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ENVIRONMENTAL IMPACT **ASSESSMENT REPORT**

**EXTENSION OF AN EXISTING PIGGERY AND ALL ANCILLARY
SITE WORKS AND SERVICES**

**WOODVILLE PIG FARMS LIMITED
BALLYMACKEY
NENAGH
CO. TIPPERARY**

2020

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TABLE OF CONTENTS

SECTION	PAGE
NON-TECHNICAL SUMMARY.....	16
<i>GENERAL</i>	<i>16</i>
<i>SLURRY MANAGEMENT</i>	<i>17</i>
<i>WASTE MATERIAL.....</i>	<i>18</i>
<i>HUMAN BEINGS</i>	<i>18</i>
<i>AIR / ODOUR / CLIMATE</i>	<i>20</i>
<i>NOISE</i>	<i>21</i>
<i>VISUAL AMENITY & LANDSCAPE CHARACTER.....</i>	<i>22</i>
<i>BIODIVERSITY</i>	<i>23</i>
<i>SOILS, GEOLOGY AND HYDROLOGY.....</i>	<i>27</i>
<i>MATERIAL ASSETS</i>	<i>28</i>
<i>USE OF NATURAL & OTHER RESOURCES.....</i>	<i>29</i>
<i>ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE</i>	<i>30</i>
<i>SUMMARY</i>	<i>31</i>
1.0 INTRODUCTION AND METHODOLOGY.....	32
1.1 INTRODUCTION	32
1.2 ENVIRONMENTAL IMPACT ASSESSMENT & PLANNING LEGISLATION.....	32
1.3 EIA PROCESS OVERVIEW.....	35
1.3.1 Screening.....	35
1.3.2 Scoping.....	36
1.4 INFORMATION TO BE CONTAINED IN AN EIS / EIAR	37
1.5 IDENTIFICATION OF LIKELY SIGNIFICANT IMPACTS	38
1.5.1 Scenarios Investigated	39
1.6 REPORT STRUCTURE	39
1.7 COMPETENCE AND EXPERTISE	40
1.8 LINKS BETWEEN EIA AND APPROPRIATE ASSESSMENT	42
2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT.....	43
2.1 RECENT PLANNING HISTORY OF THE SITE	45
2.2 OVERVIEW OF THE EXISTING ACTIVITY	47
2.3 OVERVIEW OF THE PROPOSED DEVELOPMENT	50
2.4 PROPOSED SITE LAYOUT AND CONSTRUCTION	52
2.4.1 Demolition of Existing Structures.....	52
2.4.2 Topsoil & Landscaping.....	52
2.4.3 Proposed Pig Houses.....	53
2.4.4 New Slurry Reception Tank (17).....	55
2.4.5 Slurry Generation, Storage and Leak Detection.....	55
2.4.6 Low Emission Housing Design	58
2.4.7 Ancillary Buildings	60
2.4.8 Site Boundaries	60
2.5 PRODUCTION PROCESSES AND MANAGEMENT	62
2.5.1 Production Process.....	62
2.5.2 Site Access / Traffic.....	64
2.5.3 Management of Slurry and Soiled Water	65

TABLE OF CONTENTS

SECTION	PAGE
2.5.4 Drainage & Monitoring	65
2.5.5 Energy	67
2.5.6 Heating.....	69
2.5.7 Ventilation.....	69
2.5.8 Water Provision	70
2.5.9 Feed Silos.....	71
2.5.10 Rodent Baiting	72
2.5.11 Management of Wastes Arising from Operation	73
2.6 REFERENCES	75
3.0 ALTERNATIVES	77
3.1 EXAMINATION OF POSSIBLE ALTERNATIVES.....	77
3.2 ALTERNATIVE SITE	77
3.3 ALTERNATIVE LAYOUT AND DESIGN	78
3.4 ALTERNATIVE PROCESSES	78
3.5 ALTERNATIVE MANAGEMENT OF SLURRY BY-PRODUCT.....	79
3.6 “DO-NOTHING” ALTERNATIVE	79
PART II - ENVIRONMENTAL IMPACTS	81
SECTION A HUMAN ENVIRONMENT	82
4.0 POPULATION AND HUMAN HEALTH.....	83
4.1 INTRODUCTION	83
4.2 METHODOLOGY	83
4.3 RECEIVING ENVIRONMENT	83
4.3.1 Population and Dynamics.....	83
4.3.2 Economic Activity	84
4.3.3 Employment.....	86
4.3.4 Land Use and Settlement Patterns.....	88
4.3.5 Community and Social Infrastructure.....	89
4.3.6 Amenities and Tourism	89
4.4 IMPACTS.....	90
4.4.1 Economy and employment	90
4.4.2 Amenities and Tourism	91
4.4.3 Air, Dust and Odour	91
4.4.4 Noise	92
4.4.5 Traffic.....	93
4.4.6 Land-use.....	94
4.4.7 Visual Amenity	95
4.4.8 Water.....	95
4.5 MAJOR ACCIDENTS AND NATURAL DISASTERS	96
4.6 MITIGATION MEASURES	97
4.7 REFERENCES	98

TABLE OF CONTENTS

SECTION	PAGE
5.0 AIR QUALITY & ODOUR	99
5.1 INTRODUCTION	99
5.1.1 Air Emissions	99
5.1.2 Depositional Dust	101
5.1.3 Asbestos Dust	101
5.2 LEGISLATIVE CONTEXT	102
5.3 METHODOLOGY	104
5.4 DESCRIPTION OF BASELINE AIR QUALITY	104
5.4.1 Existing Sources of Air Emissions	104
5.4.2 Existing Sources of Odour Emissions	107
5.5 MONITORING ASSESSMENT	108
Monitoring Locations	108
5.5.2 Methodology	109
5.6 IMPACTS	110
5.6.1 Odour	110
5.6.2 Air Quality	113
5.6.3 Depositional Dust	114
5.6.4 Asbestos Dust	114
5.7 MITIGATION MEASURES	116
5.7.1 Mitigation of Odour and Air Emissions	116
5.7.1.1 Slurry Cooling System	116
5.7.1.2 Slurry Removal System	119
5.7.2 Mitigation of Depositional Dust	120
5.7.3 Mitigation of Asbestos Dust	121
5.8 CUMULATIVE IMPACTS & MITIGATION	121
5.9 REFERENCES	123
6.0 NOISE	126
6.1 INTRODUCTION	126
6.2 LEGISLATION CONTEXT	127
6.3 REGIONAL ENVIRONMENTAL SETTING	129
6.3.1 Baseline Noise Assessment Methodology	129
6.3.2 Baseline Noise Assessment – Results	130
6.3.3 Baseline Noise Assessment – Analysis	131
6.4 PREDICTIVE NOISE ASSESSMENT	132
6.4.1 Source Noise Specifications	132
6.4.2 Predictive Noise – Results	133
6.4.3 Predictive Noise – Analysis	136
6.5 EVALUATION OF THE RESULTS	140
6.6 NOISE MITIGATION	141
6.7 REFERENCES	142

TABLE OF CONTENTS

SECTION	PAGE
7.0 LANDSCAPE AND VISUAL	143
7.1 INTRODUCTION	143
7.2 METHODOLOGY	143
7.2.1 Baseline Study Methodology.....	143
7.2.2 Landscape Assessment Criteria	143
7.2.3 Landscape Planning.....	144
7.3 EXISTING ENVIRONMENT	145
7.3.1 Woodville Townland Landscape	145
7.3.2 Landscape Setting of The Proposed Site.....	147
7.4 IMPACTS.....	149
7.4.1 “Do-Nothing” Scenario.....	149
7.4.2 Construction Phase.....	149
7.4.3 Operational Phase	150
7.4.4 Landscape Planning Impact	168
7.4.5 Landscape and Visual Impact Assessment Summary.....	173
7.5 MITIGATION MEASURES	174
7.6 RESIDUAL IMPACTS.....	175
7.7 REFERENCES	175
SECTION B THE NATURAL ENVIRONMENT.....	177
8.0 BIODIVERSITY	178
8.1 INTRODUCTION	178
8.2 LEGISLATIVE FRAMEWORK AND PLANNING POLICY	178
8.2.1 Legislative Context.....	178
8.2.2 Planning Policies.....	180
8.3 METHODOLOGY	183
8.3.1 Relevant Guidelines	183
8.3.2 Study Area / Zone of Influence.....	183
8.3.3 Desktop Research.....	184
8.3.4 Field Surveys Methodology.....	184
8.3.5 Ecological Valuation Criteria.....	187
8.4 DESCRIPTION OF EXISTING ENVIRONMENT	188
8.4.1 Designated Sites.....	188
8.4.2 Flora & Habitats.....	195
8.4.3 Fauna (Excluding Bats)	199
8.4.4 Fauna - Bats.....	201
8.4.5 Avifauna	202
8.4.6 Records of Protected, Rare and Invasive Species.....	203
8.4.7 Water Quality.....	205
8.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT	208
8.5.1 Determination of Ecological Value	208
8.5.2 Construction Phase.....	210
8.5.3 Operational Phase	217
8.5.4 Cumulative Impacts	222

TABLE OF CONTENTS

SECTION	PAGE
8.5.5 “Do-Nothing” Impact.....	225
8.5.6 Potential Impacts Pre-Mitigation	225
8.6 MITIGATION MEASURES	227
8.6.1 Construction Phase.....	227
8.6.2 Operational Phase	230
8.6.3 “Worst Case” Scenario	231
8.7 PREDICTED IMPACTS WITH MITIGATION	231
8.8 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION	235
8.9 REFERENCES	235
9.0 LAND – SOILS, GEOLOGY, HYDROLOGY AND HYDROGEOLOGY	240
9.1 INTRODUCTION	240
9.2 METHODOLOGY	240
9.3 DESCRIPTION OF THE EXISTING ENVIRONMENT	241
9.3.1 Land & Soils	241
9.3.2 Geological Heritage.....	244
9.3.3 Economic Geology.....	245
9.3.4 Geohazards	245
9.3.5 Water.....	246
9.4 IMPACTS.....	259
9.4.1 Construction Phase.....	259
9.4.2 Operational Phase	261
9.4.3 “Do-Nothing”	264
9.5 MITIGATION MEASURES	264
9.5.1 Construction Phase.....	264
9.5.2 Operational Phase	266
9.6 RESIDUAL IMPACTS.....	267
9.6.1 Construction Phase.....	267
9.6.2 Operational Phase	270
9.7 REFERENCES	272
10.0 CLIMATE	274
10.1 INTRODUCTION	274
10.2 DESCRIPTION OF THE EXISTING ENVIRONMENT	274
10.2.1 The Climate of Ireland	274
10.2.2 Local Climate.....	275
10.3 IMPACTS.....	277
10.3.1 “Do Nothing” Impact	277
10.3.2 “Do something” Impacts	277
10.4 MITIGATION.....	278
10.5 REFERENCES	279

TABLE OF CONTENTS

SECTION	PAGE
SECTION C ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE	280
11.0 ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERRITAGE	281
11.1 INTRODUCTION	281
11.1.1 <i>Definition of Archaeological, Architectural and Cultural Heritage</i>	281
11.2 LEGISLATIVE FRAMEWORK & POLICY	282
11.2.1 <i>Legislative Context</i>	282
11.2.2 <i>Planning Policies</i>	283
11.3 METHODOLOGY	284
11.3.1 <i>Impact Assessment Criteria</i>	285
11.4 DESCRIPTION OF THE EXISTING ENVIRONMENT	286
11.4.1 <i>Site Description</i>	286
11.4.2 <i>Archaeological and Historical Background</i>	287
11.4.3 <i>Cartographic Analysis</i>	291
11.4.4 <i>Toponomy</i>	295
11.4.5 <i>Previous Archaeological Investigations</i>	296
11.4.6 <i>Previous Archaeological Finds</i>	297
11.4.7 <i>Archaeological Heritage</i>	297
11.4.8 <i>Architectural and Cultural Heritage</i>	298
11.4.9 <i>On-Site Inspection</i>	300
11.4.10 <i>Inventory of Archaeology, Architecture and Cultural Heritage and Features, including Areas of Archaeological Potential</i>	305
11.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT	307
11.6 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT	307
11.6.1 <i>Construction Phase</i>	307
11.6.1.1 <i>Potential Direct Impacts</i>	307
11.6.1.2 <i>Potential Indirect Impacts</i>	308
11.6.2 <i>Operational Phase</i>	308
11.6.2.1 <i>Potential Direct Impacts</i>	308
11.6.2.2 <i>Potential Indirect Impacts</i>	308
11.6.3 <i>Operational Phase</i>	308
11.6.4 <i>“Do Nothing” Impact</i>	308
11.7 MITIGATION MEASURES	310
11.7.1 <i>Pre-Construction Phase</i>	310
11.7.1.1 <i>Avoidance of Impact</i>	310
11.7.1.2 <i>Archaeological Test Excavation</i>	310
11.7.2 <i>Construction Phase</i>	311
11.7.2.1 <i>Archaeological Monitoring</i>	311
11.7.3 <i>Operational Phase</i>	311
11.8 RESIDUAL IMPACTS.....	311
11.9 DIFFICULTY ENCOUNTERED IN COMPILING INFORMATION	311
11.10 REFERENCES	312

TABLE OF CONTENTS

SECTION	PAGE
SECTION D MATERIAL ASSETS.....	314
12.0 MATERIAL ASSETS - AGRICULTURE	315
12.1 INTRODUCTION	315
12.2 METHODOLOGY	315
12.3 DESCRIPTION OF THE EXISTING ENVIRONMENT	315
12.3.1 Agricultural Pig Economy	315
12.3.2 Agricultural Land Use	318
12.3.3 North Tipperary	319
12.3.4 Woodville, Co. Tipperary.....	320
12.3.5 Agricultural Enterprises	320
12.4 IMPACTS.....	321
12.4.1 “Do-nothing”.....	321
12.4.2 “Do-something”	321
12.5 MITIGATION MEASURES	322
12.6 CONSTRUCTION IMPACTS AND MITIGATION.....	322
12.6.1 Construction Impacts.....	322
12.6.2 Mitigation.....	322
12.7 RESIDUAL IMPACTS.....	322
12.8 REFERENCES	323
13.0 MATERIAL ASSETS – WASTE MANAGEMENT	324
13.1 INTRODUCTION	324
13.2 METHODOLOGY	324
13.3 LEGISLATIVE FRAMEWORK AND PLANNING POLICY	324
13.3.1 Legislative Context.....	324
13.3.2 Planning Policies, Plans and Other Guidance.....	325
13.4 DESCRIPTION OF THE EXISTING ENVIRONMENT	328
13.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT	330
13.5.1 Construction Phase.....	330
13.5.2 Operational Phase	333
13.5.3 Cumulative Impact.....	334
13.5.4 “Do-Nothing” Impact.....	334
13.6 MITIGATION MEASURES – CONSTRUCTION PHASE	334
13.6.1 Operational Phase	340
13.7 MONITORING	341
13.7.1 Demolition and Construction Phase.....	341
13.7.2 Operational Phase	341
13.8 RESIDUAL IMPACTS.....	342
13.9 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION	342
13.10 REFERENCES	343

TABLE OF CONTENTS

SECTION	PAGE
14.0 MATERIAL ASSETS - UTILITIES.....	344
14.1 INTRODUCTION	344
14.2 METHODOLOGY	344
14.3 DESCRIPTION OF THE EXISTING ENVIRONMENT	344
14.3.1 Electricity.....	344
14.3.2 Water.....	345
14.3.3 Wastewater.....	346
14.3.4 Gas.....	347
14.3.5 Telecommunications	348
14.4 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT	348
14.4.1 Construction Phase.....	348
14.4.2 Operational Phase	348
14.4.3 Potential Cumulative Impacts.....	348
14.5 AVOIDANCE, REMEDIAL & MITIGATION MEASURES.....	349
14.5.1 Construction Phase.....	349
14.5.2 Operational Phase	349
14.5.3 Cumulative Impact.....	349
14.5.4 “Do-Nothing” Impact.....	350
14.6 RESIDUAL IMPACTS.....	350
14.7 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION	350
14.8 REFERENCES	350
15.0 MATERIAL ASSETS – NATURAL AND OTHER RESOURCES	351
15.1 INTRODUCTION	351
15.2 METHODOLOGY	351
15.3 DESCRIPTION OF THE ENVIRONMENT	351
15.3.1 Land use and Soil.....	351
15.3.2 Transport Network.....	352
15.3.3 Economic Minerals	352
15.4 IMPACT AND MITIGATION	353
15.4.1 Land and Soil	353
15.4.2 Transport Network.....	353
15.4.3 Economic Minerals	354
15.4.4 Raw Materials Required	354
15.5 RESIDUAL IMPACTS.....	354
15.6 POTENTIAL CUMULATIVE IMPACTS.....	354
15.7 PREDICTED IMPACTS WITH MITIGATION	354
15.8 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION	354
15.9 REFERENCES	355

TABLE OF CONTENTS

SECTION	PAGE
SECTION E INTERACTIONS AND INTER-RELATIONSHIPS	356
16.0 INTERACTIONS AND INTER-RELATIONSHIPS	357
16.1 AIR AND SOILS	358
16.2 AIR AND CLIMATE	358
16.3 AIR, HUMAN HEALTH AND BIODIVERSITY	358
16.4 NOISE, HUMAN HEALTH AND BIODIVERSITY	359
16.5 MATERIAL ASSETS AND HUMAN BEINGS	360
16.6 MATERIAL ASSETS, BIODIVERSITY, WATER QUALITY AND SOILS	361
16.7 MATERIAL ASSETS AND NOISE	361
16.8 MATERIAL ASSETS AND AIR	361
16.9 WATER QUALITY AND SOILS	362
16.10 WATER QUALITY AND HUMAN BEINGS	362
16.11 WATER QUALITY AND BIODIVERSITY	362
16.12 LANDSCAPE AND VISUAL, SOILS AND HUMAN BEINGS	363
16.13 CULTURAL HERITAGE, SOILS AND HUMAN BEINGS	364

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LIST OF TABLES

Table 1.1	Current and Proposed Number of Pigs at the Woodville Site.
Table 1.2:	General Criteria used to Quantify the Potential Impacts of the Proposed Scheme.
Table 1.3:	Part II EIAR Sections.
Table 1.4:	Contributors to the EIAR.
Table 2.1:	Recent Planning History of the Site.
Table 2.2:	Current and Proposed Maximum Pig Numbers at the Woodville Site.
Table 2.3:	Existing and Proposed Available Slurry Storage Capacity.
Table 2.4:	Estimation of Pig Slurry Volumes for the Existing Number of Pigs.
Table 2.5:	Estimation of Pig Slurry Volumes for the Proposed Number of Pigs.
Table 2.6:	Estimated Traffic Journeys Each Week at the Site.
Table 2.7:	Electrical Usage Finishing Phase of Pig Production. Source, Teagasc (2018) and Carbon trust UK (2005).
Table 2.8:	Estimated Annual Wash-water usage. (Intensive Pig Farm BREF, July 2017).
Table 2.9:	Drinking Water Consumption (PIC - The Real Pig Handbook).
Table 2.10:	Estimation of Waste Volumes for Existing and Proposed Finishing Houses.
Table 4.1:	Population Change Between 2011 Census and 2016 Census/Age Group.
Table 4.2:	Population Changes in Towns Within the Purlieu of the Proposed Site 2011 – 2016.
Table 4.3:	EPA Licenced Facilities Within 15 km of the Proposed Development.
Table 4.4:	Summary of the Working Population in Co. Tipperary, 2016.
Table 4.5:	Persons at Work by Broad Industrial Group 2016.
Table 4.6:	Population Aged 15 Years and Over by Principal Economic Status 2016.
Table 4.7:	Estimated Traffic Journeys Each Week at the Site.
Table 5.1:	List of Air Quality Monitoring Stations in Zone D, Ireland.
Table 5.2:	Average Reading of Measured Parameters from Zone D Air Quality Monitoring Stations Ireland (April 2019).
Table 5.3:	Current and Proposed Annual Emissions of Ammonia, Methane and Nitrous Oxide from the Woodville Site.
Table 5.4:	Slurry Cooling Systems Performance Studies.
Table 5.5:	Slurry Removal Systems Performance Studies.
Table 6.3.1	Noise Monitoring Locations
Table 6.3.2	Baseline Noise Monitoring Summary
Table 6.4.1	Noise Levels from Construction Plant (Ref: BS5228:2009)
Table 6.4.2	Operational Noise Levels of the Proposed Development
Table 6.4.3	Predicted Noise Results Summary (dB)
Table 6.4.4	BS4142 Operational Noise Assessment (Max Ventilation)
Table 6.4.5	BS4142 Operational Noise Assessment (Normal Ventilation)
Table 6.4.6	BS4142 Construction Noise Assessment
Table 6.4.7	Examples of Temperatures Requirements for Pig Housing
Table 6.4.8	Gurteen-Average Days per Month where Max Temp $\geq 21^{\circ}\text{C}$
Table 7.1:	Derivation of Landscape Character Areas
Table 7.2:	Landscape Management Policies, Tipperary County Development Plan (2010-2016).
Table 7.3:	Significance of Landscape Effects Matrix.
Table 8.1:	Regional Policies Relevant to Biodiversity and the Proposed Development
Table 8.2:	Summary of Local Policies Relevant to Biodiversity and the Proposed Development
Table 8.3:	Ecological Surveys Informing the EIAR

LIST OF TABLES

Table 8.4:	Bat Roost Potential Categories
Table 8.5:	SAC Sites within 15km of the Proposed Development
Table 8.6:	SPA Sites within 15km of the Proposed Development
Table 8.7:	NHA Sites within 15km of the Proposed Development
Table 8.8:	pNHA Sites within 15km of the Proposed Development
Table 8.9:	Summary of Habitats Identified at the Proposed Development Site
Table 8.10:	Fish Present within the Ollatrim River during IFI Surveys in 2017
Table 8.11:	Protection and Conservation Concern Statuses for Recorded Birds
Table 8.12:	Records of Protected, Rare or Threatened Flora Species from the NPWS
Table 8.13:	Records of Protected, Rare or Threatened Fauna Species from the NPWS
Table 8.14:	Monitoring Stations of the Ollatrim River within the Vicinity of the Development
Table 8.15:	Biological Monitoring within the Vicinity of the Development
Table 8.16:	Ecological Value of Identified Habitats at the Proposed Development
Table 8.17:	Ecological Value of Species Present / within the Vicinity of the Development
Table 8.18:	EPA Licenced Facilities within 15km of the Development
Table 8.19:	Summary of Predicted Impacts Pre-Mitigation
Table 8.20:	Summary of Residual Impacts Post-Mitigation
Table 9.1:	Status and risk of nearby WFD surface water bodies.
Table 9.2:	Quarterly COD Measurements from SW2.
Table 9.3:	Quarterly Measurements from AGW1, AGW2 and AGW3.
Table 9.4:	Summary of Predicted Construction Phase Impacts.
Table 9.5:	Summary of Predicted Operational Phase Impacts.
Table 10.1:	2018 Athenry Data and 30 Year Average Meteorological Conditions from the Claremorris Synoptic Station.
Table 10.2:	Estimated Traffic Journeys Each Week at the Site.
Table 11.1:	Previous archaeological investigations in the vicinity of the proposed development site.
Table 11.2:	RMP sites within a 2km radius of the proposed development site.
Table 11.3:	RPS sites within a 2km radius of the proposed development site.
Table 11.4:	NIAH sites within a 2km radius of the proposed development site.
Table 11.5:	NIAH Garden Survey sites within a 2km radius of the proposed development site.
Table 11.6:	Summary of Impacts
Table 12.1:	EPA Licenced Agricultural Enterprises within 15 km of the Proposed Development.
Table 13.1:	North County Tipperary Development Plan Waste Management Objectives.
Table 13.2:	Nenagh Town and Environs Plan 2013-2019 Waste Management Objectives.
Table 13.3:	Waste Licensed Facilities Within 20 km of the Proposed Development.
Table 13.4:	Predicted Main Construction Waste Streams.
Table 13.5:	EPA Licenced Asbestos Waste Facilities
Table 13.6:	BRE Benchmarks for Predicting and Forecasting Construction Waste.
Table 13.7:	Estimated Tonnes of Waste Produced by Proposed Development.
Table 13.8:	Waste Materials Generated and Estimated Construction Waste Quantities.
Table 13.9:	Principal Waste Produced at the Site During the Operational Phase.
Table 15.1:	Operational Quarries Within 15 km of the Proposed Development.
Table 16.1:	Summary of Potential Interactions/Inter-Relationships.

LIST OF FIGURES

- Figure 2.1: Layout of Existing and Proposed Buildings.
 Figure 2.2: Site Location Map (Discovery map).
 Figure 2.3: Proposed Slurry Storage at the Site.
 Figure 2.4: Plan View of Typical Leak Detection System for a Partially Below-Ground Slurry Tank.
 Figure 2.5: Slurry Cooling Liquid Pipes.
 Figure 2.6: Location of Surface and Groundwater Monitoring Points at Woodville Site.
 Figure 2.7: The Average Overall Energy Use Breakdown for a Typical Pig Farm (Carlow/Kilkenny Energy Agency, 2018).
 Figure 4.1: Commercial Activities per NACE Code Within 1km of the Site.
 Figure 4.2: EPA Licenced Facilities within 10km of the Proposed Development.
 Figure 4.3: Address Points by Buildings for Properties within 1km of the Site.
 Figure 5.1: Odour Sensitive Locations Map
 Figure 5.2: Odour Monitoring Locations Map
 Figure 5.3: Slurry Cooling System (Klimadan, 2019).
 Figure 5.4: Slurry Removal to External Slurry Storage
 Figure 6.1.1 Proposed Site Layout
 Figure 6.3.1 Monitoring and Noise Sensitive Locations
 Figure 6.4.1 Max Operation Noise Rating vs. Existing Baseline Noise (L90)
 Figure 6.4.2 Normal Operation Noise Rating vs. Existing Baseline Noise (L90)
 Figure 6.4.3 Construction Noise Rating vs. Existing Baseline Noise (L90)
 Figure 7.1: Primary and Secondary Amenity Areas (North Tipperary County Development Plan 2010 – 2016).
 Figure 7.2: The Landscape Archetypes of County Tipperary.
 Figure 7.3: Visual Assessment Point Locations.
 Figure 7.4: Visual Assessment Points and site Visibility.
 Figure 8.1: Habitat Map of Encountered Habitats at the Proposed Development Site, Ballymackey, Co. Tipperary
 Figure 8.2: Buildings scheduled for removal.
 Figure 8.3: EPA Ecological Monitoring of the River Ollatrim from 1996 – 2018
 Figure 9.1: Teagasc Soils (GSI map).
 Figure 9.2: SIS Soils (EPA map).
 Figure 9.3: Bedrock Geology 100k (GIS map).
 Figure 9.4: Groundwater Karst Data (GIS map)
 Figure 9.5: Elevation Data (Topography map 2km).
 Figure 9.6: Surface Water Features (EPA map).
 Figure 9.7: OPW Draft Flood Map.
 Figure 9.8: Past Flood Events (OPW map).
 Figure 9.9: Subsoils (EPA map).
 Figure 9.10: Groundwater Vulnerability (GIS map.)
 Figure 9.11: Groundwater Resources – Aquifer (GIS map).
 Figure 9.12: Source Protection Areas and Well & Springs (GIS map).
 Figure 11.1: Proposed site layout plan (site boundary in red).
 Figure 11.2: Location of site (circled red) within wider context (OSi Licence EN 0077919).
 Figure 11.3: Extract from Down Survey map of County Tipperary, 1656-58.
 Figure 11.4: Extract from Down Survey map of Barony of Ormond Upper, 1656-58.
 Figure 11.5: Extract from Down Survey map of Civil Parish of Ballymackey, 1656-58.

LIST OF FIGURES

- Figure 11.6: Extract from first edition 6-inch Ordnance Survey map, 1837-43 (OSi Licence EN 0077919) (application site boundary in red).
- Figure 11.7: Extract from revised 25-inch Ordnance Survey map, 1888-1913 (OSi Licence EN 0077919) (application site boundary in red).
- Figure 11.8: Extract from revised 6-inch Ordnance Survey map, c. 1940s (OSi Licence EN 0077919) (application site boundary in red).
- Figure 11.9: RMP sites (red dots) in relation to the proposed development site (outlined in red) (OSi Licence EN 0077919).
- Figure 11.10: NIAH sites (blue dots) in relation to the proposed development site (outlined in red).
- Figure 11.11: Location of Woodville House (A1), with wooded landscape feature (hachured green line), alignment of former avenue (blue line) and garden feature (yellow line), Bessborough House (A2), and Area of Archaeological Potential (AP1) in relation to the proposed development site (outlined in red).
- Figure 12.1: Employment in the Agriculture Sector. (Fact Sheet on Irish Agriculture, January 2018)
- Figure 12.2: Number of Pigs in Ireland by County (National Pig Census 2017).
- Figure 12.3: Land Use in Ireland as of 2010.
- Figure 12.4: Corine Land Cover 2018 (EPA map).
- Figure 13.1: Waste Licensed Facilities within 20 km of the Proposed Development.
- Figure 13.2: Waste Hierarchy.
- Figure 14.1: Irish Electrical Grid Map.
- Figure 14.2: Map of Public Water Abstraction, Purification and Waste Treatment Sites.
- Figure 14.3: Gas Network of Ireland.

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LIST OF PLATES

- Plate 11.1: Vertical drone image of existing piggery facility (17th July 2019).
Plate 11.2: View to existing entrance on local road L1052 (17th July 2019).
Plate 11.3: View to southwest from northeast corner showing buildings proposed for demolition (17th July 2019).
Plate 11.4: View to east from rear of the existing facility showing gravel platform formed by levelling a tree covered glacial till ridge evident in the centre background (17th July 2019).
Plate 11.5: View to east from rear of the existing facility showing tree covered glacial till ridge elevated above pasture to left of photo (17th July 2019).
Plate 11.6: View to west from rear of the existing facility showing gravel platform and immature trees and scrub vegetation on the northern boundary of the proposed development site (17th July 2019).
Plate 11.7: Aerial view of parterre location on aerial image dated 2005 (with field boundaries) to left, and on digital globe imagery dated 2011-2013 (without field boundaries) to right.

LIST OF ATTACHMENTS

- ATTACHMENT 2.1: SITE LOCATION MAP
ATTACHMENT 2.2: PROPOSED SITE LAYOUT
ATTACHMENT 2.3: PROPOSED BUILDINGS LAYOUT

ATTACHMENT 5.1: ODOUR IMPACT ASSESSMENT REPORT
ATTACHMENT 5.2: ODOUR MANAGEMENT PROGRAMME

ATTACHMENT 6.1: NOISE IMPACT ASSESSMENT REPORT
ATTACHMENT 6.2: NOISE MANAGEMENT PROGRAMME

ATTACHMENT 8.1: MAPS OF DESIGNATED SITES
ATTACHMENT 8.2: HABITAT MAP
ATTACHMENT 8.3: PHOTO LOG
ATTACHMENT 8.4: FULL LIST OF RECORDED FLORA
ATTACHMENT 8.5: BAT RECORDS

ATTACHMENT 11.1: LEGAL STATUS OF SITES

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

NON-TECHNICAL SUMMARY

GENERAL

Woodville Pig Farms currently operates an Industrial Emissions Licenced (Reg. No. P0467-02) pig rearing facility at Woodville County Tipperary (Eastings 196520 Northings 182050).

Permission is sought by Woodville Pig Farms to demolish a gilt house, two weaner houses and one first stage weaner house and to construct a modern second stage weaner house and extend farrowing Unit 1 with additional farrowing sow accommodation, convert farrowing Unit 2 to loose sow accommodation, extend Unit 2 to provide additional weaner accommodation, construct a new pre-finisher house for slow growing pigs, construction of a slurry reception tank and all associated site development works at their breeding facility in Woodville.

The current number of sow places and the proposed sow places at Woodville Pig Farms exceed the threshold in Schedule 5, Part 1, 17(c) of the Planning & Development Regulations, 2001 (as amended) which requires a mandatory EIAR to be completed for the development.

This EIAR document has been prepared on behalf of and for the exclusive use of Woodville Pig Farms by Panther Environmental Solutions Ltd.

The activities currently at the site are farming activities appropriate to the area, and is consistent with the development plan for County Tipperary. Given a successful application, the activities at the site would not change.

The farm operates under the conditions of an Industrial Emissions License (Reg. No. P0467-02) issued by the Environmental Protection Agency on 19th March 2000 and amended on 27th July 2012.

The main activities on the site are summarised as follows:

- Breeding of pigs;
- Feeding and rearing of pigs for transfer to finishing site (Ballyknockane);
- Delivery of feed to farm;
- Feeding of pigs via an automated feed and drinking water systems;
- Removal of pig slurry from slurry tanks periodically;
- Removal of fallen animals when required;
- Cleaning/disinfecting of pig pens between batches.

Pigs produced for the meat market at the Woodville site are finished at the Ballyknockane site. The pigs are taken in at the finishing site at a weight of c. 32-40 kg and then fed on a low protein industry standard diet until they reach a weight between 75 and 110kg after which they are transported to a factory for processing.

The principal input at the site would include pig feed, water, veterinary medicines and electricity for the automated feed system, lighting etc.

The main outputs at the site are weaner stage pig for finishing and animal slurry (by-product). The primary wastes produced at the site include domestic refuse, recyclable packaging waste and fallen animal carcasses.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The Woodville site occupies a space of c. 13.7 acres. The proposed development would be constructed on an area which is currently made-ground/hardcore and rough grassland, which is currently used as farmyard and is in the ownership of the Woodville Pig Farms. The construction phase of the proposed project would take an estimated 3-4 months.

The proposed development would improve the environmental and welfare performance of the existing facility, to increase stock numbers to sustain viability and to comply with the EU Animal Welfare regulations (S.I. No. 311 of 2010). Following the completion of the project, Woodville Pig Farms would remain fully compliant with the EC Regulations on Animal Welfare, Nitrate Directives, and Water Framework Directive.

The nearest settlement to the proposed development site is the village of Toomevara, located c. 4.5 km south of the site. The next closest populated area is the village of Moneygall c. 6.3 km south-east of the site.

Access for the site is taken from a local country road which connects the R491 road to Nenagh Town to the R490 and R445 regional roads near the village of Moneygall.

The regional setting of the development is predominantly rural and in a farming area with intermittent housing along the local road network. The nearest residential property to the proposed site not owned by the applicant is c. 300 m distance from the site.

SLURRY MANAGEMENT

Slurry storage capacity at the site would be compliant with the minimum 26 weeks' slurry storage capacity specified in S.I. 605 of 2017 if the development went ahead.

Slurry from the site would be collected periodically at designated times by customers (i.e. local farmers) for the purpose of land spreading. All slurry collections from the site would be recorded in a log by the applicant, as per Nitrates Regulations (S.I. No. 605 of 2017).

All wash water produced on site (i.e. water from cleaning down pig pens between batches) is diverted to the nearest slurry tank where it is treated as slurry. There would be no discharge of any soiled water or any effluent from the site to any watercourse or to groundwater.

The existing and proposed slurry tanks conform to a recognised design standard for slurry storage, i.e. The Irish Department of Agriculture and Food Specifications S123 (Minimum Specification for Bovine Livestock units and Reinforced Tanks) March 2006. The existing and new slurry tanks would include an approved sub-floor leak detection system as a method of monitoring to ensure there is no source of pollution in the vicinity from the slurry tanks.

The applicant proposes to construct a new uncovered slurry reception tank in the north of the farmyard. The proposed reception tank would accommodate c. 80% of the slurry produced by the pigs in the new proposed buildings when operational. The remaining 20% of the slurry would be stored in the existing slurry tanks at the site.

The proposed slurry storage facilities would incorporate modern "low emission" design. The removal of slurry from underneath the pigs would reduce air and odour emissions from the site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The applicant also intends to use a modified “slurry cooling” system in the newly constructed slurry tanks. Cooling of pig slurry significantly lowers ammonia emissions from the slurry and consequently odours from the site.

WASTE MATERIAL

All waste material would be stored as per the BREF Document on Emissions from Storage (July 2006) and removed from the site by a licensed waste contractor as necessary. Removal of waste materials would be documented as appropriate.

The proposed buildings would generate certain waste types during both the construction and operational phases. During construction works, construction and demolition waste would be generated. Waste would be segregated onsite and would be reused in infilling processes and landscaping where permitted and where possible, with remaining wastes sent for recycling or disposal as appropriate.

The operational phase would generate small amounts of typical domestic-type wastes (e.g. cardboard and plastic), animal tissue waste, fluorescent tubes and some veterinary waste which would be collected by the applicant and stored until removed by a suitably licenced waste contractor.

Woodville Pig Farms would ensure that all waste hauliers which are contracted by the farm are suitably licenced to transport specific waste streams from the site and that all waste would be delivered to facilities which are licenced to accept the waste.

HUMAN BEINGS

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along the existing road network. A number of large farmsteads and agricultural facilities are located in the surrounding area of the proposed site. The area also supports a number of commercial developments.

The proposed development would have a positive impact on the local economy by providing temporary employment during the construction phase as well as providing job security for employees currently working for Woodville Pig Farms.

The enterprise currently provides full-time employment for eight full-time staff (not including the directors) at the Woodville site. The proposed new developments would also result in the creation of three new full-time positions.

The development would also provide employment for contract workers including hauliers delivering feed and removing products and wastes. The provision of employment would further contribute to the economy of the area through direct spending of goods and services in the local area.

The proposed development would have a potential nuisance upon human beings during the construction phase due to potential increased dust and noise emissions. However, the potential

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

impact would be temporary given the transient nature of construction works. Noise and dust control measures would be implemented throughout the construction phase to reduce the potential impact where required. Therefore, noise and dust would not be considered to pose a significant impact.

The proposed demolition works pose a potential risk of dust due to the presence of asbestos sheeting from roofs off the sheds for demolition. Corrugated asbestos cement sheet (CACS) are one of the most common low-risk asbestos containing materials (ACMs). CACS would be removed from roofs by competent asbestos contractors prior to any other construction activities being carried out. Therefore, the risk to human health via contaminated dust is considered minor.

During the operational phase, there would be potential for odour generation from new buildings. No odour complaints have been received by the site, County Council or EPA for the Woodville Pig Farms Ltd site since the beginning of operations. An odour assessment survey was undertaken as part of this EIAR. The proposed weaner house would replace existing houses of obsolete design and the new structures would incorporate modern low air emission design. There would be expected to be a significant reduction in odour emissions from weaner accommodation. It is therefore considered that the siting of the new piggery development would not impact significantly upon nearby sensitive receptors with respect to odour.

No significant additional noise impact would be anticipated during the operational phase of the proposed development in combination with existing operations. Maximum fan noise would be inaudible to slightly audible at sensitive locations and due to the low predicted resultant noise levels and the infrequency of occurrence, it is predicted that there would be slight to no significant impact upon noise sensitive locations. The proposed development is unlikely to generate noise levels that will significantly impair amenity beyond the site boundary.

The proposed development has the potential to impact upon traffic volumes in the area. While there would be increased vehicle movements during the construction phase, this would be for a limited period of time. During the operational phase of the project traffic movements to and from the site should increase due to the new number of animals and works at the site. Operational traffic movements would be expected to involve deliveries, collections and staff movement. Traffic movements would be similar to the traffic movements associated with the existing piggery at the site when operating at full capacity.

The proposed development would not be anticipated to have any significant impact on the land use of the area. The proposed buildings would be constructed on land currently used as farmland and farmyard and owned by Woodville Pig Farms. The land use would continue to be for agricultural purposes, however, the agricultural value of the grassland area would be improved by the proposed development.

There would be no adverse impacts to human health due to a deterioration in water quality. The site is not located in the vicinity of groundwater or surface water wells for supply to humans. There are no surface water drains within the proposed construction site, only clean rainwater from roofs and clean yards is collected by the existing storm drain network and flow paths in the underlying bedrock aquifer are limited. During the construction phase, water quality would be protected by the implementation of mitigation measures, such as the appropriate storage of excavated topsoil and the appropriate handling and storage of potentially polluting substances. Similar controls are currently in place, including a requirement for

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

bunding of potentially polluting materials and leak detection systems on slurry tanks, which would continue to protect water quality during the operational phase.

It is not considered that the proposed development would pose any significant risk to human health or amenity.

AIR / ODOUR / CLIMATE

The main potential sources of air pollutants from the operation of the proposed development would be the livestock digestive processes and pig slurry. Emissions from digestive processes and slurry include primarily ammonia and methane. Such air emissions would be concomitant with piggery odours.

Airborne dust associated with the animals is not expected to be an issue due to the modern design of the proposed buildings.

The proposed development would result in the generation of greenhouse gasses (GHG), in particular carbon dioxide, methane and ammonia. GHG's emitted from the site would have no significant effect upon the local climate, however, would contribute to the overall generation of GHG's from agriculture in Ireland.

The use of modern "low emission" housing design and the demolition and replacement of outdated building designs would minimise the generation of air emissions from the farm. However, the overall generation of air emissions from the farm, including greenhouse gases, would be expected to increase due to the proposed increase in pig numbers.

Air emissions generated at the proposed development would be typical of the industry and would be anticipated to have no significant to slight air quality impacts in the regional context. Air quality in the vicinity of the development would be expected to continue to be "Good", as rated by the EPA's Air Quality Index for Health and would remain dominated by general traffic and agricultural sources within the region.

With regard to the potential for odour nuisance effects, there are no sensitive receptors not in the ownership of the applicant within 300m of the site. Since the applicant commenced pig farming at the site in the 1970's and since receipt of an EPA IPPC/IE licence in 2000, the site has not received any complaints with regard to odours.

The high standard of design of the proposed pig houses, coupled with continued good housekeeping practices currently in place at the site, would serve to ensure the effective control of odour emissions and mitigate the risk of environmental impact and nuisance to sensitive receptors from odours associated with the site.

Mitigation measures for air emission and odour control are outlined in **Section 5.7** and include a state of the art slurry cooling system, a slurry removal system, appropriate stocking density, appropriate timing/weather for slurry removal, quality ventilation and high-quality building design. A draft odour management plan has been completed for the site and is included as **Attachment 5.2** of this EIAR.

It is considered that the proposed development would not have a significant impact upon air quality, climate or odour nuisance.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

NOISE

A Noise Survey has been prepared in support of this EIAR. The survey identified the main noise sensitive locations (NSLs) and assessed the potential impact of the proposed development at these locations, in accordance with the methodologies prescribed in ISO 9613-2:1996 “Attenuation of Sound during Propagation Outdoors” and in BS 4142:2014 “Methods for Rating and Assessing Industrial and Commercial Sound”.

The baseline noise assessment conducted for the proposed development provides a predictive analysis of the impact of the construction and operation of the proposed development on NSLs to determine the need for any mitigation measures.

Peak source noise levels would occur during short periods during the initial construction phase, such as excavation/site clearance activities. It is anticipated that the proposed development would have a significant but short-term impact on the closest noise sensitive locations during the construction phase. The overall construction phase would be temporary (approx. 3-4 months) and works would be conducted during normal working hours, reducing the risk of negative impacts. Therefore, the subjective impact of noise from construction activities would be mitigated. Predicted construction noise levels would be in compliance with NRA guidance for noise during construction.

The maximum noise from onsite ventilation fans would be predicted to occur predominantly during the daytime periods of the warmest summer days. It is likely that ventilation fans would only be operating at maximum from May to September, for a number of days during these months and only for short periods of these days. The maximum potential impact of noise from ventilation has been based upon all fans working at maximum power and includes a correction for potential tonal noise from malfunctioning fans. Therefore, the predicted maximum noise levels may be seen as a worst-case scenario for ventilation noise during the operation of the site.

The operation of fans at the typical low /medium power levels which would occur through the majority of the year were also modelled in order to define the expected normal noise impact from the proposed development.

All predicted operation noise levels, at all noise sensitive locations, have been determined to be below the sites existing EPA license daytime limit of 55dB and night-time limit of 45dB.

Due to the low predicted resultant noise levels and the infrequency of occurrence, it is predicted that maximum fan noise would have a slight to no significant impact upon noise sensitive locations.

During the normal operation of the ventilation system, it is predicted that there would no significant impact upon noise sensitive locations during the daytime period and a slight to no significant impact upon noise sensitive locations during the night-time period.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

VISUAL AMENITY & LANDSCAPE CHARACTER

The proposed development site is located within a rural agricultural landscape, dominated by pasture fields of varying sizes, bordered by hedgerows and treelines. Residential development in the area is sparse and mostly found next to local roads. Residential property is generally dispersed along local roads. A number of one-off residences and farmyard complexes exist in the area and are the dominantly visible man-made structures in the landscape. Large farmyard complexes are common in the area and are generally composed of a barn, lean-to or A-shaped sheds.

According to the Landscape Character Assessment of County Tipperary, the site is in an area described as “the Plains”. The Plains are described as working landscapes containing most settlements and services as well as large continuous areas used for pasture, tillage and peat harvesting. The Plains area is subdivided into landscape character types. The proposed development site in the townland of Woodville is positioned in the Borrisokane wetlands (Peatlands & Wet Mixed Farmland) landscape character type. The Landscape Character Assessment identifies the dominant forces for change of this landscape character type as; a decline in agricultural activity, commercial coniferous forestry plantations and inappropriately designated and landscaped housing.

The proposed development is well screened from the north, east and west by folds in the land and the treelines and hedgerows which border most fields and roads. However, the existing site is a notable feature in the landscape at viewpoints to the south, in particular from the northern faces of ridgelines.

However, the proposed development is located at the north of the existing farm hub. Therefore, construction activities and the majority of proposed structures would be obscured by the existing structures. The proposed pre-finisher house would be obscured to views from the south by the esker ridgeline bordering the site.

There would be a minor to no significant and temporary visual impact from construction works as, by its nature, works would mainly occur at a low level and construction is not expected to continue for more than three to four months. The main visible impact would be predominantly construction vehicles and plant machinery, such as excavators and delivery vehicles.

The only part of the development which would be expected to result in any visual impacts is the proposed weaner house. This development would increase the height of the existing weaner house, which forms the background of the existing site. The proposed weaner house would not be expected to exceed the height of the existing feed silo's, the tallest existing structures currently at the site.

Therefore, it is anticipated that there would be a permanent slight to no significant impact upon the visual amenity at locations south of the site. It is anticipated that impacts would be predominantly limited to locations within 1 to 1.5 km of the site.

The recommendation of a green finish on the buildings would ensure that the development would blend in well with surrounding landscape features and elements. The recommended planting of trees to the south of the existing buildings would also merge the existing and proposed structures with the treelined character of the area.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

A review of the County Development Plan shows that the site is not located within a primary or secondary amenity area, nor does the site impinge upon views from amenity areas or listed views.

According to the Tipperary Landscape Character Assessment, The Borrisokane Wetlands are a moderately sensitive landscape area. The proposed development is of an agricultural nature and would be incorporated within an existing farming enterprise. Given the nature, location and design features of the proposed buildings, it is considered that the proposed development would have a non-significant Minor-Negligible effect on the level of landscape and visual impact in the area.

BIODIVERSITY

Designated Sites

An Appropriate Assessment Screening Report has been prepared in support of this application (Document Ref. PES_AA_19_9350). The European sites considered to be within the potential zone of influence of the proposed development were Scohaboy (Sopwell) Bog Special Area of Conservation (SAC) (Site Code: 002206), Lough Derg, North-East Shore SAC (Site Code: 002241) and Lough Derg (Shannon) Special Protection Area (SPA) (Site Code: 004058), due to the potential hydrological connectivity and / or distance from the proposed development site.

As discussed in detail within the Appropriate Assessment Screening Report and as summarised in **Sections 8.5.2 and 8.5.3**, the proposed development would not be considered to result in any adverse impact to the protected habitats or species of the designated sites due to habitat loss or fragmentation, reduction in species density or diversity, introduction of invasive species or potential impacts upon water quality.

The proposed development does not directly impinge on any part of a European site and it is not considered that the proposed development site would contain the habitats or species for which the sites have been designated for. It is unlikely that the development site would be of importance to the special conservation interests of Lough Derg (Shannon) SPA, given the habitats present onsite and the distance from the SPA site.

In the absence of any invasive flora species of concern onsite and given that no topsoil or subsoil would be required to be imported onsite, the development would have no significant impact upon designated sites due to invasive species.

It is not envisaged that protected species would be adversely impacted upon due to noise generated by the proposed development, given the nature of the proposed development and the distances to the designated sites. While there would be increased noise emissions during the construction phase, these would not be considered to pose a significant risk owing to the transient nature of works, the construction timeframe and the distances between the development site and designated sites.

The potential disturbance on protected habitats due to dust during the construction phase would not be considered significant, given the transient nature of construction works, the construction timeframe and given the distance to the nearest European site (approximately 9.6km).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

It is not considered that the proposed development would have the potential to significantly impact upon air quality within the area, with the potential to adversely impact upon Scohaboy (Sopwell) Bog SAC, Lough Derg, North-east Shore SAC or Lough Derg (Shannon) SPA. While ammonia emissions would increase in response to an increase in pig numbers at the proposed development site, the proposed development includes design measures which limit the potential for the generation of ammonia emissions to atmosphere. Of particular note is the incorporation of a slurry cooling system, which has been estimated to reduce ammonia emissions by 25% (as discussed in **Section 5**). The development would also include for the removal of slurry to an external slurry store, which has been noted as a key principle within the document, “*Reference Document on Best Available Techniques (BAT) for Intensive Rearing of Poultry and Pigs*”, for reducing air emissions. Given the incorporated design measures for the reduction of ammonia emissions at source and given the considerable distances of designated sites from the proposed development, no potential significant impacts are anticipated upon designated sites due to the proposed development in relation to air emissions.

The proposed development is located within the Lower Shannon catchment (25C) and is hydrologically connected to the Lough Derg, North-east Shore SAC and Lough Derg (Shannon) SPA. The development site is not hydrologically connected to the Scohaboy (Sopwell) Bog SAC, therefore no potential water quality impacts are anticipated upon this site. As discussed in the Appropriate Assessment Screening Report, the development site is located a considerable distance, approximately 22.4km from Lough Derg, North-east Shore SAC and Lough Derg (Shannon) SPA. Given the considerable distance and subsequent tributaries involved, any drainage from the site would undergo considerable dilution prior to reaching the SAC or SPA sites.

The proposed development would not be considered to impact upon the SAC or SPA sites due to deleterious effects on water quality during construction works, owing to the duration of construction works, the considerable hydrological distance (and thus dilution) between the proposed development and designated sites and given that the proposed footprint is not located within the immediate vicinity of any watercourses. Further details are provided in the Appropriate Assessment Screening Report and **Section 8.5.2**, “*Designated Sites – SAC and SPA Sites*”.

It is not anticipated that the operational phase has the potential to impact upon the SAC or SPA sites due to deleterious effects on water quality. Stormwater from the site comprises of clean rainwater run-off from the roofs. Stormwater from the proposed structures would connect to this existing stormwater network prior to discharge to the Wilton Stream, located a significant hydrological distance from the SAC and SPA sites (greater than 22km). There are no process effluent emissions from the site, with all manure stored within underground slurry tanks, awaiting collection for landspreading activities. The existing slurry tanks are fitted with leak detection systems, which would also be incorporated within the proposed new slurry tanks.

The development could result in a potential impact upon the biodiversity of designated sites through the landspreading of pig manure as organic fertiliser, either through pollution of waterbodies or the enrichment of natural vegetation. However, manure is and would continue to be, collected by registered contractors / farms, for application to lands held by third parties in the area and managed in compliance with the Nitrates Regulations (S.I. No. 605 of 2017).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

One Natura Heritage Area (NHA) site, Scohaboy Bog NHA (Site Code: 000937), is considered to be within the potential zone of influence of the proposed development. The proposed development does not directly impinge on this NHA site. It is not considered that the proposed development would have the potential to impact upon the NHA due to a potential deterioration in water quality, given that the NHA site is located upstream of drainage from the proposed development and therefore is not considered to be hydrologically connected to the development. The development could result in a potential impact upon the biodiversity of the NHA through the landspreading of manure as organic fertiliser. However, as noted above, manure is and would continue to be, collected by registered contractors / farmers, for application to lands in the area and managed in compliance with the Nitrates Regulations (S.I. No. 605 of 2017).

It is not considered that the proposed development would have the potential to significantly impact upon air quality within the area, with the potential to adversely impact upon the NHA. As discussed above, while ammonia emissions would increase in response to an increase in pig numbers at the proposed development site, the development includes design measures which limit the potential for the generation of ammonia emissions to atmosphere. These design measures include the incorporation of a slurry cooling system and the removal of slurry to an external slurry store. Given the incorporated design measures for the reduction of ammonia emissions at source and given the distance of the proposed development from the NHA, no potential significant impacts are anticipated upon the NHA due to the proposed development in relation to air emissions.

Land Use and Habitat Loss / Fragmentation

The proposed development would result in a change of habitat use at the proposed development footprint, resulting in the loss of recolonising bare ground (ED3), wet grassland (GS4) and scrub (WS1) habitats. The loss of ED3 habitat would not be considered significant, given that this habitat is modified and of low ecological value. The loss of wet grassland (GS4) and scrub (WS1) habitats would not be considered significant, given that wet grassland is common in the general area and given that replacement planting would be undertaken, comprising of a new hedgerow of native species, measuring approximately 250m in length.

Where possible, scrub and tree removal would not take place during the bird nesting season (1st of March – 31st of August). However, it may be necessary to undertake some scrub / tree removal works during the bird nesting season. In such instances, a suitably qualified ecologist would be engaged to carry out inspections for the presence of breeding birds prior to any clearance works taking place and recommendations would be followed (for example the establishment of a buffer zone around an active nest).

There would be no loss of any known bat roosts. The buildings onsite scheduled for demolition were determined to have a negligible bat roost potential. The mature Ash tree scheduled for removal was assessed as having a moderate bat roost potential, due to dense ivy cover. Therefore, measures are proposed in Section 8.6.1 to ensure that the tree is re-assessed prior to felling or soft-felled under supervision of a suitably qualified ecologist.

No rare plant species or protected flora under the Flora (Protection) Order 2015, were recorded within the proposed development area. Therefore, the proposed development would not be considered to impact upon any rare or protected flora species.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Invasive Flora of Concern

No invasive flora species of concern were recorded during the onsite ecological assessment. The potential risk of introducing invasive species during the construction phase would be considered low, given that excavated soils would be re-used in site levelling and landscaping works, therefore, no importation of topsoil or subsoil would be required as part of the development works.

