would support an average annual direct and indirect employment of between 100 FTEs per year under the lowest impact scenario and 1,100 FTEs per year under the highest impact scenario.

144. As with the Scotland level impact assessment, we would expect the direct employment effects to be concentrated in the following sectors:
- Manufacturing and engineering sectors;
 - Construction sectors;
 - Transport sectors;
 - Professional services; and
 - Other sectors: such as the accommodation, food and beverage service activities; and electric generation, transmission and distribution.
145. The uplift on the baseline level of employment in these sectors will differ across the three scenarios (i.e., 85 FTEs under the low scenario, 410 FTEs under the medium scenario, and 965 FTEs under the high scenario). With approximately 42,300 individuals in employment in these sectors, this would represent an uplift on the current baseline of between 0.2% under the low impact scenario to 2.3% under the high impact scenario.
146. The indirect effects would be spread across a much wider set of sectors than the direct effects, so the most appropriate benchmark against which to measure the magnitude of impact is total employment across the whole economy in the Local Study Area. Under all scenarios assessed, the overall impact of employment generated during the construction period will be less than 0.03% of the total employment in the Local Study Area (i.e., 597,500 jobs in 2015).
147. For all scenarios, the combined direct and indirect effects on employment are expected to result in a small change in baseline conditions within the Local Study Area. The impact is predicted to be of local spatial extent, medium term duration and temporary (i.e., only throughout the expected 3-year construction period). In the context of the current level of employment in relevant sectors in the Local Study Area, the magnitude is considered low for all scenarios.

Significance

148. With sensitivity assessed as high, but magnitude of impact low, the effect will therefore be of moderate beneficial significance which is significant in EIA terms.

15.8.1.2 Direct and indirect construction related GVA creation

15.8.1.2.1 Scotland Study Area

Sensitivity of Receptor

149. Nationally, GVA is an important measure of the amount of wealth that economic activity is creating. The latest evidence available shows that Scotland-wide GVA for 2015 was around £127.3 billion.
150. In light of the strategic importance attached to the creation of wealth and economic growth as set out in the baseline section, the GVA receptor is deemed to be of high value. The sensitivity of the receptor is therefore considered high.

Magnitude of Impact

151. Table 15-25 below sets out the predicted levels of GVA impacts of construction activity on Scotland for the three impact scenarios during the construction phase of the Project, based on the methodology and assumptions set out in Section 15.5.

Table 15-25 Summary of construction impacts on GVA at the Scotland level (Source: Socio-economic impact calculations by Regeneris Consulting, 2017. Please note GVA figures have been rounded to the nearest £0.1m. Totals might not add up due to rounding).

	Low scenario (£ million)	Medium scenario (£ million)	High scenario (£ million)
Direct	£50.3	£197.0	£371.7
Indirect	£29.4	£132.3	£255.2
Total	£79.7	£329.3	£626.9

152. Construction activity on the Project is expected to deliver GVA impact of between £79.7 million under the low scenario and £626.9 million under the high scenario. The annual estimated GVA impact is a more useful means of assessing the magnitude of impact on baseline conditions, as this can be used to estimate the percentage uplift in annual GVA that the impact would represent. This is presented below in Table 15-26, along with the percentage uplift on national GVA that it would represent.

Table 15-26 Summary of construction impact on annual GVA at the Scotland level (Source: Socio-economic impact calculations by Regeneris Consulting, 2017).

	Low scenario	Medium scenario	High scenario
Estimated annual GVA impact (£ million)	£26.6	£109.8	£209.0
% of 2015 Scotland GVA (£127.3 billion)	0.02%	0.09%	0.16%

153. Under the high scenario, the GVA impact is expected to be around 0.16% of 2015 Scotland GVA baseline.

154. The impact is predicted to be of national spatial extent, medium term duration and temporary (i.e. through the construction period). The magnitude is therefore, considered to be negligible for all impact scenarios.

Significance

155. With sensitivity assessed as high, but magnitude of impact negligible, the effect will therefore be of minor beneficial significance which is not significant in EIA terms.

