CONTENTS

PREFACE

NON-TECHNICAL SUMMARY (NTS)

Introduction
Seagreen Wind Energy Limited
The Seagreen Project
  Project Background and Existing Consents
  The Optimised Seagreen Project
  The Capacity Variation
  The Need for Renewable Energy
Purpose of EIA Report
Project Description
Site Selection and Alternatives Considered
Project Programme
The Environmental Impact Assessment Process
  Overview
  Scoping
  Assessing Impact Significance
  Mitigation and Residual Impacts
  Consultation
Summary of Environmental Impacts
  Introduction
  Ornithology
    Scope of Assessment
    Summary of Assessment
  Natural Fish and Shellfish Resource
    Scope of Assessment
    Summary of Assessment
  Marine Mammals
    Scope of Assessment
    Summary of Assessment
  Commercial Fisheries
    Scope of Assessment
    Summary of Assessment
  Shipping and Navigation
    Scope of Assessment
    Summary of Assessment
  Seascape, Landscape and Visual Amenity
    Scope of Assessment
    Summary of Assessment
<table>
<thead>
<tr>
<th>CONTENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military and Civil Aviation</td>
<td>NTS-16</td>
</tr>
<tr>
<td>Scope of Assessment</td>
<td>NTS-16</td>
</tr>
<tr>
<td>Summary of Assessment</td>
<td>NTS-17</td>
</tr>
<tr>
<td>Socio-economics</td>
<td>NTS-17</td>
</tr>
<tr>
<td>Scope of Assessment</td>
<td>NTS-17</td>
</tr>
<tr>
<td>Summary of Assessment</td>
<td>NTS-17</td>
</tr>
<tr>
<td>Habitat Regulations Appraisal (HRA)</td>
<td>NTS-18</td>
</tr>
<tr>
<td>Conclusion</td>
<td>NTS-19</td>
</tr>
<tr>
<td>Further Information</td>
<td>NTS-20</td>
</tr>
<tr>
<td>References</td>
<td>NTS-20</td>
</tr>
</tbody>
</table>

**CHAPTER 1: INTRODUCTION**

Introduction 1-1
Existing Consents 1-1
Purpose of the EIA Report 1-2
The Applicants 1-3
The Seagreen Project 1-4
  - Project Design Evolution 1-5
Scope of the Assessment 1-6
Structure of the EIA Report 1-7
Project Team 1-8
References 1-8

**CHAPTER 2: NEED FOR THE PROJECT**

Introduction 2-1
Climate Change 2-1
New Energy Infrastructure 2-3
Energy Security 2-4
Economic Benefit 2-5
Offshore Wind in Scotland 2-6
Need for and Benefits of Round 3, the Zone and the Optimised Seagreen Project 2-7
References 2-8

**CHAPTER 3: SITE SELECTION AND ALTERNATIVES**

Introduction 3-1
Site Selection and Alternatives 3-1
  - Site/Phase Selection within the Firth of Forth Zone 3-1
  - Boundary Refinement for the Seagreen Project (Project Alpha and Bravo) 3-3
  - Seagreen Project Design Evolution: Location 3-5
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seagreen Project Design Evolution and Alternatives</td>
<td>3-6</td>
</tr>
<tr>
<td>Design Envelope Parameters</td>
<td>3-6</td>
</tr>
<tr>
<td>The Project Design</td>
<td>3-6</td>
</tr>
<tr>
<td>Wind Turbine Generators, Number and Size</td>
<td>3-7</td>
</tr>
<tr>
<td>Offshore Wind Farm Capacity and Indicative Array Layout</td>
<td>3-8</td>
</tr>
<tr>
<td><strong>Offshore Wind Farm Structures</strong></td>
<td>3-10</td>
</tr>
<tr>
<td>The Application vs the Originally Consented Project</td>
<td>3-11</td>
</tr>
<tr>
<td>‘Do-nothing’ Approach</td>
<td>3-11</td>
</tr>
<tr>
<td><strong>Summary</strong></td>
<td>3-12</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td>3-13</td>
</tr>
</tbody>
</table>

### CHAPTER 4: POLICY AND LEGISLATION

#### Introduction

**Policy**

- International and European Context
- Key UK Policy and Legislation
  - The Climate Change Act 2008
  - National Policy Statement
  - UK Marine Policy Statement
- Scottish Policy and Legislation
  - The Climate Change Act (Scotland) 2009
  - The Electricity Generation Policy Statement
  - The Scottish Energy Strategy
  - National Planning Framework 3
  - Scottish Planning Policy
  - The Renewables Action Plan and 2020 Routemap for Renewable Energy in Scotland
  - Scotland’s Offshore Wind Route Map

**Scottish Marine Planning**

- Scottish National Marine Plan (NMP)
- Regional Marine Plans
- Sectoral Plans

**Development Consents**

- Section 36 Consent
- Marine Licensing

**EIA Legislative Framework**

**Other Consents and Legislation**

- Habitats and Birds Directives and Regulations
- European Protected Species (EPS) Licence
- Energy Act 2004 – Safety Zones
- Decommissioning Plan