Disturbance

Artificial lighting has the potential to negatively impact upon bat species. During the construction phase, works are not anticipated to be conducted outside of normal working hours, which would considerably reduce the potential impacts upon bat species. Should lighting be required, measures are included within **Section 8.6.1** to reduce the potential impact of light pollution. With regards the operational phase, there are no external yard lights, with the exception of one light on the back door of the staff office. The proposed development would not require any additional lighting, therefore no significant impacts due to lighting are anticipated.

It is not envisaged that fauna would be significantly impacted upon by the development due to noise. No significant additional noise would be anticipated from the proposed new additions to the facility. Fauna present within the site or immediate area would likely be accustomed to the facility's existing noise environment. Furthermore, a noise management plan accompanies this application and would be put in place for the development. Construction noise would not be considered to pose a significant risk to fauna owing to the transient nature of works, the construction timeframe and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice.

Air Emissions

Dust emissions may arise during construction activities, in particular during earth-moving works, which may have the potential to impact upon photosynthesis, respiration and transpiration processes of flora due to the blocking of leaf stomata. However, given the transient nature of construction works, the construction timeframe and standard working practices including dust control, the potential impact to flora would not be considered significant.

As discussed in the “*Designated Sites*” section above, the proposed development would generate ammonia emissions to atmosphere. Emissions of ammonia to atmosphere is undesirable from an ecological point of view, as it can have toxic, eutrophic and acidifying effects on certain ecosystems. In particular, the presence of high ammonia levels in peatland ecosystems has been found to inhibit the growth of certain moss species, allowing sedge and grass species to outcompete. While the proposed development would result in an increase of ammonia emissions in response to an increase in pig numbers, no adverse significant impact upon habitats is anticipated, given that there are few peatland ecosystems in the area, with the two nearest bogs, Glenahilty Bog, located 300m north of the site and an un-named bog located approximately 3.4km to the north-east, currently worked and therefore of reduced ecological value and given that the land use of the area is mainly pasture land, which would not be particularly sensitive to ammonia emissions. Furthermore, the proposed development has incorporated design measures which limit the potential for the generation of ammonia

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

emissions to atmosphere. These design measures include the incorporation of a slurry cooling system, which has been estimated to reduce ammonia emissions by 25% and the removal of slurry to an external slurry store.

Water Quality and Biodiversity

As discussed in **Section 8.5.2** and **Section 8.5.3**, the potential for the development to impact upon water quality during either the construction or operational phase and thus aquatic biodiversity, is reduced, given the absence of any watercourses within the immediate vicinity of the development site (with the nearest watercourse, the Wilton Stream, located approximately 220m from the main piggery facility and approximately 300m from the proposed development footprint).

No significant impact on water quality would take place due to drainage from the site. Stormwater from the site comprises of clean rainwater run-off from the roofs. Stormwater from the proposed structures would connect to the existing stormwater network. There are no process effluent emissions from the site, with all animal manure stored within underground slurry tanks, awaiting collection for landspreading activities. All slurry tanks have been designed to ensure sufficient storage capacity and are fitted with leak detection systems. The landspreading of manure has the potential to impact upon biodiversity. However, as discussed in the “*Designated Sites*” section above, manure is and would continue to be, managed in compliance with the Nitrates Regulations (S.I. No. 605 of 2017).

No adverse potential impacts upon water quality would be anticipated due to accidents and potential spills and leaks, given the absence of watercourses within the vicinity of the site, the low volume of stored chemicals onsite and given that chemicals and oils are stored upon bunds, in accordance with the site’s Industrial Emissions (IE) Licence.

SOILS, GEOLOGY AND HYDROLOGY

GSI online mapping indicates that the soil underlying the majority of the site is classed as shallow, rocky, peaty/non-peaty mineral complexes which are mainly basic. A small portion of site is underlain by soil described as deep well drained mineral basic soil. These two soil types and poorly drained basic mineral soils are the predominant soil type in the surrounding area. The subsoils beneath the proposed site are mapped as limestone till (Carboniferous) and a small portion of bedrock near the surface.

GSI and OS maps indicate the site of the proposed development is located on bedrock classified as Carboniferous Ballysteen Formation. The Ballysteen Formation comprises bioclastic argillaceous limestone interbedded with shales, becoming increasingly muddy upwards. This lower impure limestone is generally thought to have low bulk permeability with the possible exception of areas near faults.

The south of the site is in a high-risk groundwater vulnerability area and the north of the site is in an extreme risk groundwater vulnerability area. The vulnerability of the groundwater within much of the site is interpreted as being high due to the high permeability of the sand and gravel subsoil and due to the sites position on a bedrock outcrop.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

GSIs aquifer classification map indicates that the site of the proposed development is situated on a bedrock aquifer, which is classified as a Locally Important Aquifer (LI) which is moderately productive in local zones. Due to the bedrock in the area, groundwater storage and movement would be limited.

Due to the topography of the area, it is likely that groundwater beneath the site discharges to the Wilton stream and Ollatrim River.

During the construction phase, the main potential impacts upon soils would be through soil removal as part of excavation works, soil compaction arising from the use of construction plant and hydrocarbon contamination from leaks and spills. Mitigation measures would include the re-use of excavated soils for reinstatement and landscaping works where possible, the use of specialised machinery to minimise soil compaction and the appropriate storage of potentially polluting materials.

During the construction phase, the main potential impacts to surface and groundwater would be the potential for hydrocarbon spillage and uncured concrete spillage. Mitigation measures would include the appropriate handling and storage of hydrocarbons, daily inspections of construction plant, good housekeeping practices and the provision of spill kits.

During the operational phase of the development, the main potential impacts to soils, groundwater and surface waters would include the storage of slurry and accidental leakage or spillage of hydrocarbons.

All existing and new pig houses would include a leak detection system underneath the slurry tanks. In compliance with the sites IE licence, the leak detection system would be required to be visually assessed weekly and collected water laboratory tested bi-annually.

The sites existing IE licence includes conditions for the minimisation of risk from containment of chemicals and fuels. All chemical containment is required to be appropriately bunded and spill clean-up materials are required to be available onsite.

The use of agricultural slurry as a fertiliser is regulated under *Good Agricultural Practice for the Protection of Waters Regulations 2017 (Nitrates Regulations)*, which controls the landspreading of organic fertilisers in order to protect groundwater, surface waters and drinking waters.

Given good working practices and appropriate mitigation measures, it is considered that the proposed development would have no significant impact upon soils, geology or hydrology.

MATERIAL ASSETS

There would be no significant impacts upon agricultural properties or non-agricultural properties (including residential, commercial, recreational and non-agricultural land) due to the proposed development.

There would be no loss of residential, commercial, recreational or non-agricultural land due to the proposed development. As the proposed development would be an extension to an existing piggery, the site would continue to be used for agricultural activities. Therefore, there would be no land use change at the proposed site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

During the construction phase, there is potential for noise and dust to impact upon agricultural and non-agricultural material assets. However, the potential impact would not be considered significant, given the transient nature of construction works and given that noise and dust control measures would be implemented throughout the construction phase.

There would be construction-related traffic during the construction phase of the proposed development. As construction works would be located on agricultural land, there would be no potential impacts on non-agricultural material assets. For agricultural material assets, discussions would take place with local landowners to ensure that construction traffic causes minimum interference with movements of stock and does not hinder farm operations.

The potential for operational noise associated with the proposed development to cause disturbance to livestock within grassland surrounding the proposed development would be considered low. Animals would quickly become acclimatised to the new noise environment adjacent to the development, as with similar projects such as new roads and motorways.

The potential for noise to impact upon residential, commercial and other non-agricultural facilities would be considered low, given the nature of the proposed development, the existing noise climate of the area and the distance from other facilities.

There is predicted to be no significant increase in traffic volumes using the local road infrastructure as a result of the operation of the proposed development. On completion of the construction phase, there would be an estimated c. 96 traffic movements at the site per week. This increase in traffic movements would be similar to the existing site and to the traffic movements of comparable facilities in Ireland.

Due to the relatively small footprint of the proposed site, there would be no significant impact on the microclimate of the area. There are no significant direct impacts predicted on the macroclimate as a result of the proposed development.

USE OF NATURAL & OTHER RESOURCES

There are no significant negative effects expected in relation to the use of natural resources.

Operations carried out on-site would lead to the consumption of water, pig feed, electricity and medication during the operational phase of the proposed development. The main resource to be consumed would be feed, which is classifiable as a natural resource that is renewable.

The proposed development would be connected to the electrical mains supply. There are multiple power line systems within the vicinity of the site. There are two 110 kv stations within c. 10 km of the site one in Nenagh Town the other in the townland of Ikerrin. The largest and closest power generation station is the Ardnacrusha hydrogenation station near Limerick City.

Water needs for the current piggery are provided through an existing groundwater well at the site (AGW1). This well would also be used to supply water and services to the new proposed buildings. The site currently uses c. 5,811 m³ of water per year which would be expected to increase to c. 16,333 m³ per year if the proposed development/expansion went ahead. Although the above figures are estimates they may be used to adequately describe water usage at the site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

During the construction stage, the volume of HGVs and small commercial vehicles for deliveries of construction materials and transport of construction workers would increase over a 3 to 4 month period. The expected volume of traffic on the road network would have a negligible additional effect on the structural integrity of the road network and its on-going maintenance costs.

It is considered that the proposed development would have no significant impact on mineral resources in the vicinity of the area.

Overall, the proposed development would have a minor negative impact on natural and other resources. Any disruption to services and existing transport networks would be minimal and of a temporary nature during the construction phase of the development.

ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

Shanarc Archaeology Ltd. has prepared an archaeological, architectural and cultural heritage impact assessment relating to the proposal to extend the Woodville Pig Farms Ltd. piggery facility in Woodville townland, Ballymackey, Nenagh, Co. Tipperary. The assessment has been prepared for inclusion in an Environmental Impact Assessment Report (EIAR) in support of a planning application to Tipperary County Council.

The purpose of the chapter is to provide an archaeological, architectural and cultural heritage assessment of the receiving environment, to identify the likely significant effects on the receiving environment and to propose measures to mitigate these effects. The assessment is based on a desk-top study of the receiving environment supported by an on-site inspection.

The Woodville Pig Farms Ltd. existing facility is situated on the southern periphery of a bog, on land that formed part of the attendant grounds of Woodville House, a late 18th century gentry residence. Historically, the landholding associated with the house was broken up, and the existing piggery facility, a number of residences and Tipperary County Council's Ballaghveny Landfill and Recycling Centre have developed in the demesne grounds that once surrounded the house.

No known archaeological monuments are recorded in association with Woodville townland, and none will be directly or indirectly affected by the proposed development.

Woodville House is listed in the Record of Protected Structures, RPS Ref. S404, in the North Tipperary County Development Plan 2010-2016 (as varied). The National Inventory of Architectural Heritage (NIAH) lists Woodville House in its Building Survey, Ref. 22401522, and Garden Survey, Ref. TN-59-R-967821. The attendant grounds of Woodville House will be directly affected by the proposed development.

Archaeological, architectural and cultural heritage effects are considered in respect of the following:

- Woodville House and its original setting;
- Bessborough House and its setting; and
- Archaeological potential presented by bog in Woodville and surrounding townlands.

Mitigations measures at the pre-construction, construction and operation phases of the proposed development are provided to address identified effects. These include pre-

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

construction archaeological test excavation and construction phase monitoring to address the archaeological potential presented by bog in Woodville and at the site of a former formal garden, located to the north of a linear wooded ridge that also formed part of the landscaped grounds at Woodville House. Retention of landscaped features within the setting of Woodville House, such as the wooded ridge and the remains of an entrance avenue is recommended, as these features contribute to the historic setting of the protected structure. Cumulatively, the proposed expansion of the existing facility will increase the footprint of development within the attendant grounds of Woodville House. An adequate buffer between the proposed development and the curtilage of Woodville House, and using screening to mitigate the potential visibility of the proposed development from outbuildings in the curtilage, will serve to limit a potential indirect effect on potential future uses of the protected structure.

SUMMARY

The potential for the proposed development to cause adverse environmental impacts during the construction and operational phases, considering the proposed mitigation measures, is anticipated to be negligible. This is due to the nature, scale, high specification, management and location of the proposed development.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

1.0 INTRODUCTION AND METHODOLOGY

1.1 INTRODUCTION

Panther Environmental Solutions Limited (PES Ltd.) has been commissioned by the applicant, Woodville Pig Farms Limited, to prepare an Environmental Impact Assessment Report (EIAR), for the proposed demolition and construction project at Woodville, Ballymackey, County Tipperary.

The proposed development is to demolish a gilt house, two weaner houses and one first stage weaner house and to construct a modern second stage weaner house and extend farrowing Unit 1 with additional farrowing sow accommodation, convert farrowing Unit 2 to loose sow accommodation, extend Unit 2 to provide additional weaner accommodation, construct a new pre-finisher house for slow growing pigs and construction of a slurry reception tank.

The existing farm and proposed works are located in the townland of Woodville, Co Tipperary. The piggery location is c. 9.6 km north-east of Nenagh town, c. 4.5 km north of the village of Toomevara, c. 6.3 km north-west of the village of Moneygall and c. 5.7 km south of the town of Cloughjordan. The site is located in a rural, farming area predominantly comprised of pastureland, hedgerows and peatland. Access for the site is taken from a local country road (L1052) which connects the R491 road to Nenagh Town to the R490 and R445 regional roads near the village of Moneygall.

A full description of the existing and proposed development is provided in Section 2 of this EIAR document.

This EIAR is to be submitted to Tipperary County Council in support of an application for planning permission for the proposed development, as described above, under the Planning and Development Regulations 2001 (S.I. No 600 of 2001).

1.2 ENVIRONMENTAL IMPACT ASSESSMENT & PLANNING LEGISLATION

This EIAR has been prepared in accordance with the requirements of the European Communities (Environmental Impact Assessment) Regulation, 1989 to 2001, the Planning and Development Act 2000 and the Planning and Development Regulations 2001, as amended. This legislation requires the assessment of the effects of certain public and private projects on the environment.

Schedule 5, of the Planning and Development Regulations refers to development for the purposes of Part 10 (Environmental Impact Assessment Report) of the planning regulations.

“An EIAR is required to accompany a planning application for development of a class set out in Schedule 5 of the Planning and Development Regulations which exceeds a limit, quantity or threshold set for that class of development. An EIAR will also be required by the planning authority in respect of sub-threshold development where the authority considers that the development would be likely to have significant effects on the environment (article 103)”.

The schedule sets out the prescribed classes of development that require an EIAR document. The following sections of schedule 5 are applicable to the proposed development.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

- *Schedule 5, Part 1:*
17. Installations for the intensive rearing of poultry or pigs with more than:
 - (a) 85,000 places for broilers, 60,000 places for hens,
 - (b) 3,000 places for production pigs (over 30 kilograms)
 - (c) 900 places for sows
- *Schedule 5, Part 2:*
1. Agriculture, Silviculture and Aquaculture
 - (e) (ii) Installations for intensive rearing of pigs not included in Part 1 of this Schedule which would have more than 2,000 places for production pigs (over 30 kilograms) in a finishing unit, more than 400 places for sows in a breeding unit or more than 200 places for sows in an integrated unit.

Current and proposed animal numbers housed at the Woodville (breeding unit) site are included in table 1.1 below. No finisher pigs are kept at the Woodville site.

Table 1.1: Current and Proposed Number of Pigs at the Woodville Site.

ANIMAL CLASS	EXISTING EPA LICENSED NO. OF PIGS NOTE 1, 2	PROPOSED NO. OF PIGS
Dry Sows / Farrows / Suckling Sows	920	1,650
Weaners	3,850	8,400
Pre-Finisher	---	4,200

Note 1: This excludes suckling pigs maintained on site.

Note 2: A 20% increase in the number of production pigs (finishers) held on site, for a period not exceeding 2 weeks, is permissible. The frequency of such occurrences must be kept to a minimum. Any other variation in any of the animals numbers specified requires prior agreement from the Agency.

Current animal numbers at the site exceed the thresholds given in schedule 5 (Annex I) of the Planning and Development Regulations. The site also operates under an Industrial Emissions (IE) Licence (P0467-02) from the EPA.

The number of breeding sow places on the site would change from 920 to 1,650, which exceeds the threshold limit stated in schedule 5 (part 1) (c) of the Planning and Development Regulations 2001-2018 (i.e. 900 pig places).

The proposed development exceeds the given thresholds for an Annex I class activity described in the EU Directive 85/337/EEC. Therefore, a mandatory EIAR was required for the project.

This EIAR is drafted with particular regard to Article 94 and Schedule 6 in the 2018 planning regulations, and is submitted to provide information that may assist the planning authority in making its decision on this application for planning permission.

The EIA Directive, 2014/52/EU, amending the EIA Directive 2011/92/EU, was transposed into Irish law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). Circular letters issued by the Department of Housing, Planning, Community and Local Government on the 15th of May 2017 (Ref.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

PL1/2017) and 27th August 2018 (Ref. PL05/2018) have also been consulted in preparation of this report, advising planning authorities and An Bord Pleanála of the procedures and information necessary to comply with the EIA Directive required under the new regulations:

“The new Regulations transpose the requirements of Directive 2014/52/EU, amending previous Directive 2011/52/EU, on the assessment of the effects of certain public and private projects on the environment (the EIA Directive) into planning law with effect from 1 September 2018.”

The following documents and guidelines have been consulted as part of the preparation of this report:

- *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017);
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (Department of Housing, Planning and Local Government, 2018);
- *Development Management Guidelines* (Department of the Environment, Heritage and Local Government, 2007);
- *Guidelines on the information to be contained in Environmental Impact Statements* (EPA, 2002);
- *Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)* (EPA, 2003);
- *Environmental Impact Assessment (EIA) Guidance for Consent Authorities Regarding Sub-Threshold Development* (Department of the Environment, Heritage and Local Government, 2003).

The guidelines state that in preparing an EIAR, the Developer will carry out an analysis of the likely effects of the project (positive or negative) on the environment. The Environmental Impact Assessment procedure commences at the project design stage when the scope of the study is determined. Studies are then carried out to investigate in detail, any potential environmental impacts. Where significant adverse impacts are identified, measures are recommended to mitigate or avoid the impact of the proposed development.

This Environmental Impact Assessment Report examines the potential significant impacts of the proposed development, comprising of the proposed demolition of three out-dated pig sheds, the construction of one pre-finisher house, an extension to two existing farrowing units, the construction of an uncovered slurry reception point, the construction of one main large building to house weaner stage pigs and all associated site development works at Woodville, Co. Tipperary.

The extent of the proposed farm is described in detail in Section 2 – Description of Development. The potential environmental impacts of the proposed farm are addressed in Sections 4 – 17 of this volume of the report under the headings Human Environment, Natural Environment, Architecture, Archaeology and Cultural Heritage, Material Assets and Interactions and Inter-relationships.

1.3 EIA PROCESS OVERVIEW

Environmental Impact Assessment (EIA) is the process by which the anticipated effects on the environment due to a project are assessed or measured. The Environmental Impact Assessment Report (EIAR) summarises the environmental information collected during the impact assessment of the proposed development.

The steps of the EIA process can be described as follows:

- (i) Screening;
- (ii) Scoping;
- (iii) Preparation of the EIAR:
 - Consideration of Alternatives
 - Project Description
 - Description of Receiving Environment
 - Identification and Assessment of Impacts
 - Monitoring and Mitigation Proposals
- (iv) Completion of EIAR:
 - Scrutiny and Consent
 - Enforcement and Monitoring

1.3.1 SCREENING

In order to determine if an EIA is required for the proposed development, it is necessary to determine whether the project is listed in one of the Annexes of Directive 2011/92/EU, as amended by Directive 2014/52/EU. These annexes have been transposed into Irish Law, with the prescribed classes of development requiring an EIAR outlined in Schedule 5 of the Planning and Development Regulations, 2001 (S.I. No. 600 of 2001), as amended.

Schedule 5, Part 1, of the above-mentioned regulations, prescribes the mandatory thresholds in respect to Annex I projects. Annex II of the EIA Directive, transposed by Schedule 5, Part 2, of the Planning and Development Regulations, provides E.U. Member States discretion in determining the need for an EIA on a case-by-case basis for certain classes of projects, having regard to the overriding consideration that projects likely to have significant effects on the environment should be subject to EIA.

The proposed development exceeds the given thresholds for an Annex I class activity described in the EU Directive 85/337/EEC. Therefore, a mandatory EIAR was required for the project.

1.3.2 SCOPING

Scoping is an essential part of the preparation of an EIAR as it ensures that all potential and important significant impacts on the receiving environment are taken into account at the earliest possible time. Scoping provides relevant information on the most important potential impacts of the project, which will have to be addressed in the EIAR. With regard to EPA criteria for scoping, the environmental areas that may be impacted by the proposed scheme were identified and are as follows:

Human Beings

During scoping, particular regard was given to the potential impact of the proposed development and operations on human beings. In particular, potential impacts which may occur due to noise and dust during the construction phase, and noise, odour and visual impact during the operational phase were considered.

Natural Environment

The nearest sites of ecological importance are the Scohaboy (Sopwell) Bog Special Area of Conservation (SAC) which is 9.6km north of the site, Kilduff, Devilsbit Mountain SAC which is c. 11.6 km south-east of the site (Site Code 000934) and the Slievefelim to Silvermines Mountains Special Protection Area (SPA) which is c. 14.3 km south-west of the site (Site Code 004165). Two Natural Heritage Areas (NHAs) are located within 15km of the development, which are designated for their bog habitat.

The proposed development site is located on an aquifer categorised as a “Locally Important Aquifer – Bedrock which is moderately productive only in local zones”. Groundwater vulnerability across the site is mapped as “high” to “extreme” due to areas of exposed bedrock or shallow soils.

The potential impacts on land, waters and biodiversity must be assessed with care to ensure that all impacts are clearly identified and where possible removed, reduced or minimised to a satisfactory level.

Material Assets

This involves assessing the impact of the development on land take, the availability of resources such as soils, utilities and natural resources and waste management in the area. Given the location of the proposed development site in an agricultural area, the development’s potential impact upon agriculture must also be assessed.

Architecture, Archaeology & Culture Heritage

A number of monuments are present within the wider vicinity of the site, however there are no designated monuments within c. 1.4 km of the site boundary. There are two sites of Architectural heritage within c. 400m of the site boundary, Woodville House and Bessborough House.

1.4 INFORMATION TO BE CONTAINED IN AN EIS / EIAR

Schedule 6 of the Planning and Development Regulations, 2001, specifies the information to be contained within an EIS / EIAR, including:

1.
 - (a) A description of the proposed development, comprising information on the site, design and size of the proposed development.
 - (b) A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.
 - (c) The data required to identify and assess the main effects which the proposed development is likely to have on the environment.
 - (d) An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.
2. Further information, by way of explanation of the information referred to in paragraph 1, on the following matters:
 - (a)
 - (i) A description of the physical characteristics of the whole proposed development and the land-use requirements during the construction and operation phases.
 - (ii) A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used.
 - (iii) An estimate, by type and quantity, of expected residues and emissions (including water, air, and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed development:
 - (b) A description of the aspects of the environment likely to be significantly affected by the proposed development, including in particular:
 - Human beings, fauna and flora,
 - Soil, water, air, climate factors and the landscape
 - Material assets, including the architectural and archaeological heritage,
 - The cultural heritage,
 - The inter-relationship between the above factors
 - (c) A description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from:
 - The existence of the proposed road development
 - The use of natural resources
 - The emission of pollutants, the creation of nuisance and the elimination of waste and
 - A description of the forecasting methods used to assess the effects on the environment:
 - (d) An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.

1.5 IDENTIFICATION OF LIKELY SIGNIFICANT IMPACTS

Schedule 6 of the Planning and Development Regulations requires that an EIS describes likely, direct and indirect significant impacts of a proposed scheme. The EPA's draft "*Guidelines on the information to be contained in Environmental Impact Assessment Report, 2017*" defines an impact as the "change resulting from the implementation of project" and goes on to elaborate on impacts in terms of:

- Quality (positive, neutral or negative);
- Significance (imperceptible, not significant, slight, moderate, significant, very significant or profound);
- Extent and context;
- Probability of effects (likely, unlikely);
- Duration (momentary, brief, temporary, short-term, medium-term, long-term, permanent, reversible);
- Type (indirect, cumulative, Do-Nothing, worst-case, indeterminable, irreversible, residual, synergistic).

The following factors have been considered for this EIAR when determining the significance of the impacts, both positive and negative, of the proposed development on the various aspects of the receiving environment:

- The quality and sensitivity of the existing/baseline receiving environment.
- The relative importance of the environment in terms of national, regional, or local importance.
- The degree to which the quality of the environment is enhanced or impaired.
- The scale of change in terms of land area, number of people impacted, number and population of species affected including the scale of change resulting from all types of impacts.
- The consequence of that impact/change occurring.
- The certainty/risk of the impact/change occurring.
- Whether the impact is temporary or permanent.
- The degree of mitigation that can be achieved.

The magnitude of the impacts outlined in the sections which follow, take into account the guidelines given by the EPA and those scales used in other EIS / EIAR documents for significant developments in this country. A broad outline of the scale of impacts is given in **Table 1.2**.

Where mitigation in the form of design measures have been suggested throughout the evolution of the EIAR, these have been incorporated into the scheme design as far as is possible from an engineering perspective.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 1.2: General Criteria used to Quantify the Potential Impacts of the Proposed Scheme

SIGNIFICANCE LEVEL	DEFINITION OF IMPACT
Profound	Significant Impact An impact, which obliterates sensitive characterisation
Major	An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate	An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends
Slight	An impact, which causes noticeable changes in the character of the environment without affecting its sensitivities
Not significant	Neutral or imperceptible impact An impact which does not change the quality of the environment is capable of being measured but without noticeable consequences and causes changes in the character of the environment which are not significant or profound

1.5.1 SCENARIOS INVESTIGATED

A number of different scenarios should be examined when determining likely significant impacts. The “do nothing” scenario should compare the quality of the existing receiving environment with that of the likely environment should the proposed scheme not be built. The “do something” scenario should compare the quality of the existing receiving environment with that of the likely environment should the proposed scheme be built.

1.6 REPORT STRUCTURE

The main EIAR document is comprised of the following:

Non-Technical Summary:

A summary of the findings of the EIAR, in non-technical language.

Part I: Proposed Development:

Part I describes the existing and proposed development at the site, previous planning applicants and consents and a summary of consultations with the relevant statutory bodies and competent authorities. Part I includes the following sections:

- Section 2: Description of the Development
- Section 3: Alternatives

Part II: Environmental Impacts:

Part II describes the likely significant environmental impacts arising from the proposed development. Where possible, design measures have been included to reduce or eliminate potential impacts. Where this has not been possible, mitigation measures have been suggested to reduce or eliminate the identified impacts of the proposed development.

Part II has been divided into five main sections, as per the table below.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 1.3: Part II EIAR Sections.

MAIN SECTION	SUB-SECTION
Section A Human Environment	4. Population and Human Health
	5. Air Quality & Odour
	6. Noise
	7. Landscape and Visual
Section B The Natural Environment	8. Biodiversity
	9. Land – Soils, Geology and Hydrology
	10. Climate
Section C Archaeological, Architectural and Cultural Heritage	11. Archaeological, Architectural and Cultural Heritage
Section D Material Assets	12. Material Assets – Agriculture
	13. Material Assets – Waste Management
	14. Material Assets – Utilities
	15. Material Assets – Natural and Other Resources
Section E Interactions and Inter-relationships	16. Interactions and Inter-relationships

1.7 COMPETENCE AND EXPERTISE

Directive 2014/52/EU states that the preparation of EIAR documents should be undertaken by “competent experts”, ensuring that the information provided is of high quality.

Panther Environmental Solutions Ltd. (PES Ltd.) is a leading Environmental Consulting Firm based in Carlow, Ireland. PES Ltd was established in 2005 by Environmental Consultant Mike Fraher who has over two decades of experience working in the Environmental Consultancy Industry, both in Ireland and in the UK. The PES Ltd. team are experienced in preparing EIAR documents, having completed a number of these reports for a range of industries including the intensive agriculture sector.

PES Ltd. has been requested by the applicant to prepare an EIAR in support of a planning permission application for the proposed development at Woodville, Co. Tipperary.

This EIAR has been prepared by experienced environmental consultants with PES Ltd. Mr. Mike Fraher has over 25 years’ of consultancy experience and has a B.Sc Degree in Environmental Sciences from the University of Glamorgan, Cardiff in Wales and a Diploma in Food Sciences from Cork Institute of Technology.

Mr. Martin O’Looney has over six years’ consultancy experience and has a B.Sc Degree in Environmental Science and Technology from Sligo Institute of Technology. Ms. Lorraine Wyse has over five years’ consultancy experience and has a B.Sc Degree in Environmental Science and Health from Dublin City University and a Diploma in Field Ecology from University College Cork. Mr. Nial Ryan has over three years’ consultancy experience and has a B.Sc in Applied Physics from Dublin City University and an M.Sc in Regulatory Affairs from Institute of Technology Carlow.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Additional expertise was obtained for Section 11 of the EIAR, as discussed below. The following table outlines the contributor of each section of the EIAR.

Table 1.4: Contributors to the EIAR

REF	EIAR TOPIC	COMPANY	PERSONNEL
1	Introduction and Methodology	PES Ltd.	Ms. Lorraine Wyse
2	Description of Development	PES Ltd.	Mr Martin O’Looney
3	Alternatives	PES Ltd.	Mr Martin O’Looney
4	Population and Human Health	PES Ltd.	Mr Martin O’Looney
5	Air Quality & Odour	PES Ltd.	Mr Nial Ryan
6	Noise	PES Ltd.	Mr Nial Ryan
7	Landscaping and Visual	PES Ltd.	Mr Martin O’Looney
8	Biodiversity	PES Ltd.	Ms. Lorraine Wyse
9	Land – Soils, Geology & Hydrogeology	PES Ltd.	Mr Nial Ryan
10	Climate	PES Ltd.	Mr Martin O’Looney
11	Archaeological, Architectural and Cultural Heritage	Shanarc Archaeology Ltd.	Mr. Seán Shanahan Ms. Marion Sutton
12	Material Assets – Agriculture	PES Ltd.	Mr Nial Ryan
13	Material Assets – Waste Management	PES Ltd.	Mr Nial Ryan
14	Material Assets – Utilities	PES Ltd.	Mr Nial Ryan
15	Material Assets – Natural and Other Resources	PES Ltd.	Mr Nial Ryan
16	Interactions and Inter-relationships	PES Ltd.	Mr Martin O’Looney

Archaeological, Architectural and Cultural Heritage

The Archaeological, Architectural and Cultural Heritage section has been prepared by Mr. Seán Shanahan and Ms. Marion Sutton of Shanarc Archaeology Ltd. Shanarc Archaeology Ltd. was established in 2014 by Mr. Shanahan, specialising in archaeological and geophysical services.

Mr. Seán Shanahan has over 20 years' experience working in commercial archaeology and is a licence eligible director. Mr. Shanahan has an honours degree in Archaeology and Philosophy from NUI Galway and a Master's Degree in Geographical Information Systems and Remote Sensing from NUI Maynooth.

Ms. Marion Sutton has several years' experience preparing environmental impact assessment reports in Ireland, and has worked overseas in public land management, preparing Heritage Assessments and supervising works on archaeology and cultural heritage sites. Ms. Sutton has an honours degree in Archaeology and Geography from NUI Cork and a Master's degree in Environmental Resource Management from NUI Dublin.

1.8 LINKS BETWEEN EIA AND APPROPRIATE ASSESSMENT

The EU Habitats Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora, as amended by council directive 97/62/EC, 2006/105/EC, and Regulation EC1882/2003 of September 2003, as transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477/11), provides the framework for legal protection for habitats and species of European importance.

Article 6(3) and 6(4) of the Habitats Directive lays down the procedure to be followed when planning new developments that might affect a European site (Natura 2000 site). Article 6(3) of the Habitats Directive states;

“Any plan or project not directly connected with, or necessary to the management of the site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site, and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”

Article 6(4) would come into force following a determination that a plan or project may adversely affect the integrity of a European site.

In accordance with these requirements, the proposed development has been assessed to determine whether any likely significant effects would arise due to the proposed development upon European sites. The resulting Screening for Appropriate Assessment Report forms part of this application (Report Ref. PES_AA_19_9350).

PART I – PROPOSED DEVELOPMENT

This section of the EIAR describes the proposed development and all works to the existing piggery at an address of Woodville, Ballymackey, Co. Tipperary.

In this section is also described all associated site alterations and development works that would take place at the proposed development site.

2.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

Below is listed a brief synopsis of the proposed development:

- (1) The demolition of buildings of obsolete design namely; a gilt house, two weaner houses and one first stage weaner house, so as to make space available for new modern specification buildings within the existing yard.
- (2) The construction of a modern weaner / grower pig building (Unit 15) that will allow six weeks accommodation for second stage weaners/grower pigs (950 pigs per room) up to 50kg live-weight along with ten rooms for smaller pigs with 100 pigs per room.
- (3) The extension of the existing farrowing Unit No. 1 which would add 140 new farrowing places and would replace 110 farrowing places in Unit No. 2 which are too small for modern large pig litters and are no longer fit for purpose.
- (4) The conversion of the existing farrowing Unit No. 2 to a loose sow unit and the extension of the building (Unit No. 2A) to include a new weaner building / rooms.
- (5) The construction of a new pre-finisher pig building to accommodate 4,200 slow growing pigs.
- (6) The construction of a slurry tank system beneath all the proposed buildings and an uncovered slurry reception and collection tank.
- (7) All proposed slurry tanks beneath buildings would incorporate modern low air emission design, including slurry cooling and removal. A tank leak detection system with inspection chamber would be installed on all new slurry tanks.

Figure 2.1 shows the layout of the existing and proposed buildings at the site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

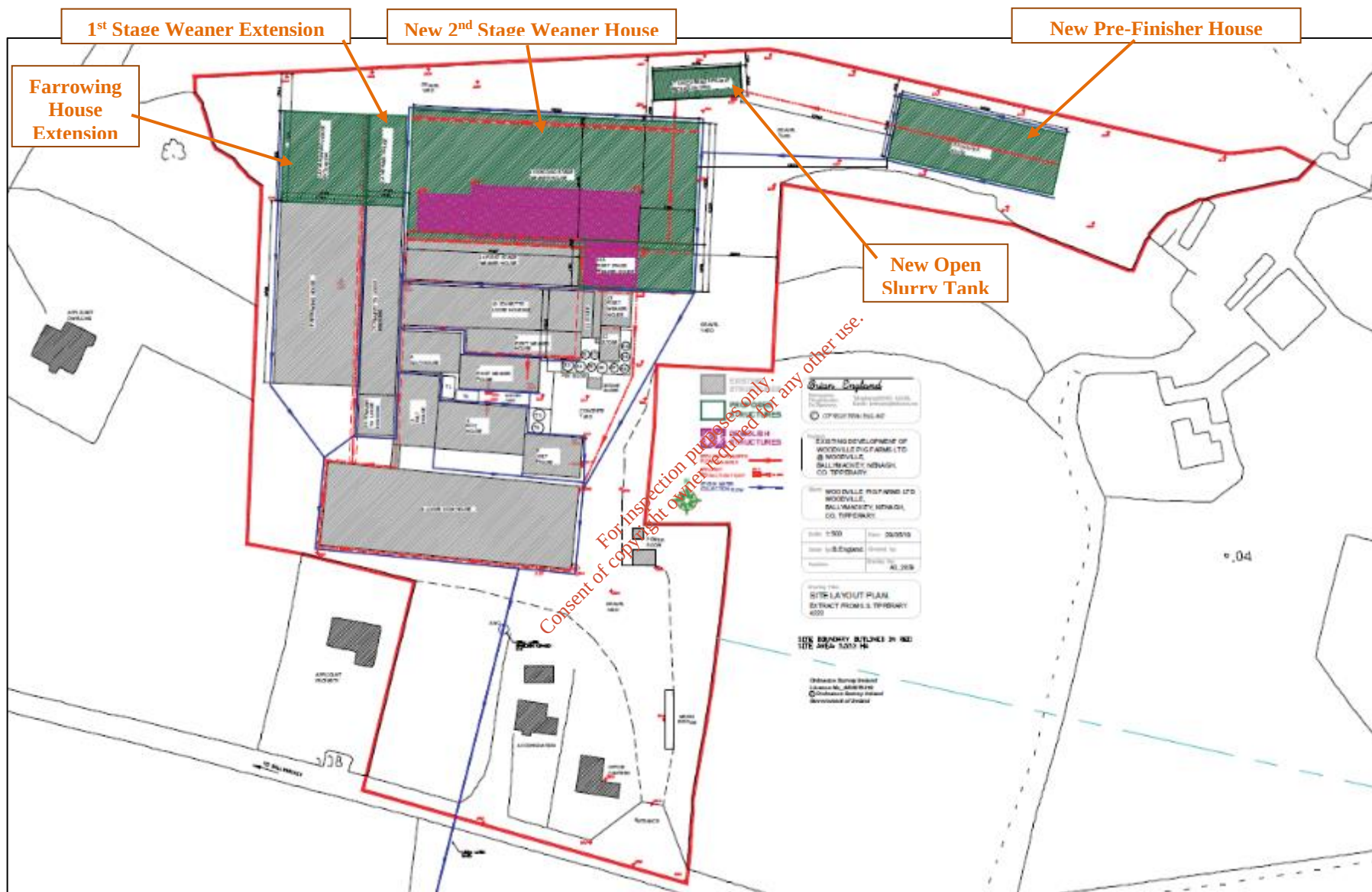


Figure 2.1: Layout of Existing and Proposed Buildings.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

2.1 RECENT PLANNING HISTORY OF THE SITE

This is a new application and is separate to any previous applications for planning permission. The applicant is Woodville Pig Farms Limited. It is for a proposed development at the site of the sow breeding farm at Woodville townland, Ballymackey, Nenagh, Co. Tipperary.

There have been a number of previous planning applications associated with the site. Planning information was sourced from the Tipperary County Council Record-based Planning Enquiry System (**Table 2.1**).

Table 2.1: Recent Planning History of the Site.

TIPPERARY COUNCIL PLANNING REFERENCE	APPLICANT	DEVELOPMENT DESCRIPTION	STATUS
11510345	Woodville Pig Farms Ltd	New loose welfare friendly dry Sow House, a new loose welfare friendly Gilt House, to extend an existing Farrowing House, relocation of the existing site entrance and associated site works. This development comprises an activity in relation to which a license under Part IV of the new first schedule to the Environmental Protection Agency Act 1992 as amended by Protection of the Environment Act 2003 is required. An EIS will be submitted to the planning authority with the application.	Granted (28/01/2012)
11510280	Woodville Pig Farms Ltd	New loose welfare friendly dry Sow House, a new loose welfare friendly dry Gilt House, to extend the existing Farrowing House Number 2, relocation of existing site entrance and associated site works (An EIS has been submitted with this application).	Incomplete application (17/08/2011)
10510163	Woodville Pig Farms Ltd	To construct a new loose welfare friendly Dry Sow House, new loose welfare friendly Dry Gilt House and to extend existing Farrowing House No. 2, which is required for animal welfare regulation compliance, staff service building with office, canteen, shower facilities, relocation of the existing site entrance and associated site works. The development comprises of an activity in relation to which a license under Part IV of the Environmental Protection Agency Act 1992, as amended by the Protection of the Environment Act 2003 is required. An EIS has been submitted with this application.	Withdrawn (08/02/2011)

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

TIPPERARY COUNCIL PLANNING REFERENCE	APPLICANT	DEVELOPMENT DESCRIPTION	STATUS
09510301	Woodville Pig Farms Ltd	A new loose dry sow house, which is required for animal welfare regulation compliance and staff service building with office, canteen, shower facilities and associated site works.	Incomplete application (08/06/2009)
08510895	Woodville Pig Farms Ltd	New Loose Dry Sow House, which is required for animal welfare regulation compliance and staff service building with office, canteen, shower facilities and associated site works.	Withdrawn (13/05/2009)
08510705	Woodville Pig Farms Ltd	Loose dry sow house, which is required for animal welfare regulation compliance and staff service building with office, canteen, shower facilities and associated site works.	Incomplete application (08/07/2008)
5121048	Woodville Pig Farms Ltd	Retain 3 no pig fattening houses, ESB room, mill., toilet/shower/canteen facilities & meal loft, 3 no meal silos & permission to extend pig fattening house and install septic tank & percolation area.	Granted (03/12/1999)
5120928	Woodville Pig Farms Ltd	Retain 4 No Pig fattening Houses (description not complete).	Granted (27/10/1999)
5120551	Woodville Pig Farms Ltd	Retention of 3 no. pig fattening houses, ESB room, mill room, toilet/shower/canteen facilities & meal loft, 3 no meal silos & permission to extend Pig Fattening House & install septic tank & per Area.	Withdrawn (31/05/1999)

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

2.2 OVERVIEW OF THE EXISTING ACTIVITY

The site of the proposed development is located in the rural townland of Woodville in North Tipperary (Eastings 196520 Northings 182050).

The piggery location is c. 9.6 km north-east of Nenagh town, c. 4.5 km north of the village of Toomevara, c. 6.3 km north-west of the village of Moneygall and c. 5.7 km south of the town of Cloughjordan in North Tipperary.

Access for the site is taken from a local country road (L1052) which connects the R491 road to Nenagh Town to the R490 and R445 regional roads near the village of Moneygall.

The setting is predominantly rural and in a farming area with intermittent housing along the local road network. The nearest residential property to the proposed site not owned by the applicant is c. 300 m distance from the site. **Figure 2.2** below shows the location of the proposed development.

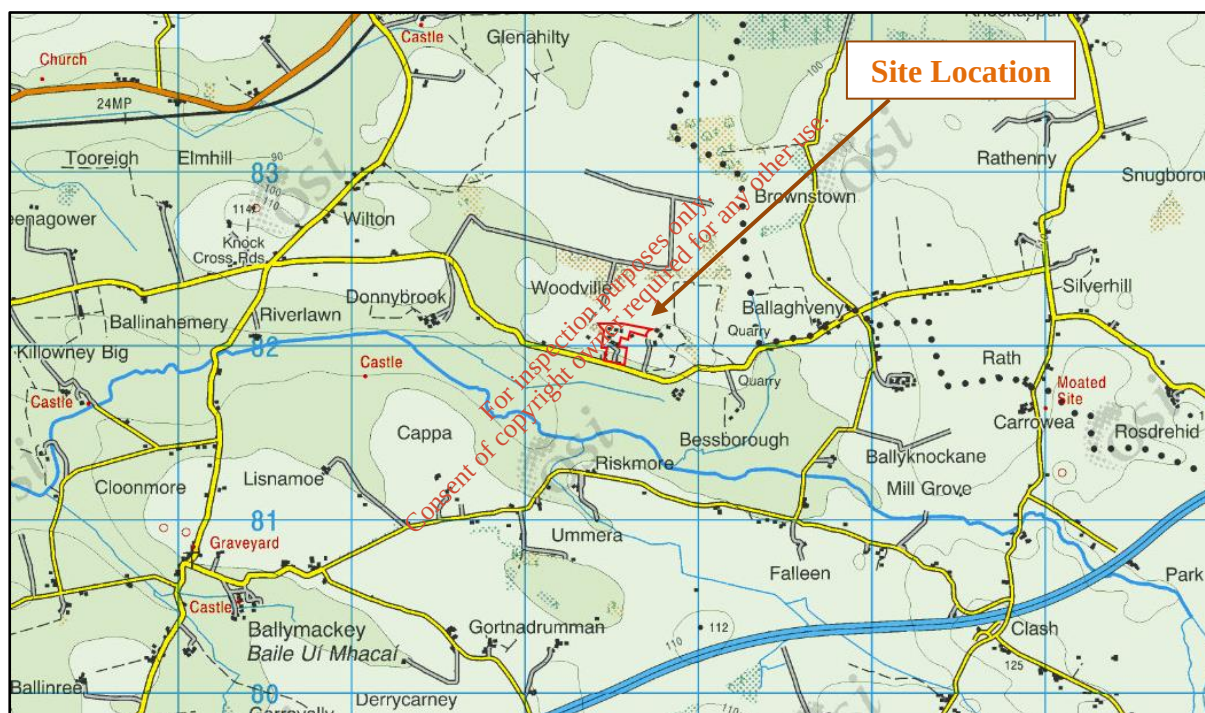


Figure 2.2: Site Location Map (Discovery map).

Woodville Pig Farms Ltd has operated a pig rearing enterprise at this location since 1979. Current activities on the site include the management, feeding and monitoring of stock.

The farm operates under the conditions of an Industrial Emissions License (Reg. No. P0467-02) issued by the Environmental Protection Agency on 19th March 2000, and amended on 27th July 2012. The farm is licenced under activity 6.2(a) and 6.2(b) of the First Schedule of the EPA Act 1992, as amended.

- 6.2 The rearing of pigs in an installation where the capacity exceeds –
- (a) 750 places for sows;
 - (b) 2,000 places for production pigs which are each over 30kg.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The license holder is registered as Woodville Pig Farms Ltd and is operated by the applicant. The EPA licenced activity includes the breeding unit at Woodville and a finishing unit at Ballyknockane, c.1.5km to the west. The Ballyknockane site occupies a landscaped site of c. 10.7 acres while the Woodville site occupies a space of c. 13.7 acres.

An IPPC License Reg. No. P0467-01 was issued by the Agency on 29th March 2000 with 147 farrowing sows, 473 dry sows, 75 gilts, 8 boars, 2400 weaners and 3000 fattening pigs. In 2002, Woodville Pig Farms Ltd purchased an existing pig facility at Ballyknockane with a capacity for 8000 fattening pigs.

Following communication with the Agency, approval was issued to adjust the stock numbers of this IPPC License to 220 farrowing sows, 700 dry sows, 109 gilts, 12 boars, 3850 weaners and finishing stock would be transferred to the associated pig finishing unit in Ballyknockane.

The revised IPPC licence (Reg. No. P0467-02) was issued on 27th July 2012, allowing 220 farrowing sows, 700 dry sows, 109 gilts, 12 boars, 3,850 weaners and 8,000 finishing pigs.

This license would be required to be reviewed by the EPA if planning permission is granted for this proposal.

The eastern and western boundaries of the farmyard are marked by mature treelines and small areas of woodland, beyond which are agricultural lands and/or residences in the ownership of the applicant.

The north of the site is marked by agricultural land, under the ownership of Ballaghveny / Ballymackey Landfill (Waste Licence: W0078-03). The landfill underwent temporary closure on the 26th February 2011. The Civic Amenity Site was open to the public on Fridays and Saturdays only for recycling and bags of domestic waste, but this facility closed on 30th June 2012. The EPA Office of Environmental Enforcement approved the recommencement of waste acceptance at Ballaghveny Landfill on 2nd April 2019.

The landfill site will not be taking in domestic waste, as the main reason for the re-opening is to accept waste from the remediation of the former Shannon Vermicomposting site in Coolross, Rathcabbin. However, this will not fill all of the available space in the three cells and operation would continue until the landfill is full, which may take 6 years (Fanning, 2019).

There is one main entrance to the site located along the L1052 local road which makes up the southern boundary of the site. The entrance is gated and monitored from an adjacent office building. The surface of the gateway is concreted and has a low wall on both sides. The entrance is c. 10 m wide at the roadside and 5.0 m wide at the intersection and would facilitate the proposed and existing piggery.

The office/canteen/facility building is located to the west of the site entrance 0.6m back from the road carriageway. There is another dwelling west of the office building (owned by the applicant) set 2.0 m back from the road which is screened by a mature hedge approximately 3.5m tall.

The road is straight for more than 300 m in both directions from the entrance and has a speed limit of 80 km/hr. As the proposed development would be located within the same footprint of

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

the existing piggery, no existing hedgerows or trees would be removed or altered as part of the development.

Existing ancillary services include a storm-water drainage system which drains south of the site to the Wilton / Ballaghveny stream, which is a tributary of the Ollatrim River. There are slurry tank systems in place below all the existing pig houses with leak detection in place.

There is a septic tank present, servicing the staff toilet/facilities on site. The septic tank is in place for the disposal of domestic sewage from the site. All wastewater generated by the showers, toilets, etc. in the staff facilities/office building is discharged to the septic tank system.

There are two c. 200,000-litre water tanks on site which are supplied from an onsite groundwater borewell.

The farm is connected to the electrical mains power supply. The site also contains a backup diesel generator (SDMO®).

Tipperary Milling Company Ltd. conduct a commercial milling operation on the same site as the breeding piggery and this company is also owned by the operators of Woodville Pig Farms. The company has ten dry material storage silos. These silos contain materials such as Soybean, soy husk, barley and wheat. The capacities of the silos are as follows: 5 x 40 tonnes, 1 x 45 tonne, 3 x 35 tonnes and 1 x 21 tonne.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

2.3 OVERVIEW OF THE PROPOSED DEVELOPMENT

The proposed development is to demolish a gilt house, two weaner houses and one first stage weaner house and to construct a modern second stage weaner house and extend farrowing Unit 1 with additional farrowing sow accommodation, convert farrowing Unit 2 to loose sow accommodation, extend Unit 2 to provide additional weaner accommodation, construct a new pre-finisher house for slow growing pigs and construction of a slurry reception tank.

The proposed development would occur on the Woodville property alone and there would be no alterations to structures at the Ballyknockane site as a result of this proposed development.

The activity on the site is and would be farming activity appropriate to the area and is consistent with the development plan for County Tipperary. These proposed developments would remain in compliance with the Animal Health and Welfare Act (2013) and the European Union - Good Agricultural Practice for Protection of Waters, Regulations 2018 transposed into Irish law as Statutory Instrument No. 65/2018.

Animal numbers housed at the Woodville (breeding unit) and Ballyknockane (finishing unit) piggery sites are listed below in **Table 2.2** (only finisher pigs are kept at the Ballyknockane site).

Table 2.2: Current and Proposed Maximum Pig Numbers at the Woodville Site.

ANIMAL CLASS	EXISTING EPA LICENSED NO. OF PIGS NOTE 1, 2	PROPOSED NO. OF PIGS
WOODVILLE		
Dry Sows / Farrows / Suckling Sows	920	1,650
Weaners	3,850	8,400
Pre-Finisher	----	4,200
BALLYKNOCKANE		
Finisher Pigs	8,000	8,000

Note 1: This excludes suckling pigs maintained on site.

Note 2: A 20% increase in the number of production pigs (finishers) held on site, for a period not exceeding 2 weeks, is permissible. The frequency of such occurrences must be kept to a minimum. Any other variation in any of the animals numbers specified requires prior agreement from the Agency.

Employment would be generated during the construction phase, as well as seasonal workers during the operational phase.

The enterprise currently provides full-time employment for eight full-time staff (not including the Directors) at the Woodville site and two full-time staff at the Ballyknockane site. The proposed new developments would also result in the creation of three new jobs and would make the business much more economically sustainable.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The extension of the farm would allow for an increase in the live weight of pigs at sale, an increase in sows and stock numbers and an increase in animal welfare and production efficiency to sustain the financial viability of this pig rearing enterprise.

The proposed new structures will lead to a more efficient production system, as they will allow more space for the production of heavier pigs that the market now seeks.

There will be much greater scope to manage disease by increasing the accommodation on the site and allowing a longer time for disinfection and drying of rooms between batches of pigs.

Advances in the genetics of the Irish sow herd are responsible for increases in numbers of piglets born alive. However, there has been a concomitant increase in the number of small and weak piglets produced. These problems culminate in piglets dying at a younger age, or reaching finishing weight at a slower rate.

The proposed development would modernise the design of farrowing places at the breeding site and improve animal welfare. In order to accommodate the larger piglet litters that genetic improvements in modern pig breeds have brought, larger farrowing pens are needed to provide sufficient space for the sow and the piglets.

The provision of a separate finisher unit for slow growing pigs would also improve animal welfare by improving survival rates for pigs at the site and therefore improve the production efficiency at the site.

The National Food Harvest 2020 Policy Document established a policy for the agricultural sector and recommended a target of c. 50% increase in the value of pig-meat sales from Ireland. The proposed development would aid in achieving this national policy target and develop an economically viable pig farm that would sustain more employment in a rural area.

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2.4 PROPOSED SITE LAYOUT AND CONSTRUCTION

The construction phase would extend over a period of approximately 3-4 months. All of the construction materials and equipment required would be acquired from local sources, where possible and transported into the site by road.

All work on the site would be conducted in accordance with the duty of safe working environment under the Safety, Health, and Welfare at Work Act 2005. All proposed buildings would be of a similar design, for example, each building would be finished in a dark green colour so as to better blend the buildings in with the surrounding landscape.

2.4.1 DEMOLITION OF EXISTING STRUCTURES

The proposed development involves; the demolition of a gilt house, two weaner houses and one first stage weaner house that occupy an area of c. 1,390 m². The buildings that are to be demolished are no longer fit for purpose and would be replaced by a new modern designed building.

The buildings for demolition have walls constructed from cavity blocks, the roofs are constructed from fibre cement and the frames of the buildings are made from wood and steel.

The majority of the demolished buildings (i.e. blocks and fibre cement roof) would be used as fill at the site for landscaping and levelling.

The other materials created from the demolition process (i.e. wood, steel, plastics) would be recovered or disposed of by the applicant through a registered waste contractor.

The construction contractor would be required to remove any construction wastes other than soil from the site for disposal or recovery in authorised sites elsewhere.

It is considered likely that the roof panels of the pig houses to be demolished are composed of asbestos fibre cement. These roof panels would be removed by an asbestos specialist contractor prior to commencing demolition of the remainder of the structure. Asbestos is a hazardous waste and would require disposal via a hazardous waste contractor.

2.4.2 TOPSOIL & LANDSCAPING

Given the dimensions of the proposed new buildings and their underlying slurry tanks, it is estimated that between 7,000 to 9,000 tonnes of soil would need to be excavated to accommodate the new buildings / slurry tanks (weight of one cubic meter of soil ranging from 1.2 to 1.7 tonnes estimate).

It is planned that all of the soil that would be moved during the laying of services and site preparation works would be stockpiled onsite and used within the site for land levelling and landscaping.

It is not intended to remove any soil/earth from the site.

2.4.3 PROPOSED PIG HOUSES

Walls would be constructed from insulated cavity blocks and insulated pre-cast concrete. Rooves, gables and side cladding would consist of dark green box profile cladding. Building frames would be constructed from steel and timber purloins.

All tanks constructed beneath the buildings would also be fitted with a leak detection system.

The interior design of the buildings would be industry standard for pigs and include a state of the art ventilation system, suspended ceiling, heating system, insulated internal walls and stainless steel / PVC finishes.

A site layout plan and building plans are provided in **Attachment 2**.