15.8.1.2.2 Local Study Area

Sensitivity of Receptor

156. At the Local Study Area level, economic growth is identified as a key ambition. In light of the strategic importance attached to the creation of economic growth and GVA, and the lagging performance on this indicator behind the national average, the GVA receptor is deemed to be of high value. The sensitivity of the receptor is therefore, considered to be high.

Magnitude of Impact

157. Table 15-27 below sets out the predicted levels of cumulative GVA impacts of construction activity on the Local Study Area for the three impact scenarios during the construction phase of the proposed development, based on the methodology and assumptions set out in Section 15.5.

Table 15-27 Summary of construction impacts on GVA at the Local Study Area level (Source: Socio-economic impact calculations by Regeneris Consulting, 2017. Please note GVA figures have been rounded to the nearest £0.1m. Totals might not add up due to rounding).

	Low scenario (£ million)	Medium scenario (£ million)	High scenario (£ million)
Direct	£16.2	£82.2	£178.9
Indirect	£2.3	£12.3	£26.9
Total	£18.5	£94.5	£205.9

158. Construction activity on the Project is expected to deliver a GVA impact in the Local Study Area of between £18.5 million under the low scenario and £205.9 million under the high scenario. The GVA impact data presented in the table below has been used to estimate annual average GVA impacts during the construction period as well as the uplift on the Local Study Area's GVA.

Table 15-28: Summary of construction impact on annual GVA at the Local Study Area level (Source: Socio-economic impact calculations by Regeneris Consulting, 2017).

	Low scenario	Medium scenario	High scenario
Estimated annual GVA impact (£ million)	£6.2	£31.5	£68.6
% of 2015 Local Study Area GVA (£31.8 billion)	0.02%	0.10%	0.22%

159. Even under the high scenario, the GVA impact is expected to be only around 0.22% of the 2015 GVA baseline for the Local Study Area.

160. The impact is predicted to be of local spatial extent, medium term duration and temporary (during the construction period). The magnitude is therefore considered negligible.

Significance

161. With sensitivity assessed as high, but magnitude of impact negligible, the effect will therefore be of minor beneficial significance which is not significant in EIA terms.

15.8.2 Operational Phase Impacts

15.8.2.1 Direct and indirect O&M related employment creation

15.8.2.1.1 Scotland Study Area

Sensitivity of Receptor

162. The evidence underpinning the assessment of the sensitivity of the receptor is as for the construction phase (see Section 15.8.1). The O&M employment receptor is deemed to be of high value, and as a result is considered high.

Magnitude of Impact

Table 15-29 Summary of predicted levels of Scotland-based employment during O&M phase of the Project (Source: Socio-economic impact calculations by Regeneris Consulting, 2017. Please note, job figures have been rounded to the nearest 5 jobs. Totals might not add up due to rounding).

Impact type	Person years of employment			Average annual employment impact during operational period (FTEs)		
	Low scenario	Medium scenario	High scenario	Low scenario	Medium scenario	High scenario
Direct	2,345	2,490	2,645	95	100	105
Indirect	1,565	2,130	2,735	65	85	110
Total	3,910	4,620	5,380	155	185	215

163. At the Scotland-level, the potential employment impact ranges from 155 FTE posts each year for the lowest impact scenario to 215 FTE posts each year for the highest impact scenario.
164. There are currently 12,000 jobs in Scotland in the electric power generation sector (see Table 15-22, SIC 351). The addition of 95 to 105 FTE posts across Scotland would have a small impact on the level of employment in this sector nationally (the percentage increase would be between 0.8% and 0.9%).
165. It can reasonably be expected that the indirect employment effects would be focussed on a smaller number of sectors than during the construction phase, as activities would be related primarily to (i) manufacture and installation of spare components, (ii) engineering activities associated with maintenance, and (iii) land and marine transport of components. The main sectors considered in this assessment have therefore been limited to the following:
- Relevant manufacturing and engineering sectors;
 - Specialist construction sectors;
 - Marine and land transport sectors; and
 - Professional services.
166. Together these sectors support around 87,200 positions nationally (see Table 15-22). Under the highest impact scenario, the annual indirect employment impact of 110 FTE posts would represent around 0.1% of the employment in these sectors nationally, and therefore would have no discernible impact on overall levels of employment.
167. In light of this, the impact is predicted to be of a national spatial extent, long term duration and permanent. The magnitude on employment is therefore considered negligible.