**References**

4-11
CHAPTER 5: PROJECT DESCRIPTION

Introduction 5-1
Outline of Project Components 5-1
The Project Design Envelope 5-4
Site Description and Characteristics 5-5
  Project Location 5-5
  Metocean, Seabed and Ground Conditions 5-5
Indicative Offshore Wind Farm Array Layout 5-5
Offshore Project Components 5-6
  Wind Turbine Generators 5-6
  Substructures and Foundations 5-10
  Jacket Substructures and Associated Foundations 5-12
    Jacket Substructures 5-12
    Pin Piled Tubular Foundations 5-13
    Suction Caisson Foundations 5-13
  Gravity Base Foundations and Substructures 5-13
  Monopiles 5-14
  Foundations: Scour Protection 5-15
  Foundation and Substructure Zones of Influence 5-15
  Summary of Foundation and Substructure Design Parameters 5-16
  Array Cables 5-17
  Wind Measurement 5-19
  Wave Buoys 5-19
Offshore Wind Farm Construction 5-19
  Offshore Pre-Construction and Construction Key Activities 5-20
  Outline Offshore Construction Programme 5-20
  Marine Control and Safety 5-22
  Pre-Installation Activities 5-23
  Construction Methods for the Optimised Seagreen Project (Project Alpha and Project Bravo) 5-23
  Foundation and Substructure Installation 5-23
    Jacket Installation with Driven and/or Drilled Tubular Pin Piles 5-23
    Suction Caisson Installation 5-27
    Gravity Base Structure Installation 5-28
    Monopile Installation 5-28
  Drilling Monopiles and Pin Piles/Sediment Discharges 5-30
  Noise Emissions from Piling: Monopile and Pin Piling Activities 5-30
  Grouting of Foundations 5-31
  Installation of Scour Protection: all Foundations 5-31
  WTG Installation 5-32
    Stick Build Installation 5-32
Array Cable Installation 5-32
  Array Cable Installation Procedure 5-32
  Pre-installation Works 5-33
  Array Cable Installation Methods 5-34
  Cable Burial by Ploughing 5-34
Array Cable Burial Depths and Trench Widths 5-36
Alternative Array Cable Protection 5-36
  Concrete Mattresses 5-36
  Rock Placement 5-36

Offshore Wind Farm Commissioning 5-37

Offshore Wind Farms Operation and Maintenance 5-38
  Marine Control and Safety 5-39
    Lighting, Marking and Signage 5-39
    Anchorage and Safety Zones 5-39
    Marine Control Centre 5-39
  Access Strategy for Offshore Infrastructure 5-40
    Access by Work Boat 5-41
    Access from Mothership 5-41
    Personnel and Access to WTGs 5-41
    Vessel and Helicopter Movements 5-42
  O&M Activities 5-42
  Pollution Prevention and Waste Management 5-43
  Waste Management 5-43
    Construction 5-43
    Operation and Maintenance 5-44
  Weather and Sea Conditions Monitoring 5-44
  Port Facilities 5-44

Repowering 5-45

Decommissioning 5-45
  Background 5-45
  Decommissioning of WTGs 5-45
  Decommissioning of Substructures and Foundations 5-45
  Decommissioning of Offshore Cabling including Export Cabling 5-47

Summary of Optimised Seagreen Project Design 5-47

References 5-51

CHAPTER 6: EIA PROCESS 6-1

Introduction 6-1

Requirement for EIA 6-1
  Legislative Framework 6-1
  EIA Guidance and Best Practice 6-3
CONTENTS

The EIA Process 6-3
Scope of This EIA Report 6-3
Structure of Assessment 6-4
Consultation 6-8
Consultation with Statutory Consultees 6-8
Consultation with Non-statutory Consultees 6-9
Public consultation 6-9
Public information days 6-9
Design Envelope Approach 6-10
Impact Identification and Evaluation 6-11
Source-pathway-receptor model 6-11
Effect vs Impact 6-11
Baseline Environment 6-12
Assessing Impact Significance 6-12
Sensitivity of a Receptor 6-13
Magnitude of Effect 6-13
Impact Significance 6-14
Mitigation and Residual Impacts 6-15
Monitoring 6-15
Interrelationships 6-16
Assessment of Cumulative Impacts 6-16
Cumulative Impact Assessment Methodology 6-16
Transboundary Impacts 6-17
Assumptions and Limitations 6-17
Habitats Regulations Appraisal 6-18
References 6-19

CHAPTER 7: SCOPE OF EIA REPORT

Introduction 7-1
2012 Offshore ES 7-1
ES Addendum 2013 and Consents Decision 2014 7-2
Scoping Request and Scoping Opinion 2017 7-2
Scoping Request May 2017 7-2
Scoping Opinion September 2017 7-3
EIA Regulations 7-3
Using information contained within the 2012 Offshore ES 7-3
Reporting of Potential Significant Impacts 7-3
Reporting of Consent Conditions from Original Consents 7-3
Use of Competent Experts 7-3
Post Scoping Consultation 7-4
Parameters Scoped into and out of EIA 7-6
Habitats Regulations Appraisal 7-6
CHAPTER 8: ORNITHOLOGY