Farrowing House (1A) Extension

It is proposed to add two and a half rooms onto the existing farrowing house to add 140 new farrowing places. These new farrowing places will allow the existing 110 farrowing places in House 2 on the site plan to be converted to a loose sow house.

The farrowing pens currently in place in House 2 are smaller traditional farrowing pens and are no longer fit for purpose. Larger number of piglets being born alive per litter now as a result of great genetic improvements in the Irish herd, in competition with European pig producers.

It is proposed to add an additional two and a half rooms to the existing farrowing building (1). The building would measure c. 27 m across the gable (excluding an additional c.1.325m sluice channel), c. 31 m in length and c. 6.5 m at its highest point. The floor area of the proposed extension would be c. 792 m².

The slurry tanks beneath this extension would be constructed from reinforced mass concrete and have a capacity of c. 792 m³ and a freeboard of 158 m³.

Weaner House (2B) Extension

The existing farrowing pens would be converted to loose sow pens. Sows cycling in and out of servicing, farrowing and suckling would be held in this building.

It is proposed to extend house 2 / 2A which is abutted to farrowing house 1. An additional two and a half rooms would be added extending the building to the same position as farrowing building 1A.

The extension to House 2 would be used to house first stage weaners.

The building would measure c. 12.8 m across the gable, c. 31 m in length and c. 3.5 m at its highest point. The floor area of the proposed new building would be c. 359 m².

The slurry tanks beneath the building would be constructed from reinforced mass concrete and have a capacity of c. 359 m³ and a freeboard of 72 m³. The tanks would also be fitted with a leak detection system.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

New 2nd Stage Weaner House (15)

The new 2nd Stage weaner (i.e. growing pigs to 32-40 kg live weight) house is the largest of the proposed building for which planning permission is sought. Before construction begins, four smaller sheds (a gilt house, two weaner houses and one first stage weaner house) would need to be demolished to make room for the new building.

Three existing weaner houses would be replaced with a modern designed weaner house. The proposed footprint of the building would allow appropriate living space for the larger litter sizes produced at modern pig farms.

The proposed structure would be an extension to the existing weaner house (14). The roof slope would be a continuation of the lean-to type roof on this house to the apex of the proposed A-frame pig house.

The reinstated and extended floor area of the new building would be c. 4,517 m² of which c. 3,127 m³ would be new construction.

The building would measure c. 57.9 m across the gable, c. 98.6 m in length and c. 9.6 m at its highest point.

The slurry tanks beneath the building would be constructed from reinforced mass concrete. Existing tanks would also be utilised. The capacity of the existing tanks is c. 816 m³ with a freeboard of c. 162 m³. The capacity of the proposed tanks would be c. 3,462 m³ with a freeboard of c. 738 m³. The tanks would also be fitted with a leak detection system.

New (14A) 1st Stage Weaner House

The existing 1st Stage weaner house (14A) would be demolished and replaced with new first stage weaner accommodation. This first stage weaner accommodation would abut the existing first stage weaner rooms (14) which would remain in place.

This new build would form part of the new 2nd Stage weaner house (15) described above, with first stage weaner accommodation located along the south side of the new structure.

Pre-finisher House (16)

The applicant is proposing to build a pre-finisher building. The purpose of this building would be to accommodate pigs that are slow growing and not of sufficient weight to be transported to the Ballyknockane finishing site.

“Slow growers” refer to pigs that do not grow as efficiently as the rest of the herd. Usually, less than 10% of a pig litter are “slow growers”. The applicant intends to improve the animal welfare and survivability for these animals by building a separate pre-finisher building. The pre-finishers would receive a specialised diet so as to improve their growth efficiency.

The pre-finisher building is proposed to be built away from the other buildings on the site as a precautionary biosecurity measure.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The pre-finisher house is at the north-east part of the site, away from other buildings. The building would measure c. 21 m across the gable, c. 58 m in length and c. 7.5 m at its highest point. The floor area of the proposed new building would be c. 1190 m².

There would be a total of twelve interconnected slurry tanks beneath the building which would be constructed from reinforced mass concrete and have a capacity of c. 992 m³ and a freeboard of 198 m³. The tanks would also be fitted with a leak detection system.

2.4.4 NEW SLURRY RECEPTION TANK (17)

It is proposed to construct a new uncovered slurry reception tank in proximity to the proposed buildings.

The extensions to houses 1 and 2 would be connected to the existing slurry tank and drainage system currently in place for these houses. The rooms along the southern wall of the new weaner house (15), comprising the first stage weaner house (14) and adjacent rooms would also be directed to the existing slurry drainage network.

Slurry produced within the remainder of the weaner house (15) and the proposed new pre-finisher house (16) would be directed to the proposed new reception and collection tank (17).

The removal of slurry in this manner from the pre-finisher and second stage weaner buildings would form part of the modern design to make these houses to a “low emission” design. The removal of slurry from beneath pig accommodation has been found to reduce the emission of odorous compounds like ammonia by limiting the exposure of slurry to the atmosphere, reducing the volume or surface area available for reaction.

The proposed slurry reception tank (17) would measure c. 10.4 m in width, c. 30.4 m in length and 2.4 m deep. The approximate floor area of the slurry tank would be c. 316.2 m². The tank would be constructed from reinforced mass concrete and have an approximate slurry capacity of 763 m³.

2.4.5 SLURRY GENERATION, STORAGE AND LEAK DETECTION

Slurry produced by animals at the site would be collected and stored within slurry tanks beneath the houses. For weaner house (15) and the proposed new pre-finisher house (16), additional storage would be provided by the proposed external slurry reception tank (17).

There are currently four slurry reception locations in place at the site. The slurry from the majority of slurry tanks at the site travels to the collection point south of loose sow house (8). Slurry from gilt house (4), gilt house (5), first stage weaner house (7) and first stage weaner house (9) travel to the closest local collection point. The slurry is collected by customer farmers at these points. The proposed slurry reception tank would add a fifth slurry collection point to the site.

All soiled water produced on site (i.e. rainwater on dirty yards and water which has been used to clean down pig pens between batches) is diverted to the nearest slurry tank where it is treated as slurry. Pig pens would be washed down at least once a week between batches. There would be no discharge of any soiled water or any effluent from the site to any watercourse or to groundwater.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

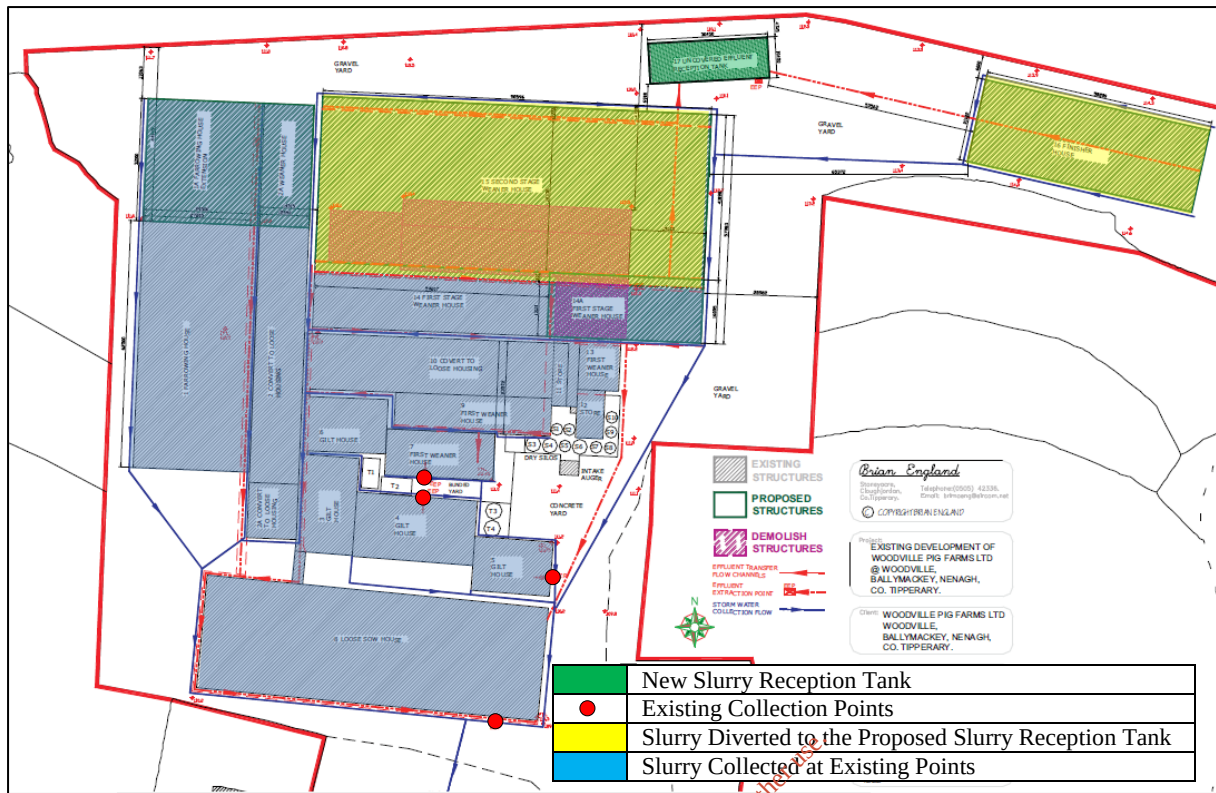


Figure 2.3: Proposed Slurry Storage at the Site.

The existing and proposed slurry tanks conform to a recognised design standard for slurry storage, i.e. The Irish Department of Agriculture and Food Specifications S123 (*Minimum Specification for Bovine Livestock units and Reinforced Tanks*) March 2006.

The new slurry tanks would include an approved sub-floor leak detection system as a method of monitoring to ensure there is no source of pollution in the vicinity from the slurry tanks.

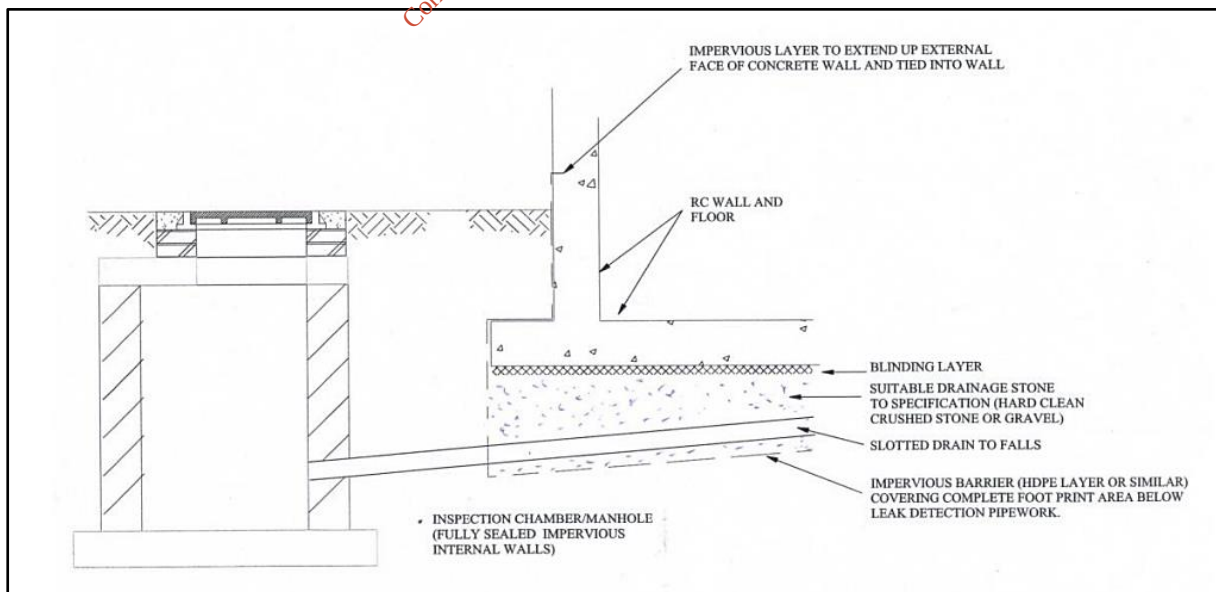


Figure 2.4: Plan View of Typical Leak Detection System for a Partially Below-Ground Slurry Tank.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The subfloor leak detection system would consist of slotted drains (100 mm PVC pipes laid to falls in a herring bone arrangement beneath the floor of the slurry tank. These pipes would feed to an inspection chamber of standard manhole construction with fully plastered impervious internal walls. Integrity assessment of the slurry tank would be carried out through periodic sampling and analysis of liquid contained in specifically constructed monitoring chambers. **Figure 2.4** above shows a more detailed drawing of the inspection chamber.

Article 10 of the European Union (Good Agricultural Practice for Protection of Waters) Regulations), S.I. No. 605 of 2017, requires the licensee to provide a minimum of 26 weeks' storage for slurry and soiled water on-site or at an agreed storage station.

Table 2.3: Existing and Proposed Available Slurry Storage Capacity

UNIT NO	BUILDING	NET STORAGE (M ³)
Existing Storage		
1	Farrowing House	2,409
2	Existing Farrowing House	732
2A	Ex. Sow House	167
8	Loose Sow House	3,844
9	First Stage Weaner House	243
10	Dry Sow House	1,087
14	First Stage Weaner House	923
	<u>Total</u>	<u>9,405</u>
Proposed New Storage		
1A	Farrowing House Extension	792
2B	Weaner House Extension	359
14A	New First Stage	350
15	New Second Stage	3,462
16	New Finisher House	992
17	New Slurry Reception tank	660
	<u>Total</u>	<u>6,615</u>
TOTAL STORAGE		16,020

The total slurry storage capacity of the entire site if the proposed buildings planning application is successful would be c. 16,020 m³.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Tables 2.4 and 2.5 below show estimates for the existing and proposed amount of slurry that would be produced at the site using standard figures, as per SI 605 of 2017.

Table 2.4: Estimation of Pig Slurry Volumes for the Existing Number of Pigs.

ANIMAL CLASS	CURRENT NUMBER OF STOCK	PIG SLURRY / WEEK (M ³)	TOTAL SLURRY / WEEK (M ³)
Farrows / Dry Sows	920	0.174	160
RAINFALL	SURFACE AREA (M ²)	NET WEEKLY RAINFALL (M)	TOTAL SLURRY / WEEK (M ³)
Soiled Water Area	320	0.027	8.64
Total / week			169
Total / 26 week			4,387

The volume of all slurry produced at the site within 26 weeks by the current amount of pigs is c. 4,387 m³. The total slurry storage currently available at the site is c. 9,405 m³. The current slurry storage capacity at the site is in compliance with S.I. 605 of 2017.

Table 2.5: Estimation of Pig Slurry Volumes for the Proposed Number of Pigs.

ANIMAL CLASS	CURRENT NUMBER OF STOCK	PIG SLURRY / WEEK (M ³)	TOTAL SLURRY / WEEK (M ³)
Farrows / Dry Sows	1650	0.174	287
Pre-Finisher Pigs	4200	0.039	164
RAINFALL	SURFACE AREA (M ²)	NET WEEKLY RAINFALL (M)	TOTAL SLURRY / WEEK (M ³)
Soiled Water Area	320	0.027	8.64
Total / week			460
Total / 26 week			11,948

The volume of all slurry produced at the site within 26 weeks by the proposed amount of pigs would be c.11,948 m³. The total proposed slurry storage available at the site if the developments went ahead would be c. 16,020 m³. Therefore, the proposed slurry storage capacity at the site would be in compliance with S.I. 605 of 2017.

Currently, the facilities stock numbers would produce an estimated 8,773 m³ of slurry every year. If the proposed pig numbers were introduced, then the amount of slurry produced at the site would increase to c. 23,896 m³.

2.4.6 LOW EMISSION HOUSING DESIGN

The applicant intends to avail of new modern design for low atmospheric emissions in the new weaner and pre-finisher structures.

The Netherlands have pioneered measures for the reduction of emissions to atmosphere from agriculture since the publication of the “Action Plan for Ammonia” in 2001, and has subsequently brought in legislated limits for ammonia emissions on a per animal basis for several farming sectors. There are no such limits for agriculture in Ireland. This has spurred innovation in building design and farming practices for the reduction of Ammonia and other compounds from farming activities.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Not only have these designs improved the environmental performance of agricultural housing, improvements in animal husbandry and productivity are also gained as animals are reared within a fresher atmosphere.

This system was chosen because of its modern design and air emission and odour mitigating properties. The system and emission performance are further described in **Section 6.0 (Odour)** of this document.

A modified slurry cooling system would be installed in the newly constructed slurry tanks beneath the proposed new weaner house (15) and pre-finishing house (16). The cooling system would be incorporated into the traditional fully slatted house system. Cooling of pig slurry significantly lowers ammonia emissions, and other emissions including odours from the stored slurry.

Ammonia, methane and carbon dioxide are the primary atmospheric emissions from pig farms. A significant part of these emissions are produced by the decomposition of slurry organic matter during slurry storage.

The cooling of the slurry effectively decreases the rate of microbiological activity taking place within the slurry that produce ammonia and other odorous compounds and gasses. (Fermentation processes in a slurry tank can cause an increase in temperature to c. 50 to 65 °C). A reduction in the temperature of the slurry also alters the equilibrium between gaseous Ammonia (NH_3) and dissolved Ammonium (NH_4^+).

The process would involve the installation of slurry cooling pipes in the concrete slab beneath the slurry tanks. Typically, pipes of 18 mm Low Density Polyethylene (LDPE) are cast into or fixed to the floor at c. 350–400 mm spacing.

The heat pump system uses the same principal as a refrigeration system. Ambient temperature water, brine or another liquid is pumped through an expansion valve, which reuses the pressure of the liquid and therefore reduces the temperature of the liquid. The piped liquid, being at a lower temperature than the concrete / slurry surrounding it, absorbs heat energy from the surrounding material. The liquid is then passed through a compressor, where normal atmospheric pressure (or higher pressure) is restored, and the excess heat energy is released.

Brine is typically used because it has a lower freezing temperature than water (i.e. a saturated NaCl solution has a freezing point of – 21.1 °C). Glycol or other forms of antifreeze can be added to the contents of the closed cooling loop to cool slurry to temperatures approximately or less than 0°C.

The recovered energy (heat) can be used to heat water for other uses on the site. Heat from the compressor / condenser element of the heat pump is relatively low-grade, in the form of hot water, normally at between 35–50°C. **Figure 2.5** below shows an example of the fitting of slurry cooling pipes below a slurry tank.

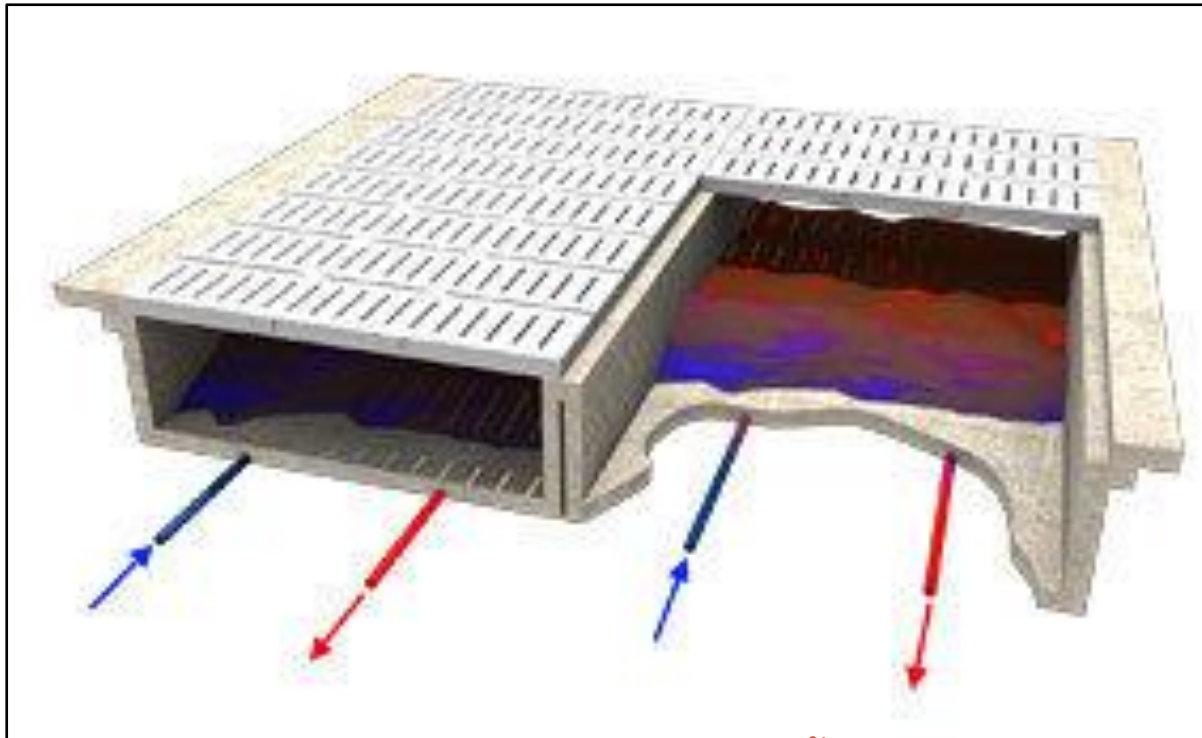


Figure 2.5: Slurry Cooling Liquid Pipes.

It is also proposed to store a significant volume of the slurry from the proposed weaner and pre-finisher shed within an external remote slurry storage tank. Experience in the Netherlands has found that remote slurry storage (i.e. away from the animal house) is another key strategy to reducing atmospheric emissions from animal housing.

Removal of slurry from warm internal pig house spaces, to remote storage, removes the slurry from conditions which promote gaseous and odour emissions. The formation of a crust on the slurry surface also creates a barrier to emissions. Crusts only form if the slurry dry matter (DM) is high enough (>7%) and agitation is avoided until collection.

For outside stores, the store/ tank should be filled from below the surface of the crust to prevent it from breaking up.

2.4.7 ANCILLARY BUILDINGS

There are several ancillary building on the site (e.g. powerhouse, canteen, toilet facilities, shower rooms, etc.). The waste produced by these buildings should mainly consist of domestic waste and packaging.

The toilet facilities present on the site is already serviced by a septic tank system. The septic tank is constructed of blow moulded plastic and has a capacity of 3,000 litres. The integrity of the tank was tested in 2008 to BS 8007 Section 9 and found to be fit for purpose.

2.4.8 SITE BOUNDARIES

The eastern and western boundaries of the farmyard are marked by mature treelines and small areas of woodland, beyond which are agricultural lands and/or residences in the ownership of the applicant.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The northern boundary of the site is defined by a timber post and wire fence and immature willow trees. To the north of the site is grassland under the ownership of Ballaghveny Landfill and an area of peatland, which have no residential developments.

The south of the site is bounded by cultivated hedges surrounding two residences and a small field in the ownership of the applicant and the main entrance from the L1052 road. The staff office building is located beside the main entrance.

The proposed development would be located within the existing piggery development's farmyard and would use the existing site entrance. No boundaries, hedgerows or mature trees would be removed or altered as part of the proposed development.

The proposed buildings would be screened from public view by the existing farm buildings and by extensive existing screening in the form of boundary hedges and trees.

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2.5 PRODUCTION PROCESSES AND MANAGEMENT

2.5.1 PRODUCTION PROCESS

The applicant currently operates a pig breeding unit at the proposed project site, housing 920 breeding sows and 106 served gilts. The term “*breeding*” refers to the production of pigs from birth up to weaner weight (c. 32-40 kg) after which they are sent to finisher housing.

The term “*finishing*” refers to the production of pigs from weaner weight to slaughter weight. The proposed development would provide two routes for weaner/finisher pigs. At the end of weaning the pigs would be graded by weight; pigs of average to large sizes would be transported to the finishing unit at Ballyknockane, while small / slow growing pigs would be moved to the new Woodville pre-finisher house.

There would be no alterations to the structures or management of the Ballyknockane finishing unit.

A brief description of the main processes carried out at the Woodville rearing site:

Sow Cycle

- Following farrowing, the suckling period for the sow is 28 days on average.
- At weaning, the sow is moved back into the service area where she is fed ad lib until she returns to cycle at approximately 5-7 days.
- After a gestation period of c. 114 days within the loose sow rooms, the pre-farrowing sow is moved to the farrowing rooms 4-5 days before farrowing.
- Sows will normally have anywhere from 11 to 13 pigs per litter. The national average for sow farrowing is 2.32 to 2.38 litters per sow per year (Teagasc, 2019).

Weaner Production

- Piglets are born in farrowing rooms. Approximately 28 days after farrowing the piglets, at c. 6 to 8 kg, would be weaned and placed in the 1st stage weaner house for approximately 4 weeks.
- At c. 18 to 20 kg the pigs are moved on to the 2nd stage weaner house. The pigs would stay here for about six to eight weeks or until the pigs weigh approximately 32-40 kg.
- At the last stage of production, the pigs would spend approximately 16 weeks in a finishing unit until they reached a market weight of c. 112 kg or are returned to the breeding herd as replacement sows.

The main input materials to be used in the proposed development would be the same as the inputs for the current site, for example, water, animal feed, and electricity. The pig feed is industry standard pig rations, appropriate to the nutritional requirements of the pigs. Electricity (Eirgrid) is used to power all of the processes and services on the site.

There are also small inputs of veterinary medicines administered in accordance with relevant regulations (e.g. injectable iron, vaccines, anthelmintics and antibiotic). Other small inputs include detergents, disinfectants, and pest control products.

To ensure the health of stock, all new pigs entering the site are vaccinated (i.e. vaccinated against *Mycoplasma hyopneumoniae* which causes pneumonia in pigs) on arrival and again three weeks later. New-born piglets are often vaccinated early too.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Health of stock and the potential threat of animal disease is a key management issue in the pig production process. To that end, protocols are in place to minimise the risk of disease.

All staff entering the site must shower in and have a change of clothing.

Non-essential personnel are restricted from entering the site and persons that have recently visited another pig farm (last 4 days) are prohibited from entering the site.

Vehicles such as delivery trucks and on-site vehicles are cleaned regularly to minimise the chance of transferring diseases between sites.

Pig pens are washed down at least once a week between batches. Presently the pens/rooms are washed down first using a detergent and power hose. When clean disinfectant is sprayed over the entire area. This procedure would be the same in the proposed new buildings. Soiled water generation is minimised through the efficient use of wash-water during cleaning.

The principal animal welfare protocols practiced on the site include:

Dry Sow / Gilt House(s)

- ensure all sows/gilts have adequate feed and water;
- check health status and treat accordingly;
- check sows/gilts returning to cycle after service;
- scrape excess faeces from behind sows/gilts.

Farrowing House(s)

- ensure all sows have adequate feed and water;
- check the health status of this area and treat as required;
- check house temperature and heat pad temperature;
- check and record births and deaths;
- remove excess faeces, farrowing debris, dead and mummified pigs at the time of farrowing for hygiene purposes;
- manually remove all faeces at weaning to reduce water waste at power washing.

Weaner House(s)

- ensure all pigs have adequate feed and water;
- check the health status of this area;
- check temperature and ventilation rates;
- check for water wastage via drinkers.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

2.5.2 SITE ACCESS / TRAFFIC

The site is accessed from a gateway c. 10 m wide off a local by-road that links Knock Cross to the Ballaghveny Landfill (speed limit set at 80 km/hr). The site is at an elevation higher than the road on sloped ground c. 50 m back from the road. The site is c. 104 m above sea level.

The road is straight for c. 300 m in either direction from the site access point and there is a sightline of c. 160 m in both directions along the road from the entrance. The gateway area is surfaced with concrete and services a hardcore road that extends to the main part of the piggery.

While there would be increased vehicle movements during the construction phase of the development, this would be for a limited period of time only and would be minimal. Traffic movements during construction would be expected to consist of deliveries of building materials / plant equipment and vehicle movements from sub-contractors.

During the operational phase of the project traffic movements to and from the site should increase due to the new animal numbers at the Woodville site. Operational traffic movements would be expected to involve deliveries, collections and staff movement.

Current traffic volumes for the site and the estimated increase in traffic movements subsequent to the new developments going ahead have been estimated and listed below in **Table 2.6**.

Table 2.6: Estimated Traffic Journeys Each Week at the Site.

ACTIVITY ¹	TRAFFIC MOVEMENTS / WEEK FOR CURRENT SITE	TRAFFIC MOVEMENTS / WEEK FOR PROPOSED SITE	INCREASE IN TRAFFIC MOVEMENTS / WEEK
Transport of pigs from site ²	2	4	2
Delivery of pig feed to the site (through Tipperary Milling Company Ltd.)	10	10	0
Transport of slurry from site ³	34	92	58
Operator/Staff transport ⁴	96	132	36
Service staff, sales etc.	6	6	0
Carcasses to rendering	1	1	0
Total	149	245	96

¹ Movements entering and exiting the site.

² Transport of weaners to Ballyknockane and transport of finishers from pre-finisher house to market.

³ Movements based upon Nitrates regulations estimated slurry storage, 26 weeks open landspreading period and 10 m³ tankers.

⁴ Assumes all staff travel to and from the farm alone and once per day, excluding Sunday.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

2.5.3 MANAGEMENT OF SLURRY AND SOILED WATER

The enterprise on the site produces pigs and produces pig slurry as a co-product. Pig pens are washed down at least once a week, the washings from which would go directly into the slurry tanks. Slurry volume would also be derived from washings and rainfall on “dirty yard” areas around the buildings.

Pig slurry is an animal by-product by reference to the Animal By-products Regulations (S.I. 252 of 2008 and Regulation EC/1069/2009). The spreading of by-product pig slurry on land to supply fertiliser nutrients is provided for and is controlled under the European Union (Good Agricultural Practice for Protection of Waters) Regulations (S.I. 605 of 2017 and Directive 91/676/EEC), a.k.a. the Nitrates Regulations.

The use of pig slurry from this installation on lands owned by other farmers is required to be in accordance with the terms prescribed in the Fertilisers and Soil Improvers Order (S.I. 253 of 2008) and the Nitrates Regulations (S.I. 605 of 2017).

The system for the management of slurry in this pig unit and for the transfer of slurry to customers (i.e. occupiers of other holdings) who seek supply from the farm is:

- Collect and store all slurry in compliance with requirements under S.I. 605 of 2017. Current and proposed slurry storage capacity is compliant with the minimum 26 weeks’ slurry storage capacity;
- Store all slurry temporarily in the tanks pending sale or supply and transfer to customers, in response to customer demand, as by-product fertiliser, as is provided for and authorised under S.I. 252 of 2008 and S.I. 253 of 2008, in the knowledge that uses by customers, are required to be in compliance with standards prescribed in S.I. 253 of 2008 and S.I. 605 of 2017,;
- Record all transfers of slurry from the farm/holding as is required by Article 23(1)(g) in S.I. 605 of 2017 and maintain the records for relevant inspectors, and
- Submit details of annual supplies of pig slurry to the Department of Agriculture, Food and the Marine.

Article 16 of S.I. 605 of 2017 states that the responsibility for nutrient management planning is the responsibility of each ‘occupier of a holding’, i.e. the farmer carrying out landspreading. The pig slurry is and would be required to be used by each occupier of each holding in compliance with S.I. 605 of 2017.

The applicant states that there is significant local demand for pig slurry as a fertiliser and pig slurry produced at the existing and proposed site would continue to be distributed to local farmers in response to their demand and for their use on their farmland.

2.5.4 DRAINAGE & MONITORING

The only emissions to surface from the proposed development would be water run-off from the roof of the proposed buildings and clean hard standing surfaces.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Stormwater from roofs and clean yards would discharge through the surface water collection network. This water should be uncontaminated and therefore should have no impact on surface or groundwater.

The site drains naturally to the Wilton / Ballaghveny stream and ultimately to the Ollatrim River which feeds into the Nenagh River.

There is one surface water monitoring point located at the Woodville breeding unit. SW2 is located central to the site and receives all stormwater from the site before it is discharged to field drainage. SW1 is located at the production pig unit at the Ballyknockane site.

Under Schedule C.2.3. of the sites EPA IE licence (P0467-02), these surface water monitoring sites are visually inspected weekly and sampled quarterly (subject to rainfall collected at the sample point) for COD. There are no thresholds set on COD monitoring at SW2 under the sites licence.

There are also three groundwater monitoring wells associated with the Woodville site AGW1, AGW2, and AGW3. Land containing a groundwater well previously operated by the adjacent landfill site, AGW4, has recently been acquired by the applicant.

Under Schedule C.6.1. of the sites EPA IE licence (P0467-02), AGW1, AGW2, and AGW3 are monitored biannually for COD, Nitrate, Total ammonia, Faecal coliforms, and Total coliforms.

There are no thresholds set on ambient groundwater monitoring at AGW1, AGW2 or AGW3 under the sites licence.

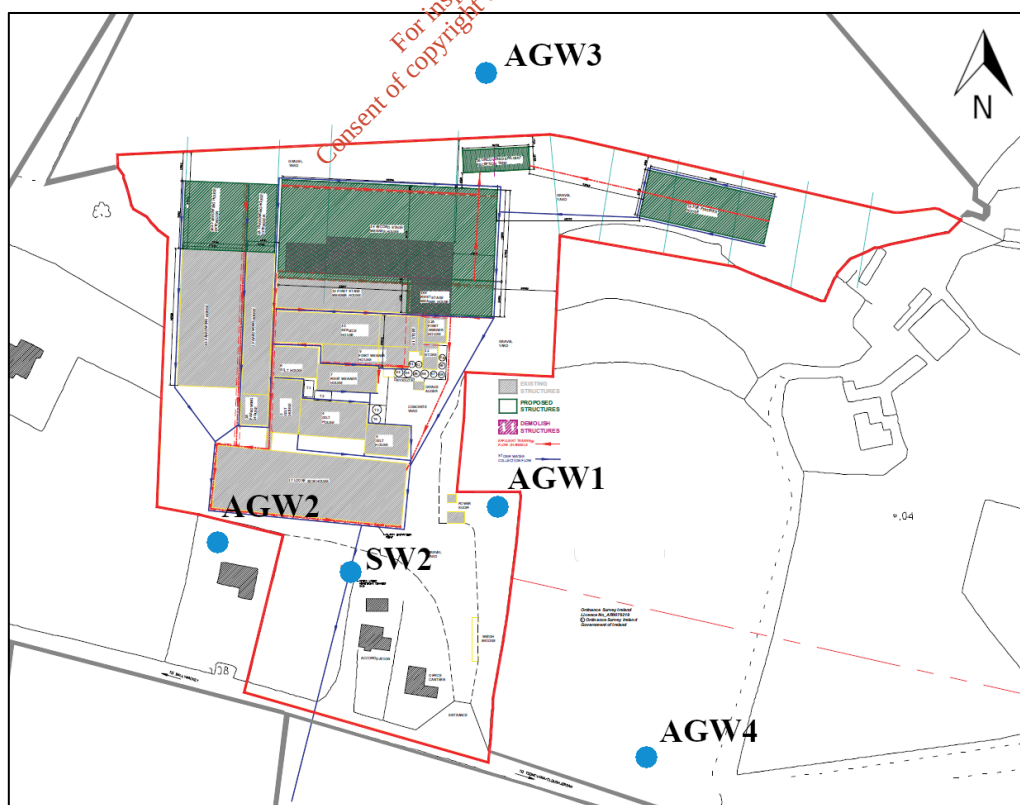


Figure 2.6: Location of Surface and Groundwater Monitoring Points at Woodville Site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

2.5.5 ENERGY

The sites electricity is currently supplied by Eirgrid the proposed new buildings would be wired into the existing infrastructure and also be supplied by Eirgrid. A back-up diesel generator is located on the site.

Optimising energy input in pig farming is vital in order to reduce production costs, maintain financial viability and gain a marketing edge on competitors. Energy costs always require a significant part of the running cost of a pig farm.

According to the 2017 Annual Environmental Report submitted by Woodville Pig Farms, the site electricity use for 2016 was 612,220 kWh and 631,200 kWh for 2017.

The amount of energy used would be minimised by high insulation standards, regular maintenance and minimal wastage.

Efficient fan selection, good design of inlets, outlets and system cleaning are the key points to minimising energy use on a pig farm.

According to Teagasc (2018) and their work, the largest amount of energy input required is in the production of pig finishers.

Table 2.7 below shows reasonable estimates of the energy required for each pig. **Figure 2.7** provides a breakdown of the overall energy consumption in a typical pig farm.

Table 2.7: Electrical Usage Finishing Phase of Pig Production. Source, Teagasc (2018) and Carbon Trust UK (2005).

STAGE	TYPICAL/PIG PRODUCED	BEST PRACTICE/PIG PRODUCED	MAIN INFLUENCE
Farrowing	8kWh	4kWh	Heating
Weaning	9kWh	3kWh	Insulation and ventilation
Finishing	10 kWh	6 kWh	Efficient fan/inlet design
Feeding system	3 kWh	1 kWh	Dry feed more efficient
Slurry handling	6 kWh	2 kWh	Heat / pumps / separators

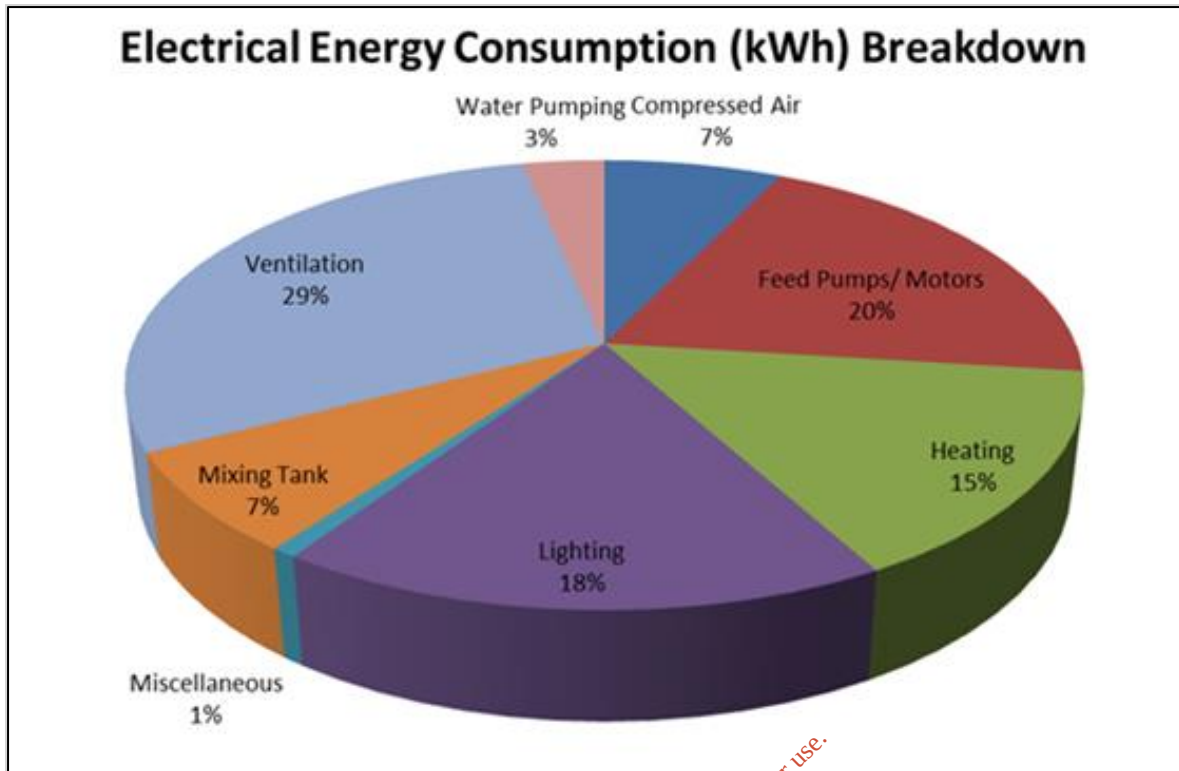


Figure 2.7: The Average Overall Energy Use Breakdown for a Typical Pig Farm (Carlow/Kilkenny Energy Agency, 2018).

The main energy uses at a finishing piggery include:

- Ventilation systems and fans.
- Lighting.
- Feed delivery and mixing.
- Slurry pumps to mix and agitate slurry tanks.

According to Teagasc (2018), a study involving eight piggeries found that the average amount of energy needed to produce a pig was 27kWh ranging from 17 to 37kWh/pig. Another study that included data from twenty-three piggeries (i.e. > 20,000 pigs) put the figure at 28kWh ranging from 18 to 45kWh/pig produced.

Fluorescent tube lighting is currently used in the existing buildings at the site.

Lighting in the proposed building would be fluorescent or light emitting diodes (LEDs)

There are no external yard lights, excluding a fluorescent light on the back door of the staff office.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

2.5.6 HEATING

There are several factors that are responsible for the thermal comfort of a pig that includes, air temperature, air speed, floor temperature and body condition to name a few.

All current buildings at the site are insulated to a high standard. The proposed buildings would also be insulated to the same standard.

Farrowing House: - Piglets are born into an environment of between 20 and 24 °C but require a temperature of > 30 °C. This is supplied by a heated bar system which is electrically heated. Weaker pigs may receive extra and beneficial heat from an infrared lamp, hung over them.

1st Stage Weaner House: - These rooms are to be artificially heated with electric heaters. The floors are slatted with plastic slats. The air temperature and freshness are climatically controlled by sensors and computers.

Finisher/Gilt/Sow Houses: - These houses will receive no artificial heating. All new houses are to be totally slatted. At the finished stage of production, the optimum temperature required for finisher pig welfare is 18 to 20°C. The combination of insulated buildings and the pigs' own body heat are sufficient to maintain this temperature, so no heating system is required.

Slurry Heat Pump

The applicant proposes to recover energy from a slurry cooling system installed at the site using a heat pump and using the recovered heat energy.

The heat generated from the slurry cooling system may be used to heat weaner accommodation. Alternatively, water heated by this system may be used as hot water for cleaning and other services.

2.5.7 VENTILATION

All ventilation systems on this farm are mechanically operated. The ventilation systems in the proposed buildings would also be mechanical.

The ventilation system takes into account factors such as air volume, temperature, insulation value, number/size of stock present and feeding methods when controlling the ventilation system.

The system controls the temperature in the pig houses by either activating the heating system or by drawing fresh air into the buildings via several air inlets along the sides of the buildings, mixing the fresh air in the building then expelling the warm air through the roof apex extractor fans.

Ventilation accounts for almost 30% of the overall energy use on a pig farm. The ventilation system has three main aims; to provide fresh air for the pigs to breathe, to provide the correct temperature for the pigs' and to remove stale air containing microbes, dust, harmful gases and water vapour from the pigs' environment.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The side and roof vents provide the primary method of temperature control for the sheds. As temperature increases, the roof stacks open to provide additional natural ventilation.

During periods where extra ventilation is required (primarily during periods of warm weather), the ventilation systems would be mechanically set to provide the optimal conditions for animal growth, energy efficiency, odour and noise considerations. All fans and ducts would also be cleaned regularly.

2.5.8 WATER PROVISION

Water needs for the current piggery are provided through an existing groundwater well at the site. This well would also be used to supply water and services to the proposed buildings.

The water supply is used to fill two c. 200,000-litre water tanks at the site. Water from these tanks would be used to wash down the pig pens between batches and be a source of drinking water for the pigs.

In Ireland, the National *Salmonella* Control Programme was implemented in August 2002 to monitor and control *Salmonella* infection in pigs. An effective hygiene / cleaning program has an important part to play in controlling *Salmonella* on Irish pig farms.

The cleaning of the pig's pens between batches usually starts with a pre-soak with soapy water for one day prior to power washing the pens. This has been observed (Teagasc 2018) to be an effective cleaning technique that requires the least amount of water (recommended to be sprayed on the pens at c. 1.5L/m²).

The following table provides an estimate of existing and proposed wash water usage based upon best practice methods;

Table 2.8: Estimated Annual Wash-water usage. (Intensive Pig Farm BREF, July 2017)

Animal type	Animal Numbers	Water Use (litres/animal place/year)	Estimated Wash- water (M ³ / year)
Existing Farm			
Sows	920	340	313
Weaners	3850	87	335
		<u>Total</u>	648
Proposed Farm			
Sows	1650	340	561
Weaners	8400	87	731
Finishers	4200	100	420
		<u>Total</u>	1,712

Soiled water from the cleaning process between batches would be stored within the underground slurry tank where it would mix with the slurry and eventually be spread on lands as organic fertiliser.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Broadly speaking, the drinking water requirements of pigs vary dependent on the size of the animal and / or the stage of a sows production cycle. The following table provides an estimate of current and proposed annual water consumption at the farm, based upon animal cycles as detailed in **Section 2.5.1** and guidance daily water consumption figures.

Table 2.9: Drinking Water Consumption (PIC - The Real Pig Handbook)

ANIMAL CLASS	NUMBER OF PIGS	M ³ PER YEAR
CURRENT FARM		
Sows	920	4,382
Weaners	3,850	782
	Total	5,164
PROPOSED FARM		
Sows	1,650	7,859
Weaners	8,400	1,705
Pre-Finishers	4,200	5,057
	Total	14,621

Given these estimates of water usage at the site (i.e. 648 m³/year for cleaning, 5,164 m³/year for animal drinking water), it has been estimated that c. 5,811 m³/year of water is currently used for animal husbandry on the Woodville farm.

It has been estimated that water consumption would increase to 16,333 m³/year on the Woodville farm.

2.5.9 FEED SILOS

Feed management is key to the pig production process as this represents 65 to 70% of the total costs of pig production, while providing the nutritional requirements for growth of pigs at different stages.

Tipperary Milling Co. Ltd. (Reg. No – 246349) operate a mill at the site. The principal activity of the company is the manufacturer and distribution of prepared farm animal feeds and pet foods.

The company operates the mill and ten feed mill silos at the site. The silos are appropriately bunded and positioned on concrete aprons. Two people are employed in the running of the mill.

The applicant sources all his pig feed requirements from this company. The company's operation has a capacity to produce c. 12,000 tonnes/year of pig feed, some of the ingredients used to make the feed include barley, soybean, soy husk and wheat. The capacities of the silos are as follows, 5 x 40 tonnes, 1 x 45 tonne, 3 x 35 tonnes and 1 x 21 tonne.

Tipperary Milling Ltd provides appropriate feedstuffs for each stage of the pig production process using, where possible, locally sourced feedstuffs.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The applicant uses low protein diets to feed the pigs. Low protein diets have been shown to reduce GHG emissions from pigs by at least 30%.

No new feed silos are proposed for the site. The current four silos have sufficient capacity to accommodate the proposed pig houses.

2.5.10 RODENT BAITING

Rodent presence can be a major economic threat on a piggery. It is important to control rodents and other pests on a piggery in order to prevent loss of feedstuffs, structural damage and disease spread. In this context, rodent refers to the two principle rodents of concern in Ireland; Brown rat (*Rattus norvegicus*) and House Mouse (*Mus domesticus*).

Pest/Rodent waste would not be expected to increase significantly if the new developments were to go ahead (i.e. c.1 kg/year).

The applicant has already in place an effective rodent and fly control programme. There are thirty-three bait stations on site in strategically designated areas baited with rodenticide (i.e. Storm Rat[®] and Mice Killer[®]). These stations provide a secluded feeding area, holding sufficient bait for nearby rodents.

The bait boxes protect the bait from weather and exclude pets and other non-target animals. All bait boxes are clearly labelled and secured. Bait points are monitored weekly by trained staff and the bait is replaced as required and recorded in the site's vermin control register.

The applicant is responsible for all rodent control measures on the site including the installation of new baiting sites appropriate for the new proposed buildings. The applicant is also responsible for inspecting and removing/replacing boxes as necessary. The number of baiting boxes would increase as per the construction of the proposed buildings.

The applicant also has in place a fly control programme. With regard to pig rearing in Ireland, there are two species of fly that predominate, the common house fly (*Musca domestica*) and the fruit fly (*Drosophila melanogaster*).

The applicant controls fly levels on the site using methomyl (a carbamate insecticide) based products. The bait contains a powerful attractant that lures flies to the sugar-based bait containing methomyl which quickly kills the flies. Fly control activities are carried out weekly at the site and would easily accommodate the new proposed buildings.

All buildings are screened so that birds may not enter any of the buildings. A vermin control register is maintained on site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

2.5.11 MANAGEMENT OF WASTES ARISING FROM OPERATION

Measures to prevent any significant effect of the proposed installation and the proposed activity on environmental parameters are directed towards ensuring that the systems for collecting wastes and removing them from the site for appropriate treatment in authorised waste treatment installations would be adequate for that purpose.

Wastes generated at the facility would be managed in order of priority in accordance with Section 21A of the Waste Management Act 1996, as amended, commonly referred to as the waste hierarchy.

Waste materials generated on the site would be collected and transported by appropriately authorised waste contractors for disposal, recovery or recycling at authorised installations.

The expected residues and emissions that would result from the operation of the proposed development are set out in **table 2.10** below.

Table 2.10: Estimation of Waste Volumes for Existing and Proposed Finishing Houses.

RESIDUE/ EMISSION	CURRENT PER ANNUM	PROPOSED PER ANNUM	ULTIMATE DESTINATION	TRANSPORTER
Veterinary waste – Sharps	6 kg	17.9 kg	Sterile Technologies	Initial Healthcare
Fluorescent tubes	14.7 kg	c. 30 kg	Nenagh Recycling Centre	Applicant
Dead animals	55 tonnes	164 tonnes	Premier Proteins	Beechfield Products
Packaging & Domestic Waste	5.3 tonnes	6 tonnes	Nenagh Civic Amenity Centre	Applicant

Veterinary Waste

Veterinary waste is classified as a hazardous waste.

Veterinary waste includes used syringes, needles and the containers in which veterinary medicines and similar products (anthelmintics, antibiotics, pesticides, rodenticides, etc.) are contained. The volume of veterinary waste would be expected to increase with the increase in pig numbers at the site.

These wastes would be accumulated on-site in purpose manufactured sealed containers and eventually removed by Initial Healthcare Ireland addressed at 2, Raheen Business Park, Abhann Road, Ballycummin, Raheen, County Limerick, V94 D9C5. The company specialises in Washroom Hygiene and Healthcare Waste Services.

Initial Healthcare Ireland delivers the veterinary waste to Sterile Technologies addressed at 430 Beech road Western Industrial Est Naas road 12. The company specialises in the Waste Disposal / Healthcare sector.

This process would not change if the proposed developments went ahead. The applicant keeps a veterinary waste register on site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Fluorescent Tubes and Lightbulbs

Fluorescent tubes are classified as a hazardous waste.

The waste fluorescent tubes currently produced by the site are collected on site by the applicant and then periodically delivered to the Nenagh Civic Amenity Centre.

This arrangement would not change for the proposed development. The applicant keeps a fluorescent tube waste register on site.

Animal Carcasses

Animal Carcasses are currently stored in several sealed, waterproof steel containers located at different points around the site.

The fallen animals are collected by Beechfield Products Transport Ltd addressed at Beechwalk, Townparks, Roscrea, County Tipperary. The company specialises in the transport of Hazardous and non-hazardous waste.

Beechfield Products deliver the fallen animals to Premier Proteins Ltd addressed at Pollboy, Ballinasloe, County Galway. Premier Proteins is engaged in the rendering of animal by-products to produce tallow, meat and bone meal.

This process would not change if the proposed developments went ahead. The applicant keeps a carcass register onsite.

Rodent Waste

The applicant would manage rodent baiting and removal from the site. Rodent waste would not be expected to be in excess of 1 kilogram per year.

This arrangement would not change for the proposed development. The applicant keeps a pest control register on site.

Packaging & Domestic Waste

Packaging (paper and cardboard) derived from the outer covers of various inputs such as veterinary medicinal products and the minor feed ingredients is and would be collected on site.

The packaging is collected by the applicant and delivered to Nenagh Civic Amenity Centre addressed at Springfort Cross, Nenagh, County Tipperary. A small amount of “domestic-type” waste is also generated from the site.

All domestic refuse for disposal from the site is collected by Clean Ireland Recycling who removed the waste periodically. This arrangement would not change for the proposed development. The applicant keeps a packaging and domestic waste register on site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

2.6 REFERENCES

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

3.0 ALTERNATIVES

3.1 EXAMINATION OF POSSIBLE ALTERNATIVES

Schedule 6, Article 94 of the Planning and Development Regulations 2001 requires that: Information to be contained in an Environmental Impact Statement shall include –

- (1d) an outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.

This section investigates the following alternatives to the proposed development:

- Alternative Site;
- Alternative Layout and Design;
- Alternative Process;
- Alternative Management of Slurry By-Product.

3.2 ALTERNATIVE SITE

A review of available lands within the applicant's holding reveals that the proposed site location is the most appropriate site for the development.

The proposed buildings are intended to modernise the existing buildings at the site and provide extensions to increase the animal numbers accommodated and financial viability of the farm enterprise. The new buildings are proposed to be integrated into the existing farm and farmyard enterprise operated by the applicant.

Acquiring property further away from the proposed site has been ruled out as an option by the applicant for several reasons, including the following:

- Additional costs associated with purchasing and developing a new site.
- A new site would require the construction of new feeding, watering and heating systems, whereas the proposed site would only require that the existing systems be extended to accommodate the new buildings.
- The same economies of scale applies to other associated systems including the stormwater system, slurry storage system and the water supply network on site.
- New site access would not be a requirement at the proposed location.
- A new site would require a new electricity infrastructure, whereas the existing site would only require connection to the existing electrical systems.
- Operation costs would also increase due to construction of additional infrastructure that already exists at the proposed site, such as feed silos and water tanks. There would also be a potential increase in traffic and emissions due to staff, materials and animals travelling between Woodville, a new site and Ballyknockane.
- The applicant is also established in the area and has an existing customer base of local farmers who obtain organic fertilisers from the enterprise.
- Woodville Pig Farms has not got the financial resources to develop elsewhere.

The most practical site for the proposed development is adjacent to the existing buildings so that access, services and controls could be easily shared.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The proposed location is considered the best economically viable option for the applicants and would ensure the future productivity of the company.

The site chosen allows for the daily operation and management of the breeding component of the facility. This would be more difficult to achieve if the breeding component of the installation was in two separate locations.

The Woodville site operates under an Industrial Emissions Licence issued by the EPA and the environmental controls required under this licence would apply to the operations at the proposed development. This would ensure that existing environmental management systems, mitigation and controls can be availed of for the proposed new structures.

3.3 ALTERNATIVE LAYOUT AND DESIGN

The layout and design of the proposed buildings have been based upon feasibility, environmental impacts, animal welfare (S.I. 311 of 2010) and the efficiency of the pig rearing process. The minimising of operational costs was also a key factor in deciding the layout and design of the proposed buildings.