Significance

168. With sensitivity assessed as high, but magnitude of impact negligible, the effect will therefore be of minor beneficial significance which is not significant in EIA terms.

15.8.2.1.2 Local Study Area

Sensitivity of Receptor

169. The evidence underpinning the assessment of the sensitivity of the receptor is the same as for the construction phase (see Section 15.8.1). The O&M employment receptor is deemed to be of high value, and as a result, the sensitivity of the receptor in the Local Study Area is considered high.

Magnitude of Impact

170. Table 15-30 below sets out the predicted levels of employment that the proposed development would deliver in the Local Study Area during the O&M phase. The total potential employment impact during the O&M phase of the Project is between 30 to 120 FTE posts each year.

Table 15-30 Summary of predicted levels of the Local Study Area based employment during O&M phase of the Project (Source: Socio-economic impact calculations by Regeneris Consulting, 2017. Please note, job figures have been rounded to the nearest 5 jobs. Totals might not add up due to rounding).

Impact type	Person years of employment			Average annual employment impact during operational period (FTEs)		
	Low scenario	Medium scenario	High scenario	Low scenario	Medium scenario	High scenario
Direct	595	2,315	2,460	25	95	100
Indirect	80	450	560	5	20	20
Total	675	2,765	3,025	30	110	120

171. As with the Scotland-level impact assessment, the direct employment impact would be focussed on the electric power generation sector, which supports around 1,600 jobs within the Local Study Area (see Table 15-22, SIC 351). Direct employment resulting from the operation and maintenance of the Project is expected to create 25 to 100 direct FTEs. This would add an additional 1.6% to 6.3% jobs to the sector.
172. Indirect employment would be focussed on the same sectors outlined under the assessment of the receptor for Scotland. Within the Local Study Area, these sectors support around 4,700 jobs (see Table 15-22). Under the high scenario, the maximum increase of 20 FTEs would represent an increase of 0.4% on the current baseline.
173. The employment generated by O&M activity within the local impact study area is expected to have a minor level of impact. The impact of O&M activity is predicted to be of local spatial extent, long-term in duration and permanent, and the magnitude of the impact is considered low.

Significance of effect

174. With sensitivity assessed as high and the magnitude of impact as low, the effect will therefore be of moderate beneficial significance which is significant in EIA terms.

15.8.2.2 Direct and indirect O&M related GVA creation

15.8.2.2.1 Scotland Study Area

Sensitivity of Receptor

175. The evidence underpinning the assessment of the sensitivity of the receptor is as for the construction phase (see Section 15.8.1). The O&M GVA receptor is deemed to be of high value. The sensitivity of the receptor is therefore considered high.

Magnitude of Impact

176. Table 15-31 sets out the predicted levels of annual GVA impacts of O&M activity on Scotland for the three scenarios assessed. Annually, O&M activity is predicted to support between £10.7 million GVA under the low scenario and £17.0 million GVA under the high scenario.

Table 15-31 Summary of predicted levels of Scotland-based GVA impact during O&M phase of the Project

	Annual GVA impact during O&M phase		
	Low scenario (£ million)	Medium scenario (£ million)	High scenario (£ million)
Direct	£5.2	£6.6	£8.1
Indirect	£5.5	£7.1	£8.9
Total	£10.7	£13.7	£17.0

177. The most recent estimate of the Scotland's GVA is £127.3 billion. This means that the annual GVA created across Scotland as a result of O&M activity even in the high scenario would be no more than 0.01%.

178. The impact is predicted to be of national spatial extent, long-term duration and permanent. The magnitude is therefore considered negligible for all impact scenarios.

Significance

179. With sensitivity assessed as high, but magnitude of impact negligible, the effect will therefore be of minor beneficial significance which is not significant in EIA terms.