Introduction 8-1

Legislation, Policy and Guidance 8-3
  Policy Context 8-3
  Legislative Requirements 8-5
  Designated Sites 8-6
  Guidance 8-6

Consultation 8-8

Scope of Assessment 8-12
  Disturbance 8-13
  Displacement and Barrier Effects 8-13
  Collision 8-14
  Scoped Out Impacts 8-14

Methodology 8-14
  Study Area 8-14
  Data Collection 8-15
    Baseline Survey 8-16
    Data Analysis 8-18
  Impact Assessment 8-19
  Developments in Assessment Methods 8-19
  Displacement Analysis 8-19
  Collision Risk Analysis 8-27
  Significance Criteria 8-33
  Assessment Limitations and Uncertainty 8-37

Baseline Conditions 8-37
  Gannet 8-39
  Kittiwake 8-41
  Herring Gull 8-42
  Guillemot 8-43
  Razorbill 8-45
  Puffin 8-46
  Predicted Future Baseline 8-48

Assessment of Impacts – Worst Case Scenario 8-49
  Worst Case Scenario 8-49
  Environmental Measures Incorporated into the Project 8-51
CONTENTS

Impact Assessment – Construction Phase

Project Alpha

Disturbance and Displacement Impacts

Project Bravo

Disturbance and Displacement Impacts

Project Alpha and Project Bravo Combined

Disturbance and Displacement Impacts

Impact Assessment – Operational Phase

Project Alpha

Disturbance

Displacement

Collision

Project Bravo

Disturbance

Displacement

Collision

Project Alpha and Project Bravo Combined

Disturbance

Displacement

Collision

Impact Assessment – Decommissioning

Project Alpha

Project Bravo

Project Alpha and Project Bravo combined

Impact Assessment: Cumulative

Scope of Assessment

Projects Considered

Cumulative Assessment with Other Projects in the Forth and Tay Region

Cumulative Construction Impacts

Cumulative Operational Impacts

Interrelationships

Transboundary Impacts

Mitigation and Monitoring

Impact Assessment Summary – The Optimised Seagreen Project

References

CHAPTER 9: NATURAL FISH AND SHELLFISH RESOURCE

Introduction

Legislation, Policy and Guidance

Policy Context

Legislative Requirements

Guidance
Consultation 9-4
Scope of Assessment 9-7
Methodology 9-7
Study Area 9-7
Data Collection 9-8
Survey Work 9-8
Impact Assessment 9-8
Approach to underwater noise assessment 9-9
Developments in Assessment Methods 9-12
Significance Criteria 9-12
Assessment Limitations and Uncertainty 9-14
Baseline Conditions 9-15
Immediate Study Area (Current Baseline) 9-15
Regional Study Area (Current Baseline) 9-17
Wider Study Area (Current Baseline) 9-17
Individual species accounts – finfish 9-18
Individual species accounts – elasmobranchs 9-28
Individual species accounts – shellfish and other fish species 9-30
Individual species accounts – migratory fish 9-33
Summary of Baseline 9-37
Predicted Future Baseline 9-37
Sensitivity of Fish and Shellfish to Underwater Noise 9-39
Assessment of Impacts – Worst Case Scenario 9-41
Worst Case Scenario 9-41
Environmental Measures Incorporated into the Project 9-44
Impact Assessment – Construction Phase 9-45
Project Alpha 9-45
Effects of noise – mortality and injury impacts 9-47
Effect of noise – behavioural impacts 9-47
Project Bravo 9-49
Effect of noise – mortality and injury impacts 9-49
Effect of noise – behavioural impacts 9-50
Project Alpha and Project Bravo Combined 9-50
Effect of noise – mortality and injury impacts 9-51
Effect of noise – behavioural impacts (herring and other Group 3 fish species) 9-52
Impact Assessment – Operational Phase 9-53
Impact Assessment – Decommissioning 9-53
Impact Assessment: Cumulative 9-53
Effect of noise – behavioural impacts (herring and other Group 3 fish species) 9-55
Additional Mitigation 9-57
Residual Impact 9-57
Interrelationships 9-57
CHAPTER 10: MARINE MAMMALS

Introduction 10-1

Legislation, Policy and Guidance 10-3
  Policy Context 10-3
  Legislative Requirements 10-3
  Guidance 10-6

Consultation 10-6

Scope of Assessment 10-12

Methodology 10-12
  Study Area 10-12
  Data Collection 10-13
  Impact Assessment 10-15
  Approach to underwater noise assessment 10-15
    Modelling the population consequences of noise impacts 10-18
    Developments in Assessment Methods 10-19
    Significance Criteria 10-21
  Assessment Limitations and Uncertainty 10-23
    Predicting the Exposure of Animals to Underwater Noise 10-23
    Predicting the Response of Animals to Underwater Noise 10-23
    Predicting the Population Consequences of Disturbance 10-25