There were no other buildings on site which could be used to accommodate the proposed development (i.e. modernise farrowing places, improve survivability of low weight weaners, increase in pig numbers at the site). The layout and design proposed takes into consideration the required connections with existing infrastructure and utilities.

Alternative layouts and designs were considered but it was decided more economical and practical to design the development as adjoining the existing pig rearing buildings. The pre-finisher unit, for low weight weaners, has been sited away from the rearing facility for biosecurity reasons in accordance with best practice.

The proposed design of the new buildings incorporates the most up to date concepts in modern pig farming in relation to animal welfare and environmental control. The design of the proposed development incorporates “low emission housing” design elements in order to minimise the potential for significant environmental impacts at the site.

3.4 ALTERNATIVE PROCESSES

The activities at the site would not change. The production process would be industry standard and identical to that already in place at the farm (i.e. the rearing of pigs).

These activities are not expected to change for the foreseeable future, therefore, no other alternative process was considered for the development.

A key motivation for developing the site is to improve the animal welfare performance of the existing facility, which would increase the production at the site, improving the economic viability of the enterprise in a market which is prone to price volatility. The construction of the modern design farrowing, weaner and pre-finisher accommodation would improve outcomes

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

from the existing stock and the additional stock numbers would improve the financial performance of the farm enterprise.

The construction of the proposed buildings would allow the applicant's company to remain competitive in today's modern pig farming economy and secure his family's future and business.

3.5 ALTERNATIVE MANAGEMENT OF SLURRY BY-PRODUCT

Land spreading is a practical and economic means of utilising the nutrients in pig slurry. The process is common in rural Ireland and is in line with the current thinking on resource recovery. Organic fertiliser from this farm are currently used in the local area as an alternative/additive to imported artificial fertiliser.

3.6 "DO-NOTHING" ALTERNATIVE

The "do-nothing" alternative would result in no extension or new buildings added to the existing pig farm in the townland of Woodville, County Tipperary. The existing piggery at the site would remain in operation and the land proposed for development would remain as an existing farmyard (i.e. made / sealed ground) in ownership of the applicant.

As discussed in further detail in the following sections of this statement, the level of risk to the environment would not increase significantly as a result of the proposed development, given existing environmental controls and proposed mitigation measures.

The "do-nothing" alternative would deny the locality the opportunity to gain from the economic benefits associated with the increase in production at the facility. It would also impact upon employment growth at the operation.

The proposed development will add to the economic activity on the farm, with consequent positive effect in the region and the local community.

The "do-nothing" alternative would also deny local farmers access to increased amounts of readily available organic fertiliser for land spreading purposes. The former legal definition of organic fertilisers as a 'waste' requiring disposal has changed and has been redefined as a by-product, indicating that this product is recognised as an economically valuable resource.

Due to increasing costs for chemical fertilisers, slurry is becoming an essential part of the agricultural industry in Ireland. Higher transportation costs in the future will make the availability of local organic fertiliser by-product producers an asset to local agri-business.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Should the proposed development proceed, it would support the following objectives and strategic core aims outlined in the North Tipperary County Development Plan 2010 to 2016.

Policy TI1: Management of Agricultural Slurries

It is the policy of the Council to ensure that proposals for agricultural developments, as appropriate, comply with the European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2010 or any amendment thereof.

Policy ED1: Strategic Employment

It is the policy of the Council to identify land in key strategic locations that is suitable for different employment and economic activity. These lands will be protected from inappropriate development that would undermine the future development of economic and employment activity.

Policy LH1: Landscape Management and Protection

It is the policy of the Council to facilitate new development which integrates and respects the character, sensitivity and value of the landscape in accordance with the designations of the County Landscape Character Assessments (or any review thereof).

Policy TI9: Storm Water Disposal

It is the policy of the Council to require the implementation of Sustainable Drainage Systems (SuDS) as an integral part of the design of new developments to reduce the generation of storm water run-off and to ensure that all storm water generated is disposed of on-site or is attenuated and treated prior to discharge to an approved storm water system.

Policy ED7: Agriculture

It is the policy of the Council:

- a. To protect farms and high quality agricultural land from proposals for development where such would result in negative impacts upon their viability.
- b. To facilitate and encourage the development of alternative farm enterprises, including agri-tourism development and farm shops subject to compliance.

Policy ED9: Enterprise in the Open Countryside

It is the policy of the Council to support and facilitate the provision and/or expansion of appropriate small-scale rural enterprise in the open countryside within residential sites and in vacant or derelict buildings. Development proposals will be required to meet the following criteria:

- a) The development shall not have an adverse impact on the residential, environmental and rural amenity of the area;
- b) Any new structure shall be of a scale appropriate to the size of the site and be sited and designed to ensure it does not detract from the rural setting and landscape character of the area.
- c) The development shall comply with the development management standards set out in Chapter 10.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

PART II - ENVIRONMENTAL IMPACTS

This section of the EIAR describes the likely significant environmental impacts arising from the proposed demolition of four out-dated pig sheds, the construction of one pre-finisher house, an extension to two existing farrowing units, the construction of an uncovered slurry reception point, the construction of weaner stage pig house and all associated site development works at Ballymackey, County Tipperary.

Where possible, design measures have been included to reduce or eliminate possible impacts. Where this has not been possible, mitigation measures have been suggested to reduce or eliminate the identified impacts of the proposed development.

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SECTION A

HUMAN ENVIRONMENT

This section of the Environmental Impact Assessment Report deals with the potential effects of the proposed scheme on human beings.

These effects have been grouped into:

Air Quality Impacts

The impact of emissions to air generated by the proposed development.

Odour Impacts

The impact of odours generated by the proposed development on nuisance odour in the general vicinity has been assessed.

Noise Impacts

The impact of noise generated by the proposed development on noise levels in the general vicinity has been assessed.

Landscape and Visual Impacts

The impact of the proposed development on the visual amenity of the landscape has been assessed.

While human beings interact in some way with every aspect of the environment, the above interactions are considered the most significant in this case. The impacts of the proposed development on human beings in relation to effects on the natural environment are further considered in **Section B**, while the impacts of effects on archaeology, architecture and cultural heritage and material assets are considered in **Sections C and D** respectively.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

4.0 POPULATION AND HUMAN HEALTH

4.1 INTRODUCTION

Any development that alters the existing environment has the potential to impact upon human beings at a local and/or regional scale, through impacts upon socio-economic factors including demographics, land use, economic development and employment.

This section of the EIAR provides an overview of the receiving social-economic environment of the area and briefly outlines the main potential impacts of the proposed development, at both the construction and operational phases, on human beings. The following sections of this EIAR provide detailed assessments of potential impacts on human beings and detail proposed mitigation measures to address the identified impacts.

4.2 METHODOLOGY

A study was undertaken to assess the potential impact of the proposed development on the receiving socio-economic environment. This study comprised a review of available information with regards to population and dynamics, economic activity, employment, land use and residential amenity. Information was obtained from the Central Statistics Office (CSO) and the North Tipperary County Development Plan 2010 (as varied).

4.3 RECEIVING ENVIRONMENT

4.3.1 POPULATION AND DYNAMICS

According to the 2016 Census, County Tipperary had a population of 159,553, comprising 79,668 males and 79,885 females, growing from 158,754 in 2011. This represents a slight population increase of approximately 0.5% since the previous Census in 2011.

Table 4.1 shows the changes in population by age group in County Tipperary between the 2011 and 2016 Census. Considerable increases are noted for the older age groups, with an increase of 12.4% for the 60 to 84 age group and an increase of 13.6% in the 85+ age group. The population of the 40 to 59 age group increased by 4.2%. A population decrease was noted in the 20 to 39 age group at -11.5%. The youngest age group, 0 to 19 showed only a marginal increase in population at 0.5%

Table 4.1: Population Change Between 2011 Census and 2016 Census/Age Group.

AGE GROUP	2011 POPULATION	2016 POPULATION	% CHANGE
0 – 19	44,377	44,589	0.5
20 – 39	42,952	38,024	-11.5
40 – 59	41,824	43,610	4.3
60 – 84	27,251	30,643	12.4
85+	2,350	2,669	13.6

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Nenagh Town is the closest major town to the proposed site. The town covers an approximate area of 9.1 km² and is the second largest town in County Tipperary. The population of Nenagh Town during the 2011 census was 8,439 which increased to 8,968 in 2016 comprising of 4,333 males and 4,635 females. The proposed development is located within the Nenagh local electoral area which had a total population of 21,373 during the 2016 Census.

The nearest urban areas to the proposed site include Cloughjordan c. 5.6 km north, Borrisokane c. 12.3 km north, Moneygall c. 4.6 km east, Roscrea c. 18.6 km east and Toomevara c. 4.6 km south. **Table 4.2** details the population change within these areas between the 2011 Census and 2016 Census.

All of these urban areas within the vicinity of the facility experienced population increases since the previous 2011 Census, apart from the town of Toomevara which experienced a decrease of 10% and the larger town of Borrisokane which experienced a population decrease of 2.3%.

Table 4.2: Population Changes in Towns within the Purlieu of the Proposed Site 2011 – 2016.

AREA	2011 POPULATION	2016 POPULATION	% CHANGE
Cloughjordan	511	612	19.8
Borrisokane	964	942	-2.3
Moneygall	310	313	1.0
Roscrea	5,403	5,446	0.8
Toomevara	311	280	-10

4.3.2 ECONOMIC ACTIVITY

The Department of Agriculture, Food and the Marine (DAFM) reports that the agri-food sector is Ireland's largest indigenous industry, contributing €26 billion to the national economy in 2015, employing 8.4% of the working population and accounting for 10.7% of Ireland's exports. The DAFM's report, "Food Wise 2025", identifies further growth opportunities for the sector, with the aim to position Ireland as a world leader in sustainable agri-food production.

There are two major towns within 15 km of the site, including, Nenagh at c 9.6 km to the south-west and Borrisokane c. 12.3 km to the north, with associated businesses and industry.

Almost 90% of the properties within the vicinity of the proposed site are listed as agricultural (i.e. Crop and animal production, hunting and related service) and manufacturing activities. **Figure 4.1** below shows the address points of those organisations in relation to the proposed sites location. The organisations are categorised by their NACE Code, commonly referred to the Pan-European classification system.

The proposed development is located in the Woodville townland in the north of Co. Tipperary, c. 9.6 km north-east of Nenagh town (Eastings 196520 Northings 182050). The pre-eminent land use and economic activity in the local area is agriculture. There are a number of small-scale activities located within 1.0km of the proposed development, including two farm hubs (NACE Code A.01.00), one raising of swine/pigs (NACE Code A.01.46) operated by the applicant, one freight transport by road activity (NACE Code H.49.41) and one general public administration activity (NACE Code O.84.11) at the Ballaghveny Landfill.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Beyond 1 km of the site, the main land use in the area continues to be crop, animal production, hunting and related service activities. There is also a small number of commercial activities including a taxi operation 2.3 km west of the site in the townland of Lisnamoe and a wholesaler of agricultural machinery, equipment and supplies 2.2 km south of the site in the townland of Pallas West.

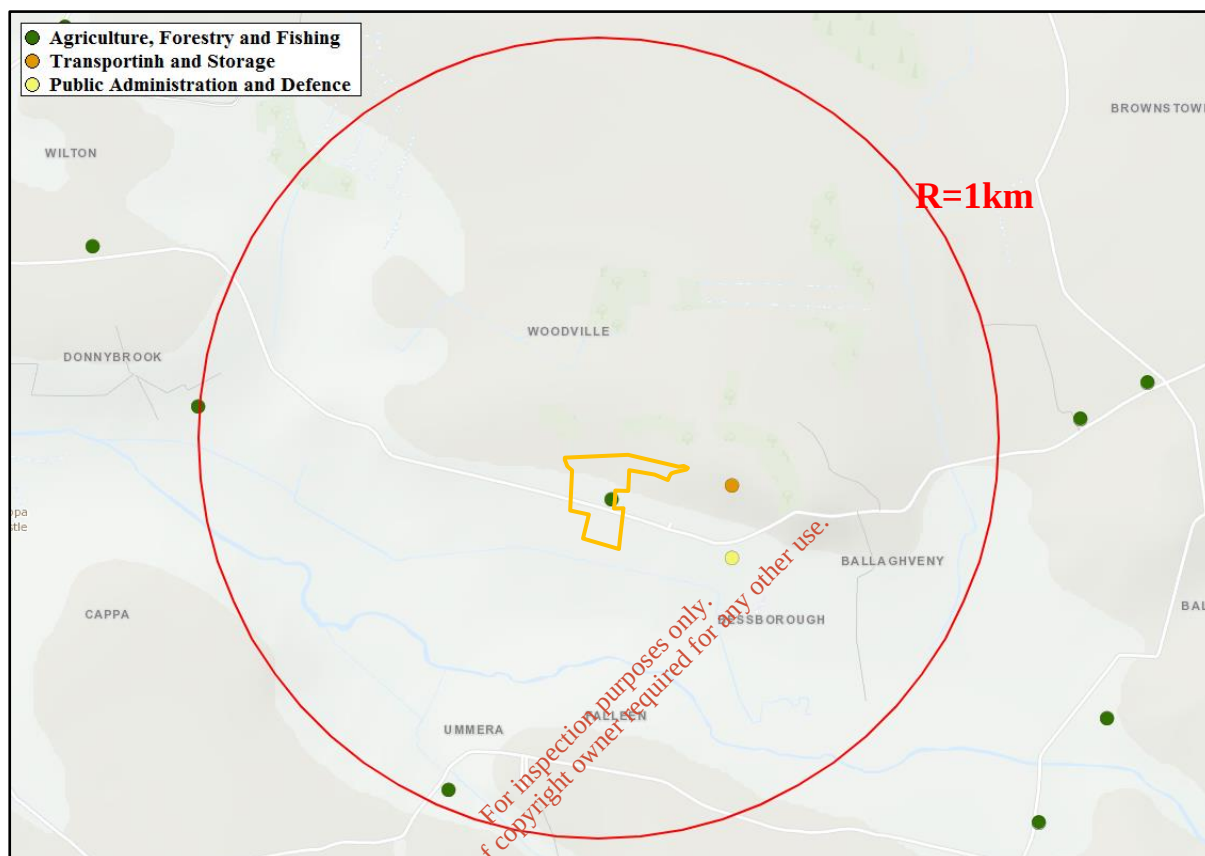


Figure 4.1: Commercial Activities per NACE Code Within 1km of the Site

There are seven EPA licenced facilities within 15 km of the proposed development.

The closest licenced site is c. 1.6 km west of the site which is a pig finishing site, operated by the applicant. The main activity at the site is classified as 6.2 (a): Intensive Agriculture. Further details of these sites are provided in sections 13 of this EIAR. These EPA licenced sites are listed below in **Table 4.3**.

Table 4.3: EPA Licenced Facilities Within 10km of the Proposed Development.

LICENCE No.	LICENCE NAME	LICENCE TYPE (FIRST SCHEDULE OF EPA ACT, 1992, AS AMENDED)	APPROX. DISTANCE FROM DEVELOPMENT SITE
W0078-03	Ballaghveny Landfill	11.5: Waste	480m E-NE
P0467-02	Woodville Pig Farms Limited	6.2 (a): Intensive Agriculture	1.64km E-SE
P0411-01	James and Nuala Gleeson	6.2 (a): Intensive Agriculture	2.60km SW
P0375-01	Toomevara Farms Limited	6.2 (a): Intensive Agriculture	6.57km SE
P0184-01	Anglo Beef Processors Ireland Unlimited Company	7.4.1: Food & Drink	9.73km W

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Figure 4.2 below shows the locations of all EPA Licenced Facilities in the surrounding area of the proposed development, which is listed in **Table 4.3** above.

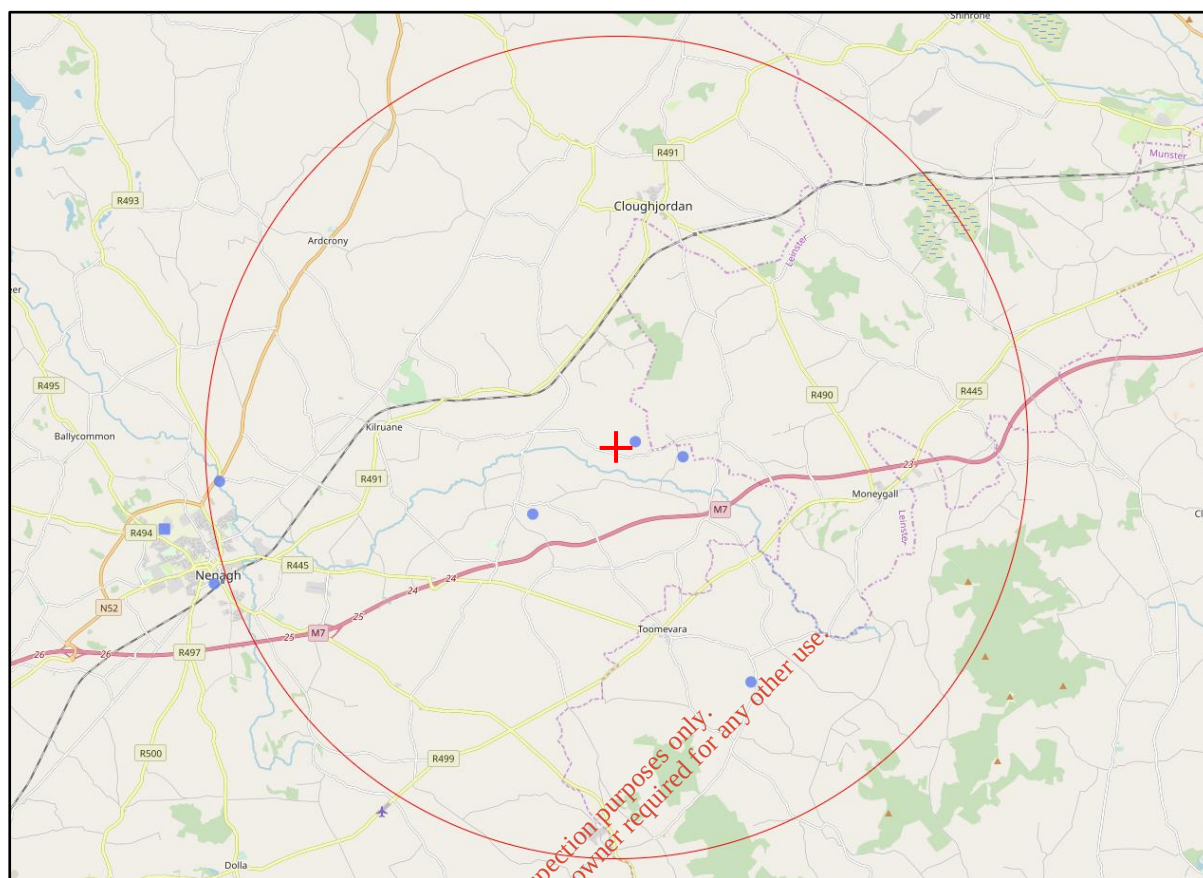


Figure 4.2: EPA Licenced Facilities within 10km of the Proposed Development.

4.3.3 EMPLOYMENT

The total potential labour force for 2016 in County Tipperary was 74,339 individuals, which represents 46.6% of the total population. In the 2016 Census. The labour force participation rate for 2016 was 59.2% with an unemployment rate of 14.6%.

The labour force participation rate was calculated by expressing the labour force, aged 15 years and over who are at work, looking for their first regular job or unemployed, as a percentage of the total population aged 15 years and over.

Table 4.4 below provides a summary of the working population for County Tipperary. The agriculture sector accounted for 9.06% of employment of the labour force in 2016.

Table 4.4: Summary of the Working Population in Co. Tipperary, 2016.

AREA	PERSONS	% OF TOTAL POTENTIAL LABOUR FORCE
Total at work	74,339	46.6
Unemployed looking for the first job	1,056	1.4
Unemployed, having lost or given up the previous job	9,811	13.2

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 4.5 below provides a synopsis of the total workforce in Tipperary by their broad industrial group.

Table 4.5: Persons at Work by Broad Industrial Group 2016.

OCCUPATION (INDUSTRIAL GROUP)	PERSONS AT WORK	% OF TOTAL POTENTIAL LABOUR FORCE
Agriculture, forestry and fishing (A)	6,740	9.07
Mining and quarrying (B)	277	0.37
Manufacturing (C)	8,691	11.69
Electricity, gas, steam and air conditioning supply (D)	291	0.39
Water supply; sewerage, waste management and remediation activities (E)	393	0.53
Construction (F)	3,352	4.51
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	8,731	11.74
Transportation and storage (H)	1,946	2.62
Accommodation and food service activities (I)	2,921	3.93
Information and communication (J)	1,067	1.44
Financial and insurance activities (K)	1,376	1.85
Real estate activities (L)	154	0.21
Professional, scientific and technical activities (M)	2,556	3.44
Administrative and support service activities (N)	1,630	2.19
Public administration and defence; compulsory social security (O)	3,484	4.69
Education (P)	5,849	7.87
Human health and social work activities (Q)	7,045	9.48
Arts, entertainment and recreation (R)	783	1.05
Other service activities (S)	1,363	1.83
Activities of households as employers producing activities of households for own use (T)	67	0.09
Activities of extraterritorial organisations and bodies (U)	3	0.004
Industry not stated	4,753	6.39
Unemployed looking for first regular job	1,056	1.42
Unemployed, having lost or given up the previous job	9,811	13.20

At 11.74 %, the wholesale and retail trade sector employs the largest number of Tipperary's total labour force. This sector includes the repair of motor vehicles and motorcycles and wholesaling and retailing which is the final steps in the distribution of merchandise. At a similar percentage, 11.69% of the manufacturing sector also employs a similar number of Tipperary's total labour force.

At 9.07% of the 2016 workforce, agriculture was the fourth largest employment sector in the county.

Table 4.6 below provides a summary of the working population of North Tipperary, given by principal economic status in County Tipperary.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 4.6: Population Aged 15 Years and Over by Principal Economic Status 2016.

ECONOMIC STATUS	PERSONS	% OF TOTAL POTENTIAL LABOUR FORCE
Professional workers	1,750	2.4
Managerial and technical	7,851	10.6
Non-manual	6,746	9.1
Skilled manual	6,901	9.3
Semi-skilled	4,574	6.2
Unskilled	1,607	2.2
All other gainfully occupied and unknown	2,304	3.1
All social classes	31,733	42.7

4.3.4 LAND USE AND SETTLEMENT PATTERNS

The proposed development would be located within the townland of Woodville, Co. Tipperary. The nearest settlement to the proposed development site is the village of Toomevara, located c. 4.5 km south of the site. The next closest populated area is the village of Moneygall c. 6.3 km south-east of the site.

Woodville is in the Electoral Division of Ballygibbon and has an area of c. 521 acres. The townland is bordered by several townlands including Ballaghveny, Bessborough and Brownstown to the east, Cappa, Wilton, and Donnybrook to the west, Glenahilty to the north and Falleen and Ummera to the south. The southern border of the townland also roughly coincides to the course of the River Ollatrim.

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along with the existing road network. A number of large farmsteads, as well as a commercial development (freight transport by road. Residential/Commercial) a landfill site (Ballymackey Landfill) and the Woodville / Ballyknockane piggery site (operated by the applicant), are also located within the area.

Figure 4.3 below shows the address points of properties within the vicinity of the proposed development. Points in yellow represent residential properties, points in purple represent commercial only properties, points in green represent properties accommodating both residential and commercial uses while points in blue are unknown.

As can be seen in the figure below, the majority of development within the vicinity of the proposed site are residential properties one residential/commercial and one commercial property. It can be seen that the majority of buildings in the area are residential and Residential & commercial.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

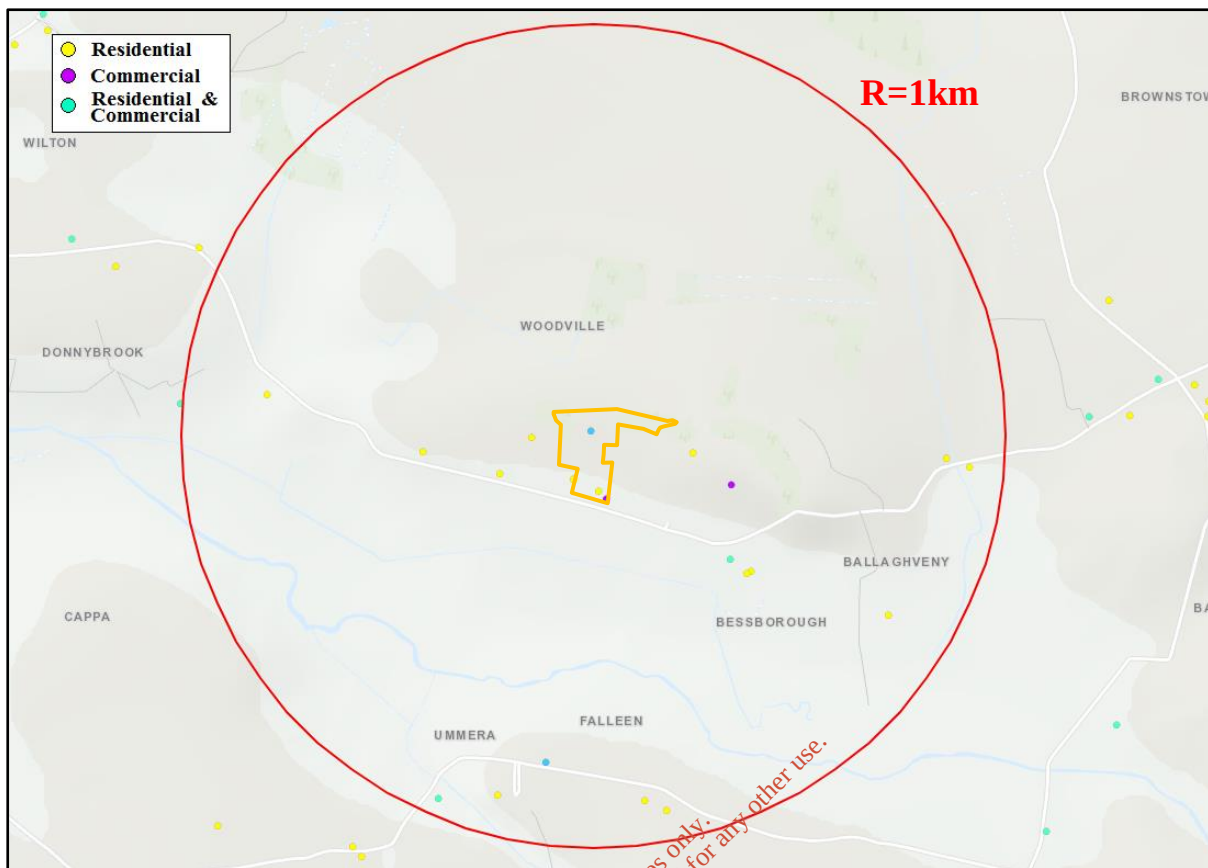


Figure 4.3: Address Points by Buildings for Properties within 1km of the Site

4.3.5 COMMUNITY AND SOCIAL INFRASTRUCTURE

Community infrastructure within the vicinity of the proposed development would be primarily located within the nearby village of Toomevara, located c. 4.5 km south-west of the site and the town of Moneygall in County Offaly c. 4.6 km east of the site.

Toomevara has a population of c. 280 as of 2016. The village is situated at the junction of the R445 and R499 regional roads in the north of Co. Tipperary. Community and social infrastructure within Toomevara include St Joseph's National School, St Joseph's Church, several retail outlets, Toomevara Health Centre, Toomevara Garda Síochána station, and other public administration properties and GAA field (St. Michael's Park).

The town of Moneygall has a population of c.313 as of 2016 and is situated on the R445 road between Dublin and Limerick, and just off the M7 Dublin-Limerick motorway. Community and social infrastructure within Moneygall include St Joseph's National School, several retail outlets including motor sales, hardware and other retail outlets for specialised goods, Moneygall Health Centre, Moneygall Garda Síochána station and other public administration properties, Community Garden and Park and GAA (St. Flannan's Park).

4.3.6 AMENITIES AND TOURISM

The proposed development is located in the Mid-West Region of Ireland. According to Fáilte Ireland's (2018) profile of tourism in the south-east of Ireland in 2017, approximately 1.4 million overseas tourists spent over €444 million in the Mid-West region of Ireland.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The area boasts several ancestral sites, cycling and walking routes which generate considerable tourist appeal in the area. Toomevara is on the route of the Beara-Breifne Way, a long-distance walking and cycling trail between the Beara Peninsula in County Cork and Blacklion in County Cavan.

Nenagh Town is a provincial Irish town which is the largest town in North Tipperary, located c. 9.6 km south-west of the proposed site. Nenagh is situated on the R445 regional road network which links it to the M7 (Limerick to Dublin) motorway. Nenagh is also served by Irish Rail, the Nenagh Train Station sits on the main Limerick to Ballybrophy rail line. Shannon Airport is located approximately one hour from Nenagh.

The area is known for its cultural heritage tourism, featuring some period architecture including, stone Georgian buildings, Nenagh Castle which has been restored and is open to the public and a ruined Franciscan Abbey. Locally, a range of amenities exist within Nenagh, which are a valuable resource for tourists including, walking tours, a Heritage Centre, a tourist information centre, an Arts Centre and several hotels and Bed & Breakfasts.

The Nenagh River flows from south to north along the eastern side of the town and empties into Lough Derg at Dromineer c. 9.0 km to the north. The River is a popular centre for sailing and other water sports in the area.

4.4 IMPACTS

A brief overview of the potential impacts on human beings during the construction and operational phases is provided below. More detailed assessments are discussed in the following sections of this EIAR.

4.4.1 ECONOMY AND EMPLOYMENT

In the Mid-West Regional Planning Guidelines (2010 – 2022) North Tipperary is described as having a strong tradition as an agricultural region. The guidelines go on to say that investment in agricultural enterprise and Agri-business in the region has the potential to contribute to the positive future growth and development of the Region.

The proposed development would have a positive impact upon the local economy by providing temporary employment for people for the duration of the construction phase (approximately 3 to 4 months) and support the continued employment of currently employed Woodville Pig Farms Ltd staff during the operational phase.

The creation of jobs during the construction phase would further contribute to the economy of the area through direct spending of goods and services in the area. The site currently provides employment for eight full-time staff and the company Directors. The proposed development would result in the creation of a further 3 full time positions at Woodville Pig Farms Ltd.

The proposed development would also provide a proportional increase in indirect employment during the operational phase, for example, via haulier contractors and other services required. Agriculture is the predominant enterprise in the region and provides employment to a relatively large number of people in the area.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

4.4.2 AMENITIES AND TOURISM

There may be greater use of local amenities and tourism facilities during the construction phase by contractors, but the construction of the proposed development would not affect the tourism profile of the area.

There are no predicted negative impacts on local amenities and tourism arising from the operational phase. Any persons directly employed during the operational phase of the project would have the opportunity to avail of the local amenities and tourism.

Their potential use, both personal and business-related, of local amenities and tourism facilities may positively benefit the business community in the area, including amenity providers.

4.4.3 AIR, DUST AND ODOUR

While it is not considered that the proposed development would pose a significant risk to air quality, there would be a potential nuisance impact upon human beings with regards to the generation of dust during the construction and operational phase. An assessment of the potential air quality impacts arising from the proposed development is discussed in detail in **Section 5** of this EIAR.

Excavations and earth moving operations may generate quantities of construction dust, particularly in drier weather conditions. The extent of any construction dust generation depends on the nature of the construction dust (soils, sands, gravels, silts etc.) and the construction activity. The potential for construction dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

Demolition activities planned for the site also have the potential to generate dust.

The proposed demolition works pose a potential risk of generating high health risk dust due to the presence of asbestos sheeting on roofs of the sheds for demolition. Corrugated asbestos cement sheet are one of the most common low-risk asbestos containing materials (ACMs). The asbestos fibres in CACS bind tightly to the base material matrix of the cement. Therefore, under normal circumstances, CACS will not release any asbestos fibres, cause air pollution or affect public health. CACS would be removed from roofs by competent asbestos contractors prior to any other construction activities being carried out. Therefore, the risk to human health via contaminated dust is considered minor.

The issue of construction dust dispersion may be exaggerated with vehicles transporting sand/gravel/concrete/etc. to and from the site, having the potential to cause an environmental nuisance to use of the local road.

The potential for dust generation during construction works is unlikely to impact upon third party residences in the locality, as the closest property is over 300m from the site boundary. However, there would be an increased risk of fouling of the road outside the construction site. Any potential impact of dust would be temporary, given the transient nature of construction works. Dust control measures would be implemented throughout the construction phase to reduce the potential impact. Standard working practices and mitigation measures for dust control are outlined in **Section 5.7**.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The potential for odour impacting upon human beings during the construction phase would be considered to be low, given that there are not expected to be any new sources of odour at the site during construction that would reach nuisance levels, nor would construction works impact upon existing odour generation.

Pig farms have a history of creating nuisance odours. However, newly constructed state of the art pig buildings like the ones proposed for this site is designed in such a way as to significantly reduce nuisance odours.

During the operational phase of the proposed development, as outlined in further detail in **Section 5.6** it is anticipated that odour from the proposed expansion of this piggery operation would not cause a significant environmental impact in the region or nuisance to sensitive locations. Site odour at odour sensitive locations does not appear to constitute a nuisance, as odours are and will be controlled at the site through good design and housekeeping.

All new pigs at the site would be fed the same diet as the existing pigs. The diets are controlled to ensure that the protein/amino-acid concentrations in the feed are at a level that would be sufficient for the pig's nutritional requirements. This results in fewer nutrients being excreted by the pigs, reducing the availability of the substrate used for the production of some odorous compounds.

The nearest residential property to the proposed development not in the possession of the company is c. 300 m from the site. There has been no history of odour complaints at the site.

The applicant intends to use a "slurry cooling" and remote storage system in the newly constructed slurry tanks. The traditionally fully slatted house system would be adapted to a "low emission" pig house design where by slurry generated by the pigs would be cooled and removed from emitting to the atmosphere within the pig house.

The proposed slurry cooling system should contribute significantly to odour mitigation at the site by reducing ammonia emissions from the stored slurry. Similar projects have shown average decreases of 25.2% in odour for cooling systems and decreases of 35% in odour for remote storage. As the proposed weaner house would replace existing houses of obsolete design, there would be expected to be a significant reduction in odour emissions from weaner accommodation.

4.4.4 NOISE

Noise generated during the construction and operational phases of the proposed development has the potential to impact human beings within the vicinity of the site. An assessment of potential impacts upon human beings due to noise associated with the proposed development is discussed in **Section 6**.

During the construction phase, it would be anticipated that there would be a moderate impact, for a limited period of time, on local residences within close proximity to the proposed development. Control and mitigation measures to reduce the potential for noise are outlined in **Section 6.6**. Given the transient nature of construction works and the provided control and

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings.

No significant additional noise impact would be anticipated during the operational phase of the proposed development in combination with existing operations. Due to the low predicted resultant noise levels and the infrequency of occurrence it is predicted that maximum fan noise would be inaudible to slightly audible at sensitive locations and would have a slight to no significant impact upon noise sensitive locations. During the normal operation of the ventilation system, noise is predicted to be inaudible at the nearest noise sensitive locations and would have no significant impact.

The proposed development is unlikely to generate noise levels that will significantly impair amenity beyond the site boundary.

No piling or blasting is proposed for the construction of the development, therefore, vibration impacts are considered unlikely. Vibration impacts associated with the operation of the proposed development are also considered unlikely.

4.4.5 TRAFFIC

The site is accessed from a gateway c. 10 m wide off a local by-road that links Knock Cross to the Ballaghveny Landfill (speed limit set at 80 km/hr). The site is at an elevation higher than the road on sloped ground c. 50 m back from the road. The site is c. 104 m above sea level. The road is straight for c. 300 m in either direction from the site access point and there is a sightline of c. 160 m in both directions along the road from the entrance.

Traffic on this local road is composed of normal car traffic and HGV's associated with local agriculture, the Ballaghveny Landfill, the local haulier enterprise and the applicant's Woodville farm.

The proposed development has the potential to impact upon traffic volumes in the area, which may subsequently impact the generation of noise and dust emissions. While there would be increased vehicle movements during the construction phase of the development, this would be for a limited period of time only and would be minimal. Traffic movements during construction would be expected to consist of deliveries of building materials / plant equipment and vehicle movements from sub-contractors.

During the operational phase of the project traffic movements to and from the site should increase due to the new number of animals and works at the site. Operational traffic movements would be expected to involve deliveries, collections and staff movement.

Current traffic volumes for the site and the estimated increase in traffic movements subsequent to the new developments going ahead have been estimated and listed below in **Table 4.7**.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 4.7: Estimated Traffic Journeys Each Week at the Site.

ACTIVITY ¹	TRAFFIC MOVEMENTS / WEEK FOR CURRENT SITE	TRAFFIC MOVEMENTS / WEEK FOR PROPOSED SITE	INCREASE IN TRAFFIC MOVEMENTS / WEEK
Transport of pigs from site ²	2	4	2
Delivery of pig feed to the site (through Tipperary Milling Company Ltd.)	10	10	0
Transport of slurry from site ³	34	92	58
Operator/Staff transport ⁴	96	132	36
Service staff, sales etc.	6	6	0
Carcasses to rendering	1	1	0
Total	149	245	96

¹ Movements entering and exiting the site.

² Transport of weaners to Ballyknockane and transport of finishers from pre-finisher house to market.

³ Movements based upon Nitrates regulations estimated slurry storage, 26 weeks open landspreading period and 10 m³ tankers.

⁴ Assumes all staff travel to and from the farm alone and once per day, excluding Sunday.

4.4.6 LAND-USE

The proposed development would not be anticipated to have any significant impact on human beings in the locale. The site on which the proposed development would be constructed is currently a part of the existing farmyard (i.e. made/sealed ground devoid of any plant life).

The development would not alter the land use in the area which is primarily agricultural. The proposed buildings would be an addition to the already existing pig farm on site and would be of a similar design to the existing buildings.

There are no residential properties or local amenities on the proposed site or abutting to the border of the proposed site. The land is in the ownership of the applicant and is not used by any other persons from the community for any reason.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

4.4.7 VISUAL AMENITY

A detailed assessment of the potential impacts upon visual amenity arising from the proposed development is discussed in detail in **Section 7** of this EIAR.

The proposed development is not expected to have a significant impact on the visual landscape of the region. The design and site layout of the proposed buildings would take into consideration the need to minimise the associated visual impact. The proposed structures are proximate to the existing structures and very similar in terms of design, height and scale.

Natural screening at the site is substantial. There are numerous well-established hedgerows and trees along the eastern and western boundary of the site. To the north of the site is a peatland area which has no residential developments within. There is also screening to the north of the site provided by hedges and scrub.

To the south, the existing structures would screen the majority of proposed development from causing any significant visual impacts. The roof of the proposed new weaner shed would be the only new visual element at the site and would be an extension to the existing weaner roof in place at the site.

As the proposed new roof would not significantly alter the profile, visual extent or character of the site, it is anticipated that there would be a permanent but slight to no significant impact as a result of the proposed development to locations atop ridgelines to the south of the site.

Given the existing agricultural character of the area, the moderate sensitivity of the landscape to development and the proposed design features of the buildings, it is considered that the proposed development would have a non-significant Minor-Negligible effect on the level of landscape and visual impact in the area.

4.4.8 WATER

The proposed development is located within the WFD Lower Shannon 25C Catchment, the Ollatrim_SC_010 Sub Catchment and the Ollatrim_040 River Sub Basin. The proposed development is hydrologically linked to the River Ollatrim.

A deterioration in the water quality of the River Ollatrim has the potential to impact upon human beings by adversely affecting drinking water quality the fishery industry and water-based leisure activities in the area. A detailed assessment of potential impacts to water quality is included in **Section 9** of this EIAR.

The Ollatrim River, which is a tributary of the Nenagh River, flows in a generally west by south-west direction for c. 7.6 km before it is met by the Ballintotty River. The Ollatrim River then continues on for c. 2.6 km before it meets the Nenagh River in the Nenagh sub-catchment. The Nenagh River flows south to north-west from this confluence and eventually discharges into Lough Derg c. 9.0 km further north.

The closest point downstream of the proposed site from which drinking water is abstracted is Limerick City and Environs Drinking Water Supply Scheme (1800PUB1001), a significant

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

distance downstream on the River Shannon. There is also an abstraction on Lough Derg at Portumna (1200PUB1042), however, this would be located upstream within the catchment.

The proposed site is positioned in the Nenagh groundwater body (GWB). The GWB covers an area c. 756 km² and is classified as being poorly productive bedrock. Elevation within the GWB ranges from c. 30 m along the shore of Lough Derg to c. 489 m in the Silvermine Mountains in the south of the GWB. Rivers flows are predominantly northwards and westwards, to Lough Derg.

During the construction phase of the proposed development, there would be a potential for impacts upon water in the event of contamination of underlying groundwater and potential contamination of surface water.

Groundwater at the site could be contaminated due to potential “spills” at the site, especially during excavation works where the overburden is removed. A deterioration in surface water quality could arise through the release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils) in the run-off to surface waters.

Water quality at the site would be protected by the implementation of mitigation measures (outlined in **Section 9.5** of this EIAR) and through the implementation of a responsible working environment (e.g. the appropriate handling and storage of potentially polluting substances and the regular inspection and maintenance of construction plant).

It is not anticipated that the proposed development would have the potential to adversely impact water quality during the operational phase.

The only discharges from the site to surface water would be discharges of rainwater from roofs and clean yards to field drainage and ultimately to the Ollatrim River. There would be no discharges of soiled water from the site. All soiled water would be diverted to the nearest pig slurry tank.

There would be no process effluent emissions from the site. The surface water collected by the current stormwater system should be uncontaminated and therefore have no impact on either the surface or groundwater in the area.

4.5 MAJOR ACCIDENTS AND NATURAL DISASTERS

As noted in Directive 2014/52/EU, precautionary actions need to be put in place for certain projects which, *‘due to their vulnerability to major accidents and/or natural disasters (such as flooding, sea level rise or earthquakes) are likely to have significant adverse effects on the environment’*.

The proposed development would not fall within the Seveso III Regulations or European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, as no dangerous substances / significant volumes of chemicals would be used at the site.

During the construction phase of the proposed development, the risk of spills to the environment would be minimised through the implementation of measures, such as the

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

appropriate storage of potentially polluting substances (e.g. oils, fuels), the regular maintenance and inspection of construction plant, the implementation of good housekeeping practices and the provision of spill kits.

It is considered that the most likely natural disaster to which the proposed development may be vulnerable to and could have significant adverse effects on the environment, is fluvial flooding.

According to the Commissioners of Public Works in Ireland responsible for developing flood maps for the Republic of Ireland website (www.floodinfo.ie) as part of the Catchment Flood Risk Assessment and Management (CFRAM) Programme. The site is not located within any fluvial, pluvial or groundwater flood zones. Further details are provided in **Sections 9.3 and 9.4** of this EIAR.

The proposed site of the new buildings is c. 430 m north and uphill from the area designated as the potential fluvial flooding zone of the Ollatrim River.

4.6 MITIGATION MEASURES

The following sections of this EIAR provide further information on the potential impacts on human beings as a result of the proposed development. Mitigation measures have been proposed to address the potential impacts and are detailed under the following sections:

- Air Quality and Odour
- Climate
- Noise and Vibration
- Landscape and Visual
- Biodiversity – Aquatic Environment
- Soils, Geology and Hydrology
- Architectural, Archaeological and Cultural Heritage
- Material Assets

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

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5.0 AIR QUALITY & ODOUR

5.1 INTRODUCTION

This air quality study identifies, describes and assesses the impact of the proposed development on air quality. Particular attention has been given to sensitive receptors, such as residential areas and to the extent of the exposure of these receptors to airborne pollutants derived as a result of the development.

This assessment was prepared in accordance with the EPA documents “*Guidelines on the information to be contained in an Environmental Impact Statement, 2002*” and draft “*Guidelines on the information to be contained in an Environmental Impact Assessment Reports, 2017*”.

It is noted that technologies for the limitation of air emissions have been proposed as part of the design of the new pig units, i.e. slurry cooling systems and remote slurry storage, and the anticipated performance of these systems have been addressed in this section.

5.1.1 AIR EMISSIONS

Air quality is variable and subject to significant spatial and temporal variation. In relation to spatial variation in air quality, concentrations generally fall significantly with distance from major sources. Thus, residential exposure is determined by the location of sensitive receptors relative to major sources in the area. Temporally, air quality can vary significantly due to changes in traffic volumes, meteorological conditions and wind direction.

The main potential sources of air pollutants from the proposed development would be from the digestive processes and slurry of the pigs. Emissions from digestive processes and slurry of the pig herd include odours associated with the gases, ammonia, nitrogen oxides, methane and carbon dioxide.

Ventilation in pig houses is necessary to provide a constant environment inside the house, which enables optimum pig growth and results in gaseous emissions.

The type of ventilation to be used in the proposed facility would be mechanical ventilation, which is to Department of Agriculture specification. Ventilation would be provided by side wall vents and roof stack fans.

The fans operate automatically and are controlled by temperature probes, which will in turn be managed by a central computer system. Temperature within the houses would be maintained based upon the air circulation and temperature control needs of the animals.

Generally, the fans would operate continuously at low to medium % power states in order to maintain fresh air within the buildings. For sow and pre-finisher accommodation, where ventilation is used as the primary temperature control mechanism, ventilation rates would fluctuate based upon internal building temperature. Maximum ventilation rates would not reach maximum output until outside temperatures exceeded 21 °C. Based on this temperature, the fans would not be operating during evening and night-time hours and only during the warmest of summer days.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

As no fuel is burned on site, the main potential source of air pollutants is from the proposed development digestive processes and slurry of the pig herd during the operational phase of the development.

Odours from pig farming arise mainly from the following sources:

- The pig farm;
- The manure spreading operation.

In certain facilities, drainage and bad house-keeping can be a significant source of odours. Spillages and drain liquid from offal storage containers and offal handling can contaminate significant surface areas. The build-up of organic matter on rough concrete surfaces can lead to significant emissions especially during warmer summer months. Great care should be taken to ensure the elimination of unscheduled emissions such as these through good housekeeping and management.

Gaseous Emissions from the Pig Buildings

Odour

Odour nuisance is considered to be pollution and is primarily of concern due to potential impacts upon amenity value of public and private areas and the wellbeing of local receptors.

The odorants that are released from the operations of pig production are the result of anaerobic metabolism of micro-organisms. This conversion starts in the digestive system of the pig, but accelerates within hours after excretion. In combination with ammonia, substances such as hydrogen sulphide (H₂S), sulphur and volatile fatty acids contribute to the characteristic malodour. The concentration of these latter compounds may be negligible in a measurable sense however when combined, they create an odour.

The main source of the odour emissions from a pig farm is from the storage of pig slurry. Bacterial growth during storage results in release of volatile compounds, which are emitted to the atmosphere from the slurry surface and particularly at agitation. Malodours arise from pig buildings and from the land spreading of pig slurry.

Malodour is defined as a nuisance; however it is non-toxic and non-infectious. Experience with Irish pig farms would suggest that operating pig farms are seldom as strong a focus for odour complaints as planned pig farms i.e. that the general perception may be worse than the actual impact.

Ammonia (NH₃)

Ammonia is abundant in slurry (approximately 50-60% of pig slurry N is Ammonia N). It is highly volatile and is emitted when the slurry is in contact with air during storage. It disperses rapidly in the atmosphere. Agriculture is the largest contributor of NH₃ emissions to atmosphere in Ireland. NH₃ emissions from the proposed development which would quickly dissipate to back ground levels within a few hundred meters of the site, however, cumulative low level emissions may contribute to ecosystems further afield.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The proposed development would emit NH₃ from the air vents in the pig houses. A spike in NH₃ levels is normal in rural areas adjoining cattle and pig farmyards.

Certain land-spreading practices release ammonia into the atmosphere. This is a normal occurrence in a rural environment and agriculture (in particular the landspreading of animal slurry) accounts for most of the national NH₃ deposition. While contained within the slurry, NH₃ does not leach through soils to surface or groundwater as it is a cation absorbed by negatively charged soil colloids. Soil ammonia has been found to have positive impacts for agricultural land, promoting crop growth.

Emission of ammonia to the atmosphere is undesirable from an ecological point of view because it has toxic, eutrophic and acidifying effects on certain ecosystems. In particular, the presence of high ammonia levels in peatland ecosystems has been found to inhibit the growth of the moss species which form the bog, allowing sedge and grass species to outcompete.

Other Gaseous Emissions

Methane and Nitrous Oxide are green-house gases which would be emitted from the proposed development. Methane is emitted from two sources: firstly from the digestive process of organic matter in pigs and secondly from anaerobic decomposition processes of organic matter in slurry. Nitrous Oxide is produced during several microbial processes in the nitrogen (N) cycle within manure and slurry.

In the context of a decline of 6%, 38% and 13.7% in the national cattle, sheep and pig herd in the past 10 years, the proposed development would not affect the national trend of lower agricultural green-house gas emissions.

5.1.2 DEPOSITIONAL DUST

Dust generation, dispersion and deposition from operational and construction activities are typically considered an environmental nuisance for sensitive receptors in the vicinity of a development.

Other potential sources of dust in the proposed development are from trafficking and strong winds in dry conditions, leading to the suspension of dust particles from the pig finishing operation.

Earthworks and demolition activities during construction are also a potential source of dust pollution.

5.1.3 ASBESTOS DUST

A risk of asbestos dust emission arises at the proposed development due to the presence of Corrugated Asbestos Cement Sheets (CACS) on several of the houses proposed for replacement.

The risk associated with exposure to asbestos relates to the possibility that the fibres within the asbestos containing material (ACM) can become released into the air and are then inhaled. Breathing in air containing asbestos fibres can lead to asbestos-related diseases. Inhaled asbestos fibres contribute to increased risk of lung cancer, asbestosis and mesothelioma.

5.2 LEGISLATIVE CONTEXT

The main legislation and guidelines pertaining to air quality in Ireland are outlined below.

AIR POLLUTION ACT, 1987:

Under this act, local authorities and/or the Environmental Protection

Agency (EPA) are given responsibilities relating to air quality monitoring, to the prevention of air pollution and the issuing of air pollution licences. Owners of certain industrial facilities must obtain an air pollution licence from their local authority or an Industrial Emissions / Integrated Pollution Prevention and Control licence from the EPA.

AIR QUALITY STANDARDS REGULATIONS, 2011 (S.I. NO. 180 OF 2011):

These regulations transpose the Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) into Irish legislation. The regulations specify the limit or target values for specific air pollutants including sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter (PM₁₀ and PM_{2.5}), lead, benzene, carbon monoxide, and ozone. The EPA is the competent authority for the purpose of the CAFE Directive.

TA LUFT AIR QUALITY STANDARD:

There are no statutory limit values for dust deposition in Ireland, above which nuisance is considered to exist. Generally, the German regulation “*Technical Instructions on Air Quality Control*”, commonly known as the “TA Luft Air Quality Standard”, is referred to in measuring and assessing the level of dust deposition and potential for dust nuisance.

LEGISLATION OF ODOUR NUISANCE IN IRELAND.

The Public Health Act of 1878 introduced legislation to control nuisance in Ireland, but its execution became viable after the implementation of the Planning and Development Act (1963) (Scannell, 1995). Any industry producing a nuisance was controlled under these regulations and the development of scientific measurement techniques made it practical to quantify and control the release of gaseous environmental pollutants from enterprises.

Odour impact from any facility on the surrounding vicinity may be considered a nuisance. Section 107 of the Public Health Act 1878 states that “*Sanitary authorities are bound to inspect their district for nuisances*’. Upon the receipt of any information respecting the existence of a statutory nuisance, the sanitary authority is obliged, if satisfied of the existence of the nuisance, to serve an abatement notice on the person by whose act or default the nuisance arises or continues or, if such a person cannot be found, on the owner or occupier of the premises on which the nuisance arises” (Scannell, 1995).

Odour is defined as environmental pollution in section 4(2) of the EPA Act (1992), as it is considered to potentially cause a nuisance and/or adversely affect the countryside or a place of special interest.

Waste licensing and Integrated Pollution Control Licensing (IPC) (now IPPC) for specified facility types was implemented in 1996 by the EPA and the related guidance note was termed

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

BATNEEC (Best available Technology Not Entailing Excessive Cost) (i.e. now BAT which complement the BATNEEC Notes) (EPA, 1996). It set out specific conditions for these industries (i.e. Intensive Agricultural Production, Landfills, Waste transfer stations, etc.) to be implemented in order to comply with the environmental requirements of the EPA. Minimisation of odour emissions and complaints is one of the requirements of the BATNEEC Guidance Note for industries likely to cause odour emissions. For example, a typical IPC license/Waste license condition states *'that there shall be no emission to the atmosphere of environmental significance and that all operations on site shall be carried out in a manner such that air emissions and/or odours do not result in significant impairment and/or interference with amenities beyond the site boundary and at odour sensitive locations in the area'* (EPA, 1996).

Local authorities and the EPA have responsibility for ensuring enterprises meet their planning and environmental requirements. Where these facilities are found to be causing odour nuisance, local government enforces Section 29 of the 1987 Air Pollution Act and serves the offenders with an abatement notice. If the facility is licensed as an IPPC or Waste enterprise, the EPA can enforce the conditions of the license and either serve the facility with non-compliance for odour detected beyond the site boundary or prosecute the facility and seek a high court injunction to close the facility.

As part of SI 787 of 2005 *'the planning authority where granting permission for a development in accordance with section 34 of the Act of 2000 attach such conditions to the permission as may be, in the opinion of the authority and having regard to the function of the Agency under Article 4 of these Regulations, necessary to ensure that the plant is so operated and maintained as to ensure that it avoids causing nuisance through odours or noise'*.

Additionally, in considering an appeal to planning, Board Pleanala *'shall include such conditions as may be necessary in its opinion to ensure that the plant is so operated and maintained as to avoid causing nuisance through odours or noise'*.

EPA LICENCE

The existing site is licensed by the Environmental Protection Agency (EPA), Licence Ref: P0467-02, which sets environmental noise emission limits for the site.

Licence Condition 5.2 states:

'No emissions, including odours, from the activities carried on at the site shall result in an impairment of, or an interference with amenities or the environment beyond the installation boundary or any other legitimate uses of the environment beyond the installation boundary.'

5.3 METHODOLOGY

This section has been prepared following a desktop review, which involved reviewing baseline air quality monitoring data for the area, the identification of existing air emissions sources and any sensitive receptors and the assessment of potential impacts to air quality resulting from the proposed development.