15.8.2.2.2 Local Study Area

Sensitivity of Receptor

180. The evidence underpinning the assessment of the sensitivity of the receptor is as for the construction phase (see Section 15.8.1). The O&M GVA receptor is deemed to be of high value, and the sensitivity of the receptor is therefore considered high.

Magnitude

181. Table 15-32 below sets out the predicted levels of annual GVA impacts of O&M activity in the Local Study Area. Annually, O&M activity is predicted to generate between £1.6 million GVA under the low scenario and £8.9 million GVA under the high scenario.

Table 15-32 Summary of predicted levels of the Local Study Area-based GVA impact during O&M phase of the Project. (Please note GVA figures have been rounded to the nearest £0.1m. Totals might not add up due to rounding)

	Annual GVA impact during O&M phase		
	Low scenario (£ million)	Medium scenario (£ million)	High scenario (£ million)
Direct	£1.3	£5.9	£7.1
Indirect	£0.2	£1.6	£1.9
Total	£1.6	£7.5	£8.9

182. The most recent estimate for the Local Study Area's GVA is £31.8 billion. It is expected that even in the high scenario the annual GVA created across the Local Study Area as a result of O&M activity would deliver an additional 0.03% GVA.

183. The impact is predicted to be of local spatial extent, long term duration and permanent. The magnitude is therefore considered negligible.

Significance

184. With sensitivity assessed as high, but magnitude of impact negligible, the effect will therefore be of minor beneficial significance which is not significant in EIA terms.

15.8.3 Decommissioning Phase Impacts

185. The impacts of the decommissioning phase of the Project have been assessed on the socio-economics of the Study area and Scotland. There is considerable uncertainty with regards to the potential effects of the decommissioning process of the proposed development. This is because the approach to decommissioning the Project, the available technology, which could be used, and the associated costs are not yet known.

186. A description of the significance of impacts upon socio-economic receptors caused by each identified impact is given below.

187. Towards the end of the operational life of the Project, all decommissioning options will be considered. It may be deemed that removal of certain pieces of infrastructure may have a greater environmental impact than leaving in-situ. The potential decommissioning options will be presented to MS-LOT in a Decommissioning Programme for approval prior to construction. The Decommissioning Programme will then be reviewed and amended as required prior to the commencement of any decommissioning activities.

15.8.3.1 Direct and indirect decommissioning related employment creation

Sensitivity of receptor: Scotland study area

188. As for the construction and O&M phases, the sensitivity of the employment receptor is based on current policy and socio-economic conditions, and is considered high.

Magnitude of impact: Scotland study area

189. Given the unknown nature of the decommissioning phase and position of the Scotland sector at that point in time, it is not possible to estimate the employment impacts associated with the decommissioning phase.

190. However, it can be assumed that these will be of a similar nature but lower than the impacts relating to the construction phase.

191. On that basis, it is concluded that the magnitude of impact is expected to be negligible.

Significance of effect: Scotland study area

192. With sensitivity assessed as high, but magnitude of impact negligible, the effect will therefore be of minor beneficial significance which is not significant in EIA terms.

Sensitivity of receptor: Local Study Area

193. As for the construction sector, the employment receptor is deemed to be of high value and high vulnerability. The sensitivity of the receptor is therefore considered high.

Magnitude of impact: Local Study Area

194. As above, given the unknown nature of the decommissioning phase and position of the Local Study Area sector at that point in time, it is not possible to estimate the employment impacts associated with the decommissioning phase.

195. However, it can be assumed that these will be of a similar nature but lower than the impacts relating to the construction phase.

196. On that basis, we can conclude that the magnitude of impact is expected to be negligible.

Significance of effect: Local Study Area

197. With sensitivity assessed as high, but magnitude of impact negligible, the effect will therefore be of minor beneficial significance which is not significant in EIA terms.

15.8.3.2 Direct and indirect decommissioning-related GVA creation

Sensitivity of receptor: Scotland study area

198. As for the construction and O&M phases, the sensitivity of the GVA receptor, based on the current policy context, and socio-economic conditions, is considered high.

Magnitude of impact: Scotland study area

199. Given the unknown nature of the decommissioning phase and position of the Scotland sector at that point in time, it is not possible to estimate the employment impacts associated with the decommissioning phase.