Baseline Conditions 10-26
  Harbour seal 10-26
    Current baseline 10-26
  Grey seal 10-28
    Current Baseline 10-28
  Bottlenose dolphin 10-31
    Current baseline 10-31
  Harbour porpoise 10-33
    Current baseline 10-33
  Minke whale 10-35
    Current baseline 10-35
  White-beaked dolphin 10-36
    Current baseline 10-36
  Baseline summary 10-37
    Predicted future baseline 10-38
Assessment of Impacts

Sensitivity of Marine Mammals to Noise Impacts from Pile Driving

PTS

Behavioural effect: displacement

Worst Case Scenario

Environmental Measures Incorporated into the Project

Impact Assessment – Construction Phase

Project Alpha

PTS Impacts from Piling Noise
Disturbance Impacts from Piling Noise

Project Bravo

PTS Impacts from Piling Noise
Disturbance Impacts from Piling Noise

Projects Alpha and Project Bravo Combined (the optimised Seagreen Project)

PTS risk from the concurrent construction of Project Alpha and Project Bravo combined
Disturbance Impacts from Piling Noise: Sequential Construction of Project Alpha followed by Project Bravo
Disturbance Impacts from Piling Noise: Concurrent Construction

Summary

Impact Assessment: Cumulative

Harbour Seal Cumulative Impact of Disturbance
Grey Seals Cumulative Impact of Disturbance

Population modelling

Bottlenose Dolphin Cumulative Impact of Disturbance

Bottlenose Dolphin Cumulative Construction Scenarios
Consideration of PTS

Bottlenose Dolphin Cumulative Assessment: Single vessel (longest duration) without PTS at Inch cape

Harbour Porpoise Cumulative Impact of Disturbance
Minke Whale Cumulative Impact of Disturbance
White-beaked Dolphin Cumulative Impact of Disturbance

Interrelationships

Transboundary Impacts

Mitigation and monitoring

Impact assessment summary – the optimised Seagreen project

References
# CHAPTER 11: COMMERCIAL FISHERIES

## Introduction

### Legislation, Policy and Guidance

- Policy Context
- Legislative Requirements
- Guidance

### Consultation

### Scope of Assessment

### Methodology

- Study Area
- Data Collection
- Impact Assessment
  - *Developments in Assessment Methods*
  - *Significance Criteria*
- Assessment Limitations and Uncertainty

### Baseline Conditions

- Overview
- Scallop Fishery
  - Current baseline
  - Predicted future baseline
- Squid Fishery
  - Current baseline
  - Predicted future baseline
- Lobster and Crab Fishery
  - Current baseline
  - Predicted future baseline
- Nephrops Fishery
  - Current baseline
  - Predicted future baseline
- Whitefish Fishery
  - Current baseline
  - Predicted future baseline

### Assessment of Impacts – Worst Case Scenario

### Impact Assessment – Construction Phase

- Project Alpha
  - Potential impacts on commercially exploited fish and shellfish populations
  - Temporary loss of, or restricted access to, traditional fishing grounds
  - Displacement of fishing activity into other areas
  - Safety issues for fishing vessels
  - Increased steaming times to fishing grounds
  - Interference with fishing activities
Project Bravo

Project Alpha and Project Bravo Combined

Potential impacts on commercially exploited fish and shellfish populations 11-34
Temporary loss of, or restricted access to, traditional fishing grounds 11-35
Displacement of fishing activity into other areas 11-36
Safety issues for fishing vessels 11-37
Increased steaming times to fishing grounds 11-38
Interference with fishing activities 11-38

Impact Assessment – Operational Phase 11-39

Project Alpha

Complete loss of, or restricted access to, traditional fishing grounds 11-39
Displacement of fishing activity into other areas 11-42
Safety issues for fishing vessels 11-42
Increased steaming times to fishing grounds 11-43
Interference with Fishing Activities 11-44

Project Bravo

Project Alpha and Project Bravo Combined

Complete loss of, or restricted access to, traditional fishing grounds 11-46
Displacement of fishing activity into other areas 11-47
Safety issues for fishing vessels 11-48
Increased steaming times to fishing grounds 11-48
Interference with fishing activities 11-49

Impact Assessment – Decommissioning 11-50

Impact Assessment: Cumulative 11-51

Cumulative Impacts during Construction

Potential impacts on commercially exploited fish and shellfish populations 11-54
Temporary loss of, or restricted access to, traditional fishing grounds 11-54
Displacement of fishing activity into other areas 11-57
Increased steaming times to fishing grounds 11-57
Interference with fishing activities 11-58

Cumulative Impacts during Operation

Complete loss of, or restricted access to, traditional fishing grounds 11-59
Displacement of fishing activity into other areas 11-60
Increased steaming times to fishing grounds 11-61
Interference with fishing activities 11-61