An odour assessment survey was conducted by Nial Ryan of Panther Environmental Solutions Ltd. within the site and at odour sensitive and boundary locations surrounding the site. An Odour Assessment Report (ref: **Attachment 5.1**) was prepared based upon the EPA Guidance Document “*Odour Impact Assessment Guidance for EPA Licensed Sites (AG5)*”.

5.4 DESCRIPTION OF BASELINE AIR QUALITY

The location of the proposed development is in a rural, farming area, within an existing piggery in the townland of Woodville, Co. Tipperary.

The piggery location is c. 9.6 km north-east of Nenagh town, c. 4.5 km north of the village of Toomevara, c. 6.3 km north-west of the village of Moneygall and c. 5.7 km south of the town of Cloughjordan in North Tipperary (Eastings 196520 Northings 182050). Access for the site is taken from a local country road which connects the R491 road to Nenagh Town to the R490 and R445 regional roads near the village of Moneygall.

5.4.1 EXISTING SOURCES OF AIR EMISSIONS

The dominant existing sources of air emissions in the area would be local road traffic, private residences, and emissions from agricultural activities, such as the housing of animals and spreading of organic fertilisers. However, the combined effect on air quality would be expected to be low. Dust would also be generated on local roads and from agricultural activities, particularly during dry periods.

Air quality is judged relative to the Air Quality Standards, which are concentrations of pollutants in the atmosphere, which achieve a certain standard of environmental quality. Air Quality Standards are formulated on the basis of an assessment of the effects of the pollutant on public health and ecosystems.

The EPA monitors national air quality from a number of sites around the country. This information is available from the EPA’s website. According to the EPA’s classification of zones for air quality, the proposed development would be located in Zone D – Rural.

There are no air monitoring stations currently operating within the vicinity of the proposed development. The closest of the currently operating 29 stations which give real time data in the National Ambient Air Quality Monitoring Network, located within the same zone (Zone D), is the Emo Court station, Emo Court House, County Laois (Easting: 253866.82 Northing: 206517.51) c. 62 km north-east of the site. **Figure 5.1** below shows the location of the proposed site in relation to the current air quality monitoring stations in Ireland.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Of the 29 stations in the network, only eleven are located in Zone D. The Zone D air quality zone covers most of the state (i.e. Zone A: Dublin Zone B: Cork and Zone C: Other cities and large towns).

Each of the monitoring stations in Zone D is responsible for monitoring a specific suite of parameters, which may be different from other stations (e.g. Emo Court station only monitors NO₂ and O₃), as per **Table 5.1** below.

Table 5.1: List of Air Quality Monitoring Stations in Zone D, Ireland.

STATION	PARAMETERS MEASURED
Carnsore Station Co. Wexford	O ₃
Castlebar Station, Co. Mayo	PM ₁₀ , O ₃ , NO _x , C ₂₀ H ₁₂ , As, Cd, Pb and Ni
Claremorris Station, Co. Mayo	PM ₁₀ , NH ₄ , Ca, C, Cl ⁻ , Mg, NO ₃ ⁻ , Na, K and SO ₄ ⁻² ,
Enniscorthy Station, Co. Wexford	PM ₁₀ and PM _{2.5}
Emo Court Station, Co. Laois	NO ₂ and O ₃
Kilkitt Station, Co Monaghan	PM ₁₀ , O ₃ , NO ₂ , SO ₂ , C ₂₀ H ₁₂ , As, Cd, Pb, Ni
Longford Station, Co. Longford	PM _{2.5} , C ₆ H ₆ , C ₇ H ₈ , C ₈ H ₈ , m ⁺ p-C ₈ H ₁₀ and o-C ₈ H ₁₀
Mace Head Station, Co. Galway	O ₃ and Hg
Malin Head, Co. Donegal	O ₃
Shannon E. Station, Co. Limerick	SO ₂
Valentia Station, Co. Kerry	O ₃

In order to acquire a representative data set of current air quality parameters, data from each station was assessed. While some of these stations may be located a considerable distance from the proposed development site, they are all within the same air quality zone and can provide an indicative baseline assessment of air quality for the area of the proposed development.

The data from the stations and emission limits/targets are presented in **Table 5.2** below.

The EPA's Air Quality Index for Health (AQIH) is a number from one to ten that scores the current air quality in a region. A reading of ten means the air quality is very poor and a reading of one to three inclusive means that the air quality is good. This is the highest category for air quality. The index is based on information from monitoring instruments at representative locations in the region and may not reflect local incidents of air pollution.

According to the EPA's Air Quality Index for Health Map, the site is positioned in the Rural East AQIH Region, where the current (Dec 2019) air quality is at 2 - Good. The AQIH is based on measurements of five air pollutants all of which can harm health. In a good air quality zone, such as the proposed site, the concentration range of these pollutants are very low (Ozone 0-100 µg/m³, Nitrogen dioxide 0-200 µg/m³, Sulphur dioxide 0-89 µg/m³, PM_{2.5} particles 0-35 µg/m³ and PM₁₀ particles 0-50 µg/m³).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 5.2: Average Reading of Measured Parameters from Zone D Air Quality Monitoring Stations Ireland (April 2019).

STATION	PARAMETER	READING	LIMIT/TARGET
Carnsore	Ozone	< 100 µg/m ³	180 µg/m ³
Castlebar	Particulate Matter ₁₀	< 40 µg/m ³	50 µg/m ³
	Ozone	< 50 µg/m ³	180 µg/m ³
	Nitrogen dioxide	< 100 µg/m ³	200 µg/m ³
	Benzo(a)pyrene	0.34 ng/m ³	1.0 ng/m ³
	Arsenic	0.18 ng/m ³	10.0 ng/m ³
	Cadmium	0.002 ng/m ³	0.25 ng/m ³
	Lead	0.06 ng/m ³	2.4 ng/m ³
	Nickel	0.08 ng/m ³	2.0 ng/m ³
Claremorris	Particulate Matter ₁₀	< 10 µg/m ³	50 µg/m ³
	Ammonium	0.19 µg/m ³	-----
	Calcium	0.02 µg/m ³	-----
	Carbon	1.1 µg/m ³	-----
	Chloride	0.41 µg/m ³	-----
	Magnesium	0.03 µg/m ³	-----
	Nitrate	0.07 µg/m ³	-----
	Sodium	0.31 µg/m ³	-----
	Potassium	0.02 µg/m ³	-----
	Sulphate	0.15 µg/m ³	-----
Enniscorthy	Particulate Matter ₁₀	< 50 µg/m ³	50 µg/m ³
	Particulate Matter _{2.5}	< 50 µg/m ³	25 µg/m ³
Emo Court	Nitrogen dioxide	< 30 µg/m ³	200 µg/m ³
	Ozone	< 100 µg/m ³	180 µg/m ³
Kilkitt	Particulate Matter ₁₀	< 40 µg/m ³	50 µg/m ³
	Ozone	< 100 µg/m ³	180 µg/m ³
	Nitrogen dioxide	< 10 µg/m ³	200 µg/m ³
	Sulphur dioxide	< 5 µg/m ³	350 µg/m ³
	Benzo(a)pyrene	0.08 ng/m ³	1.0 ng/m ³
	Arsenic	0.09 ng/m ³	10.0 ng/m ³
	Cadmium	< 0.05 ng/m ³	0.25 ng/m ³
	Lead	< 0.05 µg/m ³	0.25 µg/m ³
Longford	Nickel	0.002 ng/m ³	2.0 ng/m ³
	Particulate Matter _{2.5}	< 10 µg/m ³	25 µg/m ³
	Benzene	0.2 µg/m ³	2.0 µg/m ³
	Toluene	0.44 µg/m ³	-----
	Ethylbenzene	0.04 µg/m ³	-----
	M+P-Xylene	0.19 µg/m ³	-----
Mace Head	O-Xylene	0.07 µg/m ³	-----
	Ozone	< 100 µg/m ³	180 µg/m ³
Malin Head	Mercury	1.45 ng/m ³	-----
	Ozone	< 100 µg/m ³	180 µg/m ³
Shannon Estuary	Sulphur dioxide	-----	350 µg/m ³
Valentia	Ozone	< 100 µg/m ³	180 µg/m ³

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The EPA releases an air quality report which give a general account of air quality in specified zones. The most recent report is from 2017 “*Air Quality in Ireland 2017- Indicators of Air Quality*”. This report provides an overview of air quality in Ireland for 2017, based on data obtained from the 29 monitoring stations that formed the National Ambient Air Quality Network in 2017. Highlights of the report include:

- Overall, air quality in Ireland compared favourably with other EU Member States and all the parameters were below the EU limit and target values.
- The 2017 dioxin survey shows that concentrations of dioxins and similar pollutants remain at a consistently low level in the Irish environment.
- The 2017 data show that burning of solid fuel is the biggest threat to good air quality in Ireland, followed by emissions from vehicle exhausts.
- Air quality in Ireland is consistently above the WHO Guideline value for fine particulate matter (PM_{2.5}).
- We are also approaching the EU limit value for nitrogen dioxide (NO₂) in our urban areas due to vehicle emissions.
- PAHs (using benzo(a)pyrene as a marker) are a problem pollutant across Europe, and Ireland is no exception. The dominant source of ambient air emissions of PAH in Ireland is solid fuel burning in the residential sector.
- Ireland was above the WHO guideline values for ozone (O₃) in 2017.

5.4.2 EXISTING SOURCES OF ODOUR EMISSIONS

In a regional context, the proposed site is positioned in an agricultural hinterland where typical farm odours are to be found and expected. There are no significant dominant odour sources in the area other than farm hubs. However immediately to the east of the site is located an operational landfill facility which would be an expected source of odours, at minimum within the landfill boundary.

North Tipperary County Council operate the Ballaghveny landfill facility at Ballymackey, Co. Tipperary under Industrial Emissions (IE) Licence No. W0078-03 issued by the Environmental Protection Agency (amended on 19th of June 2018). The site has been used as a landfill since 1985.

The total licensed landfill area is c. 50.71ha, of which only c. 8.5ha is used for landfill. There is a buffer zone of land, which has never been used for landfilling (c. 350 m) between the landfilling cells and the proposed site. The landfill facility has several odour control measures in place including covered leachate lagoons and the lime (Ca(OH)₂) stabilisation of biological sludge. The facility is inspected daily for odours and has not had any recent nuisance odour complaints.

Significant odours would generally be present during the slurry spreading season associated with the agricultural industry in the area, of which the piggery site is a part. Agricultural farm hubs throughout the area would be expected to generate odours within the vicinity of animal housing, slurry and silage storage.

Woodville Pig Farms is currently in operation and would constitute an existing odour source. No odour complaints have been received to date by the applicant, local council or the EPA with regard to operations at Woodville Pig Farms.

5.5 MONITORING ASSESSMENT

MONITORING LOCATIONS

The residences in the area are linearly aligned along the existing local road network and land-cover is predominantly agricultural pasturelands. The site is rural in character and located at c. 104 m above sea level. In a regional context lands to the north-west, north, north-east, east and south-east are at a higher elevation than the site.

The nearest residential property to the site which is not under the ownership of Woodville Pig Farms or the applicant is located c.390m west from the proposed development site. There are several other residential properties positioned along the local roads in the area east and west of the site.

The nearest large settlement to the proposed development site is the village of Toomevara, located c. 4.5 km south of the site. Toomevara is located c. 11 km from Nenagh Town on the N7 national primary road linking Limerick and Dublin.

Five Odour Sensitive Receptors (i.e. closest third-party residential properties) within the odour contours of the piggery and proposed development were selected as data points for the assessment (i.e. 15-minute odour measurements). These points were in proximity to local residential dwellings with distances from the piggery as follows:

- OSL1 – Odour Sensitive Location c.778m West of the piggery.
- OSL2 – Odour Sensitive Location c.392m West of the piggery.
- OSL3 – Odour Sensitive Location c.420m East-South-East of the piggery.
- OSL4 – Odour Sensitive Location c.830m East of the site of the piggery.
- OSL5 – Odour Sensitive Location c.790m South of the piggery.

These odour monitoring points are mapped in **Figure 5.1** below. Their location is based on recognised measurement criteria to give an accurate assessment of odour emanating from the site at its boundary and the level of odour dispersion at defined setback distances.

Weather conditions during the survey were warm with a gentle, north-easterly breeze, ideal for the transmission of odour.

The main aims of the survey included:

- Assessment of any potential odour emission from the piggery;
- Determine the odour impact area of the existing facility;
- Ascertain the most significant odour sources within the site boundary during the odour audit for routine operations;
- Provide general recommendations for mitigation measures to reduce the overall odour emission rate and odour impact from the facility in future years.



Figure 5.1: Odour Sensitive Locations Map

5.5.2 METHODOLOGY

The 2019 agency guidance document ‘*Odour Impact Assessment Guidance for EPA Licensed Sites (AG5)*’ has been used as the basis for the methodology for this assessment.

Unlike certain airborne pollutants, odour in ambient air is impractical to measure by conventional chemical analyses. Odours are in most cases a complex cocktail of various substances that have intricate synergistic effects upon each other. The measurement of individual compounds in ambient air will therefore not provide useful information on the character of an odour within that air.

Such techniques involving the use of instrumentation and/or analytical methods to identify and quantify specific odorous compounds may not provide any real insight into the intensity or offensiveness of odours in human terms. The threshold concentration, for example, of many odorants is often well below their analytical detection limit and hence many odours may be deemed to be causing nuisance, although the compounds responsible for the odours are not being detected by chemical techniques.

Furthermore, interactions between mixtures of odorants may lead to synergistic or antagonistic effects, leading to difficulties in linking analytical and sensory measurements for impact assessment purposes.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Representative sampling for olfactometry analysis of air may be suitable for point source emissions or, at times, ambient assessments on a site (i.e. within a site's boundary), however sampling air beyond a site boundary for olfactometry purposes is highly unlikely to be representative of odour impact.

Due to the unsuitability of the above measurement approaches, the EPA guidance AG5 procedure describes a sniff testing approach to odour assessment. This requires a human assessor to use their own sense of smell to assess odours by means of a sensory technique referred to as sniff testing.

Olfactometry using the human sense of smell is the most valid means of measuring odour (Dravniek et al, 1986) and at present is the most commonly used method to measure the concentration of odour.

5.6 IMPACTS

5.6.1 ODOUR

Air quality in this region is generally good and reflective of the rural climate in Ireland with odour sources of a minor nature.

Weather conditions during the odour survey were mild (10-15°C), dry with scattered cloud and gentle to moderate breezes (5-10 knots). Wind direction was somewhat variable during the survey periods; however, the dominant wind direction was from the south-east. Due to the mild temperatures and light winds, conditions for the transmission of odours from the site were good.

Potential sources of odours within the site were identified and included the pig houses, pig feed and sludge storage.

SOURCE ODOUR ASSESSMENT

No signature odour sources were detected in or around the front yard area, site office/staff facilities building or access roadway, which were primarily crosswind of all primary odour sources.

Generally, site management in relation to potential odours was found to be good and typical of farmyard management practices in Ireland. Manure/slurry is stored within underground tanks and is not frequently agitated and concrete surfaces are cleaned of fresh manure. Odour sources relating to the proposed development would be of similar intensity and persistence to the existing infrastructure, if not lower due to replacement of existing housing with buildings of modern design and incorporating odour mitigation measures.

ODOUR IMPACT ASSESSMENT

Please also refer to the Odour Assessment Report in Attachment 5.1, which contains detailed results and maps.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The threshold at which an odour may indicate a nuisance, as per the EPA AG5 methodology, are odours occurring at a down-wind receptor of Persistence 1 or 2 (intermittent to persistent) and Intensity ≥ 2 (moderate).

The closest third-party odour sensitive residential locations to the facility are c.390 metres to the west of the site and c.420m east-south-east of the existing site. Therefore, the transmission of odours, which may occur in the direction of the nearest residential odour sensitive locations would not be common (2.4% and 5.4% of wind direction yearly hours respectively).

No odours related to the site were detected at any of the five odour sensitive locations (OSL), two of which were cross/downwind and three were cross/upwind of the principal odour sources.

Therefore, facility related odours detected at odour sensitive locations off-site were below the “threshold that could indicate nuisance” as per the 2019 EPA AG5 Guidance methodology.

The extent of odour transmission was also investigated during the survey, using the AG5 methodology to define the odour plume on the day of the assessment. Threshold locations were determined by walking towards the onsite sources from an upwind, downwind and cross-wind location and noting changes in odour characteristics.

The odour plume did not occur within the vicinity of any odour sensitive receptor locations.

No site related odours were detected at OM1 – OM4 (upwind), OM5 (downwind), OM9 and OM11 (crosswind). Site related odours were detected at monitoring locations OM6–OM8, OM10 and OM12, which are considered odour plume boundary points.

Monitoring locations OM6–OM9 were directly downwind of the principal odour sources.

OM6 and OM7 were outside of the site boundary in the downwind direction to the north-east. Odour at these off-site locations were determined to be of an intermittent persistence, and of an intensity ranging from faint (OM6) to moderate (OM7).

A faint intermittent slurry/manure type odour was detected at OM11 and OM13, which are located crosswind of all principal odour sources. A faint intermittent slurry/manure type odour was also detected at OM6, which is located downwind of all principal odour sources.

A faint to moderate intermittent slurry/manure type odour was detected at OM7, which is located downwind of all principal odour sources.

A moderate intermittent to persistent slurry/manure type odour was detected at OM8, which is located downwind of all principal odour sources.

Using these odour monitoring (OM) points, an indicative odour plume has been drawn, as **Figure 5.2** below.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY



Figure 5.2: Odour Monitoring Locations Map

It is anticipated that there would be no significant impact to the amenity of the area as a result of the proposed development.

While EPA BATNEEC Guidance recommends a set-back distance of 400m from third-party residences, this set back distance cannot always be achieved in the real world, particularly given the proliferation of one-off housing developments in rural Ireland in recent years.

There are no properties within 300 m of the proposed site currently not in the ownership of Woodville Pig Farms. Downwind of the prevailing wind direction, land is composed mainly of pasture and bog-land. The closest odour sensitive receptors to the north-east are approximately 3 km from the proposed site boundary.

As stated previously, no odour complaints have been received to date by the applicant, local council or the EPA with regard to operations at Woodville Pig Farms.

The high standards of design of the proposed pig houses (slurry cooling and remote storage are discussed further in the mitigation section), coupled with continued good housekeeping practices currently in place at the site, would serve to ensure the effective control of odour emissions and mitigate the risk of environmental impact and nuisance to sensitive receptors from odours associated with the site.

Land-spreading of pig slurry on farmlands is a known source of odour during certain parts of the year. Increased emissions may at times be associated with transporting and land-spreading

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

slurry from the site. However, the spreading of pig slurry is not considered a significant odour issue as this is a short term, common and accepted practice in rural areas.

Proposed measures under the new DoAFM Guidance “*Code of Good Agricultural Practice for reducing Ammonia Emissions from Agriculture*” May 2019 provides measures to reduce ammonia emissions from agriculture up to 2030. These measures would also reduce odour emissions, as the mechanisms for the evolution of ammonia and odorous compounds from agricultural sourced are largely similar. As these initiatives, and other initiatives under DoAFM “*‘Ag-Climatise’ A Draft National Climate & Air Roadmap for the Agriculture Sector to 2030 and Beyond*” are implemented, it is anticipated that odour and air emissions across the agricultural sector would reduce.

Therefore, it is anticipated that odour from the proposed expansion of this piggery operation would not cause a significant environmental impact in the region or nuisance to sensitive locations. Site odour at odour sensitive locations does not appear to constitute a nuisance, as odours are and will be controlled at the site through good design and housekeeping.

5.6.2 AIR QUALITY

The proposed development would result in an increase in the production of slurry at the farm. This would result in an associated increase in gaseous emissions of ammonia, nitrogen oxides and methane from the digestive processes and slurry of the pig herd.

Increased emissions would be associated with the collection and application of slurry from the tanks.

Table 5.3 below compares the emissions associated with current pig numbers and proposed pig numbers at the Woodville, piggery.

The figures for ammonia, methane, and nitrous oxide were obtained using the EPA’s AER PRTR Intensive Agriculture Emissions Calculation Tool.

Table 5.3: Current and Proposed Annual Emissions of Ammonia, Methane and Nitrous Oxide, from the Woodville Site.

EMISSION PARAMETER	CURRENT TOTAL KG/YEAR	PROPOSED TOTAL KG/YEAR
Ammonia (NH ₃)	8,139	27,146
Methane (CH ₄)	54,579	166,783
Nitrous oxide (N ₂ O)	47	152

Proposed measures under the new DoAFM Guidance “*Code of Good Agricultural Practice for reducing Ammonia Emissions from Agriculture*” May 2019 provides measures to reduce ammonia emissions from agriculture up to 2030. As these initiatives, and other initiatives under DoAFM “*‘Ag-Climatise’ A Draft National Climate & Air Roadmap for the Agriculture Sector to 2030 and Beyond*” are implemented, it is anticipated that air emissions across the agricultural sector would reduce.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The above figures relate to the anticipated increase in emissions from the proposed development as a result of the increase in animal numbers alone. Reduction of emissions through proposed design measures have been addressed in the mitigations section of this chapter.

5.6.3 DEPOSITIONAL DUST

Dust levels generated by the development during the operational phase would be expected to be negligible.

The majority of the trafficked areas of the yard are hardcore and dust generation during dry windy periods would be expected. However, there are no current issues at the site with regard to fouling of surfaces or vegetation with dust from the site and no significant impact would be expected as a result of operation of the proposed extensions and buildings.

At the site, feed bins are loaded using an elevator system which greatly reduces the release of dust to the atmosphere.

Operational dust arising from the site would be expected to be evident only on the site and would not impact on dwellings and other buildings in the vicinity of the site. There are no third-party residences within a 300 m radius of the site.

A significant potential nuisance associated with construction activities is dust. Excavations and earth moving and demolition operations may generate quantities of construction dust, particularly in drier weather conditions. The extent of any construction dust generation depends on the nature of the construction dust (soils, sands, gravels, silts etc.) and the construction activity. The potential for construction dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

Minimal levels of dust would be expected to be generated during the construction phase given the confined area of earthworks and the short term of the construction phase.

The issue of construction dust dispersion may be exaggerated with vehicles transporting sand/gravel/concrete/etc. to and from the site having the potential to cause an environmental nuisance to use of the local road.

Construction dust control is a common part of construction management practices. The effect of construction activities on air quality, in particular construction dust, would not be significant following the implementation of the proposed mitigation measures outlined below.

5.6.4 ASBESTOS DUST

Demolition works would occur on existing buildings which are fitted with Corrugated Asbestos Cement Sheets (CACS).

CACS generally does not pose any health risk when undisturbed. However, breaking or other improper handling or removal of CACS may give rise to release of very fine asbestos fibres which would remain airborne for a very long period of time.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Asbestos cement products are considered a low risk asbestos containing material. This is due to the products being composed mostly of cement, with a small percentage of asbestos as a binding agent. Cement is not readily friable (crumbled to dust through mechanical action), and therefore, the likelihood of asbestos being released from these corrugated sheets is low during normal circumstances.

Therefore, it is not considered that there is a significant risk to air quality or health during the ongoing operation of the farm, as roof sheeting would be undisturbed.

Risk of release during demolition activities may arise if the asbestos material is not recognised and handled appropriately. Mechanical breaking of the sheets, or cutting with power tools would be high-risk activities can evolve dust which would contain asbestos fibres.

Under these circumstances, it is possible that workers would inhale some of these fibres which, once inhaled, can remain in the body for many years and hence increase their health risk due to such exposure.

The applicant would have responsibilities under the Safety, Health and Welfare (Exposure to Asbestos) Regulations 2006 S.I. 386/2006 (as amended) to provide a safe working environment for construction staff at the proposed development site. Compliance would include the identification, management and recording of asbestos containing materials (ACMs) prior to and during building works (including demolition) and refurbishment works.

Local authorities are responsible for investigating incidents of air pollution, which would include incorrect removal and disposal of asbestos. They can prosecute infringements of the Air Pollution Act 1987 and the Local Government (Water Pollution) Act 1977.

The developer is aware of the requirements for the management of asbestos during construction works and would ensure that competent contractors are used to remove and correctly dispose of any asbestos containing materials during the construction of the proposed development.

5.7 MITIGATION MEASURES

5.7.1 MITIGATION OF ODOUR AND AIR EMISSIONS

Like the majority of the agriculture and foods industry, the operation of a piggery is faced with the issue of preventing odours causing impact to the public at large. Odours from pig farms can be significantly reduced by implementing good management practices.

Emissions from this site are currently minimised using the following systems baseline principles;

- Use of low protein diets to all animals on site to reduce emissions of nitrogen-based compounds;
- Water and feed systems are maintained in optimum condition and operation so as to minimise water and feed wastage;
- Slurry management kept to a high standard;
- Stocking density maintained at design level;
- Minimisation of carcasses by keeping the herd health to the highest possible standard;
- Limited areas where pigs are moved outside buildings and covering of passageways and yards where animals have access;
- Reducing uncontrolled air movements on site and leakage from the ventilation system and from pig houses (i.e. correctly sealed windows and doors);
- The use of a high-tech computerized ventilation system, in animal houses with a backup system;
- Transporting pig slurry in suitably contained leak proof vehicles;
- Increase the volume of planted vegetation along the site boundaries;
- Cognisance of meteorological conditions which favour the spread of odours.

The proposed buildings would incorporate a '*low emission*' pig housing design features including;

- Slurry Cooling System
- Removal and Remote Storage of Slurry

It is considered that, following proposed mitigation measures, there would be a moderate increase to the level of odour generated at the facility. It is considered that, due to the proposed design, management practices and location of the farm, there would be no significant impact upon the amenity value of the area as a result of the proposed development.

5.7.1.1 Slurry Cooling System

The applicant intends to install a 'slurry cooling' system in the newly constructed slurry tanks. Cooling of pig slurry significantly lowers ammonia emissions from the slurry and other odour causing compounds from the site. **Figure 5.3** below provides a schematic representation of the system.

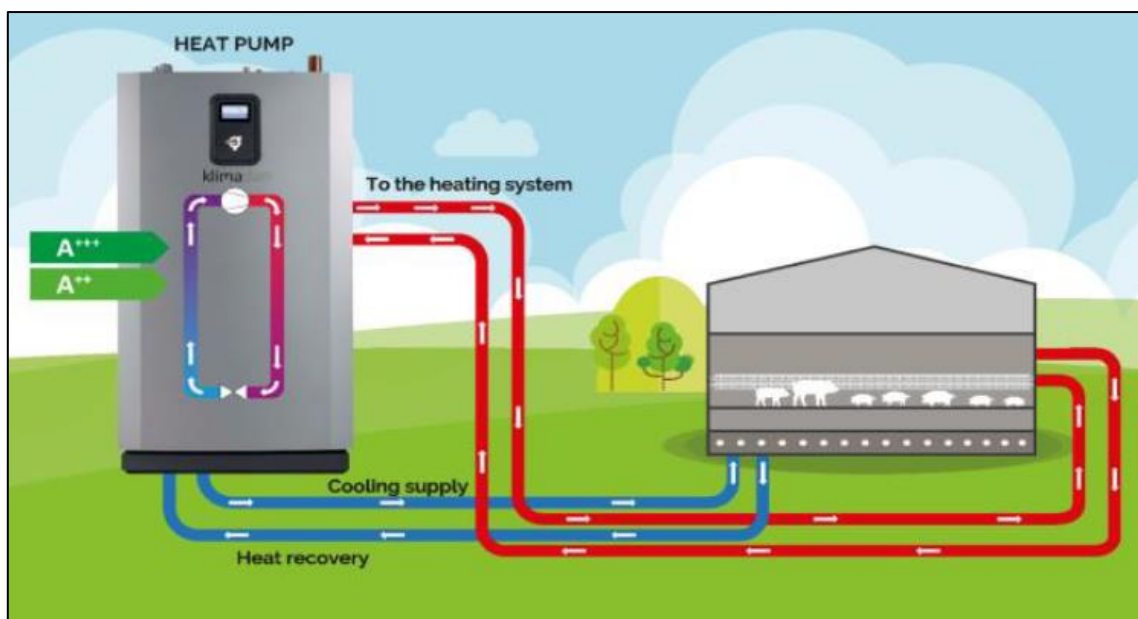


Figure 5.3: Slurry Cooling System (Klimadan, 2019).

As regulation has evolved to reduce risks to the environment and human and animal health, the pressures on the pig industry to reduce emissions of ammonia and odour from slurry have increased.

The most significant source of ammonia in pig production is the breakdown of urea, which is excreted in urine, by the enzyme urease, which is present in faeces, into ammonia and carbon dioxide. The factors that influence this process are the concentration of urea in urine, pH and slurry temperature. Volatilisation of ammonia is influenced by ambient ammonia concentration, air speed and ammonia dry matter contents of slurry. All these factors can be used to reduce ammonia emissions; slurry cooling reduces emissions at the source.

Cooling slurry in storage effectively reduces emissions and the heat extracted can be used to heat livestock housing, so reducing the use of conventional heat sources such as gas and oil. The system uses established heat pump technology to transfer the heat from one site to another.

The technique has been developed from previous BAT to suppress ammonia emissions that involved cooling the surface of slurry in underfloor stores to 12°C or less, by pumping cold water through a heat exchange system.

Cooling together with heat recovery was identified as BAT in the 2017 Reference Document for the Intensive Rearing of Poultry or Pigs, having been developed and successfully used in Finland since 2004 and on more than 300 farms in Denmark. Successful installations can also be found in the Netherlands, elsewhere in the Baltic area, North America and China.

Heat pumps work on the same principle as refrigerators, making use of small temperature differences that transfer a small amount of heat energy from one place to another. Heat pumps are commonly used to heat buildings, but they can be reversed and used for cooling. This technique makes use of both ends of the process, first to cool slurry and then to heat water.

The process involves the installation of “slurry cooling pipes” also known as “Brine pipes” in a concrete slab beneath the slurry tanks. Brine is pumped into the pipes below the slurry tanks

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

at a temperature lower than the ambient temperature of the slurry. Brine is used because it has a lower freezing temperature than water (i.e. a saturated NaCl solution has a freezing point of – 21.1 °C).

Thermal energy (heat) is conducted from the slurry to the brine solution effectively cooling the slurry. The recovered energy (heat) is then transferred to a heat pump where the energy would be used to heat water for other uses like animal house heating radiators / floor heating.

There has been limited research on the effectiveness of slurry cooling systems on odour reduction potential from intensive agricultural type pig buildings. However, there is some data available in the literature that relates to the reduction in odour and odour causing compounds such as ammonia provided by slurry cooling systems.

Data from six studies on the ability of slurry cooling systems in the intensive pig agricultural industry to reduce odour and odorous compounds is given in **table 5.4** below.

Table 5.4: Slurry Cooling Systems Performance Studies.

REFERENCE	COUNTRY	% REDUCTION Odour	% REDUCTION NH ₃
(Rzeźnik <i>et al</i> 2016)	Poland	27.3%	----
(Mol <i>et al</i> 2004)	Netherlands	23.0%	
(Andersson 1998)	Sweden	----	47.0%
(AHDB 2019)	Denmark	----	9.6%
(AHDB 2019)	Denmark	----	18.4%
(Pedersen 1997)	Denmark	----	31%
(AHDB 2019)	Denmark	----	26.4%
Average		25.2%	26.48%

The effect of slurry cooling depends on the type of shed, specific cooling system and specifications of the heat pump. That said, the results of these studies demonstrate that slurry cooling systems are a practical means of odour mitigation on pig farms.

The Code of Good Agricultural Practice for reducing ammonia emissions is a guidance document, that outlines the best practice measures for removing or lowering ammonia emissions from slurry storage systems. The document refers to three tenets which result in the reduction of ammonia from slurry storage systems:

- Decreasing the surface area where emissions arise from;
- Decreasing the time over which emissions can take place;
- Decreasing the amount of ammonia emitted from the slurry.

The proposed slurry cooling system should contribute significantly to odour mitigation at the site by reducing ammonia emissions from the stored slurry.

Klimadan have calculated that the slurry cooling system if used at the Woodville site would reduce ammonia emissions from the slurry tanks by c. 25% and a similar reduction in odours would be expected.

5.7.1.2 Slurry Removal System

The applicant intends to install a 'slurry removal' system that would remove the slurry generated in the proposed pre-finisher house (16) and the second stage weaner house periodically to the proposed slurry reception tank where it would be stored prior to been collected by customer farmers for land spreading purposes.

The proposed effluent reception tank (17) would measure c. 10.4 m in width, c. 30.4 m in length and 2.4 m deep. The approximate floor area of the slurry tank would be c. 316.2 m². The tanks would be constructed from reinforced mass concrete and have an approximate slurry capacity of > 700 m³.

The following principles of housing designs are taken from the Reference Document on Best Available Techniques (BAT) for Intensive Rearing of Poultry and Pigs, commonly referred to as the BREF.

The key principles of BAT for reducing air emissions from pig housing are:

- Reducing emitting slurry surfaces;
- Removing the slurry from the pit to an external slurry store;
- Cooling the manure surface;
- Using surfaces (for example, of slats and manure channels) which are smooth and easy to clean; and
- Frequent removal of manure by flushing or scraping.

The applicant has already adhered to one of the key principles above by proposing to use a slurry cooling system at the site. The cooling system should potentially reduce ammonia emissions from the slurry tanks by c. 25%, which should translate to an odour reduction of c. 27.1%. Most systems will reduce odour emissions as well as ammonia emissions, roughly in equal measures.

The applicant is also proposing to remove the slurry from the slurry tanks beneath the majority of (i.e. c. 80 %) proposed new pigs at the site (i.e. c. 8,400 weaners and 4,200 pre-finishers) to an external slurry store, keeping in line with another of the above key principles.

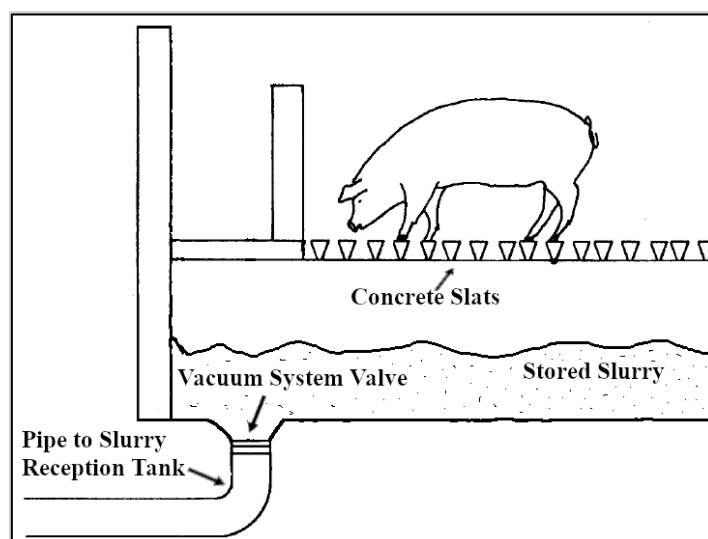


Figure 5.4: Slurry Removal to External Slurry Storage.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Figure 5.4 illustrates a simplified version of the slurry removal design that the applicant intends to use at the site.

The majority of existing pig housing in Ireland is the traditional fully slatted system. The main source of emission in these houses is the surface of the under-floor slurry storage.

The widespread use of deep tanks under these fully slatted systems is not ideal from an odour management perspective. The removal of slurry from beneath pigs significantly reduces the amount of potential ammonia and other odorous compounds like hydrogen sulphide that is released to the atmosphere where they can cause nuisance odours.

Although there is a body of scientific evidence regarding the reduction of ammonia emissions having a directly proportional effect on odour concentrations there is still limited research related to the topic of pig slurry.

Similarly, to slurry cooling research there is scant data available in the literature dealing with the topic. That said, data from six studies relating a reduction in odour concentrations to the removal of slurry from beneath pigs is given in **table 5.6** below.

Table 5.6: Slurry Removal Systems Performance Studies.

REFERENCE	COUNTRY	% REDUCTION Odour	% REDUCTION NH ₃
(Mol <i>et al</i> 2004)	Netherlands	35%	----
(EPA 2017)	Ireland	----	25%
(Rahman <i>et al</i> 2012)	Var	----	26%
(UK EA 2010)	UK	----	25%
(Ubeda <i>et al</i> 2013)	Var	----	50%
(Ogink and Groot 2001)	Netherlands	----	29%
(Lachance <i>et al</i> 2005)	USA	----	46%
Average		35%	33.5%

The proposed periodic removal of slurry from the mentioned slurry tanks should contribute significantly to odour mitigation at the site by reducing the amount of fugitive odorous compound emissions like ammonia from the slurry to the atmosphere.

5.7.2 MITIGATION OF DEPOSITIONAL DUST

During the operational and demolition / construction phase of the proposed extension of the existing pig finishing operation, all efforts would be made to ensure no dusting occurs.

As with the current operation, it is not considered that dust would be a significant nuisance issue at the proposed site.

Good housekeeping should be maintained at all times. Public roads should be inspected regularly to ensure that fouling by dust does not occur, as higher density traffic on the road would increase airborne dust traveling from the site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

It is proposed to adhere to good working practices and standard dust mitigation measures to ensure that the levels of dust generated would be minimal during the construction phase and are unlikely to cause any significant environmental nuisance.

Topsoil and gravel overburden would be used in the levelling off and landscaping of the site which would be stabilised by natural plant reinstatement.

Hard surface parts of the farmyard would be swept to remove mud and aggregate materials from their surface. Roads outside the site would be regularly inspected for cleanliness and cleaned as necessary.

Material handling systems and site stockpiling of materials would be designed and laid out to minimise exposure to wind.

Should construction activities occur during particularly dry weather, a water misting system would be installed to reduce the level of dust travelling offsite.

5.7.3 MITIGATION OF ASBESTOS DUST

All corrugated asbestos roof sheets on those buildings for demolition would be removed from the site during the construction phase. The removal and disposal of asbestos sheeting should be carried out by competent asbestos contractors.

In compliance with EPA and HSA guidance, if the material remains in good condition, the corrugated sheets should remain in place.

Any remaining asbestos containing corrugated roof panels at the site should be reviewed for integrity on an ongoing basis. In the event of deterioration, the developer should hire suitable qualified contractors to repair or replace the asbestos sheeting, as applicable.

5.8 CUMULATIVE IMPACTS & MITIGATION

It is considered that, due to the proposed design, management practices and location of the farm, there would be no significant impact upon the amenity value of the area as a result of the proposed development alone.

There are several small farm hubs in the surrounding area which would account towards the cumulative impacts of agricultural air emissions in the area. This would be the most significant source of air emissions in the area.

There is unlikely to be a significant cumulative effect with regard to odour from the farm hubs. The Ballyknockane finishing unit, which is a part of the Woodville Pig Farms Limited business, is located c. 1.4 km from the proposed development site at Woodville and is unlikely to generate cumulative odour impacts to sensitive locations in the vicinity of the Woodville site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The adjacent Ballaghveny landfill facility (W0078-03), located adjacent to the proposed development, has the potential to generate cumulative air impacts with Woodville Pig Farms.

The landfill is licenced to accept Municipal and Commercial waste, Green waste for Composting, Non-hazardous C&D waste and Pre-treated Sludge. The decomposition of these materials would produce similar air emission by-product to those generated at the proposed pig house (i.e. Ammonia, Methane and N₂O).

The landfill also has the potential to provide in combination effects in odours, however, the character of the odour from the landfill would likely be of a different character to that at the pig farm due to differences in the source materials.

In the period 2010 to 2018, only one odour complaint has been received by the landfill with regards to odour, as reported to the EPA in the 2012 Annual Environmental Report (AER). The low incidence of complaints for the landfill indicates a high standard of odour management and the capacity of this location to assimilate such developments.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

6.0 NOISE

6.1 INTRODUCTION

Woodville Pig Farms proposes to construct two new pig units, extend two existing pig units, construct a new remote slurry storage tank and all associated site works at Woodville, Ballymackey, Co. Tipperary. The proposed development would occur on a site of an existing piggery currently in the ownership of the applicant.

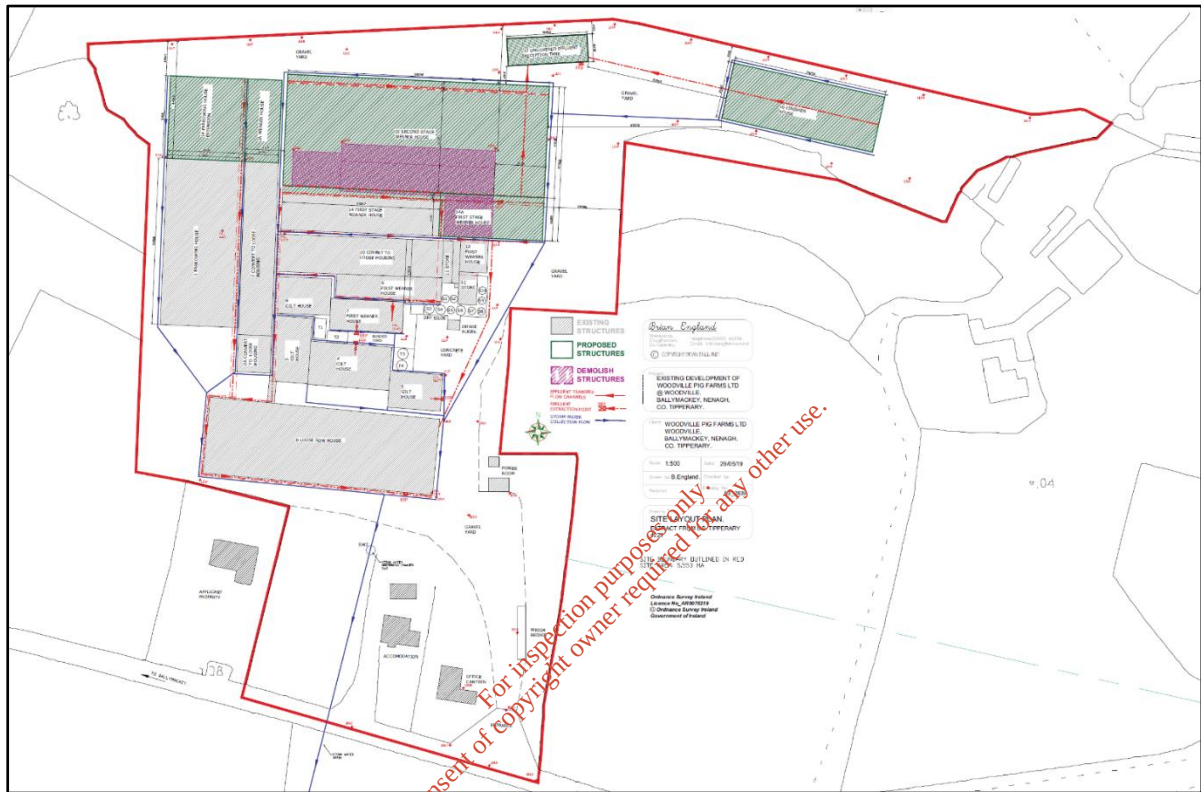


Figure 6.1.1: Proposed Site Layout

Panther Environmental Solutions Ltd was commissioned by Woodville Pig Farms to carry out a Noise Impact Assessment in support of an Environmental Impact Assessment Report (EIAR).

The report presents and interprets the results of the survey with reference to the 2016 EPA *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*.

The noise impact assessment report accompanies this EIAR and can be seen in **Attachment 6.1**.

The study identifies, describes and assesses the impact of the proposed development in terms of noise, in particular, the potential noise impacts on residential locations (noise sensitive receptors) in the vicinity of the proposed development.

This section of the EIAR summarises the findings of the Noise Impact Assessment Report.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

6.2 LEGISLATION CONTEXT

Planning and Development Act (2000), as amended

Local authorities are responsible for the planning and environmental regulation of any proposed developments. The current planning and environmental regulatory framework requires these developments to comply with the Planning and Development Act (2000) and related regulations.

The local authorities and An Bord Pleanála attach conditions relating to environmental management of these developments to planning permissions granted. Local authorities consider the land use and planning issues associated with the proposed developments in their County Development Plans.

The EPA Act (Noise) Regulations 1994 (S.I. No. 179 of 1994)

The relevant part of the Environmental Protection Agency Act 1992 dealing with noise is Part VI, Sections 106 to 108. These Sections deal with the control of noise, the power of local authorities to prevent or limit noise and the issue of noise as a nuisance.

The 1994 Regulations came into effect in July 1994 and outline the procedures for dealing with noise nuisance. The Regulations allow affected individuals, local authorities or the EPA to take action against an activity causing a noise nuisance.

These Regulations replaced the procedures for noise complaints contained in the Local Government (Planning & Development) Act 1963. Companies must show that reasonable care was taken to prevent or limit the noise from their activities.

If the courts decide that a company is responsible for causing a noise nuisance, they can order the company to take measures to reduce, prevent or limit it.

EPA 'Guidance Note on Noise (NG4)' (2016)

The document relates primarily to noise surveys and assessments for EPA licensed facilities but in the absence of any other directly applicable guidance documents, it also is pertinent for the purposes of noise surveys and assessments accompanying planning applications.

It deals in general terms with the approach to be taken in the measurement and control of noise, and provides advice in relation to the settling of noise ELV's and compliance monitoring. In line with World Health Organisation (WHO) guidance, it recommends that the following noise levels not be exceeded at the facades of the nearest noise-sensitive receptors:

Period	Times	Standard dB(A)	Low Background Noise Area dB(A)
Day	(07:00 to 19:00hrs)	55dB L _{Ar,T}	45dB L _{Ar,T}
Evening	(19:00 to 23:00hrs)	50dB L _{Ar,T}	40dB L _{Ar,T}
Night	(23:00 to 07:00hrs)	45dB L _{Aeq,T}	35dB L _{Ar,T}

Other EPA general EIA guidelines such as Guidelines on the Information to be Contained in Environmental Impact Statements [2002] and Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements) [2003] have been considered in the preparation of this Noise and Vibration Chapter.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The National Roads Authority (NRA) Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004)

The NRA's guidance document Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004) is the recognised Irish guidance document for the assessment of road traffic noise. This document sets out the key items that should be included in a noise and vibration assessment for any significant road scheme. As a minimum, it stipulates that the following items should be included:

- A series of noise surveys to quantify the prevailing noise climate at sensitive receptors along the existing and proposed routes;
- Preparation and calibration of a suitable noise prediction model;
- Prediction of Do Minimum and Do Something noise levels for opening and design years;
- Comparison of predicted Do Something noise levels with the design goal and three conditions that must be satisfied before mitigation measures are deemed necessary;
- Specification and assessment of road traffic mitigation measures, where required;
- Assessment and review of construction impacts and mitigation measures;
- Assessment and review of vibration.

This document has been referred to in the consideration of road traffic noise associated with the proposed development. The document also presents maximum permissible noise levels at dwelling facades during construction activities. This provides a useful reference for assessing construction noise of the proposed development.

The National Roads Authority (NRA) Guideline Construction Noise Limits		
Period	L _{Aeq} (1hr) dB	L _{pA} (max)slow dB
Monday to Friday (07:00 to 19:00hrs)	70	80
Monday to Friday (19:00 to 22:00hrs)	60	65
Saturday (08:00 to 16:30hrs)	65	75
Sundays and Bank Holidays (08:00 to 16:30hrs)	60	65

EPA Licencing

The existing site is licensed by the Environmental Protection Agency, licence ref: P0467-02, which sets environmental noise emission limits for the site.

Licence Condition 4.1 states:

'Noise from the installation shall not give rise to sound pressure levels (Leq, T) measured at noise sensitive locations of the installation which exceed the limit value(s) specified in Schedule B.4 Noise Emissions, of this licence.'

Schedule B.4: Noise Emissions	
Daytime L _{Aeq} (30 minutes)	Night-time L _{Aeq} (30 minutes)
55 dB(A)	45 dB(A)

Note 1: *'There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at the boundary'*

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

6.3 REGIONAL ENVIRONMENTAL SETTING

The existing facility is located approximately 9.5km east-north-east of Nenagh Town and approximately 18.0km south-south-west of Roscrea Town. The site is accessed by a laneway which runs due north, off a local road, before entering the facility yard area. The M7 motorway, which connects Naas Town and Limerick City, is located c.185km south of the existing site.

The area is rural in character with residences in the area predominantly linearly aligned along the existing road network.

There are no significant dominant point noise sources in the region as the local area is rural and not influenced by any local industry. While the proposed development is in a rural area, the influence of traffic from the local roads during the daytime is a prominent source of noise in the area.

6.3.1 BASELINE NOISE ASSESSMENT METHODOLOGY

Baseline noise monitoring was carried out in general accordance with the EPA, 2016 “Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)”.

In order to predict the impact of the construction and operational phases of the proposed development, sample noise monitoring locations were selected based upon the nearest location within groups of NSL’s sharing similar orientation with regard to the proposed site and intervening topography.

Table 6.3.1: Noise Monitoring Locations			
Ref. No.	Grid Ref	Location Type	Location
NM1	R 95762 82178	Noise Monitoring Location	740m West of the site
NM2	R 96109 81997	Noise Monitoring Location	390m West of the site
NM3	R 96841 81805	Noise Monitoring Location	430m E-SE of the site
NM4	R 97324 81980	Noise Monitoring Location	835m East of the site
NM5	R 96329 81271	Noise Monitoring Location	795m South of the site

Grid Ref Source: <http://irish.gridreferencefinder.com>

The baseline environmental noise levels at NM1 – NM5 locations were determined by instrumented monitoring of existing noise levels. This was determined by taking 15-minute broadband noise measurements at these five noise monitoring locations.

It is considered that noise levels measured at each of the NM locations would be representative of existing noise levels at nearest residential property or Noise Sensitive Locations (NSL).

All measurements were taken at:

- 1.2 – 1.5 metres height above local ground level
- 1.0 – 5.0 metres away from reflective surfaces

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY



Figure 6.3.1: Monitoring and Noise Sensitive Locations

6.3.2 BASELINE NOISE ASSESSMENT – RESULTS

The table below show the daytime and night-time measurement results taken at the five monitoring locations outlined in **Table 6.3.1**. These points are mapped in **Figure 6.3.1**.

Table 6.3.2: Baseline Noise Monitoring Summary						
Ref	Time	Leq	L₁₀	L₉₀	Equipment Operational	Tonal Element
Daytime						
NM1	09:27	50	41	30	None	None
NM2	09:47	60	53	35	None	None
NM3	10:22	51	48	39	None	None
NM4	10:42	55	40	32	None	None
NM5	11:48	44	41	35	None	None
Night-time						
NM1	22:12	28	29	20	None	None
NM2	22:31	30	32	23	Fan Type Noise – Very Faint	None
NM3	23:08	28	30	23	None	None
NM4	23:25	27	32	20	None	None
NM5	23:49	29	28	22	None	None

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

6.3.3 BASELINE NOISE ASSESSMENT – ANALYSIS

The principal factor influencing the mitigation of noise from site operations is its distance from noise sensitive locations. The closest third-party noise sensitive location is c.390m from the proposed operation. Increasing distance from a noise source significant increases the attenuation of noise as sound energy reduces by the inverse of the square of distance travelled (inverse square law).

The terrain between the closest noise sensitive locations and the existing site is composed of mature hedgerows, treelines and grassland. For the purpose of noise attenuation, these surfaces are considered 'porous', whereas made ground would be considered 'reflective'.

The baseline monitoring undertaken as part of this noise impact report, summarised in **Table 6.3.2** above, shows that the site is compliant with its current licence limits of 55dB for the daytime and 45dB for the night-time period.

All monitored Leq noise levels were below or equal to these licence limits, with the exception of the daytime NM2 figure of 60dB, which was elevated as a result of non-site related sources.

Therefore, existing site related noise does not appear to constitute a nuisance at the closest third-party noise sensitive locations.

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6.4 PREDICTIVE NOISE ASSESSMENT

In order to determine the impact of noise from the construction and operational phases of the pig operation on noise sensitive locations, the predicted noise levels at the nearest noise sensitive locations surrounding the farm have been calculated in accordance with the methodology prescribed in ISO 9613-2:1996 '*Attenuation of Sound during Propagation Outdoors*'. The resultant predicted noise levels have been assessed in accordance with the methodology prescribed in BS 4142:2014 '*Methods for Rating and Assessing Industrial and Commercial Sound*'.

6.4.1 SOURCE NOISE SPECIFICATIONS

Construction Noise

The noisiest aspect of the proposed development is likely to be the construction phase of the project. During construction, the noisiest phases are typically site clearing, excavation and landscaping activities.

Table 6.4.1 contains typical noise levels from various construction plant that will be used during the construction phase. These standard noise emission data will be used for the purposes of the worst-case noise assessment of the proposed works.

Table 6.4.1: Noise Levels from Construction Plant (Ref: BS5228:2009)									
Sound Pressure Level (dBA) at Octave Band Centre Frequency									
Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	dBA
C2.5 - 16t Tracked excavator (clearing site)	83	85	94	96	98	98	105	95	107
C2.13 - 11t Dozer (excavation/earthworks)	79	98	100	102	105	102	99	92	110
C2.21 - 22t Tracked excavator (excavation/earthworks)	89	91	94	96	96	95	89	79	102
C2.28 - Wheeled Loader (excavation/earthworks)	91	97	99	102	101	98	94	85	107
Resultant Noise Level	92	101	107	109	109	107	107	97	115

Operational Noise

The proposed ventilation system for the proposed houses would be Mechanical Ventilation. Each of the sheds has inlet vents on the sides of the sheds and multiple vents.

The site would have a total of c.80 fans, should the proposed development be granted planning permission. Fans on weaner houses operate continuously at a medium power level in order to provide sufficient fresh air to the weaners.

In sow and pre-finisher houses, the fans are the main method of climate control and fan power is moderated by air temperature. When air temperature increases above 14°C, the fans begin to operate as a percentage of the temperature increase between 14°C and 21°C. Above 21°C, the fans operate at 100%.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The noise specifications for the proposed on-site fans or similar are presented in Appendix E, with fan type 'DA 600 LPC-11-2' being the likely choice. The rated maximum noise level for a single fan is Lw 65 dB(A) and there would be a total of c.80 fans in the proposed development. This information is presented in the following table:

Table 6.4.2: Operational Noise Levels for the Proposed Development									
Sound Pressure Level (dBA) @ Octave Band Centre Frequency									
Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	dBA
Max Ventilation Noise (80 fans @ 100% power @ 1m)	60	81	83	86	89	89	87	80	95
Normal Ventilation Noise (80 fans @ <50% power @ 1m)	58	64	70	74	75	69	64	74	80

'Normal Ventilation' fan noise has been taken from the PES library of data from similar developments.