200. However, it can be assumed that these will be of a similar nature but significantly lower than the impacts relating to the construction phase.

201. On that basis, we can conclude that the magnitude of impact is expected to be negligible.

Significance of effect: Scotland study area

202. With sensitivity assessed as high, but magnitude of impact negligible, the effect will therefore be of minor beneficial significance which is not significant in EIA terms.

Sensitivity of receptor: Local Study Area

203. As for the construction and O&M phases, the sensitivity of the GVA receptor, based on the current policy context and socio-economic conditions, is considered high.

Magnitude of impact: Local Study Area

204. Given the unknown nature of the decommissioning phase and position of the Local Study Area sector at that point in time, it is not possible to estimate the employment impacts associated with the decommissioning phase.

205. However, it can be assumed that these will be of a similar nature but significantly lower than the impacts relating to the construction phase.

206. On that basis, we can conclude that the magnitude of impact is expected to be negligible.

Significance of effect: Local Study Area

207. With sensitivity assessed as high, but magnitude of impact negligible, the effect will therefore be of minor beneficial significance which is not significant in EIA terms.

15.8.4 Cumulative Impacts

208. Cumulative effects refer to effects upon receptors arising from the Project when considered alongside other proposed developments and activities and any other reasonably foreseeable project(s) proposals. In this context, the term 'projects' is considered to refer to any project with comparable effects and is not limited to offshore wind projects.

209. Project and activities considered within the cumulative impact assessment are set out in Table 15-33. There may be an element of uncertainty associated with the design envelope of proposed projects, therefore a judgement is made on the confidence associated with the latest available design envelope.

210. In assessing the cumulative impacts for the Project, two scenarios are considered to take into account the consented design envelopes of the Inch Cape Offshore Wind Farm and the Seagreen Phase 1 Wind Farm Project and forthcoming applications which were the subject of requests for scoping opinions in 2017. Scenario one incorporates the design envelopes for the proposed Inch Cape, Seagreen, and Moray West projects as detailed in the Scoping Reports submitted to MS-LOT (ICOL, 2017; Seagreen, 2017; and Moray, 2017). Scenario two incorporates the consented design envelopes as detailed in the respective project consents (The Scottish Government, 2014e, 2014f, and 2014g)

Table 15-33 Projects for cumulative assessment

Development Type	Project	Status	Data Confidence Assessment / Phase
Offshore Wind Farm	Inch Cape Offshore Wind Farm	Consented	High – Consented project details available.
Offshore Wind Farm	Inch Cape Offshore Wind Farm	Proposed	High – Scoping report publicly available.
Offshore Wind Farm	Moray Offshore East Development	Consented	High – Consented project details available.

Development Type	Project	Status	Data Confidence Assessment / Phase
Offshore Wind Farm	Moray West Offshore Wind Farm	Proposed	High – Scoping report publicly available.
Offshore Wind Farm	Seagreen Alpha Offshore Wind Farm	Consented	High – Consented project details available.
Offshore Wind Farm	Seagreen Bravo Offshore Wind Farm	Consented	High – Consented project details available.
Offshore Wind Farm	Seagreen Phase 1 Wind Farm	Proposed	High – Scoping report publicly available.

211. Under a cumulative impact assessment, the worst-case scenario is less relevant than for other chapters as all socio-economic impacts assessed will be positive, as detailed in Table 15-34.

Table 15-34 Cumulative worst-case design envelope scenarios

Impact	Worst Case Design Scenario	Justification
Scenario 1 – Development of Neart na Gaoithe and the proposed versions of Inch Cape, Seagreen Phase 1 Offshore Wind Farm Projects, and Moray West		
Direct and indirect employment creation in the supply chain (Local and Scotland study areas).	The worst case design scenario would involve low impact scenarios for the Project alongside similarly low impact scenarios for other wind farms (as outlined in Table 15-33).	The low impact scenario could be thought of as the worst case design scenario insofar as the Local Study Area and Scotland-based benefits are at their lowest.
Direct and indirect GVA creation in the supply chain (Local and Scotland study areas).		
Scenario 2 – Development of Neart na Gaoithe and the consented versions of Inch Cape, Seagreen Phase 1 Offshore Wind Farm Projects, and Moray East		
Direct and indirect employment creation in the supply chain (Local and Scotland study areas).	The worst case design scenario would involve low impact scenarios for the Project alongside similarly low impact scenarios for other wind farms (as outlined in Table 15-33).	The low impact scenario could be thought of as the worst case design scenario insofar as the Local Study Area and Scotland-based benefits are at their lowest.
Direct and indirect GVA creation in the supply chain (Local and Scotland study areas).		