Cumulative Impacts during Decommissioning 11-62

Interrelationships 11-63

Transboundary Impacts 11-63

Mitigation and Monitoring 11-63

Impact Assessment Summary – The Optimised Seagreen Project 11-63

References 11-69
# CHAPTER 12: SHIPPING AND NAVIGATION

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>12-1</td>
</tr>
<tr>
<td>Legislation, Policy and Guidance</td>
<td>12-3</td>
</tr>
<tr>
<td>Policy Context</td>
<td>12-3</td>
</tr>
<tr>
<td>Legislative Requirements</td>
<td>12-3</td>
</tr>
<tr>
<td>Guidance</td>
<td>12-4</td>
</tr>
<tr>
<td>Scoping and Consultation</td>
<td>12-4</td>
</tr>
<tr>
<td>Regular Operator Consultation</td>
<td>12-10</td>
</tr>
<tr>
<td>Scope of Assessment</td>
<td>12-10</td>
</tr>
<tr>
<td>Methodology</td>
<td>12-12</td>
</tr>
<tr>
<td>Study Area</td>
<td>12-12</td>
</tr>
<tr>
<td>Cumulative Study Area</td>
<td>12-12</td>
</tr>
<tr>
<td>Data Collection</td>
<td>12-12</td>
</tr>
<tr>
<td><em>Survey Work</em></td>
<td>12-13</td>
</tr>
<tr>
<td>Impact Assessment</td>
<td>12-13</td>
</tr>
<tr>
<td><em>Developments in Assessment Methods</em></td>
<td>12-14</td>
</tr>
<tr>
<td><em>Significance Criteria</em></td>
<td>12-14</td>
</tr>
<tr>
<td>Cumulative Impact Assessment</td>
<td>12-16</td>
</tr>
<tr>
<td>Assessment Limitations and Uncertainty</td>
<td>12-16</td>
</tr>
<tr>
<td>Baseline Conditions</td>
<td>12-16</td>
</tr>
<tr>
<td>Study Area</td>
<td>12-16</td>
</tr>
<tr>
<td><em>Current baseline – Navigational Features</em></td>
<td>12-16</td>
</tr>
<tr>
<td><em>Current Baseline – SAR</em></td>
<td>12-17</td>
</tr>
<tr>
<td><em>Current Baseline – Marine Incidents</em></td>
<td>12-18</td>
</tr>
<tr>
<td><em>Current Baseline – Marine Traffic Survey Results</em></td>
<td>12-18</td>
</tr>
<tr>
<td><em>Predicted Future Baseline</em></td>
<td>12-19</td>
</tr>
<tr>
<td>Assessment of Impacts – Worst Case Scenario</td>
<td>12-20</td>
</tr>
<tr>
<td>Worst Case Scenario</td>
<td>12-20</td>
</tr>
<tr>
<td>Environmental Measures Incorporated into the Project</td>
<td>12-23</td>
</tr>
<tr>
<td>Impact Assessment – Construction Phase</td>
<td>12-26</td>
</tr>
<tr>
<td>Project Alpha</td>
<td>12-26</td>
</tr>
<tr>
<td>Impact of Construction on Commercial Vessels</td>
<td>12-26</td>
</tr>
<tr>
<td>Project Alpha</td>
<td>12-27</td>
</tr>
<tr>
<td>Impact of Construction on Commercial Fishing Vessels</td>
<td>12-27</td>
</tr>
<tr>
<td>Project Alpha</td>
<td>12-29</td>
</tr>
<tr>
<td>Impact of Construction on Recreational Vessels</td>
<td>12-29</td>
</tr>
<tr>
<td>Project Bravo</td>
<td>12-31</td>
</tr>
<tr>
<td>Impact of Construction on Commercial Vessels</td>
<td>12-31</td>
</tr>
<tr>
<td>Project Bravo</td>
<td>12-32</td>
</tr>
<tr>
<td>Impact of Construction on Commercial Fishing Vessels</td>
<td>12-32</td>
</tr>
<tr>
<td>Project Bravo</td>
<td>12-34</td>
</tr>
<tr>
<td>Impact of Construction on Recreational Vessels</td>
<td>12-34</td>
</tr>
</tbody>
</table>
Project Alpha and Project Bravo Combined