As the operation of ventilation at maximum would be extremely rare (only during very warm weather conditions), predictive noise was also carried out based upon typical ventilation noise levels present at such developments.

6.4.2 PREDICTIVE NOISE – RESULTS

In order to determine the impact of noise from the proposed development during construction activities, maximum and normal operation the resultant noise levels at noise sensitive locations have been calculated.

Table 6.4.3 below summarises the findings of this predictive noise assessment. Detailed calculations are provided in **Appendix C of Attachment 6.1**.

Table 6.4.3: Predicted Noise Results Summary (dB)				
Ref	Location	Construction	Operation (Maximum Ventilation)	Operation (Normal Ventilation)
Source Noise Level (dBA)		115	95	80
NSL1	NSL 775m West	46	26	11
NSL2	NSL 390m West	52	32	17
NSL3	NSL 516m E-SE	50	29	15
NSL4	NSL 870m East	45	25	10
NSL5	NSL 884m South	45	25	10

The methodology outlined in BS4142 requires that predicted noise levels be compared to existing L₉₀ figures at noise sensitive locations in order to determine the likely noise impact.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

As can be seen in **Table 6.3.2** above, the background L₉₀ noise levels at all monitored locations were similar. Therefore, the average of these results will be used for comparison in this assessment.

BS4142:2014 Assessment

A noise character penalty of +3dB has also been applied to ventilation noise to account for potential distant tonal noise from fans. These noise levels would only be expected to occur during summer daytime periods.

The following table determines the likelihood of impacts from maximum theoretical noise levels on-site at sensitive locations following the BS4142 methodology:

Table 6.4.4: BS4142 Operational Noise Assessment (Max Ventilation)					
Location	Background Noise (L ₉₀)	Predicted Noise			Difference from Existing Background
		Predicted Noise	Predicted Penalty	Rating Level	
Daytime					
NSL1	35	26	+3	29	-6
NSL2	35	32	+3	35	-1
NSL3	35	29	+3	32	-3
NSL4	35	25	+3	28	-7
NSL5	35	25	+3	28	-8

A noise character penalty of +3dB has also been applied to ventilation noise to account for potential distant tonal noise from fans.

The following table determines the likelihood of impacts from normal operational noise levels on-site at sensitive locations following the BS4142 methodology:

Table 6.4.5: BS4142 Operational Noise Assessment (Normal Ventilation)					
Location	Background Noise (L ₉₀)	Predicted Noise			Difference from Existing Background
		Predicted Noise	Predicted Penalty	Rating Level	
Daytime					
NSL1	35	11	+3	14	-21
NSL2	35	17	+3	20	-15
NSL3	35	15	+3	18	-17
NSL4	35	10	+3	13	-22
NSL5	35	10	+3	13	-22
Night-time					
NSL1	22	11	+3	14	-7
NSL2	22	17	+3	20	-1
NSL3	22	15	+3	18	-4
NSL4	22	10	+3	13	-8
NSL5	22	10	+3	13	-9

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

A noise character penalty of +5 has been applied to predicted noise levels containing machine noise. This is to account for distant impulsive noise from operating machinery.

The following table determines the likelihood of construction noise impacts at noise sensitive locations following the BS4142 methodology:

Table 6.4.6: BS4142 Construction Noise Assessment					
Location	Background Noise (L ₉₀)	Predicted Noise			Difference from Existing Background
		Predicted Noise	Predicted Penalty	Rating Level	
NSL1	35	46	+5	51	16
NSL2	35	52	+5	57	22
NSL3	35	50	+5	55	20
NSL4	35	45	+5	50	15
NSL5	35	45	+5	50	15

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6.4.3 PREDICTIVE NOISE – ANALYSIS

The following sections compares the calculated noise rating arising from the proposed development and existing baseline noise at noise sensitive locations, as summarised above.

OPERATIONAL PHASE – WORST CASE SCENARIO

In order to predict the highest potential risk of impact from the proposed development during its operational phase, noise sources likely to contribute to the highest noise levels on-site at any one time were included in this assessment.

The impact of noise from the site has been based upon fans working at maximum power and includes a correction for potential tonal noise from malfunctioning fans. Therefore, the predicted noise levels may be seen as a worst-case scenario for ventilation noise during the operation of the site.

As can be seen in **Table 6.4.4** and **Figure 6.4.1**, noise arising from worst-case scenario on-site activities is predicted to be between 1 dB(A) and 8 dB(A) below the background noise level at each of the nearest noise sensitive locations. An ‘inaudible’ noise will typically be 10dB or more below the measured L₉₀ background noise level at a noise-sensitive location.

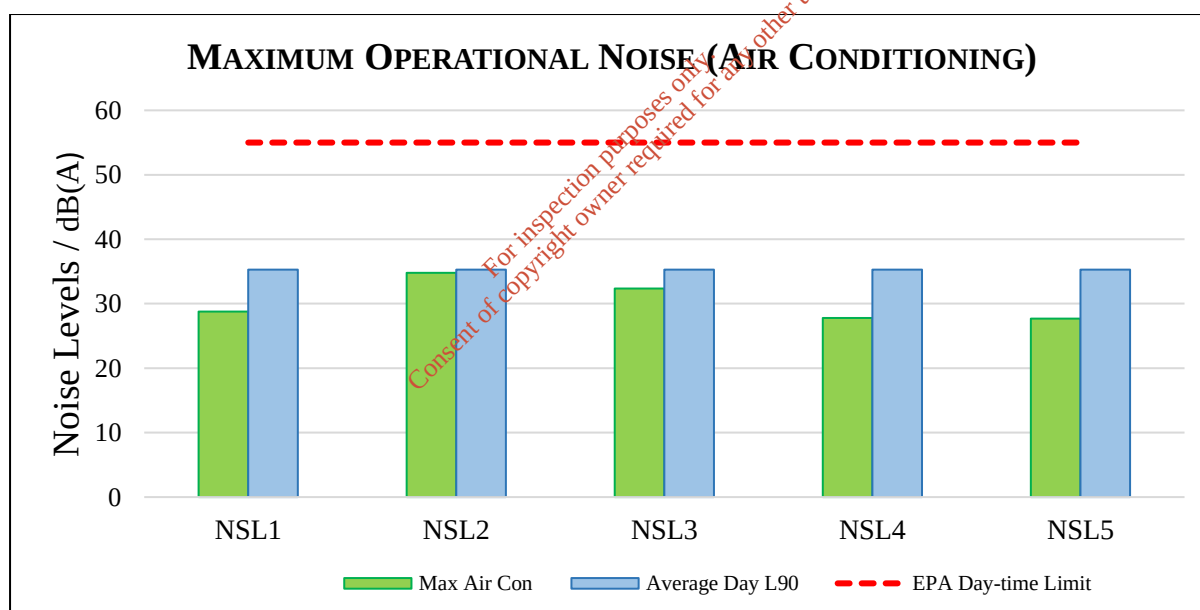


Figure 7.4.1: Max Operational Noise Rating vs. Existing Baseline Daytime Noise (L₉₀)

The proposed development would each be fitted with ventilation fans, operated and controlled by a climate control system, similar to the existing site. The climate control system would monitor the internal air temperature of the houses and modulate the speed of the fans.

As can be seen in **Table 6.4.7** below, pig sheds are typically kept to a high temperature, relative to ambient air temperature. Fans on pig sheds are predominantly used for the introduction of fresh air to the sheds and would not normally be required to regulate indoor temperature.

Therefore, these fans would normally be operating at a steady state and would only operate at maximum during the hottest periods of summer days.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 6.4.7: Example of temperature requirements in heated housing for different pig categories in healthy conditions (BREF, 2017)			
Farrowing Pen	Weaned Pigs	Mating and Gestating Sows	Fattening Pigs
Room and sow location: up to 20– 22 °C	7kg, up to 25°C	Mating, up to 20°C	20kg, up to 20–22 °C
	10kg, up to 24°C	Early gestation, up to 20°C	30kg, up to 18°C
Piglet area: first days after birth, 28–30 °C	15kg, up to 22°C	Middle gestation, up to 18°C	40kg, up to 16°C
	20kg, up to 20°C	End of gestation, up to 16°C	50kg, up to 15°C
	25kg, up to 18°C		

The following table details the average number of days per month where the maximum recorder air temperature at Gurteen Weather Station (17km north of the site) was at or above 21°C (years 2014 – 2018).

Table 6.4.8: Gurteen Station – Average Days per Month where Max Temp @ $\geq 21^{\circ}\text{C}$					
Jan	Feb	Mar	Apr	May	Jun
0.0	0.0	0.0	0.0	2.28	8.25
Jul	Aug	Sep	Oct	Nov	Dec
9.73	2.53	1.61	0.0	0.0	0.0

As can be seen from the above table, it is likely that ventilation fans would only be operating at maximum between May to September and for a small number of days and only for short periods of these days (2.04% of yearly hours). It is not anticipated for maximum operation to occur during night-time hours.

Maximum worst-case scenario ventilation fan noise would only be expected to occur during the daytime in the summer and only during short periods of these days.

Additionally, predicted worst-case scenario noise levels at all noise sensitive locations have been determined to be below the existing EPA licence daytime limit of 55dB.

Therefore, due to the low predicted resultant noise levels and the infrequency of occurrence it is predicted that maximum fan noise would have a slight to no significant impact upon noise sensitive locations.

It is noted that the noise levels have been predicted for the area external to the selected residences and facing the proposed farm. Predicted fan noise would not be expected to be audible within the residences.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

OPERATIONAL PHASE – NORMAL NOISE LEVELS

During normal farm operations alone, the noise environment is likely to be characterised by noise from ventilation fans.

As can be seen in **Table 6.4.5** and **Figure 6.4.2** below, during periods of normal operational noise, all rating levels are significantly below the background L_{90} . An ‘inaudible’ noise will typically be 10dB or less below the measured L_{90} background noise level at a noise-sensitive location.

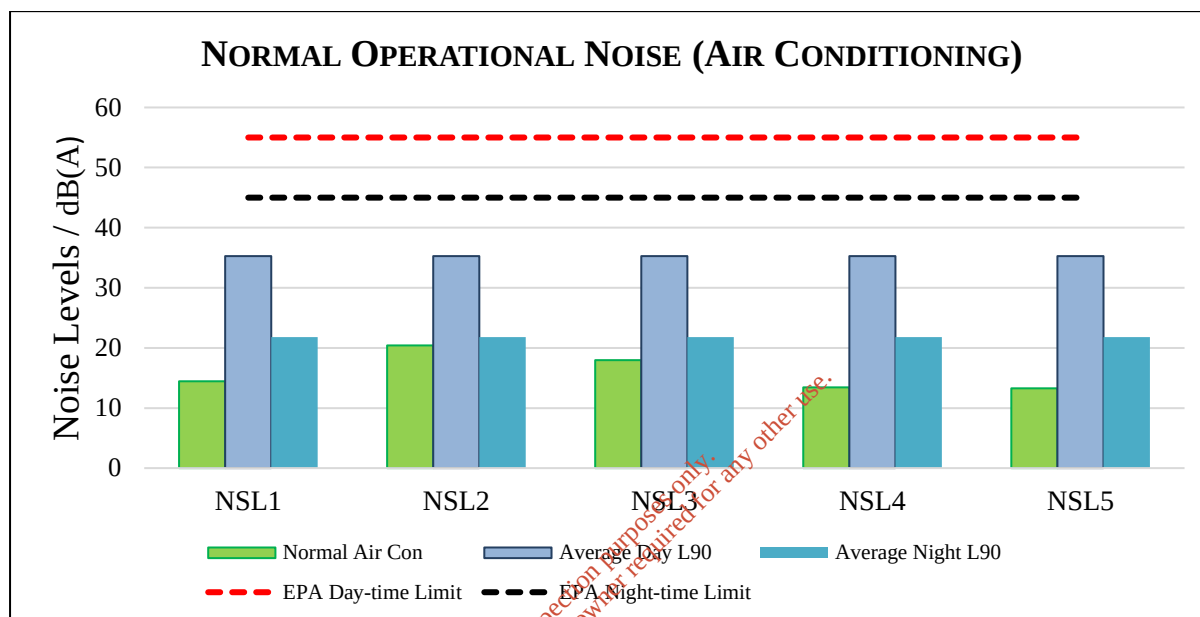


Figure 6.4.2: Normal Operational Noise Rating vs. Existing Baseline Daytime Noise (L_{90})

Noise arising from the normal operations scenario on-site activities is predicted to be between 15 dB(A) and 22 dB(A) below the daytime background noise level and between 1 dB(A) and 9 dB(A) below the night-time background noise level at each of the nearest noise sensitive locations.

Additionally, predicted normal operations noise levels at all noise sensitive locations have been determined to be below the existing EPA license daytime limit of 55dB and night-time limit of 45dB.

Therefore, it is predicted that there would be no significant impact upon noise sensitive locations during the daytime period and a slight to no significant impact upon noise sensitive locations during the night-time period.

CONSTRUCTION PHASE

As can be seen in **Table 6.4.6** and **Figure 6.4.3** below, noise levels are predicted to exceed existing background noise levels during the construction phase of the proposed development.

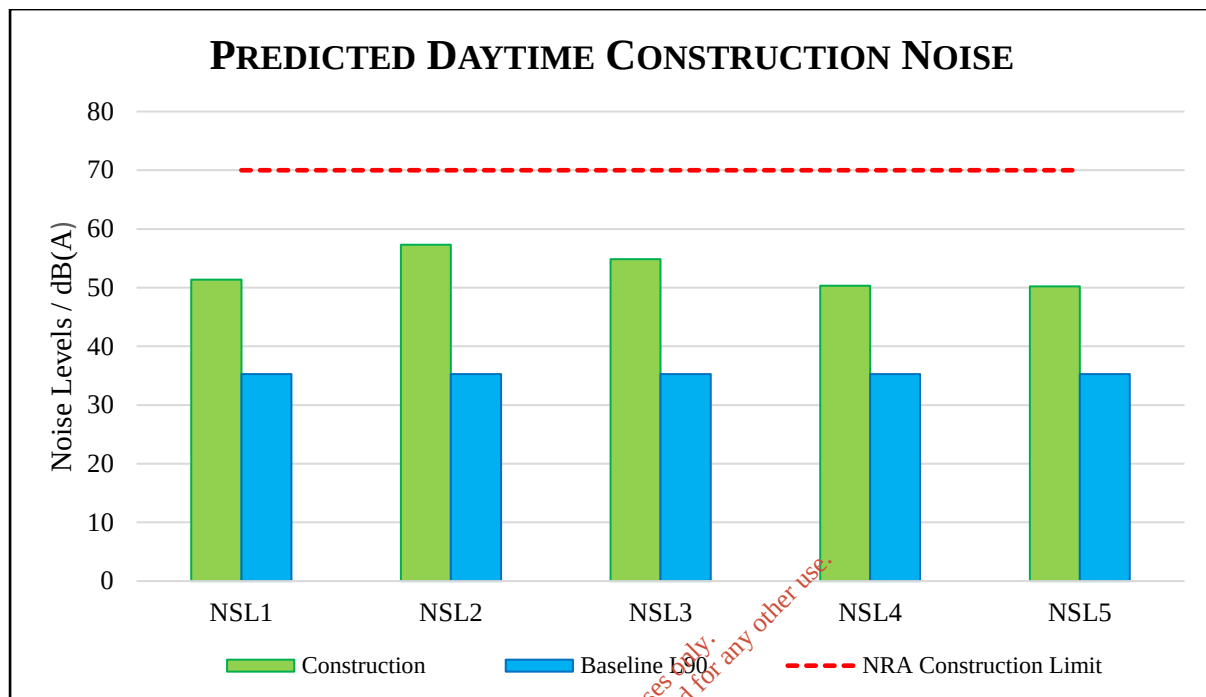


Figure 6.4.3: Construction Noise Rating vs. Existing Baseline Daytime Noise (L_{90})

Worst case scenario construction noise is predicted to range from L_{Ar} 50 to 57 dB at the closest noise sensitive locations.

Considering existing daytime background noise, predicted levels would range from 15dB at NSL4 & NSL5 and 22dB at NSL2 above background noise levels.

This is predominantly due to the high noise levels associated with excavation/site clearance works and the noise character-rating penalty applied to account for the subjective impact of impulsive noise.

It is anticipated that construction noise would be audible at all selected locations, with the character of construction type noise being more clearly audible during intermittent impulsive noise events (banging, falling stone etc.) on-site.

It should be noted that the theoretical peak noise level is a worst-case scenario and it would be unlikely that all site works would occur concurrently. Site clearance and excavation works would occur only during short periods during the initial phase of construction.

The construction phase itself would be temporary (3-4 months) and works would be conducted during normal working hours, reducing the risk of negative impacts. Therefore, the subjective impact of noise from the proposed development would be mitigated.

Predicted construction noise levels at all noise sensitive locations have been determined to be below the NRA guidance limit of 70 dBA for weekdays.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Therefore, during worst case scenario noise from initial construction works, it is predicted that there would be a significant short-term impact for a limited period of time on noise sensitive locations. However, noise levels would be in compliance with Irish guideline standards for construction noise.

6.5 EVALUATION OF THE RESULTS

As a result of this baseline noise survey and predictive analysis, it is anticipated that the proposed development would have a significant but short-term impact on the closest noise sensitive locations during the initial construction phase. This impact would be mitigated by the short period of time over which construction activities are likely to occur and the carrying out of construction during normal working hours.

Predicted construction noise levels at all noise sensitive locations have been determined to be below the NRA guidance limit of 70 dBA for weekdays.

During the worst-case scenario operational phase at the proposed development, it is anticipated that there would be a slight to no significant impact on the closest noise sensitive locations due to maximum ventilation noise.

Maximum worst-case scenario ventilation fan noise would only be expected to occur during the daytime in the summer and only during short periods of these days. Due to the low predicted resultant noise levels and the infrequency of occurrence, it is predicted that maximum fan noise would have a slight to no significant impact upon noise sensitive locations.

Predicted worst-case scenario noise levels at all noise sensitive locations have been determined to be below the sites existing EPA license daytime limit of 55dB.

During the normal operation of the ventilation system, it is predicted that there would no significant impact upon noise sensitive locations during the daytime period and a slight to no significant impact upon noise sensitive locations during the night-time period.

All predicted operations noise levels at all noise sensitive locations have been determined to be below the sites existing EPA license daytime limit of 55dB and night-time limit of 45dB.

It is the conclusion of this report that there would be a moderate impact for a limited period of time on noise sensitive locations as a result of the initial construction phase. There would be no significant impact on noise sensitive locations as a result of the operational phase of the proposed development at Woodville, Ballymackey, Co. Tipperary.

6.6 NOISE MITIGATION

It is recommended that the following mitigation measure be implemented during the construction phase of the proposed development:

- All construction activities should take place between 07:00 and 19:00, Monday to Friday. Any works that, by necessity, are required to be carried out outside of these times should be notified to any potentially effected local residents in good time and prior to specified works commencing.
- It is recommended that guidance on control of noise, as per The National Roads Authority's '*Guidelines for the Treatment of noise and vibration in National Road Schemes*' (2004) and British Standard 5228-1 '*Code of practice for Noise Control on Construction and Open Sites*' be followed during the construction phase.
- Timely and adequate maintenance of all on-site equipment, including preventative maintenance, to ensure efficient operation and minimisation of potential noise.
- All onsite workers, hauliers and contractors be informed of noise considerations, both on-site and on local access roads, during the operational and construction phases of the proposed development.
- The site access laneway and other surfaces should be maintained in a state of good repair to reduce excessive noise from vehicle usage.
- The draft Noise Management Programme (see **Attachment 6.2**) should be implemented at the site and reviewed regularly to ensure effective management of potential noise.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

6.7 REFERENCES

- ISO 9613-2:1996 *Attenuation of Sound during Propagation Outdoors*.
- BS 4142:2014 *Methods for Rating and Assessing Industrial and Commercial Sound*.
- National Roads Authority, (2004). *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*.
- EPA (2016) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*.
- BREF Document for Intensive Rearing of Poultry or Pigs (2017) Reference Document for the Intensive Rearing of Poultry or Pigs.
- EN BS 5228-1:2009 *Code of practice for noise and vibration control on construction and open sites*.
- Grant S. Anderson and Ulrich J. Kurze, “*Outdoor Sound Propagation*,” Chpt. 5 in *Noise and Vibration Control Engineering – Principals and Applications*, edited by L.L. Beranek and I.L. Vér, (John Wiley & Sons, NY, NY 1992).
- Joint Research Centre “*Best Available Techniques (BAT) Reference Document for the Intensive Rearing of Poultry and Pigs*” Draft 2, European IPPC Bureau, August 2013.

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7.0 LANDSCAPE AND VISUAL

7.1 INTRODUCTION

This section of the EIAR provides an assessment of the likely landscape and visual impacts of the proposed development at Woodville, Co. Tipperary. This assessment involved a detailed review of all plans, sections and elevations of the proposed scheme and various publications and reports, together with a visit to the proposed site and its environs.

7.2 METHODOLOGY

This assessment is made with regard to the vulnerability of the landscape to change and to the location of visual receptors relative to the proposed development. The methodology used in the assessment is based on the EPA's "*Guidelines on the information to be contained in Environmental Impact Statements, 2002*", "*Advice Notes on Current Practice in the preparation of Environmental Impact Statements, 2003*" and draft "*Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2017*".

7.2.1 BASELINE STUDY METHODOLOGY

In order to facilitate the assessment of the proposed development, the visual envelope was determined. The envelope defines the general area within which the development site may be visible, whether completely or slightly due to topography. The visual envelope extends c. 2 to 3 km from the site at its furthest point. Beyond the visual envelope, any visual impacts are considered negligible.

Potential viewpoints were established using online mapping sources. These were investigated along with all other potential viewpoints identified during the site survey.

The site survey was carried out on Friday 12th April 2019 in clear weather conditions. The visibility assessment concentrated on the publicly accessible areas such as road networks, residential and amenity areas.

Desktop and fieldwork were supported by online mapping tools from EPA, GeoHive, Google maps, Geological Survey Ireland, Myplan web map portal, Ordnance Survey Ireland and the Tipperary County Development Plan 2010-2016.

Photographs illustrating views from viewpoints were taken using a Canon EOS 1100D Digital SLR Camera.

7.2.2 LANDSCAPE ASSESSMENT CRITERIA

With regard to landscape assessment, there are two separate but closely related aspects. The first aspect is a visual impact, i.e. the extent to which a new structure in the landscape can be seen. Visual impacts may be categorised under "Visual intrusion" and "Visual Obstruction", where:

Visual intrusion is impacting on a view without blocking;
and

Visual obstruction is impacting on a view involving blocking thereof.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

In assessing visual impact, various aspects and stages are considered in detail including, impact during phasing, impact on completion and longer-term established impact.

The second aspect is **impacting on landscape character**, i.e. responses that are felt towards the landscape and drawn on the appearance of the land, including aspect, land-use topography, vegetative cover etc. and their interaction to create specific patterns and landscape units distinctive to particular localities. The character of the existing landscape setting is considered taking account of the various natural and man-made features, such as topography, landform, vegetation, land-use, built environment together with the visibility of and the views to and from the landscape.

The significance criteria used in the assessment are based on the impact levels suggested in the EPA Guidelines on the information to be contained in the afore mentioned EPA reports, which are set out in this volume of the EIAR.

7.2.3 LANDSCAPE PLANNING

The North Tipperary County Development Plan 2010 - 2016, is the statutory development control and forward planning document pertaining to the project area. The Landscape Character Assessment (LCA) of County Tipperary (2016) was published by Tipperary County Council as part of the North Tipperary County Development Plan 2010 - 2016.

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7.3 EXISTING ENVIRONMENT

The County Development Plan identifies ‘sensitive landscapes’ as Primary and Secondary Amenity Areas. According to the Council Primary and Secondary Amenity Areas offer significant opportunities for tourism development and rural recreational activities. The proposed development site is not located within either of these amenity areas (**figure 7.1**).

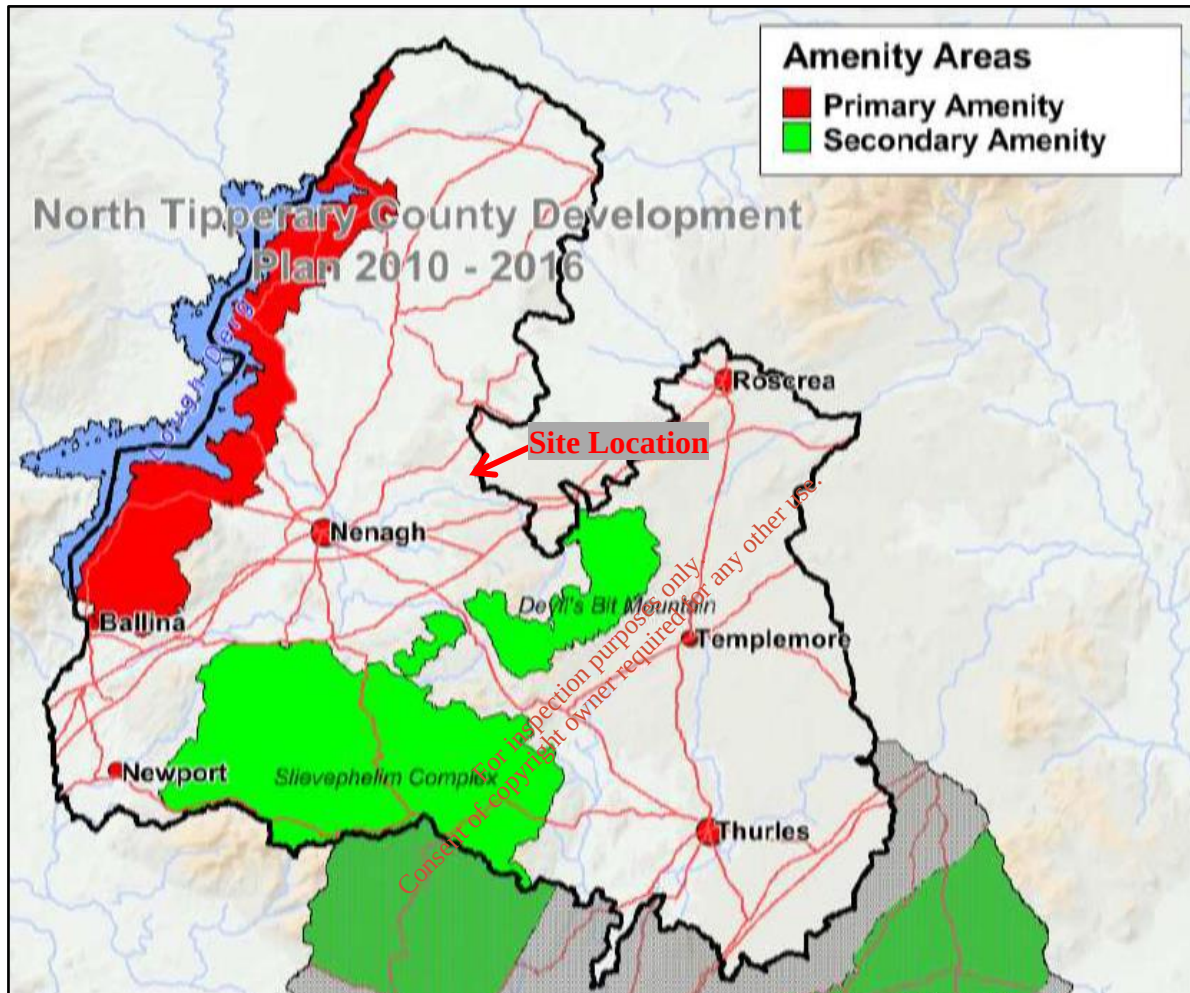


Figure 7.1: Primary and Secondary Amenity Areas
(North Tipperary County Development Plan 2010 – 2016)

The nearest Listed View identified in the County Development plan is “V10-Views east on the R491 Cloughjordan to Nenagh”, which is located 2.25km to the north – west of the site at its closest approach.

7.3.1 WOODVILLE TOWNLAND LANDSCAPE

According to the LCA of County Tipperary, the site is in an area described as ‘The Plains’. The Plains are described as working landscapes containing most settlements and services as well as large continuous areas used for pasture, tillage and peat harvesting. These areas are further subdivided into landscape character types (**figure 7.2**).

The proposed development site in the townland of Woodville is positioned in the Borrisokane wetlands (Peatlands & Wet Mixed Farmland) landscape character type. Described largely as a

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

low lying area containing good pasture and tillage land. The Borrisokane Lowlands also hosts extensive areas of raised bog [often cutover] interspersed with areas of farming.

The Borrisokane wetlands have been given a sensitivity rating of Class 2 (Moderate sensitivity to change) by the Tipperary Co. Co and ascribed a guideline as follows *‘To facilitate development that with capacity to continue and enhance established patterns of use and settlement without significant change to appearance or character’*. A Class 2 area is described as requiring additional care during design and assessment to continue established patterns of use and settlement.

The land use compatibility chart given by the Tipperary Co. Co. based on landscape sensitivity states that the Borrisokane Lowlands is most suited to agricultural and forestry development and least suited to urban expansion and windfarms. In this context compatibility refers to the probability that a particular development has the potential to give rise to significant visual effects on the landscape [Least] versus developments that have a low potential [Most].

The site is c. 500 m south of an area considered sensitive (peatlands) as per guidance given by the Tipperary Co. Co. The proposed development would not be located within the 300 m buffer zone of this sensitive area.

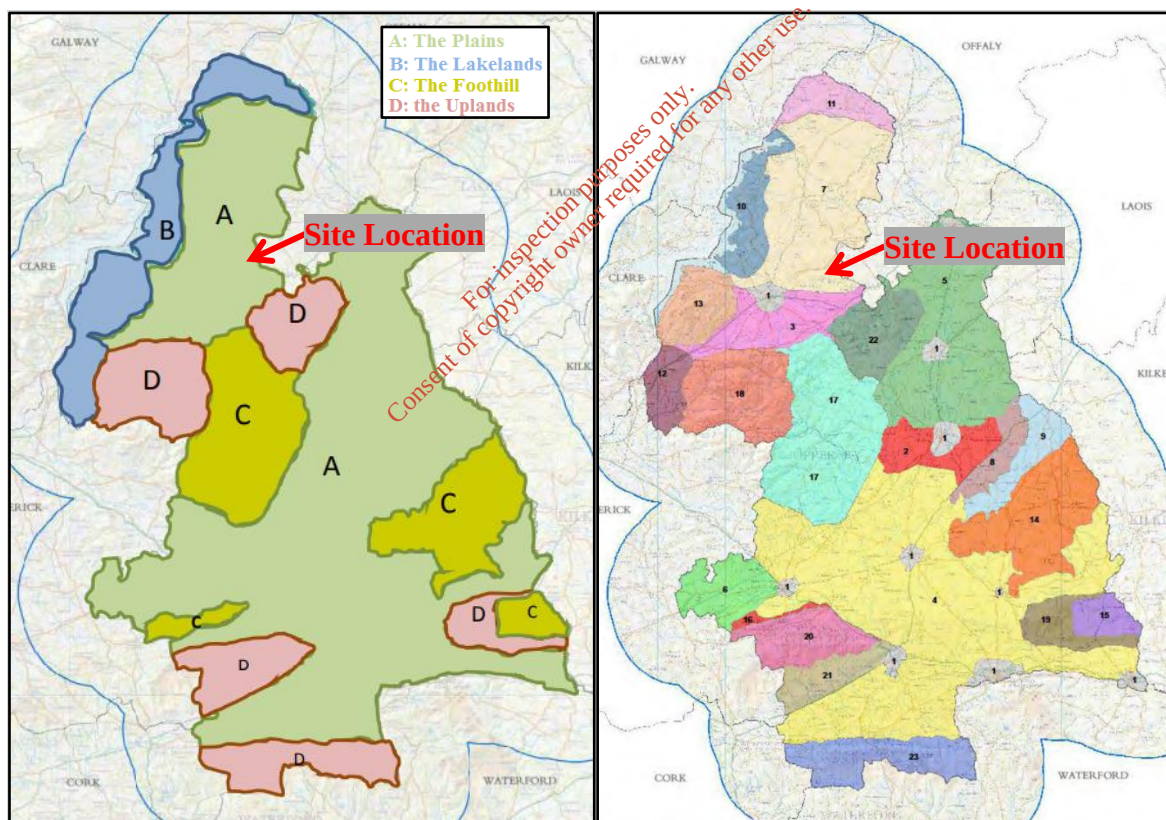


Figure 7.2: The Landscape Archetypes of County Tipperary.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 7.1: Derivation of Landscape Character Areas

Architypes	Landscape Character Types	Landscape Character Areas
A. The Plains	A1 Lowland Pasture & Arable	1. Urban And Fringe Areas
		2. Thurles Hinterland
		3. Nenagh Corridor
		4. River Suir Central Plain / Nenagh Corridor
		5. Templemore Plains
		6. West Tipperary Farmland Mosaic
	A2 Peatlands & Wet Mixed Farmland	7. Borrisokane Lowlands
		8. Littleton Raised Bog
		9. Littleton Farmland Mosaic and Marginal Peatland
B. The Lakelands	B1 Watersides	10. Upper Lough Derg
	B2 Lakeland Enclosures	11. The Shannon Callows
		12. River Shannon - Newport
		13. Arra Mountains – Lower Lough Derg
C. The Foothills	C1 Farmed	14. Slieveardagh Hills Farmland Mosaic
		15. Linguan Valley Marginal and Farmland Mosaic
	C2 Forested	16. Slievenamuck Marginal Mosaic
		17. Upperchurch – Kilcomommon/ Hollyford Hills Mountain Mosaic
D. The Uplands	D1 Mountain & Upland	18. Silvermines – Rearcross
		19. Slievenamon Mountain Mosaic
		20. Glen Of Aherlow Uplands [20[B]]
		21. Galtee Mountain Mosaic
		22. Devilsbit Uplands
		23. Knockmealdown Mountain Mosaic

7.3.2 LANDSCAPE SETTING OF THE PROPOSED SITE

The Borrisokane Wetlands is generally a flat open farmed landscape dominated by limestone pasture and tillage uses. Long range views can be gained towards the Arra Mountains. Within the flat agricultural landscape, there are isolated pockets of marshy, poorly drained areas and occasional small lakes are dispersed throughout. The Rivers Nenagh and Ballyfinboy are located within this character type but are not visually conspicuous except at short range. The immediate area around the proposed development site is characterized by numerous sand and gravel drumlins.

Field patterns tend to be of a large scale and are generally bounded by deciduous hedgerows containing mature trees. Road routes tend to be lined with earthen banks and cross roads tend to be defined by small settlements. Farm buildings are visible throughout the landscape and tend to be of variable age. The older style cottages tend to be of stone construction with boundary treatment comprising dry stone walling.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The dominant forces for change of this landscape character type identified include; a decline in agricultural activity, commercial coniferous forestry plantations and inappropriately designated and landscaped housing. According to the LCA, the area is not '*a sensitive landscape albeit that its capacity to accommodate future development is a function of good design as this is a flat and really quite visually exposed landscape*'.

The piggery is located on sloped ground north of the Ollatrim River at an elevation of c. 104 m above sea level. The immediate area around the piggery is interspersed with small wood and peatlands. Topography is characterized by low-lying small to medium sized sand and gravel drumlins. The site is bordered on the north by wetlands, on the south by a local country road, on the east by hedges and a small woodland and on the west by hedges, trees and scrub.

The piggery is partially visible from a number of locations on the local public roadways mainly from the south. The sites visibility from the east, north and west is limited due to effective screening both from trees/hedges and topography. The actual site of the proposed new development is c. 200 m from the local road and would not be visible from the road.

Throughout the area, the land is farmed with fields enclosed with a varied mix of hedges, banks, and fences. Pasture for cattle and sheep is the primary agriculture type in the area. Residential property is generally dispersed along local roads. A number of one-off residences and farmyard complexes exist in the area and are the dominantly visible man-made structures in the landscape. Immediately to the east of the piggery is a landfill operated by Tipperary Co. Co.

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7.4 IMPACTS

The assessment of potential visual amenity impacts involved examining the locations of domestic dwellings, views from public roads and the location of the proposed development. In assessing the impact, potential impacts associated with both the construction and operational phases were considered.

7.4.1 “DO-NOTHING” SCENARIO

Should the proposed development not proceed, the existing use of the site as a piggery would remain un-changed. There would be no impact on the visual amenity of the area.

7.4.2 CONSTRUCTION PHASE

The proposed development is to demolish a gilt house, two weaner houses and one first stage weaner house and to construct a modern second stage weaner house and extend farrowing Unit 1 with additional farrowing sow accommodation, convert farrowing Unit 2 to loose sow accommodation, extend Unit 2 to provide additional weaner accommodation, construct a new pre-finisher house for slow growing pigs and construction of a slurry reception tank.

The construction phase would have a relatively low landscape and visual impact. The construction phase is not expected to continue for more than three to four months. Aspects which pertain to the construction phase proper include:

- (i) The general site works;
- (ii) Excavating foundations (for tank installation);
- (iii) The demolition of existing buildings;
- (iv) The construction of the new buildings.

There would be a minor to no significant and temporary visual impact from construction works given the fact that the building site would be effectively screened from the local road (along the southern boundary of the piggery) by existing buildings. The proposed pre-finisher house would be screened from the majority of western, southern and eastern directions by the intervening treelined esker. The aerial parts of the proposed main farm hub buildings (steel frame/roof under construction) would be visible from locations along the public road and from dwellings to the south of the piggery.

The main visible impact would be predominantly construction vehicles and plant machinery, such as excavators and delivery vehicles, however, as stated, these would usually be screened from view.

The undulating landscape, along with the existing vegetation, would screen construction works in all other areas and ensure no associated significant visual impact would be observable. It is anticipated that the visual impact of the construction phase in all other areas would be insignificant due to intervening buildings, topography and treelines.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

7.4.3 OPERATIONAL PHASE

As part of this EIAR a visual assessment was carried out at locations where the proposed development would have the potential to create a visual impact. The existing piggery was used as a visual reference and to represent the proposed development, which would be of similar design. **Figure 7.3**, below shows the locations of each ‘visual point’ from which the proposed site's visibility was assessed. The site visual assessment was carried out on the 12th April 2019 by Panther Environmental Solutions Ltd personnel.

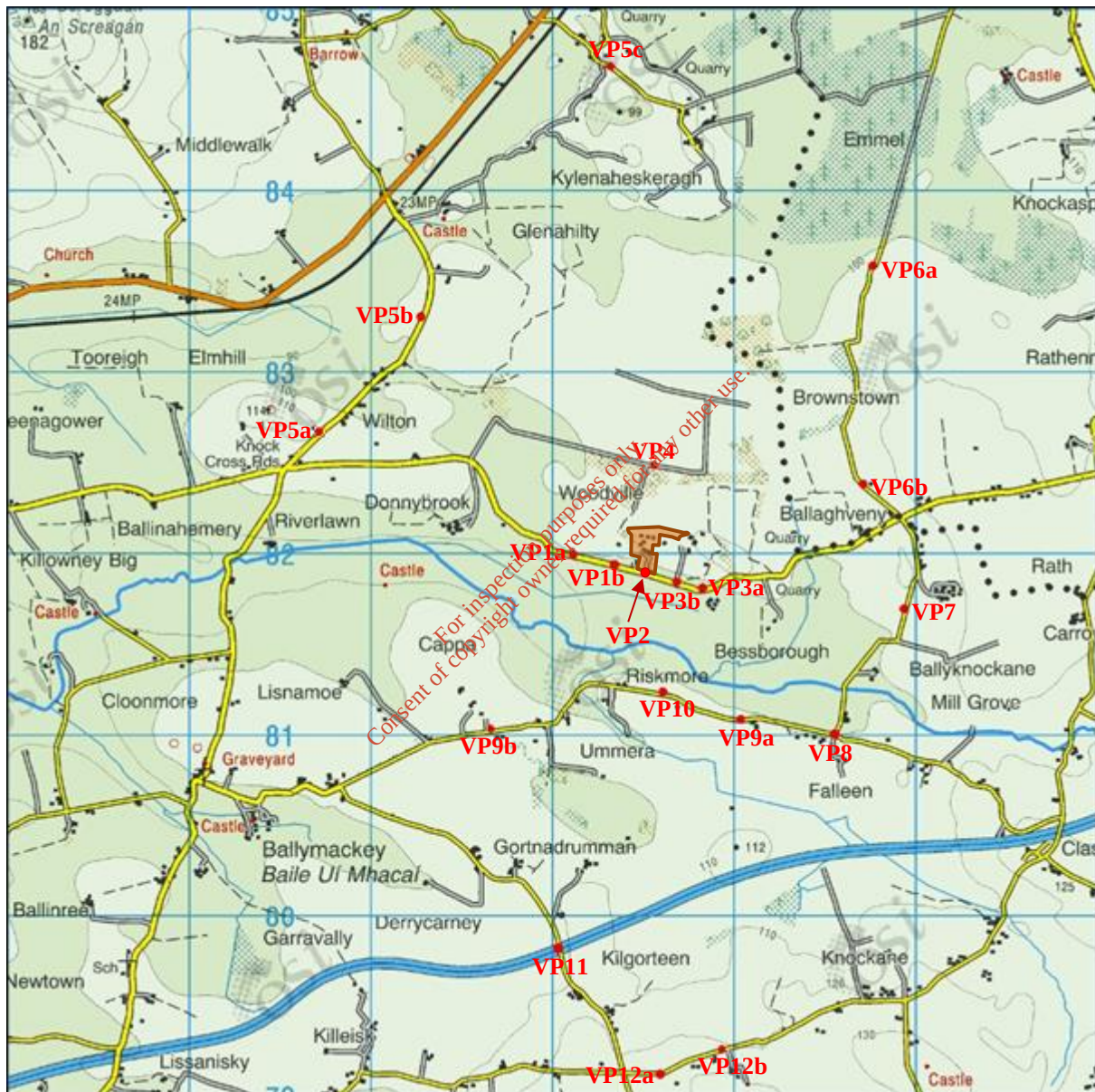


Figure 7.3: Visual Point Locations

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The following section catalogues the information taken from each view point VP.

Visual Point No.1

VP1 represents views of the site approaching from the west along the L1052 local road which passes the southern boundary of the site.

VP1a: Grid Ref: R 96113 81995



VP1b: Grid Ref: R 96353 81940



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

VP1a was located c. 315 m west of the piggery along the local road, c.230m west of VP1. The roofs of the existing site buildings were partially visible through an existing tree line from this point.

VP1b is located c. 100 m south-west of the site boundary, along the local country road, which provides access to the site. From this position, the piggery was somewhat visible. The roofs, eaves and western gable of the southernmost building was visible.

It should be noted that this visual assessment was carried out in April, before local hedgerows were in full growth/bloom. As can be seen from the photo below, which was taken in August at the same location, the site was not visible as a result of local vegetation.



Generally, due to the topography and treelined nature of the landscape, the existing site is not a prominent feature of the landscape from this approach. The majority of the site, including the tallest existing structures (feed silos) were not visible. Only the roof of the southernmost shed was visible from available viewpoints, which were sparse along the roadway through gaps in the hedgerow.

During summer periods when treeline foliage was full, the site was not visible from this approach.

The proposed extensions and new buildings would not be visible from this location if constructed, as they would be shielded by existing structures on-site and treelines.

It is not considered that there would be a significant impact upon the visual amenity or landscape character at the areas represented by these locations.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Visual Point No.2

Grid Ref: R 96558 81887



VP2 was located at the main entrance to the existing site from the local road.

At this point, a small area of the existing structures was visible to some extent, including storage tanks and the eastern gables of the southernmost buildings. The majority of the site is shielded from view by the residential / office buildings along the road-front and the southernmost buildings of the farm hub itself.

The proposed extensions to house 1 and house 2 would not be visible from locations along the shared boundary with the local road, if constructed, as these would be shielded by existing structures on-site.

The proposed pre-finisher house would be obscured by the intervening elevated treelined esker to the right of the above images.

The roof of the new weaner house may be visible as a new horizon behind the existing silos.

It is not considered that there would be a significant impact upon the visual amenity or landscape character at this location. While the new proposed weaner house would be expected to form a new horizon at this location, the existing feed silos would remain the tallest structures at the site. The proposed building roof would combine with the existing farm hub to form a single visual element.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Visual Point No.3

VP3 represents views of the site approaching from the east along the L1052 local road which passes the southern boundary of the site.

VP3a: Grid Ref: R 96834 81799



VP3b: Grid Ref: R 96688 81841



VP3a was located c.275m east of the site boundary and c.250m east of VP3b. None of the existing on-site buildings were visible at this location, shielded by the intervening topography.

VP3b was located c.130 m east of the site main access gate and CP7 along the same local road. The point was taken from the entranceway to the Ballymackey landfill site, operated by the Tipperary Co. Co, positioned east of the site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Similarly, to the conditions at VP1 the existing on-site buildings were partially visible through the tree lines. However, views of the site were much less frequent due to the more developed treelines and the esker / slopes adjoining the road.

The only clear view of structures at the site was due to the clearance of roadside hedgerow at the landfill entrance and the site was not a significant feature.

It is considered that all proposed developments would be obscured from view by the topography leading up to the site from this approach. It is not considered that the public road or residences along the road would be impacted by the proposed development.

It is not considered that there would be a visual amenity or landscape impact as a result of the development at locations represented by these viewpoints.

Visual Point No.4

VP4: Grid Ref: R 96565 82489



VP4 was taken from a forestry lane used to access the peatland directly north of the existing site at a distance of c. 360 m from the site. This area is bogland and is unlikely to be used for residences. The road is also not a public road, however, this route may be of amenity value to the area as a walking route.

Despite the relative closeness of VP4, the site was not visible due to the local vegetative screening.

It is not considered that there would be a visual amenity or landscape impact as a result of the development at locations represented by these viewpoints.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Visual Point No.5

VP5 represents viewpoints from local roads and residences at elevations to the west and north of the site.

VP5a: Grid Ref: R 94724 82661



VP5b: Grid Ref: R 95302 83330



VP5c: Grid Ref: R 96378 84645



VP5a was located at a field gate in proximity to a local residence c. 1.8 km west-north-west of the site, separated by green-fields, mature hedgerows and residential properties.

VP5b was located c. 1.65 km north-east of the site, along the same local road (L1047) as VP5a, near a small cluster of residential properties, separated by green-fields and mature hedgerows.

VP5c was located c. 2.6 km directly north of the site boundary and c. 1.7 km north-east of VP5b, at a currently closed local sand and gravel quarry along the L1057 local road.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Neither the existing piggery nor the proposed development site were visible from locations along these roads. The view was obscured by intervening treelines and the undulating topography of the area, particularly at greater distances from the site.

It is not considered that there would be a visual amenity or landscape impact as a result of the development at locations represented by these viewpoints.

Visual Point No.6

VP6a: Grid Ref: R 97706 83420



VP6b: Grid Ref: R 97699 82388



VP6a was located c. 1.8 km north-east of the site boundary, taken from a country lane, 1.2km north of VP6b. None of the existing on-site buildings were visible at this location through the intervening bogland vegetation.

VP6b was located c. 1.0 km east of the existing site, upon a country lane, separated from the site by green-fields, mature hedgerows and Ballymackey landfill site. Neither the proposed site nor the landfill were visible in this area due to local folds in the land and very well developed hedgerows.

It is not considered that any element of the proposed buildings would be visible from these locations if constructed, as the site would remain shielded by local topography and foliage.

It is not considered that there would be a visual amenity or landscape impact as a result of the development at locations represented by these viewpoints.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Visual Point No.7

VP7: Grid Ref: R 97941 81698



VP7 was located c.1.4 km east of the site boundary, within the vicinity of to the applicant's finisher pig facility at Ballyknockane. The closed and landscaped cells of the Ballaghveny Landfill are visible as the grassed hill forming the horizon in the centre of the image.

The site is obscured by the south-western tail of the esker on which the site is located, at the left of the image. None of the existing on-site buildings were visible at this location.

Along the remainder of this road, dips in the landscape and well-developed hedgerows make views towards the west very enclosed and the site would not be visible.

The proposed extension would not be visible from these locations if constructed, as it would be shielded by local topography.

It is not considered that there would be a visual amenity or landscape impact as a result of the development at locations represented by these viewpoints.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Visual Point No.8

VP8: Grid Ref: R 97554 81012



VP8 was located c.1.3 km south-east of the site boundary, at a T-junction located c. 830 m south of VP7 along the same local road. Six residences were also located in proximity to the T-junction. The residence and outbuildings of Bessborough House are just visible through the trees in the centre of the image, at a similar elevation to the viewpoint.

The existing site would be visible on the ridgeline to the left of the large ash tree in the centre of the image. However, none of the existing on-site buildings were visible at this location due to the intervening treelines and trees surrounding the boundaries of the site.

The proposed extension would not be visible from public areas surrounding this location if constructed, as it would be shielded by local topography.

It is not considered that there would be a visual amenity or landscape impact as a result of the development at locations represented by these viewpoints.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Visual Point No.9

These viewpoints represent the majority of locations from which the site is visible along a local road on the ridge across the Ollatrim River valley to the south of the proposed site.

VP9a: Grid Ref: R 97056 81091



VP9b: Grid Ref: R 95713 81032



VP9a was located c.920 m south-east of the existing. Parts of the southern-most pig house was visible from this location, due to its elevation and the lack of foliage on the intervening trees. The rest of the site was obscured by treelines and hedgerows along the sections of roads in the area, except for brief views through field entrances, such as this one.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

VP9b was located c. 1.2km south-west of the site boundary. Infrequently, the site is partially visible through gaps in treelines along this road. When viewed from the south-west and south-east, the existing silos are the most prominent feature of the existing site when visible, being taller than other site structures and breaking the horizon.

The majority of the proposed developments would not be visible from these locations if constructed, as it would be shielded by existing on-site structures, when not obscured by intervening hedgerows and treelines. However, the proposed second stage weaner house (15) would add a further c. 2.5m to the height of the existing weaner house, visible at the centre back of the VP9b images above.

There would be a slight negative visual impact from the proposed weaner house, as the building would be more prominent in the background of the site. However, the existing weaner house currently forms the background to the site and the proposed development would not significantly change the visual form or character of the site.

It is considered that there would be a slight to no significant impact to the visual amenity or landscape as a result of the development at locations represented by these viewpoints.

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WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Visual Point No.10

VP10 represents locations directly to the south of the proposed development, along the same local road as VP9 locations.

VP10: Grid Ref: R 96642 81226



VP10 was located c. 660m south of the site boundary, across the Ollatrim River valley along a country road. The existing site was visible from this location, due to its elevation. Of the areas assessed, viewpoints along this small section of the southern ridge are the most exposed to potential impacts from the proposed developments, as the main site buildings are not obscured by the eastern and western boundary treelines.

From this vantage point the majority of the proposed buildings would not be visible if constructed, as it would be shielded by existing on-site structures.

The extension of the farrowing house (1), to the extreme left of the image, would appear slightly larger from this aspect. However, the building would extend more towards the centre of the site and would therefore not significantly change visual impacts. The proposed 1st stage weaner extension to the loose sow house (2) would not be visible from this location, as the building has a lower finished roof height to the foremost building (8).

The proposed pre-finisher house (16) would be obscured by the treelines and esker to the east of the site (trees to the right of the above image).

The proposed weaner house (15) would extend the existing roof by c. 2.5m to an apex height of c. 9.6m. From this vantage point, the finished roof height would appear to be of a similar height to the existing silos.

There would be a slight negative visual impact from the proposed weaner house, as the building would be more prominent in the background of the site. However, the weaner house currently

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

forms the background to the site and the proposed development would not significantly change the visual form or character of the site.

It is considered that there would be a permanent slight negative impact to visual amenity as a result of the development at locations represented by this viewpoint.

Visual Point No.11

VP11: Grid Ref: R 96046 79844



VP11 was located c.2.1km south of the site boundary, upon a Dublin to Limerick M7 motorway fly-over. The rooftop of the existing weaner house and the existing feed silos were visible from this elevated ridge.

Similarly to VP10, the proposed extensions to house 1 & 2 and the proposed pre-finisher house would not be visible from this location, due to being obscured by the existing buildings in the foreground and the treelined esker.

The proposed weaner house (15) would extend the existing weaner house roof by c. 2.5m to an apex height of c. 9.6m. From this vantage point, the finished roof height would appear to be of a similar height to the existing silos.

There would be a slight negative visual impact from the proposed weaner house, as the building would be more prominent in the background of the site. However, the weaner house currently forms the background to the site and the proposed development would not significantly change the visual form or character of the site.

It is considered that there would be a permanent slight negative impact to visual amenity as a result of the development at locations represented by this viewpoint.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Visual Point No.12a

VP12 represents viewpoints from a local road along a ridgeline c. 3km south of the site.

VP12a: (Grid Ref: R 96538 79138)



VP12b: Grid Ref: R 96926 79263



VP12a was located c. 2.75km south of the site boundary. VP12b was located c. 2.65km south of the site boundary and c.400m east of VP12a.

At the time of the assessment, the existing site was intermittently visible through intervening hedgerows and treelines. Views were similar to those afforded at VP9, however the site was a less of a notable feature of the landscape due to the distance.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

It should be noted that this visual assessment was carried out in April, before local hedgerows were in full growth/bloom. As can be seen from the photo below, which was taken in June at the same location, site visibility was reduced as a result of local vegetation.



While the proposed development would be visible from this location, it is considered that the changes to the existing structures would be minor and difficult to detect with the naked eye at this distance. The increased height of the proposed weaner house would be the only unobstructed change to the site from these vantage points and the difference in height would be minimal.

It is considered that there would be no significant impact to the visual amenity or landscape as a result of the development at locations represented by these viewpoints.

Summary of Visual Impacts

The topography of the landscape in the immediate vicinity of the proposed site is characterised by low-rise hills of glacial origin. Undulating topography, as represented in much of the surrounding landscape, has the ability to both shelter and absorb the visual impact of developments. The abundance of hills in the area serve to screen the proposed development site from the majority of surrounding residences and public roads. In addition, the majority of the surrounding hedgerows are well-established, are high and thick, providing good screening.

There are no properties within a c. 300 m radius of the site that are not owned by the applicant. The nearest privately owned residence is c. 500 m south-east of the site, from which the piggery is not visible.



Figure 7.4: Visual Assessment Points and Site Visibility

In the wider landscape, the existing structures at the piggery are visually shielded to an extent on three sides (east, north and west) because of the hedges/trees and local topography. Peripheral views of the existing site to the south-east and south-west are partially screened by these features. The existing structures and the site as a whole are most exposed from viewpoints located south of the site.