212. Although the precise size and spend relating to proposed offshore wind farms incorporated in the cumulative assessment is not fully known, it is assumed for the purposes of this assessment that under scenario one, the size and spend relating to proposed offshore wind projects may be slightly smaller than under scenario two. This is based on the evidence available, as follows.

213. The originally consented project (relating to Scenario 2) for Inch Cape Offshore Wind Farm was for 784 MW and up to 110 turbines whilst the current application (relating to Scenario 1) is for 784 MW and up to 72 turbines (The Scottish Government, 2014a & Inch Cape Offshore Limited, 2017).

214. Similarly, whilst Seagreen Alpha and Bravo were originally consented (relating to Scenario 2) for 1,050 MW and up to 150 turbines the current application (relating to Scenario 1) is for up to 120 turbines with a maximum capacity of 15 MW per turbine (The Scottish Government, 2014b & Seagreen Wind Energy, 2017). With fewer proposed turbines for both developments, in scenario 1 than 2, it is expected that the capital costs would be lower.

215. Information on jobs and GVA generated by the respective proposed and consented wind farms listed in Table 15-34, are not in the public domain and therefore the impacts can only be assessed qualitatively below. As it is not possible to assess these impacts quantitatively, the assessment below considers both scenarios together.

15.8.4.1 Direct and indirect employment and GVA creation in the supply chain

216. For either scenario, it is not possible to confidently predict the level of cumulative impact on employment within the supply chain. This depends on several factors, which are, at this time, unknown, including the overall costings and geographical sourcing of goods and services for the construction and O&M of other wind farms. As this is not yet known, it is impossible to provide a quantitative assessment of the potential cumulative effects.
217. Though the scale of local expenditure associated with the developments in Table 15-34 is unknown, as noted in section 15.5.2.1, Scotland supply chain for offshore wind farm components is significant. With the exception of the nacelle and rotor for the wind turbine, there are suppliers within the local area and / or Scotland, which have the capabilities to supply the main tier-one contracts. As such, it is reasonable to assume that some degree of local and national sourcing would occur during the construction, O&M and decommissioning phases in either scenario. The construction of multiple windfarms alongside the Project would also increase the probability of local firms securing contracts.
218. This would lead to a further increase in employment and GVA creation in the local and Scotland study areas, thereby generating additional positive socio-economic impacts.

15.8.5 Inter-relationships

219. Inter-relationships are considered to be the impacts and associated effects of different aspects of the Project on the same receptor. These are considered to be the following:

15.8.5.1 Project Lifetime Effects

220. An assessment has been undertaken of the scope for effects that occur throughout more than one phase of the project (construction, O&M and decommissioning) to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three key project stages.
221. Table 15-35 shows the total GVA impacts across the development, construction and O&M phases of the Project, drawing on the analysis from Section 15.8. This shows a cumulative GVA impact across these phases of between £58m and £430m in the Local Study Area, and between £347m and £1.05bn in the Scotland study area.