Impact of Construction on Commercial Vessels

Project Alpha and Project Bravo Combined

Impact of Construction on Commercial Fishing Vessels

Project Alpha and Project Bravo Combined

Impact of Construction on Recreational Vessels

Impact Assessment - Operational Phase

Project Alpha

Impact of Operation on Commercial Vessels

Project Alpha

Impact of Operation on Commercial Fishing Vessels

Project Alpha

Impact of Operation on Recreational Vessels

Project Alpha

Impact of Operation on SAR Operations

Project Bravo

Impact of Operation on Commercial Vessels

Project Bravo

Impacts of Operation on Commercial Fishing Vessels

Project Bravo

Impact of Operation on Recreational Vessels

Project Bravo

Impact of Operation on SAR Operations

Project Alpha and Project Bravo Combined

Impact of Operation on Commercial Vessels

Project Alpha and Project Bravo Combined

Impact of Operation on Commercial Fishing Vessels

Project Alpha and Project Bravo Combined

Impact of Operation on Recreational Vessels

Project Alpha and Project Bravo Combined

Impact of Operation on SAR Operations

Impact Assessment - Decommissioning

Project Alpha and Project Bravo Combined

Impact of Decommissioning on Commercial Vessels

Project Alpha and Project Bravo Combined

Impact of Decommissioning on Fishing Vessels

Project Alpha and Project Bravo Combined

Impact of Decommissioning on Recreational Vessels

Impact Assessment: Cumulative

12-35
12-35
12-36
12-36
12-38
12-38
12-39
12-39
12-40
12-40
12-42
12-42
12-43
12-43
12-44
12-44
12-45
12-45
12-47
12-47
12-48
12-48
12-49
12-49
12-50
12-50
12-52
12-52
12-53
12-53
12-54
12-54
12-55
12-55
12-55
12-55
Cumulative Impact Assessment

Cumulative Impact of Construction or Decommissioning Phases on Commercial Vessels
  Potential Impacts
  Summary
  Additional Mitigation
  Residual Impact

Cumulative Impact of Operation Phase on Commercial Vessels
  Potential Impacts
  Summary
  Additional Mitigation
  Residual Impact

Optimised Seagreen Project and other Schemes
  Cumulative Impact of Construction and Decommissioning on Commercial Fishing Vessels
  Cumulative Impact of Operation on Commercial Fishing Vessels

Interrelationships

Transboundary Impacts

Mitigation and Monitoring

Impact Assessment Summary – The Optimised Seagreen Project

References

CHAPTER 13: SEASCAPE, LANDSCAPE AND VISUAL AMENITY

Introduction

Legislation, Policy and Guidance
  Policy Context
    International
    National
    Scottish Planning Policy
    SNH Policy and Guidance
    SLVIA Guidance

Legislative Requirements
  International and National Landscape and Seascape Designations
  Local Landscape Designations
  Historic Gardens and Designed Landscapes (HGDL)