This has the benefit of shielding the majority of proposed developments from external viewpoints behind the existing structures at the site and therefore, there would be expected to be no visual impact as a result of the proposed extensions to houses 1 & 2, the proposed pre-finisher house, or the proposed remote slurry storage.

The only part of the development which would be expected to result in any visual impacts is the proposed weaner house. This development would increase the height of the existing weaner house, which forms the background of the existing site. The proposed weaner house would not

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

be expected to exceed the height of the existing feed silo's, the tallest existing structures currently at the site.

Therefore, it is anticipated that there would be a permanent slight to no significant impact upon the visual amenity at locations south of the site. It is anticipated that impacts would be predominantly limited to locations within 1 to 1.5 km of the site.

When designing new buildings, consideration is often given to colours of external facing materials to ensure a level of compatibility with the surrounding landscape. It is recommended that the proposed weaner house is to be finished in a dark green colour. This would act to blend the proposed structure with the existing boundary vegetation and make the edges of the structures less well defined.

It is also recommended that a treeline be planted along the southern boundary of the site, where possible, in order to provide additional screening and blend the foreground with background foliage around the site.

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7.4.4 LANDSCAPE PLANNING IMPACT

The European Landscape Convention Florence of October 2000 aimed to encourage member States to adopt policies and measures at local, regional, national and international level for protecting, managing and planning landscapes throughout Europe. The convention set out a range of different solutions which States could apply, according to their specific needs.

Ireland signed and ratified the Council of Europe's European Landscape Convention which came into effect on the 1st of March 2004. The Convention obliges Ireland to implement policy changes and objectives concerning the management, protection and planning of the landscape. In Ireland the National Landscape Strategy (2015 – 2030) is used to ensure compliance with the convention and to establish principles for protecting and enhancing it while positively managing its change.

The objectives of Irelands National Landscape Strategy are to:

- Implement the European Landscape Convention by integrating landscape into Ireland's approach to sustainable development;
- Establish and embed a public process of gathering, sharing and interpreting scientific, technical and cultural information in order to carry out evidence-based identification and description of the character, resources and processes of the landscape;
- Provide a policy framework, which will put in place measures at national, sectoral - including agriculture, tourism, energy, transport and marine - and local level, together with civil society, to protect, manage and properly plan through high quality design for the sustainable stewardship of Ireland's landscape;
- Ensure that Ireland takes advantage of opportunities to implement policies relating to landscape use that are complementary and mutually reinforcing and that conflicting policy objectives are avoided in as far as possible;

North Tipperary County Council has implemented its Landscape Character Assessment as part of its commitment to the European Landscape convention. The council's planning policy in assessing developments, has regard to the guidance contained in the Landscape Character Assessment. Proposed developments should seek to minimise the visual impact, particularly in areas designated as Sensitive and Vulnerable Landscapes.

Tipperary County Council encourages the development of sustainable alternative agricultural enterprises and non-agricultural enterprises as a means of supporting a viable rural community subject to the retention of the holding's primarily agricultural use and the proper planning and sustainable development of the area.

Tipperary County Council has implemented a series of actions and policies aimed at understanding, protecting, managing and planning the landscape of the county while also facilitating development. Policies such as LH1 (Landscape Management and Protection) states that: It is the policy of the Council to facilitate new development which integrates and respects the character, sensitivity and value of the landscape in accordance with the designations of the County Landscape Character Assessments.

The following table lists some of the more applicable landscape management policies from the Tipperary County Council Development Plan 2010 – 2016.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 7.2: Landscape Management Policies, Tipperary County Development Plan (2010-2016).

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION	ASSESSMENT
Policy LH1	Landscape Management and Protection. It is the policy of the Council to facilitate new development which integrates and respects the character, sensitivity and value of the landscape in accordance with the designations of the County Landscape Character Assessments (or any review thereof).	The area in which the new development is proposed to be built has been a piggery since the 1970s. This is a working landscape and the proposed development would be in keeping with this ethos, as with other farm hubs visible on the landscape. The development would not change the activities on site, and would create new employment opportunities in the area.
Policy LH2	Protection of Visual Amenity and Character of Primary and Secondary Amenity Areas. It is the policy of the Council to ensure the protection of the visual amenity, landscape quality and character of designated Primary and Secondary Amenity Areas. Developments which would have an adverse material impact on the visual amenities of the area will not be permitted. New development shall have regard to the following: A. Developments should avoid visually prominent locations and be designed to use existing topography to minimise adverse visual impact on the character of primary and secondary amenity areas. B. Buildings and structures shall ensure that the development integrates with the landscape through careful use of scale, form, finishes and colour. C. Existing landscape features, including trees, hedgerows and distinctive boundary treatment shall be protected and integrated into the design proposal. D. Developments shall comply with the development standards set out in the Rural Housing Design Guidelines.	According to the Councils County Development Plan The proposed development site is not located in or near a Primary or Secondary Amenity Area (figure 7.1). The site is positioned in the Borrisokane Lowlands, a low-lying area containing good pasture, tillage land and extensive areas of raised bog. The Borrisokane wetlands have been given a sensitivity rating of Class 2 (Moderate sensitivity to change) by the Tipperary Co. Council. The land use compatibility chart given by the Tipperary Co. Co. based on landscape sensitivity states that the Borrisokane Lowlands is most suited to agricultural and forestry development. The proposed building site is effectively screened by existing topography and woodland. The buildings would be finished in a dark green colour which should minimise the visual impact of the buildings. No hedgerows or treelines would be removed during the construction or operation of the proposed additional structures. It has been recommended that additional planting be completed along the southern boundary of the site, where possible.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION	ASSESSMENT
Policy LH3	Protection of Views of Scenic Value. It is the policy of the Council to protect and enhance views identified in the County development plan (i.e. views to and from Lakelands and waterways). The Council will not permit development which would obstruct or have a significant adverse impact on these views.	The region around the site is primarily agricultural. The proposed development site is not located within the vicinity of any protected views, scenic routes or designated highly scenic vistas identified in the County Development Plan.
Policy LH5	Biodiversity, Trees and Habitats. It is the policy of the Council to conserve, protect and enhance the county's bio-diversity, including trees and hedgerows, in accordance with the County Biodiversity Plans (any review thereof) and the standards set out in this Plan (as varied).	There will be no hedgerows/trees/existing scrub/grassland etc. removed during the construction of the proposed buildings. The applicant has planted several species of trees at different locations around the piggery site in an effort to encourage natural biodiversity. It has been recommended that additional planting be completed along the southern boundary of the site, where possible. Further recommendations with regard to biodiversity have been made within Chapter 8.0 of this EIAR.
Policy LH6	Natura 2000 Sites and Protected Species. It is the policy of the Council to ensure the protection, integrity and conservation of existing and candidate Natura 2000 sites and Annex I and II species listed in EU Directives. Where it is determined that a development may independently, or cumulatively, impact on the conservation values of Natura 2000 sites, the Council will require planning applications to be accompanied by a Natura Impact Statement in accordance with 'Appropriate Assessment of Plans and Projects, Guidelines for Planning Authorities', (DEHLG 2009) or any amendment thereof.	An appropriate assessment screening report has been completed as part of this application. The screening report states that there would be no potential for significant effects on European Sites (Natura 2000 network) as a result of the proposed development, by itself or in combination with other developments, and an Appropriate Assessment is not warranted.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION	ASSESSMENT
Policy LH7	Natural Heritage Areas. It is the policy of the Council to ensure the conservation and protection of existing and proposed NHAs, and to require that proposed developments within or in close proximity to an existing or proposed NHA would not have a significant adverse impact on the ecological status of the site.	NHA sites have been addressed within Chapter 8.0 of this EIAR.
Policy LH8	Inland Waters and Riparian Zones It is the policy of the Council to protect the ecological status and quality of watercourses. In order to maintain the natural function of existing ecosystems associated with water courses and their riparian zones and to encourage sustainable public access to waterbodies, the Council will require an undisturbed edge or buffer zone to be maintained, where appropriate, between new developments and riparian zones of water bodies.	The proposed development site does not overlap with any associated riparian buffer zones. The nearest riparian zone corresponds to the Collatrim River c. 500 m to the south of the site. Indirect impacts to water quality and aquatic habitats has been addressed within Chapter 8.0 of this EIAR.
Policy LH10	Peatlands. It is the policy of the Council to have regard to the Draft National Peatlands Strategy and to ensure the conservation of peatlands which are designated sites as set out in Appendix 4. The Council will support agricultural diversification and the development of tourism facilities in peatland areas where appropriate, where it is demonstrated that such developments would not significantly or adversely impact on the ecological and environmental sustainability of such sites.	Ireland's Peatlands are a unique habitat in a European context. There are a number of peatland sites in Tipperary which have been designated SACs and are subject to conservation management plans. Directly to the north of the site less than 1.0 km away is an extensive area of peatland that is used for turf cutting, forestry and agriculture. The proposed development site does not overlap with any peatland areas.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION	ASSESSMENT
Policy LH11	Control of Invasive Species. It is the policy of the Council to protect plant and animal species and habitats as identified by the Habitats Directive, Birds Directive, Wildlife Act (1976) and Wildlife (Amendment) Act 2000 from invasive species and to seek control and manage the spread of invasive plant and animal species in the county.	The development will not involve the planting, breeding, or dispersal of any invasive animal or plant species. The facility will also not import or transport any vector materials such as soil.
Policy LH12	Water Framework Directive and River Basin Management Plans. It is the policy of the Council to protect and improve the county's water resources and support an integrated and collaborative approach to local catchment management in order to ensure the successful implementation of the River Basin Management Plans (or any review thereof)	There are no rivers, lakes, estuarine or coastal waters located on the site. There are also no surface or groundwater protected water abstraction zones on or near the site. The development will ensure that surface and groundwater's on the site are protected. The applicant understands that Tipperary Co. Co. has a responsibility to ensure the protection, maintenance and improvement of water quality through the implementation of the objectives of the Water Framework Directive and the River Basin Management Plans.

7.4.5 LANDSCAPE AND VISUAL IMPACT ASSESSMENT SUMMARY

The following methodology for assessing the visual impact of the development has been derived in accordance with the following guidance documents:

- Environmental Protection Agency, EPA (2017). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Ireland;
- Landscape Institute, LI, and Institute of Environmental Management and Assessment, IEMA, (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition, UK, Routledge;
- Landscape Institute, LI, Advice Note 01/11 (2011). Photography and Photomontage in Landscape and Visual Impact Assessment, UK;
- Countryside Agency in conjunction with Scottish Natural Heritage (2002). Landscape Character Assessment: Guidance for England and Scotland, UK;

Sensitivity

Given the nature, location and design features of the proposed development, it is considered that the landscape sensitivity of the area is “low” and tolerant to change. The visual sensitivity of the area is also considered to be “low” given that the site is a less important element in the view.

Magnitude of Change

The magnitude of landscape change may be considered “medium” due to the fact that the development is technically an extension of an existing facility. The magnitude of visual change may also be considered “low” in that the proposed development would not result in any noticeable change in the existing view.

Table 7.3: Significance of Landscape Effects Matrix

SIGNIFICANCE OF EFFECTS		SENSITIVITY		
		HIGH	MODERATE	LOW
MAGNITUDE OF CHANGE	HIGH	Major	Moderate-Major	Moderate
	MEDIUM-HIGH	Moderate-Major	Moderate	Minor-Moderate
	MEDIUM	Moderate	Moderate	Minor
	LOW-MEDIUM	Moderate	Minor-Moderate	Minor-Negligible
	LOW	Minor-Moderate	Minor	Negligible
	LOW - NEGLIGIBLE	Minor-Moderate	Minor-Moderate	Negligible
	NEGLIGIBLE	Negligible	Negligible	Negligible

(effects rated moderate and above are considered significant).

According to the LCA, The Borrisokane Wetlands are a moderately sensitive landscape area. The region in which the proposed site is positioned comprises a mixed topography of rising ground interspaced with chains of drumlins. The landscape is reasonably tolerant of change and has the capacity to absorb suitable developments (i.e. agricultural).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The proposed development is of an agricultural nature, and would be incorporated within an existing farming enterprise. Therefore, it is not anticipated that there would be any significant impact to the landscape character of the area.

With regard to visual impacts, the proposed buildings would be well screened to the west, north and east by existing treelines and the undulating topography of the area. The design and site layout of the proposed buildings would take into consideration the need to minimise the associated visual impact. The proposed structures are proximate to the existing structures and very similar in terms of design, height and scale.

To the south, the existing structures would screen the majority of proposed development from causing any significant visual impacts. The roof of the proposed new weaner shed would be the only new visual element at the site, and would be an extension to the existing weaner roof in place at the site.

As the proposed new roof would not significantly alter the profile, visual extent or character of the site, it is anticipated that there would be a permanent but slight to no significant impact as a result of the proposed development to locations atop ridgelines to the south of the site.

The recommendation of a green finish on the buildings would ensure that the development would blend in well with surrounding landscape features and elements. The recommended planting of trees to the south of the existing buildings would also merge the existing and proposed structures with the treelined character of the area.

Given the nature, location and design features of the proposed buildings, it is considered that the proposed development would have a non-significant Minor-Negligible effect on the level of landscape and visual impact in the area.

7.5 MITIGATION MEASURES

All existing hedgerows should be retained in so far as is practical. There is an appropriate amount of greenery in the form of mature trees and hedgerows currently at the site to screen the development site from several directions.

The proposed finished site structures would be of a similar visual character as the existing buildings on the site. It is recommended that native trees, appropriate to the area, are planted south of the existing buildings, where feasible. While planting along this boundary is unlikely to completely mitigate views of the development, once mature, a treeline would aid in breaking up the site as a single visual element in the landscape and would help to blend foreground and background treelined character.

It is also recommended to finish the new buildings in a dark green colour, which would significantly help to blend the structure into the existing environment helping to reduce or even nullify any visual impact.

7.6 RESIDUAL IMPACTS

The completed development, on its own or in combination with other developments, would result in no significant residual impact to the visual amenity of the landscape, given that the proposed development would effectively be an expansion to the already existing piggery.

Taking into account the “low” sensitivity of the landscape type and “low – medium” magnitude of visual impact that the proposed development would create, the development would result in a minor – negligible residual effect to the visual character of the area.

7.7 REFERENCES

Countryside Agency in conjunction with Scottish Natural Heritage (2002). Landscape Character Assessment: Guidance for England and Scotland, UK. Available online: <https://www.nature.scot/sites/default/files/2018-02/Publication%202002%20-%20Landscape%20Character%20Assessment%20guidance%20for%20England%20and%20Scotland.pdf> Accessed July 2019.

Environmental Protection Agency (2002) Guidelines on the information to be contained in an Environmental Impact Statement. Available online: https://www.epa.ie/pubs/advice/ea/guidelines/EPA_Guidelines_EIS_2002.pdf Accessed July 2019.

Environmental Protection Agency (2003) Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements). Available online: https://www.epa.ie/pubs/advice/ea/guidelines/EPA_advice_on_EIS_2003.pdf Accessed July 2019.

Environmental Protection Agency (2017) Draft. Guidelines on the information to be contained in Environmental Impact Assessment Reports. Available online: <https://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf> Accessed July 2019.

Guidelines used in the preparation of the landscape and visual impact assessment. Available online. <http://www.pleanala.ie/misc/PCI/PCI1/DAF1/North%20South%20-%20Draft%20Application%20File/Volume%203/Volume%203C%20Appendices/Appendix%2011.1%20CMSA%20Tables.pdf> Accessed July 2019.

Ireland the National Landscape Strategy (2015 – 2025). Department of Arts, Heritage and the Gaeltacht. Dublin, Irish government. Available online: <https://www.chg.gov.ie/app/uploads/2015/07/N-Landscape-Strategy-english-Web.pdf> Accessed July 2019.

Landscape Character Assessment and an associated Schedule of Views, Prospects and Scenic Routes Available online: <http://www.carlow.ie/wp-content/documents/uploads/carlow-county-development-plan-appendix-6-landscape-character-assessment.pdf> Accessed July 2019.

Landscape Character Assessment of Tipperary (2016) Landscape Character Assessment. Available online:

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

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Landscape Institute, LI, Advice Note 01/11 (2011). Photography and Photomontage in Landscape and Visual Impact Assessment, UK. Available online: <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2018/06/draft-tin-2018-XX-photography-photomontage-lvia.pdf> Accessed July 2019.

Landscape Institute, LI, and Institute of Environmental Management and Assessment, IEMA, (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition, UK, Routledge. Available online: <http://bailey.persona-pi.com/Public-Inquiries/A465-English/10%20-%20Landscape%20and%20Visual%20Impact/10.2.8%20-%20IEMA%202013%20Guidelines%20for%20Landscape%20and%20Visual%20Impact%20Assessment.pdf> Accessed July 2019.

The European Landscape Convention Florence. European Treaty Series-No. 176. Council of Europe, Palais de l'Europe, Strasbourg 22-23 March 2007. Available online: <https://rm.coe.int/16806b07e6> Accessed July 2019.

Tipperary County Council (2019) North Tipperary County Development Plan 2010-2016. Available online: <https://www.tipperarycoco.ie/sites/default/files/North%20Tipperary%20County%20Development%20Plan%202010%20-%20As%20Varied.pdf> Accessed July 2019.

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SECTION B

THE NATURAL ENVIRONMENT

This Section of the Environmental Impact Assessment Report deals with the potential effects of the proposed development on the natural environment. The effects have been grouped as follows:

Impacts on Biodiversity

Impacts on Land – Soils, Geology, Hydrogeology and Hydrogeology

Impacts on Climate

The various aspects of the natural environment interact to some degree with each other so that assessing one aspect in isolation can be misleading. For example, the survival of terrestrial fauna can be dependent on floral composition, which is in turn dependent on soil composition and groundwater levels. Similarly, the diversity of aquatic flora and fauna would be impacted by both hydrology and the quality of waters receiving drainage from the proposed scheme.

Human Beings also interact with the natural environment, often by altering land-use and landscape patterns for the purpose of agriculture and settlement.

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8.0 BIODIVERSITY

8.1 INTRODUCTION

This section outlines the biodiversity currently present in the area of the proposed development and assesses the impact of the proposal on the habitats and species identified. This section should be read in conjunction with the site layout plans for the proposed development and project description sections of the EIAR. Mitigation measures have been proposed where required.

The ecological assessment involved a desktop review and the undertaking of a field assessment of the site to identify habitats and species of flora and fauna present in order to determine the ecological diversity of this area. A Screening for Appropriate Assessment Report has been prepared for the proposed development and accompanies the planning application (Report Ref. PES_AA_19_9350).

The objectives of the ecological assessment were as follows:

- To undertake a comprehensive desktop review to identify European sites (Natura 2000 sites) within the vicinity of the proposed development and to determine previously recorded fauna for the area;
- To undertake a field assessment of the proposed development site and surroundings;
- To evaluate the biodiversity value of the proposed development and surroundings;
- To determine and assess the potential impacts of the proposed development on biodiversity;
- To propose mitigation measures for both the construction and operational phases of the development, where required, to reduce potential impacts upon biodiversity.

8.2 LEGISLATIVE FRAMEWORK AND PLANNING POLICY

8.2.1 LEGISLATIVE CONTEXT

The main legislation pertaining to biodiversity and nature conservation in Ireland is outlined below.

The Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000

The Wildlife Act is the primary piece of Irish legislation providing for the protection and conservation of wildlife and provides for the control of specific activities which could adversely affect wildlife, for example the regulation of hunting and wildlife trading. Under the Wildlife Act, all bird species, 22 other fauna species and 86 flora species in Ireland are afforded protected status. The Wildlife Act, 1976 allows for the designation of specific areas of ecological value such as Statutory Nature Reserves and Refuges for Fauna. The Wildlife (Amendment) Act, 2000 provides for greater protection and conservation of wildlife and also provides for the designation and statutory protection of Natural Heritage Areas (NHA).

The Flora (Protection) Order, 2015 (S.I. 356 of 2015)

This order provides statutory protection to flora listed in Section 21 of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000. Under the Order, it is illegal to wilfully cut, uproot or damage the listed species or interfere in any way with their habitats.

European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011)

These regulations transpose the European Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (known as the “Habitats Directive”) and the European Council Directive 2009/147/EC on the Conservation of Wild Birds (known as the “Birds Directive”) into Irish Law. The regulations provide for the designation and protection of Natura 2000 sites comprising of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The regulations safeguard the SAC and SPA sites from developments with the potential to significantly impact upon them. The EC (Birds and Natural Habitats) Regulations also address invasive species, making it an offence without a licence to plant, allow to disperse, escape or spread, to reproduce or propagate, to transport, to sell or advertise invasive species specified in the regulations.

European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. 272 of 2009)

The regulations give statutory effect to Directive 2008/105/EC and provide legal status to quality objectives for all surface waters and environmental quality standards for pollutants. The regulations allow for the classification of surface waters by the Environmental Protection Agency (EPA) in accordance with the ecological objectives approach of the Water Framework Directive. The regulations also provide for the establishment of inventories of priority substances by the EPA and the preparation of pollution reduction plans.

Water Framework Directive (2000/60/EC)

The Water Framework Directive (WFD) aims to improve the water environment (including groundwater, rivers, lakes, estuaries and coastal waters) of E.U. Member States. The aim of the WFD is for Member States to achieve and maintain “good status” in all water bodies.

The Fisheries (Consolidation) Act, 1959, as Amended

The Act prohibits the entry of polluting substances into waters, which have the potential to adversely impact upon fish, prohibits the obstruction of passage of certain fish species and provides legal protection to the spawn/fry of eels, salmon and trout, in addition to their spawning or nursery grounds.

Fisheries (Amendment) Act, 1999

This Act outlines the responsibilities of the Regional Fisheries Board to ensure the protection and conservation of fish and their habitats within its area of jurisdiction.

European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. 293 of 1988)

These regulations give statutory effect to Directive 78/659/EEC. The regulations designate salmonid waters, specify the quality standards for designated salmonid waters and outline the monitoring requirements.

Planning and Development Regulations, 2001 to 2018

These regulations transpose the requirements of Directive 2014/52/EU (and previous Directive 2011/52/EU) on the assessment of the effects of certain projects on the environment into planning law. Under these regulations, development plans must include mandatory objectives for the conservation of natural heritage and for the conservation of European sites.

8.2.2 PLANNING POLICIES

National Policies

A number of documents have been published in relation to the Government's commitment to sustainable development, including the *National Spatial Strategy 2002-2020* and the *Sustainable Development: A Strategy for Ireland 1997*.

Regional Policies

The Mid-West Regional Planning Guidelines 2010 to 2022, which includes the counties of Clare, Limerick and North Tipperary, outlines the long-term spatial planning strategy for the area. A number of policies relate to biodiversity and are relevant to the proposed development, as per **Table 8.1** below.

Table 8.1: Regional Policies Relevant to Biodiversity and the Proposed Development

REFERENCE	POLICY
Chp. 7, Pg. 94	Development Plans should include objectives for the maintenance of the conservation value of Natura 2000 sites within the area of the Plan or those areas affected by the Plan, and require assessment of all plans and projects likely to have a significant effect on those sites. Development Plans should consider how degraded habitats can be re-instated and should include policies to facilitate such re-instatement wherever possible. Prior to the introduction of structures for the management of water bodies within the Region, Local Authorities should ensure that common approaches are taken to the protection of surface and underground water bodies. These approaches should, <i>inter alia</i>, ensure that: - The impact of developments on water bodies outside the jurisdiction of the individual authorities are considered when decisions on discharges and water extraction are being made; - Developments do not interfere with the attainment of the standards required by the Water Framework Directive; - Joint actions are taken to positively address the attainment of the standards required by the Water Framework Directive, and; - Common approaches to the management of the impacts of land drainage are adopted.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

REFERENCE	POLICY
	When the RBDMPs are operational, the requirements of those plans shall be deemed to be the requirements of the RPGs. Development Plans should include consideration of the adoption of a framework for the management of invasive species within the Region.
Chp. 7, Pg. 95	Development Plans should include policies deriving from the agreed protocols regarding the protection of aquifers in general, and should undertake to consider the impacts on aquifers outside their functional areas of developments that may occur within those areas having regard to the European Communities Environmental Objectives (Groundwater) Regulations 2010. Development Plans should also include the specific policies regarding to the protection of groundwater in the sections regarding various forms of development as outlined above. When the RBDMPs are operational the requirements of those plans shall be deemed to be the requirements of the RPGs.
Chp. 7, Pg. 96	Such development may require the provision of wastewater facilities that discharge to river systems. Many of these systems contain Natura 2000 Sites that would be vulnerable to inadequately treated wastewater discharges. Therefore, policies for the development of recreational facilities in such areas must be contingent on, and be stated to be contingent on, the provision of wastewater treatment systems with a capacity to produce wastewater discharges of a standard that will not impact negatively on downstream Natura 2000 Sites. Even where Natura 2000 sites are not impacted on, any recreational development will be contingent on effluent arising from it being such that it will not impact on any wastewater treatment system whether private or public, that will prevent that system discharging a final effluent that meets the requirements of the appropriate RBDMP. Recreational developments may be proposed in areas without a piped wastewater collection and treatment system and this has implications for the quality of groundwater in the Region. The RBD analyses have identified areas within the Region where the quality of the groundwater is not adequate. Any development that requires the provision of a private treatment system should be considered in the context of the following: - The quality of the groundwater into which the effluent will discharge and the need to preserve or improve that quality; - The quality of the effluent proposed to be discharged from the waster-water treatment process; - The quantity of the effluent proposed to be discharged; - The capacity of the ground to enhance the quality of the final effluent; - Proposals for the management and maintenance of the treatment system, and; - The capacity of the Local Authority to monitor the quality of the discharge. Permission should not be granted unless the Planning Authority is satisfied that the quality of the groundwater will not be impaired and policies to this effect should be included in Development Plans. In addition to the impact from wastewater, recreational developments may have other negative implications for Natura 2000 sites. These implications may be related to the physical destruction of a habitat, the impact of air emissions, the impact of traffic, noise and other general activities and light pollution. No commercial policy shall be adopted or development permitted in or in proximity to a Natura 2000 site unless it can be demonstrated through the carrying out of an EHDA that the development will not impact negatively on a Natura 2000 site or that where such an impact is likely it can be mitigated satisfactorily.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Local Policies

Local planning policies are detailed in the North Tipperary County Development Plan, 2010 – 2016 (as varied). A number of policies relate to biodiversity and are relevant to the proposed development, summarised as follows:

Table 8.2: Summary of Local Policies Relevant to Biodiversity and the Proposed Development

POLICY REFERENCE	AREA
Policy LH5	It is the policy of the Council to conserve, protect and enhance the county's bio-diversity, including trees and hedgerows, in accordance with the County Biodiversity Plans (any review thereof) and the standards set out in this Plan (as varied).
Policy LH6	It is the policy of the Council to ensure the protection, integrity and conservation of existing and candidate Natura 2000 sites and Annex I and II species listed in EU Directives. Where it is determined that a development may independently, or cumulatively, impact on the conservation values of Natura 2000 sites, the Council will require planning applications to be accompanied by a Natura Impact Statement in accordance with 'Appropriate Assessment of Plans and Projects, Guidelines for Planning Authorities', (DEHLG 2009) or any amendment thereof.
Policy LH7	It is the policy of the Council to ensure the conservation and protection of existing and proposed NHAs, and to require that proposed developments within or in close proximity to an existing or proposed NHA would not have a significant adverse impact on the ecological status of the site.
Policy LH8	It is the policy of the Council to protect the ecological status and quality of watercourses. In order to maintain the natural function of existing ecosystems associated with water courses and their riparian zones and to encourage sustainable public access to waterbodies, the Council will require an undisturbed edge or buffer zone to be maintained, where appropriate, between new developments and riparian zones of water bodies.
Policy LH10	It is the policy of the Council to have regard to the National Peatlands Strategy 2015 and to ensure the conservation of peatlands which are designated sites as set out in Appendix 4. The Council will support agricultural diversification, renewable energy development and the development of tourism and community recreational facilities in peatland areas, where appropriate, and where it is demonstrated that such developments would not significantly or adversely impact on the ecological and environmental sustainability of such sites.
Policy LH11	It is the policy of the Council to protect plant and animal species and habitats as identified by the Habitats Directive, Birds Directive, Wildlife Act (1976) and Wildlife (Amendment) Act 2000 from invasive species and to seek control and manage the spread of invasive plant and animal species in the county.
Policy LH12	It is the policy of the Council to protect and improve the county's water resources and support an integrated and collaborative approach to local catchment management in order to ensure the successful implementation of the River Basin Management Plans (or any review thereof).

Biodiversity Plans

Ireland's third National Biodiversity Plan 2017–2021, identifies actions towards understanding and protecting biodiversity with a vision that, *"biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland*

contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally". A number of Local Biodiversity Action Plans have been prepared, including the North Tipperary Local Biodiversity Action Plan 2007 (Draft).

All-Ireland Pollinator Plan

In 2015, Ireland joined a number of other European countries in developing a strategy to address pollinator decline and protect pollination services. 68 governmental and non-governmental organisations agreed a shared plan, the "All-Ireland Pollinator Plan", which identifies 81 actions to make Ireland pollinator friendly. The plan provides recommendations for six different sectors, including farmers, county councils, communities, businesses, homeowners and schools.

8.3 METHODOLOGY

8.3.1 RELEVANT GUIDELINES

The following guidance documents have been consulted for this assessment, with a full list of consulted documentation and guidelines included within **Section 8.10**:

- *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2016);
- *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (Draft) (EPA, 2017);
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009);
- *A Guide to Habitats in Ireland* (Fossitt, 2000);
- *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.*, 2011);
- *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA, 2009);
- *Expedition Field Techniques: Bird Surveys* (Bibby *et al.*, 2000);
- *Bird census and survey techniques* (Gregory *et al.*, 2004);
- *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins 2016);
- *Bat Mitigation Guidelines for Ireland* (Kelleher and Marnell, 2006);
- *Bats and artificial lighting in the UK* (Bat Conservation Trust, 2018);
- *Bats & Lighting: Guidance Notes for Planners, Engineers, Architects and Developers* (Bat Conservation Ireland, 2010).

8.3.2 STUDY AREA / ZONE OF INFLUENCE

Following guidance set out by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2016) and the National Roads Authority (2009), a Zone of Influence should be determined, which identifies the area in which the development could potentially impact upon ecological receptors. The zone of influence takes into consideration the assigned

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

ecological value of the receptors, which ranges from international, national, county to local, and potential pathways for impacts to occur.

Taking into consideration best practice guidance and the nature of the development, the study area for the assessment ranges from the site boundary for habitats, to buffers of 100m for specific species. However, it should be noted that these buffers were extended where required.

8.3.3 DESKTOP RESEARCH

Desktop research comprised of gathering information on designated sites within 15km of the proposed development, reviewing mapping sites to provisionally identify any potential ecologically important features prior to the site assessment and reviewing online resources to determine what notable species, including protected, rare or invasive, had previously been recorded for the proposed development area and environs. The following online resources were consulted as part of this process:

- National Parks and Wildlife Service (NPWS) website: mapping of designated sites and information on designated sites within the vicinity of the development;
- NPWS Wildlife Manuals for certain habitats and species;
- National Biodiversity Data Centre (NBDC) website: data on notable species (protected, rare or invasive) within the two 2km squares (R98Q and R98R) and 10km square (R98) in which the proposed development is located;
- NPWS reports on “*The Status of Protected EU Habitats and Species in Ireland*”;
- NPWS Ireland Red Lists for species;
- Botanical Society of Britain and Ireland website: flora distribution maps;
- Data on the status of bird species from “*Birds of Conservation Concern in Ireland 2014-2019*”, (Coulhoun and Cummins, 2013);
- Various mapping websites, including EPA Envision, Google Maps, Myplan and OSI.

In addition to the above, the NPWS was contacted on the 9th of July 2019 in relation to records for sensitive, rare, threatened and protected species within 10km of the development location. Results were returned on the 23rd of July 2019.

A data request for bat records within 10km of the proposed development site was received from Bat Conservation Ireland (BCI) on the 22nd of July 2019.

8.3.4 FIELD SURVEYS METHODOLOGY

A site assessment was undertaken on the 25th of September 2019 to examine the ecological context of the proposed development, as outlined in **Table 8.3** below. Surveys had due consideration for the relevant best practice guidelines as referenced in **Section 8.3.1**.

Table 8.3: Ecological Surveys Informing the EIAR

SURVEY	STUDY AREA
Habitat Survey	100m
Fauna Survey	100m
Daytime Assessment of Bat Roost Potential	20m
Bird Survey (General)	50m

Habitats and Flora Survey

This assessment involved determining the habitats and flora present within the proposed development. The habitat survey was undertaken in accordance with the standard methodology outlined in Fossitt's "*A Guide to Habitats in Ireland*", (Fossitt, 2000), a hierarchical classification scheme based upon the characteristics of vegetation present. The Fossitt system also indicates when there are potential links with Annex I habitats of the E.U. Habitats Directive (92/43/EEC). Cognisance was also taken of the Heritage Council guidelines, "*Best Practice Guidance for Habitat Survey and Mapping*", (Smith *et al.*, 2011). The relative abundances of flora was determined using the DAFOR Scale, an acronym for the abundance levels – Dominant, Abundant, Frequent, Occasional and Rare.

During the site walkover, any notable flora species were recorded, with an emphasis on statutorily protected or rare species, species of conservation significance and invasive species.

Fauna Survey (Excluding Bats)

A fauna survey was undertaken during bright and dry weather conditions. Direct observation methods were used for the survey of fauna, however, these methods may not be suitable for shy and nocturnal species. Therefore, indirect methods were also employed, focusing on evidence of fauna including tracks, burrows/setts/nests, droppings, food items and hair. The habitats on site were assessed for signs of usage by fauna and the potential to support protected or red-listed species.

Bat Survey – Assessment of Bat Roost Potential

The buildings scheduled for demolition and an individual mature tree within the north-eastern portion of the site scheduled for removal were the focus of the assessment of bat roost potential. While an area of scrub would also require removal, the trees present are immature and therefore would not be considered suitable for potential bat roosts. The proposed development would not necessitate the removal of any other mature trees, hedgerows or treelines at the site.

A daytime assessment of the buildings and mature tree scheduled for removal was undertaken on the 25th of September 2019. The assessment comprised of an external inspection of the buildings and tree to identify potential roost features (PRFs) and evidence of bat activity, using close focusing binoculars. The criteria used to categorise the PRFs or suitability of trees and buildings as a potential roost are summarised in the table below, based upon the guidelines by Collins (2016) and Hundt (2012).

Table 8.4: Bat Roost Potential Categories

CATEGORY	DESCRIPTION
High Trees / buildings that are suitable for use by large numbers of bats on a regular basis	Features include holes, cracks or crevices that extend or appear to extend back to cavities suitable for bats. In buildings, examples include eaves, barge boards, gable ends and corners of adjoining beams, ridge and hanging tiles, behind roofing felt or within cavity walls. In trees, examples include hollows and cavities, rot holes, cracks/splits and flaking or raised bark which could provide roosting opportunities. Any ivy cover is sufficiently well-established and matted so as to create potential crevices beneath. Further survey work would be required to determine whether or not bats are present, and if so, the species present. Appropriate mitigation and potential licencing requirements may then be determined.
Moderate Moderate potential is assigned to trees / structures with potential to support bat roosts but supports fewer features than a high potential building / tree and is unlikely to support a roost of high conservation value.	From the ground, building / tree appears to have features (e.g. holes, cavities, cracks or dense ivy cover) that may extend back into a cavity. However, owing to the characteristics of the feature, they are deemed to be sub-optimal for roosting bats. Further survey work would be required to determine whether or not bats are present, and if so, the species present. Appropriate mitigation and potential licencing requirements may then be determined.
Low Low potential is assigned to structures and trees with features that could support individual bats opportunistically.	If no features are visible, but owing to the size, age and/or structure, hidden features, sub-optimal for roosting bats, may occur that only an elevated inspection may reveal. In respect of ivy cover, this is not dense (i.e. providing PRF in itself) but may mask presence of PRF features. Further survey work may be required for buildings only or works may proceed using reasonable precautions (e.g. controlled working methods, under license or supervision of a bat worker).

Bird Survey

General bird usage of the development site was assessed on the 25th of September 2019. While walking the development site, stops were undertaken on a regular basis during which time the area was scanned as far as the terrain or weather conditions allowed. Birds were identified by visual sightings and auditory identification of songs and calls. Birds flying overhead were also included as part of the survey.

Surveys Scoped Out

The following ecological features were scoped out:

Invertebrate (aquatic) / Fish surveys: There are no aquatic features within the proposed development footprint or immediate vicinity of the site. The nearest aquatic feature is the Wilton Stream, located approximately 135m south of the development site. It is considered that the assessment of the potential impacts of the development upon water quality (discussed further in this section and within **Section 9**) is sufficient in assessing the potential impact of the development upon water quality and aquatic habitats and species.

Bat Activity Survey: No significant vegetation removal works are required as part of the proposed development, with only one mature tree scheduled for removal. The existing development has limited external lighting and the proposed development would not require additional external lighting. It is therefore considered that a bat activity survey is not required and that the potential impact upon bat species can be determined based upon the fauna survey and assessment of bat roost potential undertaken as discussed in the sections above.

Reptile Surveys: Areas of the study area may provide suitable basking and refuge habitat for protected viviparous lizard (*Zootoca vivipara*). The numbers of viviparous lizard, if present at the site, are likely to be low and unlikely to be picked up in survey.

Survey Limitations

Every effort has been made to provide an accurate assessment of the situation pertaining to the site. However, an ecological survey can only assess a site at a particular time and is limited by various factors such as the season, timing of the survey, climatic conditions and species behaviour. Ecological surveys are therefore snapshots in time and should not be regarded as a complete study. Direct observations or evidence of protected species is not always recorded during ecological surveys. However, this does not indicate that the species is absent from the site.

To ensure any limitations encountered did not significantly impact upon the findings of the ecological assessments, the ecological surveys undertaken also assessed the potential of the habitats to support protected species and cognisance has been taken of available online baseline data (e.g. flora and fauna records from the NBDC, consultation with NPWS regarding protected / threatened species, consultation with BCI regarding bat roost records) and a precautionary approach taken.

8.3.5 ECOLOGICAL VALUATION CRITERIA

The ecological value of the habitats and species identified at the development site have been assessed following the criteria outlined in the 2009 NRA guidelines and is consistent with the *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (CIEEM, 2016).

8.4 DESCRIPTION OF EXISTING ENVIRONMENT

8.4.1 DESIGNATED SITES

The proposed development does not directly impinge on any designated site. In total, there are 7 designated sites located within 15km of the proposed development: 4 Special Area of Conservation (SAC) sites, 1 Special Protection Area (SPA) site and 2 Natural Heritage Area (NHA) sites. There are also 13 proposed Natural Heritage Area (pNHA) sites within approximately 15km of the development site. There are no RAMSAR sites, National Parks or Nature Reserve sites located within 15km of the development site.

Maps detailing these designated sites in relation to the proposed development are included in **Attachment 8.1**.

The following tables detail the SAC, SPA, NHA and pNHA sites located within 15km of the proposed development.

While the rule of thumb for selecting which European sites are to be analysed for potential impacts is to include all European sites within a distance of 15km, an additional SPA site has been included within **Table 8.6** below as it falls just outside the distance band and is also hydrologically connected with the proposed development (discussed further in the following sections).

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 8.5: SAC Sites within 15km of the Proposed Development

SITE NAME	SITE CODE	APPROX. DISTANCE TO DEVELOPMENT	QUALIFYING INTERESTS
Scohaboy (Sopwell) Bog SAC	002206	9.6km N	[7120] Degraded Raised Bog
Kilduff, Devilsbit Mountain SAC	000934	11.5km S-E	[4030] Dry Heath [6230] Species-rich Nardus Grassland*
Sharavogue Bog SAC	000585	13.5km N-E	[7110] Raised Bog (Active)* [7120] Degraded Raised Bog [7150] Rhynchosporion Vegetation
Lough Derg, North-east Shore SAC	002241	14.5km N-W	[5130] Juniper Scrub [7210] Cladium Fens* [7230] Alkaline Fens [8240] Limestone Pavement* [91E0] Alluvial Forests* [91J0] Yew Woodlands*

*Denotes a priority habitat

Table 8.6: SPA Sites within 15km of the Proposed Development

SITE NAME	SITE CODE	DISTANCE TO PROPOSED DEVELOPMENT	SPECIAL CONSERVATION INTEREST
Slievefelim to Silvermines Mountains SPA	004165	13.3km S-SW	[A082] Hen Harrier (<i>Circus cyaneus</i>)
Lough Derg (Shannon) SPA	004058	15.8km N-W	[A017] Cormorant (<i>Phalacrocorax carbo</i>) [A061] Tufted Duck (<i>Aythya fuligula</i>) [A067] Goldeneye (<i>Bucephala clangula</i>) [A193] Common Tern (<i>Sterna hirundo</i>) [A999] Wetland and Waterbirds

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 8.7: NHA Sites within 15km of the Proposed Development

SITE NAME	SITE CODE	APPROX. DISTANCE TO PROPOSED DEVELOPMENT
Scohaboy Bog NHA	000937	8.5km N
Cangort Bog NHA	000890	13.2km N-E

Table 8.8: pNHA Sites within 15km of the Proposed Development

SITE NAME	SITE CODE	APPROX. DISTANCE TO PROPOSED DEVELOPMENT
Ballintemple Bog pNHA	000882	4km N-E
Lough Ourna pNHA	000650	8.8km N-W
Killavalla Wood pNHA	001178	10.3km S
Willsborough Esker pNHA	000943	10.4km N-W
Lough Nahinch (Tipperary) pNHA	000936	11.3km N-E
Kilduff, Devilsbit Mountain pNHA	000934	11.6km S-E
Clareen Lough pNHA	000929	12.4km N-W
Miltown, Shinrone pNHA	002065	12.6km N-E
Mount St. Joseph Woods pNHA	000913	13.6km N-E
Fiagh Bog pNHA	000932	14.3km N
Lough Derg pNHA	000011	14.5km N-W
Lough Avan pNHA	001995	14.9km N-W
Nenagh River Gorge pNHA	001133	14.9km S-W

Given the distances of the above designated sites to the proposed development site and given that the development site is located within the Ballysteen Formation, with likely short flow paths and groundwater mainly restricted to the subsurface zone (Kelly, 2003), (discussed further in **Section 9**), it is not considered that the development site would have a groundwater connection with the designated sites.

For this assessment, the sites considered to be within the potential zone of influence of the proposed development were the Lough Derg, North-east Shore SAC (Site Code: 002241) and the Lough Derg (Shannon) SPA (Site Code: 004058), due to hydrological connectivity with the proposed development.

Scohaboy (Sopwell) Bog SAC (Site Code: 002206) and Scohaboy Bog NHA (Site Code: 000937), while within the same river catchment as the development site, are located upstream of the proposed development and therefore are not hydrologically connected with the development. However, while unlikely to be within the potential zone of influence, these sites have been included for assessment due to distance.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The proposed development is not located within the same river catchment as Sharavogue Bog SAC (Site Code: 000585) or Cangort Bog NHA (Site Code: 000890) and thus is not hydrologically connected to these sites. While small portions of the Kilduff, Devilsbit Mountains SAC (Site Code: 000934) and Slievefelim to Silvermines Mountains SPA (Site Code: 004165) are within the same river catchment as the development, these sites are located upstream of the development site. Therefore, in the absence of a source-pathway-receptor relationship and given the distances from the development, these sites have been screened out.

Scohaboy (Sopwell) Bog SAC (Site Code: 002206)

The conservation objectives for the SAC site are to maintain or restore the favourable conservation condition of the qualifying interest. An excerpt from the Natura 2000 Data Form for the Scohaboy (Sopwell) SAC is included below, while further details are available within the site's site synopsis (NPWS, 2016).

“Scohaboy (Sopwell) Bog SAC (002206) comprises 71.91 ha of raised bog (62.36 ha of high bog and over 9.55 ha cutover) which occupies the central section of the northern end of Scohaboy Bog NHA (000937). Scohaboy Bog is a Midland type raised bog developed in a basin. The site is bounded by peatland on all margins, apart from the north where a stream flows along the northern margin. Cutover bog occurs in the south-east of the site and an area of approximately 19 ha of clear-felled coniferous plantation is present on the high bog to the north of the site. Over 43 ha of the high bog was never afforested but a considerable proportion of that area was subjected to intensive, but shallow drainage. That drainage was not maintained and in some areas has naturally partly infilled by bog moss *Sphagnum* species regrowth over the years. The afforested area was planted in the 1980s and was all clearfelled by 2013. Much of the unafforested high bog has vegetation typical of Midland Raised Bog type. The two scarce hummock forming bog mosses, *Sphagnum fuscum* (*sensu lato*) and *S. austinii* occur with the latter being locally frequent in places. Some of the recovering pool systems are quite large with Bog Bean (*Menyanthes trifoliata*) and Great Sundew (*Drosera anglica*) present.

When the conifer plantation in the SAC were removed the intensive drainage system associated with it was blocked by 2014 as part of an EU funded LIFE project so as to raise the water table and restore Active raised bog (ARB) on the site... Much of the cutover to the south-east of the site is dominated by Purple Moor-grass (*Molinia caerulea*) with scattered scrub of Gorse (*Ulex europaeus*) and Downy Birch (*Betula pubescens*) in places. Peat cutting ceased in the area in 2015 and the cutover drains were all blocked in late 2015. The area has now rewetted and should eventually support raised bog communities and species. It is estimated that approximately 1.6 ha of this cutover has the potential to support Active Raised Bog in the medium to long term (i.e. over 30 years period).

Scohaboy (Sopwell) Bog SAC is a site of considerable conservation significance comprising raised bog, a rare habitat in the EU and one that is becoming increasingly scarce and under threat in Ireland. It contains good examples of the EU Habitats Directive Annex I habitat Degraded raised bog (capable of regeneration) which is being restored to the priority Annex 1 habitat Active raised bog. The site already supports a good diversity of raised bog microhabitats including some hummock/hollow complexes, tear pools and rewetted cutover bog and is one of the more southerly

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

raised bogs in the south Midlands which adds significantly to its ecological importance. The site is being actively managed for conservation as part of the Coillte EU LIFE Project and most of the required restoration measures have already been carried out. Those measures that remain, or are ongoing, should be achievable with average effort. An After LIFE management plan is being developed by Coillte for the future conservation management of the SAC. The SAC is located within the raised bog Scohaboy Bog NHA (000937) the conservation management of which should support the redevelopment of Active Raised Bog in the SAC.

The presence of White-clawed Crayfish (*Austropotamobius pallipes*), a species listed in Annex II of the EU Habitats Directive, adds to the diversity and scientific value of the site. The population at this site is considered to have a favourable conservation status with the presence of adults and juveniles. The presence of this species increases the overall scientific interest of the site.”

The main site vulnerabilities, including any key pressures or trends within and around Scohaboy (Sopwell) Bog SAC that have been identified as impacting upon the site, may be summarised as peat extraction and human induced changes in hydraulic conditions.

Lough Derg, North-East Shore SAC (Site Code: 002241)

The conservation objectives for the SAC site are to maintain or restore the favourable conservation condition of the qualifying interests. An excerpt from the Natura 2000 Data Form for the Lough Derg, North-east Shore SAC is included below, while further details are available within the site’s site synopsis (NPWS, 2014).

“This site incorporates part of the water body of Lough Derg and includes most of the northern lake shore and approximately one-third of the northeast shoreline. Lough Derg itself is the lowest order lake on the River Shannon and is one of the largest freshwater bodies in Ireland. Most of the lake overlies Carboniferous Limestone, which outcrops along the shores, but some old Red Sandstone occurs on the eastern side. The site is of high scenic value and is a well-known angling and tourism area.

This site supports a wide range of habitats, including Alkaline fens, Juniper scrub formations, limestone pavement, Yew woodlands, alluvial woodlands and *Cladium* fen. It also supports the only known population in the country for the Irish Red Data Book species Irish Fleabane (*Inula salicina*). Other scarce plant species found here include Whitebeam (*Sorbus aria*) and Buckthorn (*Rhamnus catharticus*). The endangered fish species Pollan (*Coregonus autumnalis*) has its European stronghold in Lough Derg. The open water areas of the lake itself are important for wintering wildfowl. Goat island holds a breeding colony of Common Tern (*Sterna hirundo*). A subflock of Greenland White-fronted Goose (*Anser albifrons flavirostris*) uses the callow lands around Slevoir Bay in Winter. A good population of Mute Swan (*Cygnus olor*) occurs.”

The main site vulnerabilities, including any key pressures or trends within and around the Lough Derg, North-east Shore SAC that have been identified as impacting upon the site, may be summarised as:

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

- Fertilisation;
- Mining and quarrying;
- Transportation and service corridors;
- Outdoor sports and leisure activities, recreational activities;
- Pollution to surface waters;
- Invasive non-native species;
- Human induced changes in hydraulic conditions;
- Eutrophication.

Lough Derg (Shannon) SPA (Site Code: 004058)

The conservation objectives for the SPA site are to maintain or restore the favourable conservation condition of the bird species and habitat listed as Special Conservation Interests for this SPA. An excerpt from the site's Natura 2000 Data Form is included below, while further details are available within the site's site synopsis (NPWS, 2014).

“Lough Derg is the largest of the Shannon Lakes, being some 40km long. Its maximum breadth across the Scarriff Bay-Youghal Bay transect is 13km but for most of its length it is less than 5 km wide. The lake is relatively shallow at the northern end being mostly 6m in depth but in the middle region it has an axial trench and descends to over 25m in places. The narrow southern end of the lake has the greatest average depth, with a maximum of 34m. The greater part of the lake lies on Carboniferous limestone but the narrow southern section is underlain by Silurian strata. Most of the lower part of the lake is enclosed by hills on both sides, the Slieve Aughty Mountains to the west and the Arra Mountains to the east. The northern end is bordered by relatively flat, agricultural country. The lake shows the high hardness levels and alkaline pH to be expected from its mainly limestone catchment basin and it has most recently been classified as a mesotrophic system. The lake has many small islands, especially on its western and northern sides. The shoreline is often fringed with swamp vegetation. Aquatic vegetation includes a range of charophyte species.

Lough Derg is of importance for both breeding and wintering birds. The islands support nationally important breeding colonies of Common Tern (*Sterna Hirundo*), Cormorant (*Phalacrocorax carbo*), Great Crested Grebe (*Podiceps cristatus*) and probably Tufted Duck (*Aythya fuligula*). It is a traditional site for nesting Black-headed Gull (*Larus ridibundus*) but there is no recent survey information. In winter, the lake is particularly important for diving ducks, with nationally important populations of Tufted Duck and Goldeneye (*Bucephala clangula*) occurring. Mute Swan (*Cygnus olor*) also has a population of national importance, whilst a range of other species occur in lesser numbers, including Whooper Swan (*Cygnus cygnus*), Teal (*Anas crecca*), Coot (*Fulica atra*) and Lapwing (*Vanellus vanellus*). A flock of White-fronted Goose (*Anser albifrons flavirostris*) has traditionally used the site, where they feed on grassy islands, but birds have seldom been recorded in recent years.”

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The main site vulnerabilities, including any key pressures or trends within and around the Lough Derg (Shannon) SPA that have been identified as impacting upon the site, may be summarised as follows:

- Fertilisation;
- Leisure fishing;
- Hunting;
- Nautical sports.

Scohaboy Bog NHA (Site Code: 000937)

Scohaboy Bog NHA is a large raised bog situated 4 km south-east of Borrisokane, in County Tipperary. The site comprises a relatively large raised bog that includes both areas of high bog and cutover. The site is bounded by agricultural land on all margins, apart from the north where coniferous plantation occurs. An excerpt from the Site Synopsis is included below (NPWS, 2002).

“The site comprises a large relatively flat raised bog with slopes associated with the nearby forestry. Overall the high bog appears to be quite dry with limited areas of wet hummock/hollows. A number of tear pools occur to the north and centre of the site. Cutover bog occurs around much of the bog margins. An area of coniferous plantation is present on the high bog to the north of the site.

Much of the high bog has vegetation typical of Midland Raised Bog type, consisting of Ling Heather (*Calluna vulgaris*), Cottongrass (*Eriophorum* spp.), abundant Bog Asphodel (*Narthecium ossifragum*) and White Beak-sedge (*Rhynchospora alba*). Other more locally occurring plants include Bog Rosemary (*Andromeda polifolia*) and Cranberry (*Vaccinium oxycoccos*). Bog moss (*Sphagnum* spp.) cover is generally low with scattered tear pools in the north of the high bog which are beginning to infill with *Sphagnum papillosum*, *S. capillifolium* and *S. cuspidatum*. However, the scarce bog moss (*S. imbricatum*) is present in patches. These pools are quite large with Bog Bean (*Menyanthes trifoliata*) and Great Sundew (*Drosera anglica*) in some. In places in the north of the bog, lichen cover is high with abundant *Cladonia portentosa*.

Much of the cutaway is dominated by Purple Moor-grass (*Molinia caerulea*) and scattered Gorse (*Ulex europaeus*) scrub. There is some scattered Downy Birch (*Betula pubescens*) scrub in places and in the west there is a small area of flooded cutaway with Common Reed (*Phragmites australis*). The southern cutaway has old peat banks remaining and is dominated by Ling Heather with dense Gorse. The Irish Red Data Book species Bird Cherry (*Prunus padus*) has been recorded from the site (in the past).

Current land use on the site consists of peat-cutting along the northern margins, with some limited peat-cutting in the east. Afforestation has occurred on the high bog to the north of the site. Damaging activities associated with this land use include drainage and burning. These are all activities that have resulted in loss of habitat and damage to the hydrological status of the site and pose a continuing threat to its viability.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Scohaboy Bog NHA is a site of considerable conservation significance comprising raised bog, a rare habitat in the E.U. and one that is becoming increasingly scarce and under threat in Ireland. This site supports a good diversity of raised bog microhabitats including some hummock/hollow complexes and cutover which add to the diversity and scientific value of the site. This raised bog is one of the more southerly raised bogs in the country, adding significantly to its ecological importance. Ireland has a high proportion of the total E.U. resource of raised bog (over 50%) and so has a special responsibility for its conservation at an international level.”

8.4.2 FLORA & HABITATS

The development site is located within a rural area, in an area primarily dominated by pasture, arable land and peatland. The nearest watercourse to the development site is the Wilton Stream, located approximately 135m to the south of the site. A number of one-off residences and farmyard complexes exist in the area.

The proposed development site comprises of a number of existing piggery houses, stores, site office and canteen, dwelling house, areas of grassland and limited areas of woodland, with boundaries consisting of hedgerows and treelines.