Table 15-35 Summary of total GVA impact resulting from the Project (Source: Socio-economic impact calculations by Regeneris Consulting, 2017) (Please note GVA figures have been rounded to the nearest £0.1m. Totals might not add up due to rounding)

Local Impact Study	Total GVA (£m)		
	Low	Medium	High
Direct	£49.4	£229.9	£355.3
Indirect	£8.3	£51.4	£74.2
Total	£57.6	£281.4	£429.5
Scotland	Low	Medium	High
Direct	£179.9	£361.2	£573.9
Indirect	£167.3	£310.7	£477.2
Total	£347.2	£671.8	£1051.0

15.8.5.2 Onshore Transmission Works (OnTW) Effects

222. This chapter considered the offshore activities of the Project, whilst the onshore activities had already been assessed in the EIA which accompanied the planning application for the OnTW (NnGOWL, 2012). The combined effects on employment and GVA will be larger than either application in isolation.
223. Within the OnTW planning application, the socio-economic chapter assumes employment benefits are to be predominantly realised within the study area, East Lothian district. Whilst the wider supply chain benefits may be generated in Edinburgh, Fife, Angus, and Dundee and the rest of Scotland. This chapter's Local Study Area, includes East Lothian along with districts outlined in Section 15.3, but assumes the accrual of benefits will be dependent on the level of local area supply chain sourcing.
224. The socio-economic analysis for the OnTW covers employment effects resulting from the construction and operation of the OnTW, as shown in Table 15-36. These figures include induced impacts, which have been excluded from the employment figures set out in this chapter at Section 15.8, so are not directly comparable. However, these figures demonstrate the additional employment benefits arising from the OnTW alongside the offshore works described in this chapter.

Table 15-36 Employment Effects from the Onshore Transmission Works

	Study Area			Scotland		
	Direct	Indirect + Induced	Total	Direct	Indirect + Induced	Total
Construction/Installation	59	40	99	108	99	207
Operation	1	4	5	N/A	N/A	N/A

225. There are not anticipated to be any significant inter-relationships with other receptors assessed under other chapters.

15.9 Mitigation and Monitoring

226. The effects, both in isolation and cumulatively, on socio-economic receptors as a result of the construction, operation and decommissioning of the Project are predicted to be of beneficial moderate and minor significance. None of the impacts on the receptors are adverse. Based on the predicted effects it is concluded that no specific mitigation is required beyond the embedded mitigation set out in Section 15.7.1.

15.10 Summary of Residual Effects

227. This chapter has assessed the potential effects on socio-economics of the construction, operation and decommissioning of the Project, both in isolation and cumulatively. Table 15-37 summarises the impact determinations discussed in this chapter and presents the post-mitigation residual significance.

Table 15-37 Summary of residual impacts of the Project

Potential Impact	Significance of Effect	Mitigation Measures	Residual Significance of Effect
Construction			
Impact of construction activity on direct and indirect employment creation in the construction supply chain	Scotland: moderate positive Local Study Area: moderate positive	No additional mitigation required.	Scotland: moderate positive Local Study Area: moderate positive
Impact of construction activity on direct and indirect GVA creation in the construction supply chain	Scotland: minor positive Local Study Area: minor positive	No additional mitigation required.	Scotland: minor positive Local Study Area: minor positive
Operation			
Impact of operation activity on direct and indirect employment creation in the construction supply chain	Scotland: minor positive Local Study Area: moderate positive	No additional mitigation required.	Scotland: minor positive Local Study Area: moderate positive
Impact of operation activity on direct and indirect GVA creation in the construction supply chain	Scotland: minor positive Local Study Area: minor positive	No additional mitigation required.	Scotland: minor positive Local Study Area: minor positive
Decommissioning			
Impact of decommissioning activity on direct and indirect employment creation in the construction supply chain	Scotland: minor positive Local Study Area: minor positive	No additional mitigation required.	Scotland: minor positive Local Study Area: minor positive
Impact of decommissioning activity on direct and indirect GVA creation in the construction supply chain	Scotland: minor positive Local Study Area: minor positive	No additional mitigation required.	Scotland: minor positive Local Study Area: minor positive
Cumulative Effects			
Impact of cumulative activity on direct and indirect employment and GVA creation in the construction supply chain	Not possible to quantify, however would be positive.	No additional mitigation required.	Not possible to quantify, however would be positive.

Potential Impact	Significance of Effect	Mitigation Measures	Residual Significance of Effect
Impact of cumulative activity on direct and indirect employment and GVA creation in the operation and maintenance supply chain	Not possible to quantify, however would be positive.	No additional mitigation required.	Not possible to quantify, however would be positive.

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