Consultation

Scope of Assessment

Methodology
  Overview of Assessment Methodology
  Approach
  Distinction between Seascape, Landscape and Visual Impacts
  Types of Effect Considered
  Design Sensitivity Analysis
Study Area 13-20
Desk Study 13-21
Survey Work 13-21
Impact Assessment 13-21
Significance Criteria 13-22
Assessment Terminology and Judgements 13-22
Sensitivity 13-22
Magnitude of Effect 13-25
Assessment Limitations 13-29
Mitigation 13-30
Residual Effect 13-30
Baseline Conditions 13-30
ZTV Studies 13-31
Landscape Character 13-32
Seascape Character 13-33
National Seascape Units 13-34
Regional Seascape Units 13-34
Physical and Human Influences on the Landscape/Seascape within the Study Area 13-35
Visual Receptors 13-36
Settlements 13-37
Route Corridors – Roads, Railways, Cycle Routes and Footpaths 13-37
Recognised Vantage Points 13-37
Recreational Receptors 13-38
Tourist Attractions 13-38
Marine Receptors 13-38
Viewpoints 13-39
Night Time Lighting and Sensitivity 13-41
Predicted Future Baseline 13-41
Assessment of Effects – Worst Case Scenario (WCS) 13-41
Meteorological Context 13-42
Additional Considerations 13-45
Curvature of the Earth 13-45
Acuity of the Eye 13-46
Environmental Measures Incorporated in to the Scheme 13-47
Impact Assessment – Construction Phase 13-47
Impact Assessment – Operational Phase 13-49
ZTV Analysis 13-50
Potential Effects on Regional Seascape Character during Operation 13-51
SA3: Cove Bay to Milton Ness RSCU 13-51
SA4: Montrose Bay RSCU 13-52
SA5: Long Craig RSCU 13-53
SA6: Lunan Bay RSCU 13-55
SA7: Land Craig to The Deil’s Heid RSCU 13-56
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential Visual Amenity Effects During Operation</td>
<td>13-59</td>
</tr>
<tr>
<td>Visual Effects from Representative Viewpoints</td>
<td>13-59</td>
</tr>
<tr>
<td>Viewpoint 1: Garron Point (Stonehaven Golf Club)</td>
<td>13-60</td>
</tr>
<tr>
<td>Viewpoint 2: Beach Road, Kirkton, St Cyrus</td>
<td>13-61</td>
</tr>
<tr>
<td>Viewpoint 3: White Caterthun Hill Fort</td>
<td>13-62</td>
</tr>
<tr>
<td>Viewpoint 4: Montrose</td>
<td>13-64</td>
</tr>
<tr>
<td>Viewpoint 5: Braehead of Lunan</td>
<td>13-65</td>
</tr>
<tr>
<td>Viewpoint 6: Arbroath Signal Tower</td>
<td>13-66</td>
</tr>
<tr>
<td>Viewpoint 7: Carnoustie</td>
<td>13-68</td>
</tr>
<tr>
<td>Viewpoint 8: Fife Ness, Lochaber Rock</td>
<td>13-69</td>
</tr>
<tr>
<td>Viewpoint 9: North Berwick Law</td>
<td>13-70</td>
</tr>
<tr>
<td>Viewpoint 10: Dunbar Cliffs</td>
<td>13-71</td>
</tr>
<tr>
<td>Viewpoint 11: Pinderachy</td>
<td>13-71</td>
</tr>
<tr>
<td>Viewpoint 12: The Geot/Ben Tirran (a corbett)</td>
<td>13-72</td>
</tr>
<tr>
<td>Viewpoint 13: Isle of May</td>
<td>13-73</td>
</tr>
<tr>
<td>Viewpoint 14: Bell Rock Lighthouse</td>
<td>13-74</td>
</tr>
<tr>
<td>Visual Effects Summary from Representative Viewpoints</td>
<td>13-79</td>
</tr>
<tr>
<td>Summary of Effects on Land-based Visual Receptors</td>
<td>13-80</td>
</tr>
<tr>
<td>Summary of Effects on Settlement and Residential Receptors</td>
<td>13-80</td>
</tr>
<tr>
<td>Summary of Effects on Recreational Walking and Cycle Routes</td>
<td>13-81</td>
</tr>
<tr>
<td>Summary of Effects on Roads and Railways</td>
<td>13-81</td>
</tr>
<tr>
<td>Summary of Effects on Recognised Vantage Points and Tourist Attractions</td>
<td>13-82</td>
</tr>
<tr>
<td>Visual Impacts on Other Land-based Receptors</td>
<td>13-82</td>
</tr>
<tr>
<td>Summary of Effects on Marine Receptors</td>
<td>13-82</td>
</tr>
<tr>
<td>Night Time Visual Assessment</td>
<td>13-83</td>
</tr>
<tr>
<td>Valency of Effects</td>
<td>13-84</td>
</tr>
<tr>
<td>Residual Effects</td>
<td>13-85</td>
</tr>
<tr>
<td><strong>Impact Assessment – Cumulative</strong></td>
<td>13-85</td>
</tr>
<tr>
<td>Cumulative Effects of the optimised Seagreen Project with other Schemes</td>
<td>13-86</td>
</tr>
<tr>
<td>Issues Scoped Out</td>
<td>13-87</td>
</tr>
<tr>
<td>Cumulative Effects with Offshore Wind Farms</td>
<td>13-88</td>
</tr>
<tr>
<td>Summary of Cumulative Effect on Regional Seascape Character</td>
<td>13-89</td>
</tr>
<tr>
<td>Assessment of Cumulative Effects on Visual Amenity</td>
<td>13-91</td>
</tr>
<tr>
<td>Cumulative Effects with Onshore Wind Farms</td>
<td>13-99</td>
</tr>
<tr>
<td>Summary Assessment of Cumulative Onshore Effects on Regional Seascape Character</td>
<td>13-100</td>
</tr>
<tr>
<td>Summary of cumulative impacts on Visual Amenity</td>
<td>13-101</td>
</tr>
<tr>
<td><strong>Interrelationships</strong></td>
<td>13-102</td>
</tr>
<tr>
<td><strong>Transboundary Impacts</strong></td>
<td>13-102</td>
</tr>
<tr>
<td><strong>Mitigation and Monitoring</strong></td>
<td>13-102</td>
</tr>
<tr>
<td><strong>Impact Assessment Summary – The Optimised Seagreen Project</strong></td>
<td>13-102</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td>13-111</td>
</tr>
</tbody>
</table>
CHAPTER 14: MILITARY AND CIVIL AVIATION

Introduction 14-1
Legislation, Policy and Guidance 14-3
Consultation 14-3
Scope of Assessment 14-5
Methodology 14-6
  Study Area 14-6
  Data Collection 14-6
  Impact Assessment 14-6
    Developments in Assessment Methods 14-7
    Significance Criteria 14-7
  Assessment Limitations and Uncertainty 14-8
Baseline Conditions 14-8
  Current Baseline 14-8
  Predicted future baseline 14-9
Assessment of Impacts – Worst Case Scenario 14-9
  Worst Case Scenario 14-10
  Environmental Measures Incorporated into the Project 14-10
Impact Assessment – Construction Phase 14-12
  Project Alpha 14-12
  Project Bravo 14-12
  Projects Alpha and Bravo Combined 14-12
Impact Assessment – Operational Phase 14-13
  Project Alpha 14-13
    Civil Radar (airport) 14-14
    Military Radar (air traffic control) 14-14
    En-Route Radar 14-14
    MOD Air Defence Radar 14-15
    Low Flying 14-15
    Civil Aviation Authority (CAA) – Lighting 14-15
  Project Bravo 14-16
  Projects Alpha and Bravo Combined 14-17
Impact Assessment – Decommissioning Phase 14-17
  Project Alpha 14-17
  Project Bravo 14-18
  Projects Alpha and Bravo Combined 14-18
Impact Assessment: Cumulative 14-18
Interrelationships 14-20
Transboundary Impacts 14-20
Mitigation and Monitoring 14-20
Impact Assessment Summary – The Optimised Seagreen Project 14-20
References 14-22
CHAPTER 15: SOCIO-ECONOMICS

Introduction 15-2
Legislation, Policy and Guidance 15-3
  Policy Context 15-3
Consultation 15-5
Scope of Assessment 15-5
Methodology 15-6
  Study Area 15-6
  Data Collection 15-7
  Impact Assessment
    Developments in Assessment Methods 15-9
    Significance Criteria 15-9
  Assessment Limitations and Uncertainty 15-10
Baseline Conditions 15-10
  Demographics 15-10
    Current baseline 15-10
    Future baseline 15-11
  Employment and Industrial Structure
    Current baseline 15-11
  Education
    Current baseline 15-13
  Supply Chain Opportunities 15-13
  Summary 15-14
Assessment of Impacts – Worst Case Scenario 15-14
  Worst Case Scenario 15-15
  Environmental Measures Incorporated into the Project 15-15
Impact Assessment – Construction Phase 15-16
  Project Alpha 15-16
  Project Bravo 15-18
  Project Alpha and Project Bravo combined 15-18
Impact Assessment – Operational Phase 15-20
  Project Alpha 15-20
  Project Bravo 15-23
  Project Alpha and Project Bravo combined 15-23
Impact Assessment: Cumulative 15-25
Interrelationships 15-27
Transboundary Impacts 15-27
Mitigation and Monitoring 15-27
Impact Assessment Summary – The Optimised Seagreen Project 15-27
References 15-29
CHAPTER 16: HABITATS REGULATIONS APPRAISAL

Introduction 16-1

Legislation, Policy and Guidance 16-2
  Policy Context 16-2
  Legislative Requirements 16-3
  Guidance 16-5

Consultation 16-5

Scope of Assessment 16-10

Methodology 16-13
  Study Area 16-13
  Data Collection 16-14
    Survey Work 16-17
    Data Analysis 16-18
  Impact Assessment 16-19
    Developments in Assessment Methods 16-20
    Displacement Analysis 16-24
    Collision Risk Modelling 16-30
    Assessment Limitations and Uncertainty 16-36
    Implications of developments in assessment methodology 16-36

Description of the Project (Worst Case Scenario) 16-37
  Management of the European site(s) 16-37
  Worst Case Scenario 16-37
  Environmental Measures Incorporated into the Project 16-40

Characteristics of the European Site(s) 16-42
  Berwickshire and North Northumberland Coast SAC 16-42
  Firth of Tay and Eden Estuary SAC 16-43
  Isle of May SAC 16-44
  Moray Firth SAC 16-45
  Buchan Ness to Collieston Coast SPA 16-46
  Forth Islands SPA 16-47
  Fowlsheugh SPA 16-48
  St Abb’s Head to Fast Castle SPA 16-49
  Outer Firth of Forth and St Andrews Bay Complex pSPA 16-49

Impact Prediction: Special Areas of Conservation 16-51
  Information Required 16-51
  Impact Prediction for Project Alpha and Project Bravo Combined 16-51
    Construction Noise Impacts on Marine Mammals 16-51
  Impact prediction: In Combination 16-64
    Construction Noise Impacts on Marine Mammals 16-64

Impact Prediction: Special Protection Areas 16-72
  Introduction 16-72
  Information Sources 16-72
## CONTENTS

Impact prediction 16-73  
Introduction 16-73  
Displacement 16-73  
Collision 16-76  
Apportioning 16-77  
Implications for qualifying populations 16-85  
Assessment of Project Alpha alone 16-87  
Assessment of Project Bravo alone 16-104  
Assessment of Project Alpha and Project Bravo Combined 16-118  
Optimised Seagreen Project in Combination with Other Projects 16-132  
Mitigation Measures 16-151  
Conclusions 16-152  
References 16-153

### CHAPTER 17: SUMMARY OF IMPACTS

Summary of Impacts 17-3

### CHAPTER 18: MITIGATION AND MONITORING

Introduction 18-1  
General Mitigation Measures 18-1  
Ornithology 18-2  
  Mitigation 18-2  
  Monitoring 18-3  
Natural Fish and Shellfish Resource 18-3  
  Monitoring 18-3  
Marine Mammals 18-4  
  Monitoring 18-5  
Commercial Fisheries 18-6  
  Monitoring 18-7  
Shipping and Navigation 18-8  
  Monitoring 18-9  
Seascape, Landscape and Visual Amenity 18-9  
  Monitoring 18-10  
Military and Civil Aviation 18-10  
  Monitoring 18-11  
Socio-Economics 18-11  
  Monitoring 18-11  
Physical Environment (Scoped out of the 2018 EIA) 18-12  
Water Sediment Quality (Scope out of the 2018 EIA) 18-12  
Benthic Ecology and Intertidal Ecology (Scoped out of the 2018 EIA) 18-13  
Archaeology and Cultural Heritage (Scoped out of the 2018 EIA) 18-13  
Other Marine Users and Activities (Scoped out of the 2018 EIA) 18-14