During the site walkover, eight main habitats were identified. The dominant habitat onsite was identified as buildings and artificial surfaces (BL3) habitat, comprising of the site office and canteen, dwelling house, sow house, farrowing houses, gilt houses, weaner houses, stores and yard areas (both gravel and hardstanding). Little to no vegetation was present.

Small sections of recolonising bare ground (ED3) habitat were noted adjacent the piggery houses and along access ways, in addition to an area to the front of the site office and canteen building. Flora present included abundant Short-fruited Willowherb (*Epilobium obscurum*), and occasionally recorded Common Field-speedwell (*Veronica persica*), Common Mouse-ear (*Cerastium fontanum*), Daisy (*Bellis perennis*), Dandelion (*Taraxacum* spp.), Dove's-foot Crane's-bill (*Geranium molle*), Groundsel (*Senecio vulgaris*), Redshank (*Persicaria maculosa*), Sow-thistle (*Sonchus* spp.), Thistle (*Cirsium* spp.), White Clover (*Trifolium repens*) and various grasses.

A section of recolonising bare ground (ED3) habitat was also recorded to the east of the existing piggery houses, where an area has been disturbed in recent times. Flora recorded was similar to that recorded within ED3 habitat elsewhere onsite and included frequently recorded Bramble (*Rubus fruticosus*), Nettle (*Urtica dioica*) and Willow (*Salix* spp.) and occasionally recorded Common Mouse-ear, Herb-Robert (*Geranium robertianum*), Rosebay Willowherb (*Chamerion angustifolium*), Short-fruited Willowherb and Thistle.

Amenity grassland (improved) (GA2) habitat is present within the southern portions of the development site, adjacent the site office / canteen building and dwelling house. This habitat is dominated by cultivated grass species, with some Buttercup (*Ranunculus* spp.), Daisy, Ribwort Plantain (*Plantago lanceolata*) and Red and White Clover (*Trifolium pratense* and *T. repens*).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

An area of grassland was noted in the northern portion of the development site, best characterised by wet grassland (GS4) habitat, mainly comprised of various grasses, including Bent grasses (*Agrostis* spp.), Ryegrasses (*Lolium* spp.) and Yorkshire Fog (*Holcus lanatus*), Nettle, Soft Rush (*Juncus effusus*) and Thistle. Other flora present in lower abundance included Cleavers (*Galium aparine*), Creeping Buttercup (*Ranunculus repens*), Dock (*Rumex* spp.) and Short-fruited Willowherb.

A small section of scrub (WS1) is present within the wet grassland area, dominated by Willow and with some occasional Ash (*Fraxinus excelsior*) also present. Ground and field layer flora was comprised of the same flora recorded for the wet grassland area.

Sections of hedgerows (WL1) habitat are present in the southern section of the development site. The section of hedgerow running in a north-south orientation between the site office and the dwelling house was comprised of a mixture of native and garden-variety species, including Apple (*Malus domestica*), Ash, Cherry Laurel (*Prunus laurocerasus*), Hawthorn (*Crataegus monogyna*), Hazel (*Corylus avellana*), Leyland Cypress (*Cuprocyparis leylandii*) and Snowberry (*Symphoricarpos albus*). Ground and field flora included Bramble, Cleavers, Dandelion, Dog-rose (*Rosa canina* agg.), Ivy (*Hedera helix*) and Nettle.

Hedgerows (WL1) habitat along the southern site boundary, adjacent the roadway, was mainly comprised of native species and included Ash, Elm (*Ulmus* sp.), Hawthorn and Hazel. Two mature trees were noted in this section, one mature Ash tree and one mature Beech (*Fagus sylvatica*) tree. Other flora species recorded included Bramble, Cow Parsley (*Anthriscus sylvestris*), Dock, Dog-Rose and Nettle.

The remainder of hedgerows (WL1) habitat onsite was comprised entirely of Leyland Cypress, with Bramble and Ivy recorded in low abundance.

Treelines (WL2) habitat was noted along the eastern site boundary, mainly comprised of Elder (*Sambucus nigra*), Sitka Spruce (*Picea sitchensis*) and Scot's Pine (*Pinus sylvestris*), with a recently planted row of Cherry Laurel. Other tree / shrub species noted included Beech, Hawthorn, Hazel, Holly (*Ilex aquifolium*), Sycamore (*Acer pseudoplatanus*) and Willow. Other flora included Bramble, Cleavers, Dock, Herb-Robert, Ivy, Nettle, Ribwort Plantain, Thistle and Vetch (*Vicia* spp.).

Areas of woodland were recorded to the west and east of the existing piggery buildings. These areas of woodland are best characterised as broadleaved woodland (WD1) habitat, being mainly comprised of Beech, with occasionally recorded Ash, Elder and Sycamore. Tree / shrubs recorded in lower abundance included Holly, Horse-chestnut (*Aesculus hippocastanum*), Leyland Cypress, Lime (*Tilia* spp.) and Willow. Other flora encountered included Bramble, Cow Parsley, Dock, Dog-Rose, Herb-Robert, Hogweed (*Heracleum sphondylium*), Ivy, Nettle and Thistle.

The eight habitats identified as per the Fossitt habitat classification scheme for the proposed development are summarised in **Table 8.9**, and are shown on a habitat map included as **Figure**

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

8.1, and as **Attachment 8.2**. A photo log and full list of flora recorded are included in **Attachments 8.3** and **8.4** respectively.

Table 8.9: Summary of Habitats Identified at the Proposed Development Site

HABITAT CLASSIFICATION HIERARCHY		
LEVEL 1	LEVEL 2	LEVEL 3
G – Grassland and marsh	GA – Improved grassland	GA2 – Amenity grassland (improved)
	GS – Semi-natural grassland	GS4 – Wet grassland
W – Woodland and scrub	WD – Highly modified / non-native woodland	WD1 – Broadleaved woodland
	WS – Scrub / transitional woodland	WS1 – Scrub
	WL – Linear woodland / scrub	WL1 – Hedgerows
		WL2 – Treelines
E – Exposed rock and disturbed ground	ED – Disturbed ground	ED3 – Recolonising bare ground
B – Cultivated and built land	BL – Built land	BL3 – Buildings and artificial surfaces

The majority of the site, comprising of buildings and artificial surfaces, amenity grassland and recolonising bare ground, can be considered to be modified and of low ecological value. The remainder of the habitats at the site, including hedgerows, treelines, woodland, scrub and wet grassland, can be considered to be of moderate to high ecological value.

No plant species of conservation significance or invasive plant species were noted during the site assessment.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

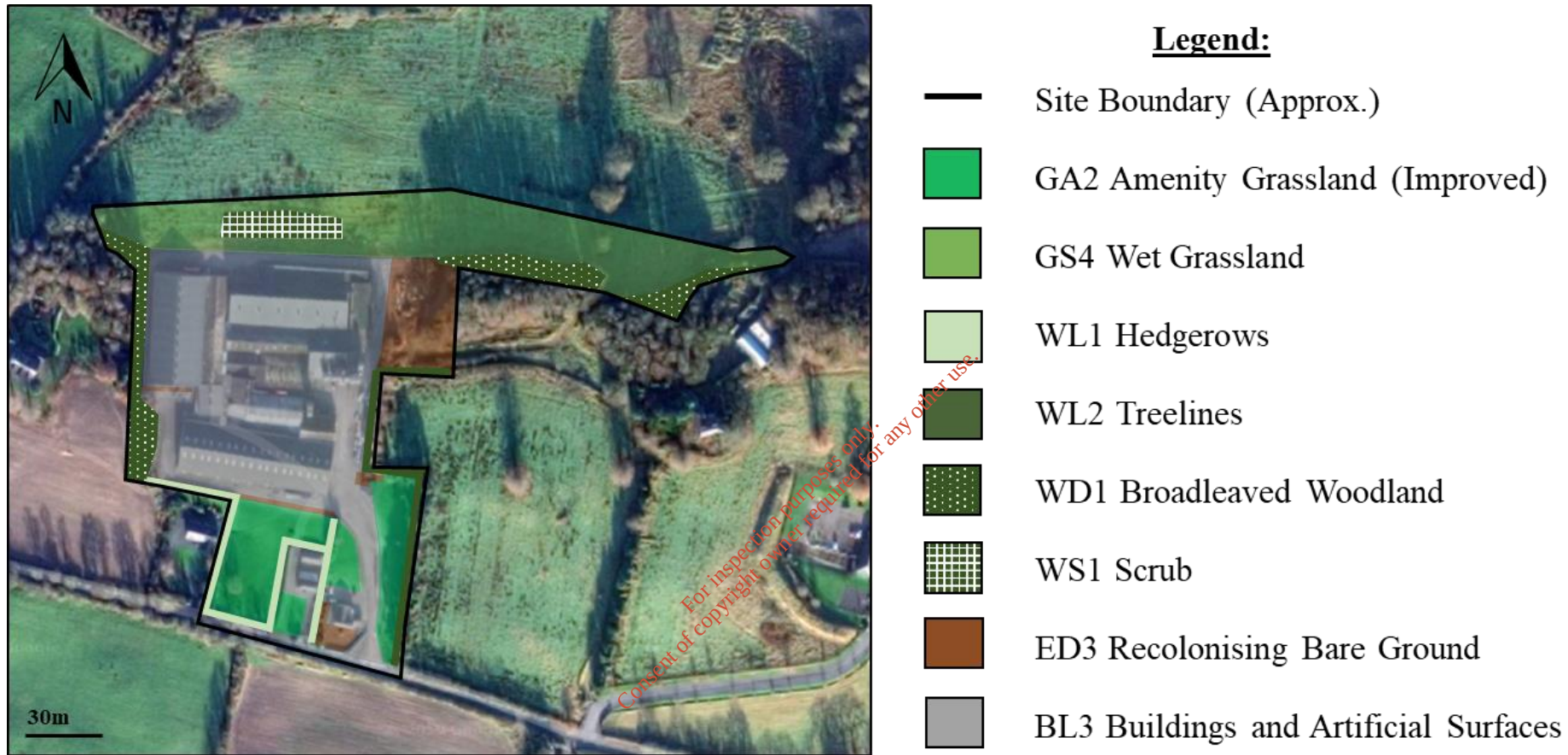


Figure 8.1: Habitat Map of Encountered Habitats at the Proposed Development Site, Ballymackey, Co. Tipperary

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

8.4.3 FAUNA (EXCLUDING BATS)

Terrestrial Fauna

Mammals, typical of that found throughout the rest of Ireland, which would be expected to be found in the general area include Badger (*Meles meles*), Fox (*Vulpes vulpes*), Otter (*Lutra lutra*), Pine Marten (*Martes martes*), Stoat (*Mustela erminea hibernica*), American Mink (*Mustela vison*), Irish Hare (*Lepus timidus hibernicus*), Rabbit (*Oryctolagus cuniculus*), Hedgehog (*Erinus europaeus*), Red Squirrel (*Sciurus vulgaris*), Wood Mouse (*Apodemus sylvaticus*), Pygmy Shrew (*Sorex minutus*), Greater White-toothed Shrew (*Crocidura russula*), Brown Rat (*Rattus norvegicus*), Bank Vole (*Myodes glareolus*), and Fallow Deer (*Dama dama*).

During the site walkover, no mammals, or evidence of mammals, was observed. There was no evidence of badger, including setts or latrines, at the development site. However, there is a sett record on the NBDC website from the Badger Setts of Ireland Database dating from 2011, which is located approximately 250m to the north of the site boundary. It is therefore possible that areas of the development site may be used by badgers for foraging.

The development site is located within the current distribution, current range and favourable reference range of pine marten (NPWS, 2019c). While there was no evidence of pine marten at the site, the NBDC has a record for a live sighting in 2011, approximately 1.25km to the south-west of the development site. Given the presence of woodland on the development site and within the immediate vicinity, it is possible that pine marten may use the site or immediate area for foraging.

Areas of the proposed development site may provide suitable basking and refuge habitat for Viviparous Lizard (*Zootoca vivipara*).

With regards terrestrial invertebrates the butterfly Red Admiral (*Vanessa atalanta*) was recorded. No Marsh Fritillary (*Eurodryas aurinia*) were recorded onsite. It was considered that the study area does not contain suitable habitat for protected whorl snail species (*Vertigo* spp.).

Aquatic Fauna

With regards aquatic fauna, there are no aquatic habitats located within the development site itself. Therefore, the development site itself would have limited potential to support aquatic species. As discussed further in **Section 8.4.7** below, the Wilton Stream and Ollatrim River are located approximately 135m and 350m south of the site respectively. Stormwater from the site is directed to the Wilton Stream, which connects to the Ollatrim River approximately 1.3km downstream from the discharge point. The Ollatrim River converges with the Nenagh River approximately 10.7km downstream from the Wilton confluence.

The development site is located within the current distribution, current range and favourable reference range of otter (*Lutra lutra*) (NPWS, 2019c), while the NBDC has records for otter approximately 2km from the development site. However, it is unlikely that the development site would be of significance to otter given the absence of aquatic habitats and given that no evidence of otter, including spraints, tracks or holts, at the development site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

In the absence of aquatic habitats onsite, it is unlikely that the site would have the potential to support Frog (*Rana temporaria*) or Smooth Newt (*Lissotriton vulgaris*). No evidence of these amphibians were recorded during the ecological site assessment.

The development site is located outside the current distribution, current range and favourable reference range of Freshwater Pearl Mussel (*Margaritifera margaritifera*) (NPWS, 2019c) and is not located within a river catchment identified as supporting Freshwater Pearl Mussel populations (DoEHLG, 2010).

The development is located within the current range and favourable reference range, but outside of the current distribution of White-clawed Crayfish (*Austropotamobius pallipes*) (NPWS, 2019c). The NBDC has historic records (1990s) for Crayfish within the Ollatrim River, with the nearest records located approximately 1.1km downstream and 3km upstream of the Wilton Stream confluence. It is possible, therefore, that Crayfish are located downstream of the development site.

The development site is located outside the current distribution, current range and favourable reference range of Sea Lamprey (*Petromyzon marinus*) and River Lamprey (*Lampetra fluviatilis*), but within the current range and favourable reference range of Brook Lamprey (*Lampetra planeri*) (NPWS, 2019c). The development site is located outside the current distribution, current range and favourable reference range of Atlantic Salmon (*Salmo salar*), Twaite Shad (*Alosa fallax*), Killarney Shad (*Alosa fallax killarnensis*) and Pollan (*Coregonus pollan*) (NPWS, 2019c).

A report by Matson et al. (2018) notes that ten sites were surveyed on the Ollatrim River catchment by Inland Fisheries personnel in August 2017. The fish species recorded at the three nearest survey sites are detailed in the table below.

Table 8.10: Fish Present within the Ollatrim River during IFI Surveys in 2017

SPECIES	BALLYKNOCKANE (2.7KM UPSTREAM OF WILTON / OLLATRIM CONFLUENCE)	BALLINAHMERY (1.1KM DOWNSTREAM OF WILTON / OLLATRIM CONFLUENCE)	RATHTHURLES (5.1KM DOWNSTREAM OF WILTON / OLLATRIM CONFLUENCE)
Brown Trout (<i>Salmo trutta</i>)	√	√	√
Lamprey	-	-	-
Minnow (<i>Phoxinus phoxinus</i>)	√	√	√
Salmon (<i>Salmo salar</i>)	√	√	√
Stone Loach (<i>Barbatula barbatula</i>)	√	√	√
Three-spined Stickleback (<i>Gasterosteus aculeatus</i>)	-	-	√

Brown trout were the most abundant species captured. The report also notes that the Ballyknockane site was assigned a poor fish ecological status, while the Ballinahemery and Raththurles sites were assigned moderate fish ecological statuses.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

8.4.4 FAUNA - BATS

Desk Based Review

Records of bat roosts were obtained from Bat Conservation Ireland (BCI) for the centre of the proposed development site to a distance of 10km. The bat records received from BCI on the 22nd of July 2019 within an approximate 10km of the radius of the site are included as **Attachment 8.5**.

In summary, four known roosts have been recorded within 10km of the proposed development site, with the nearest known roost located approximately 7km to the east of the site, north of Moneygall. The species of bat using this roost is unidentified. According to the BCI records for roosts, transects and ad hoc observations within 10km of the proposed development site, a total of six species have been recorded, as follows:

- Common Pipistrelle (*Pipistrellus pipistrellus*);
- Soprano Pipistrelle (*Pipistrellus pygmaeus*);
- Daubenton's Bat (*Myotis daubentonii*);
- Natterer's Bat (*Myotis nattereri*);
- Leisler's Bat (*Nyctalus leisleri*);
- Brown long-eared Bat (*Plecotus auratus*);

The NPWS's National Lesser Horseshoe Bat Roost Database was also consulted with regards any roost records for Lesser Horseshoe Bat (*Rhinolophus hipposideros*). The Lesser Horseshoe Bat is mainly confined to the west of Ireland, with the NPWS database indicating that the nearest record for this bat is located a considerable distance from the development site – approximately 35km to the south-west.

Assessment of Bat Roost Potential – Buildings

The buildings scheduled for demolition include a gilt house, two weaner houses and one first-stage weaner house, which occupy a total area of approximately 1,390m². These buildings have walls constructed from cavity blocks, roofs constructed from fibre cement, with the frames of the buildings made from wood and steel.

No evidence of bat usage (including droppings, urine staining, grease markings or prey remains) was recorded for these buildings. While some areas of disrepair were noted, which could provide entry opportunities for bats, it is considered that these buildings would have negligible potential to support bat roosts given that there are no attic voids, with the buildings designed as open in nature to the roof height, and given that these buildings are in use.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY



Figure 8.2: Buildings scheduled for removal.

Assessment of Bat Roost Potential – Mature Tree

One mature Ash (*Fraxinus excelsior*) tree located within the north-eastern section of the development site would require removal, to facilitate the proposed pre-finisher house footprint. The assessment of the tree was based on an external survey undertaken visually from the ground. Although no significant potential roost features were observed, the Ash tree was assessed as having a moderate potential to support a bat roost, due to the fact that it has dense ivy cover, which could provide suitable roosting opportunities for individual bats, or which could hide other suitable roost features (it should be noted that this is considered unlikely, given the age of the tree).

8.4.5 AVIFAUNA

Given the agricultural land use of the surrounding area, it would be expected that common grassland and hedgerow species would be present in the area. The following table details the bird species recorded during the site walkover on the 25th of September 2019 and their protection and conservation concern statuses.

Table 8.11: Protection and Conservation Concern Statuses for Recorded Birds

COMMON NAME	SCIENTIFIC NAME	E.U. BIRDS DIRECTIVE	BoCCI* RED LIST	BoCCI* AMBER LIST
Blackbird	<i>Turdus merula</i>	-	-	-
Blue Tit	<i>Parus caeruleus</i>	-	-	-
Chaffinch	<i>Fringilla coelebs</i>	-	-	-
Collared Dove	<i>Streptopelia decaocto</i>	-	-	-
Dunnock	<i>Prunella modularis</i>	-	-	-
Great Tit	<i>Parus major</i>	-	-	-
Magpie	<i>Pica pica</i>	-	-	-
Pied Wagtail	<i>Motacilla alba</i>	-	-	-
Robin	<i>Erithacus rubecula</i>	-	-	✓
Rook	<i>Corvus frugilegus</i>	-	-	-

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

COMMON NAME	SCIENTIFIC NAME	E.U. BIRDS DIRECTIVE	BoCCI* RED LIST	BoCCI* AMBER LIST
Starling	<i>Sturnus vulgaris</i>	-	-	✓
Swallow	<i>Hirundo rustica</i>	-	-	✓
Woodpigeon	<i>Columba palumbus</i>	-	-	-
Wren	<i>Troglodytes troglodytes</i>	-	-	-

*The BoCCI (Birds of Conservation Concern in Ireland) List classifies bird species into one of three lists (Red, Amber or Green) based on their conservation status and conservation priority.

A total of 14 bird species were recorded during the site walkover. No species are red listed under the BoCCI classification, while three species are amber listed: Robin, Starling and Swallow. None of the bird species recorded are listed under Annex I of the E.U. Birds Directive.

8.4.6 RECORDS OF PROTECTED, RARE AND INVASIVE SPECIES

National Biodiversity Data Centre Records

Flora and fauna records were reviewed on the National Biodiversity Data Centre (NBDC) website for the proposed development site and the vicinity.

No protected flora species under the Flora (Protection) Order, 2015 (S.I. No. 356 of 2015) were recorded for the thirty years previous for the 10km square (R98) in which the proposed development site is located, while records were returned for three invasive flora species listed in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011); Giant-rhubarb (*Gunnera tinctoria*), Japanese Knotweed (*Fallopia japonica*) and *Rhododendron ponticum*.

Fauna records for the previous thirty years were reviewed on the NBDC website for the two 2km squares (R98Q and R98R) in which the proposed development is located. Bird species of note recorded include Swallow, House Martin (*Delichon urbicum*), Sand Martin (*Riparia riparia*), Starling, House Sparrow (*Passer domesticus*), Great Black-backed Gull (*Larus marinus*), Herring Gull (*Larus argentatus*) and Woodpigeon.

Fauna of note include the protected species Freshwater White-clawed Crayfish (*Austropotamobius pallipes*), Marsh Fritillary (*Euphydryas aurinia*), Badger and Hedgehog.

National Parks and Wildlife Services Records

Records of protected, rare or threatened flora and fauna species within 10km of the development site obtained from the NPWS are included in **Tables 8.12** and **8.13** below.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 8.12: Records of Protected, Rare or Threatened Flora Species from the NPWS.

COMMON NAME	SCIENTIFIC NAME	PROTECTION ¹	CONSERVATION STATUS ^{2,3}
Basil Thyme	<i>Clinopodium acinos</i>	FPO	Near Threatened
Betony	<i>Stachys officinalis</i>	FPO	Near Threatened
Blue Fleabane	<i>Erigeron acer</i>	None	Least Concern
<i>Cladonia ciliata</i>	<i>Cladonia ciliata</i>	None	Not Assessed
<i>Cladonia ciliate</i> var. <i>ciliata</i>	<i>Cladonia ciliate</i> var. <i>ciliata</i>	None	Not Assessed
<i>Cladonia ciliate</i> var. <i>tenuis</i>	<i>Cladonia ciliate</i> var. <i>tenuis</i>	None	Not Assessed
Corn Chamomile	<i>Anthemis arvensis</i>	None	On Waiting List
Corncockle	<i>Agrostemma githago</i>	None	Not Assessed
Cornflower	<i>Centaurea cyanus</i>	None	On Waiting List
Golden Dock	<i>Rumex maritimus</i>	None	Near Threatened
Green-Winged Orchid	<i>Orchis morio</i>	None	Vulnerable
Marsh Saxifrage	<i>Saxifraga hirculus</i>	FPO	Near Threatened
Nettle-leaved Bellflower	<i>Campanula trachelium</i>	None	Least Concern
Opposite-leaved Pondweed	<i>Groenlandia densa</i>	FPO	Near Threatened
Reindeer Moss	<i>Cladonia portentosa</i>	None	Not Assessed
Shepherd's-needle	<i>Scandix pecten-veneris</i>	None	Regionally Extinct
Slender Cottongrass	<i>Eriophorum gracile</i>	FPO	Near Threatened
Small-white orchid	<i>Pseudorchis albida</i>	FPO	Vulnerable
Wood Bitter-vetch	<i>Vicia orobus</i>	FPO	Vulnerable

Notes:

¹ HD II/IV = Habitats Directive Annexes II/IV; FPO = Flora Protection Order.

² Vascular flora from the Irish Red Data Book 1 Vascular Plants (Curtis and McGough, 1988; Wyse Jackson *et al.*, 2016); Bryophytes from the Irish Red List No. 8 (Lockhart *et al.*, 2012).

³ IUCN Red list <http://www.iucnredlist.org/> - accessed August 2019

Table 8.13: Records of Protected, Rare or Threatened Fauna Species from the NPWS.

COMMON NAME	SCIENTIFIC NAME	PROTECTION ¹	CONSERVATION STATUS ^{2,3}
Badger	<i>Meles meles</i>	WA	Least Concern
Barn owl	<i>Tyto alba</i>	WA	High Concern - Red
Brook Lamprey	<i>Lampetra planeri</i>	HD II	Least Concern
Common Frog	<i>Rana temporaria</i>	WA	Least Concern
Curlew	<i>Numenius arquata</i>	WA	High Concern - Red
Fallow Deer	<i>Dama dama</i>	WA	Least Concern
Grey Heron	<i>Ardea cinerea</i>	WA	Least Concern - Green
Hedgehog	<i>Erinaceus europaeus</i>	WA	Least Concern

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

COMMON NAME	SCIENTIFIC NAME	PROTECTION ¹	CONSERVATION STATUS ^{2,3}
Irish Hare	<i>Lepus timidus hibernicus</i>	WA	Least Concern
Irish Stoat	<i>Mustela erminea hibernica</i>	WA	Least Concern
Peregrine Falcon	<i>Falco peregrinus</i>	BDI, WA	Least Concern - Green
Otter	<i>Lutra lutra</i>	HD II/IV, WA	Near Threatened
Pine Marten	<i>Martes martes</i>	WA	Least Concern
Pygmy Shrew	<i>Sorex minutus</i>	WA	Least Concern
Red Squirrel	<i>Sciurus vulgaris</i>	WA	Near Threatened
Smooth Newt	<i>Lissotriton vulgaris</i>	WA	Least Concern
White-clawed Crayfish	<i>Austropotamobius pallipes</i>	HD II, WA	Endangered

Notes:

¹ HD II/IV = Habitats Directive Annexes II/IV; WA = Wildlife Acts; BDI = Birds Directive Annex I.

² Terrestrial Mammal Red List (Marnell *et al.* 2009); Birds of Conservation Concern in Ireland 2014-2019 (Colhoun and Cummins, 2013); Red-listed Amphibians, Reptiles and Freshwater Fish (King *et al.* 2011); Red-listed Non-marine Molluscs (Byrne *et al.*, 2009).

³ IUCN Red list <http://www.iucnredlist.org/> - accessed August 2019

8.4.7 WATER QUALITY

The proposed development is located within the Lower Shannon catchment (25C) and the Ollatrim_SC_010 sub-catchment.

The Wilton Stream (also referred to as the Ballaghveny Stream) and Ollatrim River are located approximately 135m and 350m south of the site respectively. Stormwater drainage from the development site is directed to a field drain, which travels for approximately 135m prior to joining with the Wilton Stream. From here, the Wilton Stream travels approximately 1.27km before joining with the Ollatrim River. The Ollatrim River converges with the Nenagh River approximately 10.75km downstream from the Wilton confluence, which in turn flows to Lough Derg approximately 10.25km from the confluence with the Nenagh River.

The Ollatrim River, Nenagh River or Lough Derg are not designated as a Salmonid Water under EC (Quality of Salmonid Waters) Regulations (S.I. No. 293 of 1988).

Lough Derg is designated as the Lough Derg, North-east Shore Special Area of Conservation (SAC) (Site Code: 002241). The proposed development site is therefore located approximately 22.4km upstream from the Lough Derg, North-East Shore SAC.

The Environmental Protection Agency (EPA) undertake surface water monitoring along the River Ollatrim. The results for the nearest monitoring stations with available information (as per **Table 8.14**) for the period 1996 – 2018 are summarised in **Figure 8.3** below for indicative purposes.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 8.14: Monitoring Stations of the Ollatrim River within the Vicinity of the Development

STATION NO.	STATION LOCATION	EASTING	NORTHING	APPROX. LOCATION RELATIVE TO WILTON CONFLUENCE
RS25O010150	Bridge d/s Ollatrim Br	198849	180965	4.1km Upstream
RS25O010250	Bridge Nr Riverlawn House	194208	181932	1.1km Upstream

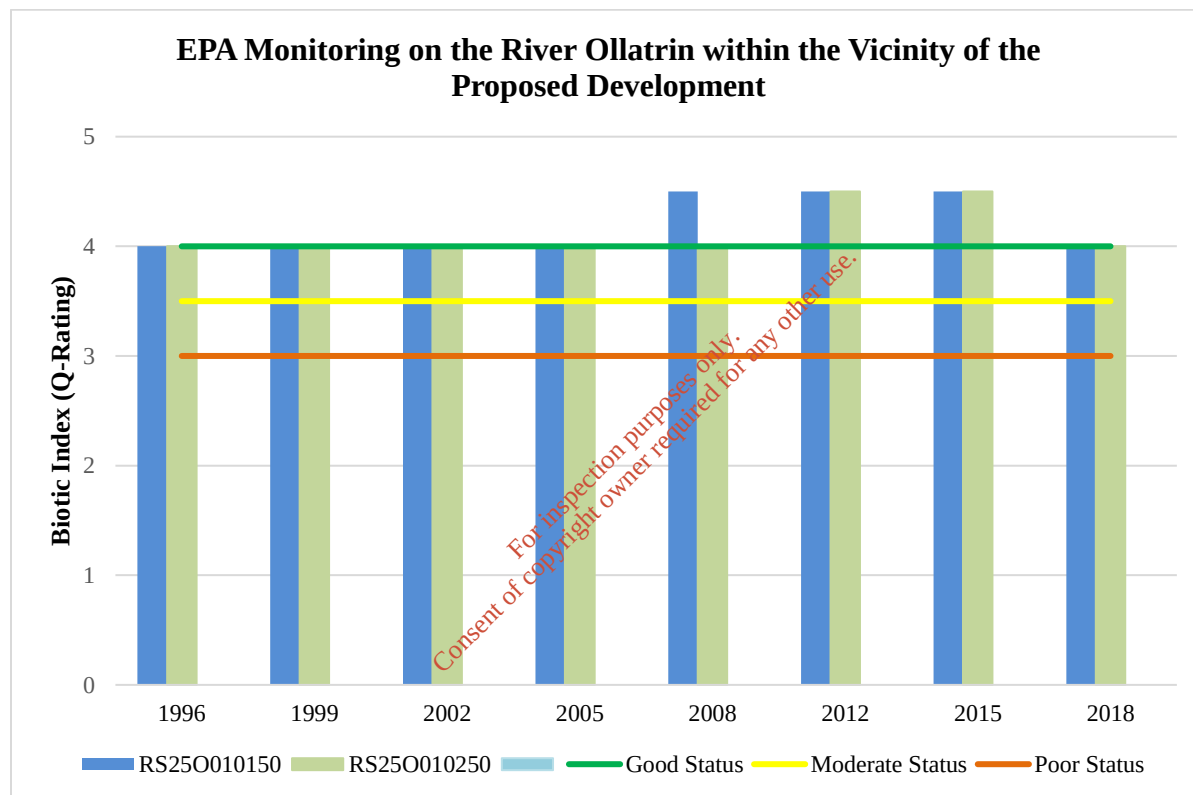


Figure 8.3: EPA Ecological Monitoring of the River Ollatrim from 1996 – 2018

As can be seen in **Figure 8.3** above, the River Ollatrim at the two monitoring stations has achieved a water quality status ranging between Q4 (good) to Q4-5 (high) from 1996 – 2018, with recent monitoring showing a water quality status of Q4 (good).

The EPA, 2013 “*Report on Water Quality in Tipperary 2013*” report notes that agriculture is the key pressure on water quality of the Ollatrim River.

As part of water quality monitoring at the adjacent Ballaghveny Landfill site (Industrial Emissions Licence No. W0078-03), Conservation Services, Ecological & Environmental Consultants were commissioned by Tipperary County Council to undertake biological monitoring of surface water

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

quality on the Wilton Stream (also referred to as the Ballaghveny Stream) and the Ollatrim River. The results for the years 2016, 2017 and 2019 is available on the EPA website. A summary of the results, in addition to the distance relative to the Woodville Pigs Ltd. site where possible, is included in the table below.

Table 8.15: Biological Monitoring within the Vicinity of the Development

SAMPLING LOCATION	LOCATION RELATIVE TO DEVELOPMENT SITE	Q-RATING		
		2016	2017	2019
Site A (Wilton Stream)	Upstream of Woodville Pig Farms Ltd. stormwater discharge	Q2-3	Q3	Q3
Site A1 (Wilton Stream)	Upstream of Woodville Pig Farms Ltd. stormwater discharge	Q3	Q3	Q3
Site B (Wilton Stream)	1.12km Downstream of Woodville Pig Farms Ltd. stormwater discharge	Q3	Q3	Q3
Site 1 (Ollatrim River)	130m (approx.) upstream of Wilton / Ollatrim confluence	Q4-5	Q4-5	Q4-5
Site 2 (Ollatrim River)	1.1km (approx.) downstream of Wilton / Ollatrim confluence	Q4-5	Q4-5	Q4-5

As can be seen from the results, the Wilton Stream has been mostly achieving a Q3 (poor) water quality status, while the Ollatrim River has been achieving a Q3-4 (moderate) water quality status. As the sampling sites on the Wilton Stream upstream of the development site's existing stormwater discharge point are returning similar results to the downstream sampling site, it is considered that the site's stormwater discharge is unlikely to be having an adverse impact upon water quality.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

8.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

8.5.1 DETERMINATION OF ECOLOGICAL VALUE

The ecological value of the habitat types and species identified at the proposed development site has been assessed following the criteria outlined in the National Roads Authority (NRA) guidelines (2009). **Tables 8.16** and **8.17** below detail the habitats recorded and potential species, and their associated ecological value.

Table 8.16: Ecological Value of Identified Habitats at the Proposed Development

HABITAT TYPE	HABITAT RATING	KEY ECOLOGICAL RECEPTOR?
Amenity grassland (improved) (GA2)	Local importance, lower value	No. Species poor habitat. Low ecological value.
Wet grassland (GS4)	Local importance, higher value	Yes. Area of semi-natural habitat, which may contain a high biodiversity.
Broadleaved woodland (WD1)	Local importance, higher value	No. While this area may contain a high biodiversity, no works are proposed within this area.
Scrub (WS1)	Local importance, higher value	Yes. Area of semi-natural habitat, comprising mainly of native species. May provide opportunities for bird nesting and foraging for bats.
Hedgerows (WL1)	Local importance, higher value	No. While this habitat is a semi-natural habitat and may provide opportunities for bird nesting and foraging for bats, no works are proposed within this area.
Treelines (WL2)	Local importance, higher value	No. While this habitat is a semi-natural habitat and may provide opportunities for bird nesting and foraging for bats, no works are proposed within this area.
Recolonising bare ground (ED3)	Local importance, lower value	No. Area of disturbed ground with recolonising vegetation. Low ecological value.
Buildings and artificial surfaces (BL3)	Local importance, lower value	No. Comprised of existing buildings and structures and yard areas. Little to no vegetation present. Low ecological value.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 8.17: Ecological Value of Species Present / within the Vicinity of the Development

SPECIES	SPECIES RATING	KEY ECOLOGICAL RECEPTOR?
Badger	Local importance, higher value	Yes. While no evidence of badger was recorded within the vicinity of the development site, it is possible that areas of the site are used for foraging.
Otter	Local importance, higher value	No. Not recorded within the vicinity of the development site. Site has limited potential to support this species, given the absence of aquatic habitats onsite, and given that the nearest watercourse, the Wilton Stream, is located approximately 135m from the site.
Pine Marten	Local importance, higher value	No. No evidence of pine marten was recorded within the vicinity of the development site. While areas of woodland onsite may offer potential nesting and foraging grounds, no works are proposed within these areas.
Bats (foraging and commuting habitat only – no bat roosts identified)	Local importance, higher value	Yes. The area of scrub scheduled for removal is likely to be utilised by bats for both foraging and commuting. While bats are likely to utilise the areas of woodland, hedgerows and treelines at the site, no works are proposed for these areas.
Other Fauna	Local importance, low to high value	No. Limited sightings / evidence of other fauna. Site has limited potential to support other fauna species.
Breeding Birds	Local importance, higher value	Yes. All birds, their nests, eggs and young are protected under the Wildlife Act.
Aquatic Fauna	Local importance, low to high value	No. Site has limited potential to support aquatic fauna species, given the absence of aquatic habitats onsite, and given that the nearest watercourse, the Wilton Stream, is located approximately 135m from the site.
Common Lizard	Local importance, higher value	Yes. Presumed present, but likely in low numbers. Protected under the Wildlife Act.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

8.5.2 CONSTRUCTION PHASE

Designated Sites – SAC and SPA Sites

As discussed in detail in the Appropriate Assessment Screening Report prepared for the project (Ref. No. PES_AA_19_9350), and within **Section 8.4.1** above, the European sites considered to be within the potential zone of influence of the proposed development are Scohaboy (Sopwell) Bog SAC (Site Code: 002206), Lough Derg, North-East Shore SAC (Site Code: 002241) and Lough Derg (Shannon) SPA (Site Code: 004058), due potential hydrological connectivity and / or distance from the proposed development site.

The proposed development does not directly impinge on any part of a European site and as such would not be expected to have any in-situ effects upon a protected site through loss or destruction of habitat, fragmentation of habitat, disturbance of habitat or direct reduction in species density or diversity.

The closest protected site to the development is Scohaboy (Sopwell) Bog SAC, located approximately 9.6km to the north. Lough Derg, North-East Shore SAC and Lough Derg (Shannon) SPA are hydrologically connected to the development and are located approximately 14.5km and 15.8km respectively from the development site. Given the presence of designated sites within the vicinity of the development, potential ex-situ impacts must also be considered.

It is not considered that the proposed development site would contain the habitats or species for which the Scohaboy (Sopwell) Bog SAC, Lough Derg, North-East Shore SAC or Lough Derg (Shannon) SPA are designated for. No areas of peatland, fen or areas of limestone are present onsite, therefore the site does not have any potential links to degraded raised bog [7120], cladium fens [7210], alkaline fens [7230] or limestone pavement [8240]. While broadleaved woodland was identified at the site, this is considered to be modified, containing many non-native species and therefore it is not considered that this woodland has any potential links to alluvial forests [91E0] or yew woodlands [91J0]. Scrub habitat is present onsite, however this is primarily comprised of willow and ash. Therefore, this scrub habitat does not have potential links with juniper scrub [5130].

With regards wildfowl species, none of the special conservation interests of the Lough Derg (Shannon) SPA were recorded during the site walkover. There are no NBDC records for the special conservation interests for the two 2km squares (R98Q and R98R) in which the development is located. While it is noted that the Wilton Stream and Ollatrim River are located approximately 135m and 350m from the development site respectively, no aquatic habitats of note are present within the development site itself. Therefore, it is unlikely that the development site would be of importance to the special conservation interests, given the distances from the SPA site and given that no areas of fens, marshes, swamps, lakes or other open bodies of water are present on the proposed development site.

The potential disturbance on protected species due to construction noise would not be considered significant, given the transient nature of works, the construction timeframe (3-4 months) and given

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

the distances between the development site and designated sites (with the nearest site located approximately 9.6km from the development).

The potential disturbance on protected habitats due to dust during the construction phase would not be considered significant, given the transient nature of construction works, the construction timeframe (3-4 months) and given the distance to the nearest European site (greater than 10km).

Activities as part of the construction of the development would not have the potential to cause a significant impact upon designated sites due to invasive species. There would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used for site levelling and site landscaping, therefore no importation of topsoil or subsoil would be required as part of the development works.

The proposed development is located within the Lower Shannon catchment (25C) and is hydrologically connected to the Lough Derg, North-East Shore SAC and Lough Derg (Shannon) SPA via the Ollatrim and Nenagh Rivers. It should be noted that the development site is not hydrologically connected to the Scohaboy (Sopwell) Bog SAC, therefore no potential impacts on water quality due to the proposed development site are anticipated upon this site.

As discussed in the Appropriate Assessment Screening Report, the development site is located a considerable distance, approximately 22.4km from the Lough Derg, North-East Shore SAC and Lough Derg (Shannon) SPA. Given the considerable distance and subsequent tributaries involved, any drainage from the site would undergo considerable dilution prior to reaching the SAC or SPA sites.

During the construction phase of projects, a deterioration in water quality can arise through the release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils). A deterioration in water quality has the potential to have an adverse impact upon the qualifying interests of the Lough Derg, North-east Shore SAC and Lough Derg (Shannon) SPA, particularly qualifying interests which have conservation objectives relating to water quality.

The proposed development would not be considered to impact upon the listed habitats and species of the SAC or SPA sites due to deleterious effects on water quality during construction works, owing to the duration of construction works, the considerable hydrological distance (and thus dilution) between the proposed development and the designated sites and given that the proposed development is not located within the immediate vicinity of any watercourses.

Construction works would be approximately three to four months in duration only. Construction works would be confined to the proposed development footprint, which, at its closest, would be located approximately 300m from the nearest watercourse (Wilton Stream), with no works taking place within or immediately adjacent to riparian or aquatic habitat. With regards the existing stormwater drainage network, there are no open stormwater drains or gullies into which potential run-off from construction activities could enter. Therefore, the risk of the proposed development impacting upon water quality would be greatly reduced.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

With regards suspended solids, it is considered that there would be no significant risk upon the water quality of the Ollatrim or Nenagh Rivers, given that excavated soils would be used in site levelling and landscaping activities, therefore being exposed for a limited period of time only and given that excavation works would not be located within the immediate vicinity of any watercourses. In the unlikely event suspended solids are entrained in stormwater run-off, the solids would likely be retained onsite as run-off percolates to ground (given the absence of watercourses or drains within the immediate vicinity of the development site).

There would be no significant risk of water quality deterioration as a result of uncured concrete, given that works would not be located within the vicinity of any watercourses (with the nearest watercourse approximately 300m from the development footprint) and given that surplus concrete would be returned to the batching plant.

Given the nature of construction activities required, the short duration of construction works (3-4 months) and given the distance to the nearest watercourse (approximately 300m), there is considered to be no significant risk of water quality deterioration as a result of hydrocarbon spillage.

Designated Sites – Scohaboy Bog NHA

As noted in **Section 8.4.1**, one NHA site, Scohaboy Bog NHA (Site Code: 000937), is considered to be within the potential zone of influence of the proposed development site. A portion of this NHA is also designated as Scohaboy (Sopwell) Bog SAC, which is discussed above.

The proposed development does not directly impinge on this NHA site and therefore would not be expected to have any in-situ effects through loss or destruction of habitat, fragmentation of habitat or disturbance of habitat.

It is not considered that the proposed development has the potential to impact upon this NHA site due to invasive species, given that there would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used in site levelling and landscaping, therefore there would be no requirement for importation of topsoil or subsoil.

It is not considered that the proposed development would have the potential to impact upon Scohaboy Bog NHA due to a potential deterioration in water quality, given that the NHA site is located upstream of drainage from the proposed development site and therefore is not considered to be hydrologically connected to the development.

Habitats and Flora

The construction phase of the development would result in a direct and permanent loss of the existing habitats wet grassland (GS4), scrub (WS1) and recolonising bare ground (ED3). Some areas of land-take would take place within existing buildings and artificial surfaces (BL3) habitat, therefore there would be no change of use for this habitat. There would be no loss of the existing

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

habitats amenity grassland (improved) (GA2), hedgerows (WL1), treelines (WL2) or broadleaved woodland (WD1).

The proposed development footprint is approximately 5,784m² in total. Approximately 3,640m² of this footprint (approximately 63%) would be located within the habitats buildings and artificial surfaces (BL3) and recolonising bare ground (ED3) habitat. Recolonising bare ground (ED3) habitat is considered modified and of low ecological value, therefore the loss of this habitat would not be considered significant.

The remaining 2,144m² (approximately) of the proposed development footprint would take place within wet grassland (GS4) and scrub (WS1) habitats. Both of these habitats were considered to be of “local importance, higher value”, as detailed in **Section 8.5.1**. However, the loss of these habitats would not be considered significant, given that wet grassland habitat is common in the general area and following the proposed recommendation of replacement planting. The replacement planting would comprise of a hedgerow along the new northern site boundary, measuring approximately 250m in length, planted with native species to include Hawthorn and Willow.

Following the Landscape and Visual Impact Assessment, it has been recommended that a treeline be planted to the south of the existing piggery buildings, adjacent the area of amenity grassland (improved) (GA2) habitat. The planting of a treeline, resulting in treelines (WL2) habitat, would be a positive impact upon habitats and flora, particularly if native tree species are incorporated into the planting scheme.

No rare plant species or protected flora under the Flora (Protection) Order 2015, were recorded within the proposed development area. Therefore, the proposed development would not be considered to impact upon any rare or protected flora species.

During construction works, there is potential for invasive species to be introduced to the development site through the movement of materials, such as soil and stone and the arrival of construction plant and equipment from an area with invasive species.

Under Regulation 49(2) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to any plant which is included in Part 1 of the Third Schedule shall be guilty of an offence. Materials containing invasive species such as Japanese Knotweed are considered “controlled waste” and, as such, there are legal restrictions on their handling and disposal. Under Regulation 49(7) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), it is a legal requirement to obtain a license to move “vector materials” listed in the Third Schedule, Part 3.

The potential risk of introducing invasive species during the construction phase would be considered low, as no invasive flora species of concern were recorded during the site assessment and given that there would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

for site levelling and site landscaping, therefore no importation of topsoil or subsoil would be required as part of the development works. Any stone required would be sourced locally where possible and would be inspected prior to arrival onsite for the presence of invasive species.

The construction works contractor would also ensure that all equipment and plant would be thoroughly washed and inspected prior to arriving to the development site. Therefore, it is considered that there would be no significant risk of introducing invasive species during construction works from importation of materials or the arrival to site of construction plant and equipment.

Dust emissions may arise during construction activities, in particular during earth-moving works, which may have the potential to impact upon photosynthesis, respiration and transpiration processes of flora due to the blocking of leaf stomata. However, given the transient nature of construction works, the construction timeframe (3-4 months) and standard working practices including dust control, the potential impact to flora would not be considered significant.

The potential impact upon habitats and flora due to a deterioration in water quality is discussed in detail below, while further information on potential impacts on water quality is addressed in **Section 9**.

Fauna and Avifauna

As noted above, approximately 63% of the proposed development footprint would take place within the habitats buildings and artificial surfaces (BL3) and recolonising bare ground (ED3). Recolonising bare ground habitat is considered modified and of low ecological value, therefore, the potential impact upon fauna due to habitat loss or habitat fragmentation would be reduced.

The remainder of the proposed development footprint would take place within wet grassland (GS4) and scrub (WS1) habitats, which are considered to be of “local importance, higher value”. The loss of these habitat would be considered to have a slight to moderate impact upon fauna species. However, it should be noted that wet grassland habitat is common in the general area, which would reduce the potential impact. To reduce the potential impact upon fauna due to habitat loss / fragmentation, recommendations for replacement replanting are included in **Section 8.6.1**.

As noted in the “*Habitats and Flora*” section above, it has been recommended as part of the Landscape and Visual Impact Assessment (Section 7) that a treeline be planted to the south of the existing piggery buildings, adjacent the area of amenity grassland (improved) (GA2) habitat. The planting of a treeline would be a positive impact upon fauna and avifauna, particularly if native tree species are incorporated into the planting scheme.

Direct mortality of fauna may occur due to the removal of vegetation at the site, in addition to the use of heavy construction plant and machinery. Mortality of fauna is most likely to occur during the mammal and bird breeding season, when young are at their most vulnerable.

Where possible, scrub and tree removal would not take place during the bird nesting season (1st of March – 31st of August), greatly reducing the potential for mortality. However, it may be necessary

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

to undertake some scrub / tree removal works during the bird nesting season. In such instances, a suitably qualified ecologist would be engaged to carry out inspections for the presence of breeding birds prior to any clearance works taking place. Where nests are present, the ecologist would make a decision as to whether a “Licence to interfere with or destroy the breeding places of any wild animals”, is required from the NPWS. Alternatively, the ecologist may establish a suitable buffer zone around an active nest, with removal works rescheduled until chicks have fledged. Where no evidence of nests is found during inspection, hedgerow / tree removal works must be undertaken within three days of inspection.

No protected fauna, or evidence of protected fauna, were noted as present on the development site. There was no evidence of badger, including setts or latrines, or evidence of otter including holts, slides, tracks or spraints. Should protected fauna be present, it is not anticipated that construction works would have a significant impact owing to the extent of the development footprint, the habitat types impacted upon and the short duration of construction works.

In the event a protected species is encountered during construction or vegetation removal works, an officer of the NPWS would be notified prior to the resumption of construction works.

Construction work has the potential to disturb fauna due to the generation of construction noise. However, construction noise would not be considered to pose a significant risk to fauna owing to the transient nature of works, the construction timeframe (3-4 months) and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice. Where possible, no construction works would be conducted outside of normal working hours, therefore there would be no disturbance to nocturnal species.

The potential impact upon fauna due to a deterioration in water quality is discussed in the “*Water and Biodiversity*” section below.

Bats

Construction works have the potential to result in direct and indirect impacts on local populations of bats through habitat loss (vegetation clearance, tree felling) and disturbance (increased lighting) potentially affecting existing foraging areas and commuting routes.

The majority of bat species utilise linear features, such as hedgerows and treelines and areas of mature vegetation for foraging and commuting. The proposed development would result in the removal of an area of scrub, located within the northern portion of the development site, which is possibly used by bats for foraging purposes. The removal of this scrub may have a moderate impact upon bats. Therefore, replacement planting, comprising of a native hedgerow, approximately 250m in length along the new northern site boundary, is proposed, which would greatly reduce the potential impact upon bat species due to habitat loss.

It is considered that the proposed recommendation, proposed within the Landscape and Visual Impact Assessment, of planting a treeline to the south of the existing piggery buildings would be a positive impact for bat species with regards the creation of additional foraging and commuting habitat.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

As discussed in **Section 8.4.4**, the buildings onsite scheduled for demolition were determined to have a negligible bat roost potential. It is considered unlikely that the Ash tree scheduled for removal is of importance for bat roosting, given its age, however, it has been assigned a moderate bat roost potential due to the presence of dense ivy. While there would be no loss of any known bat roosts during the construction phase, mitigation measures are outlined in **Section 8.6.1**, to ensure that the tree is re-assessed prior to felling or soft-felled under the supervision of a suitably qualified ecologist.

Artificial lighting during the construction phase has the potential to negatively impact upon bat species, as illumination can impact upon their roosting sites, commuting routes and foraging areas. While some bat species, such as Leisler's bats (*Nyctalus leisleri*), may take advantage of prey concentrating around light sources, other bat species are sensitive to lighting and will avoid artificially lit up areas. This can potentially sever commuting and foraging routes. As noted above, construction works would not be conducted outside of normal working hours where possible, which would considerably reduce the potential impacts upon bat species. Measures with regards artificial lighting, as outlined in **Section 8.6.1**, would be required to be implemented to reduce the potential impact of light pollution.

Water Quality and Biodiversity

The construction phase of projects has the potential to impact upon flora and fauna due to a deterioration in water quality. Risks to water quality could arise due to the potential release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils).

Suspended solids could become entrained in surface water run-off and could affect aquatic habitats through deposition. An increase in sediments has the potential to impact upon fish by damaging gravel beds required for spawning, smothering fish eggs and in extreme cases, by interfering with the gills of fish. An increase in suspended solids has the potential to reduce water clarity, which can impact the light penetration of water and may also affect certain behaviours of aquatic fauna such as foraging success. Aquatic flora and fauna could also be impacted upon by an increase in nutrients which are bound to suspended solids. A significant increase in nutrients can result in excessive eutrophication, leading to deoxygenation of waters and subsequent asphyxia of aquatic species.

A potential source of chemical contamination of surface water would be from the release of hydrocarbons (oils, fuels) from construction plant and equipment. Hydrocarbons can affect water quality, potentially resulting in toxic and / or de-oxygenating conditions for aquatic flora and fauna. Pollution could occur in a number of ways, such as neglected spillages, the storage handling and transfer of oil and chemicals and refuelling of vehicles.

Another potential source of contamination of surface water would be the release of uncured concrete. In the event of uncured concrete entering a waterbody, the pH would be altered locally, potentially leading to the death of aquatic flora, fish and macroinvertebrates and alteration to the waterbody substrate.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

However, it should be noted that in the absence of any watercourses or drainage ditches within the vicinity of the development site and with the nearest watercourse (Wilton Stream) located approximately 300m from the proposed development footprint and given that there are no open stormwater drains or gullies into which potential run-off from construction activities could enter, the potential for construction works to impact upon surface water quality and thus aquatic flora and fauna, would not be considered significant.

While no adverse impacts upon water quality are anticipated, standard construction control methods would be implemented by the construction works contractor as standard practice. These measures are outlined in **Section 8.6.1**, and are further detailed in **Section 9**.

8.5.3 OPERATIONAL PHASE

Designated Sites –SAC and SPA Sites

The potential impacts of the proposed development upon designated sites due to land-take is discussed in **Section 8.5.2**. As the development site does not directly impinge upon any part of a European site, no in-situ effects upon designated sites are expected due to loss or destruction of habitat, fragmentation of habitat, disturbance of habitat or direct reduction in species density.

As noted in **Section 8.5.2** above, it is not considered that there would be any potential adverse impacts upon the special conservation interests of Lough Derg (Shannon) SPA due to a change in land-use at the development site, as it is unlikely that the development site would be of importance to the special conservation interests, given the distances from the SPA site and given that no areas of fens, marshes, swamps, lakes or other open bodies of water are present on the proposed development site.

It is not envisaged that protected species would be adversely impacted upon by the proposed development due to noise generated by the proposed development or by noise generated from the associated site traffic, given the nature of the proposed development and the distances to the designated sites (approximately 9.6km).

It is not considered that the proposed development would have the potential to significantly impact upon air quality within the area, with the potential to adversely impact upon Scohaboy (Sopwell) Bog SAC, Lough Derg, North-east Shore SAC or Lough Derg (Shannon) SPA. Ammonia is abundant in slurry, is highly volatile and is emitted when the slurry is in contact with air during storage. Emissions of ammonia to atmosphere is undesirable from an ecological point of view, as it can have toxic, eutrophic and acidifying effects on certain ecosystems. In particular, the presence of high ammonia levels in peatland ecosystems has been found to inhibit the growth of certain moss species, allowing sedge and grass species to outcompete.

While ammonia emissions would increase in response to an increase in pig numbers at the proposed development site, the proposed development includes design measures which limit the potential for the generation of ammonia emissions to atmosphere. Of particular note is the incorporation of a slurry cooling system, which has been estimated to reduce ammonia emissions by 25% (as discussed in **Section 5**). The development would also include for the removal of slurry

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

to an external slurry store, which has been noted as a key principle within the document, “*Reference Document on Best Available Techniques (BAT) for Intensive Rearing of Poultry and Pigs*”, for reducing air emissions. Given the incorporated design measures for the reduction of ammonia emissions at source and given the considerable distances of designated sites from the proposed development (with the nearest designated site, Scohaboy (Sopwell) Bog SAC located approximately 9.6km from the development), no potential significant impacts are anticipated upon designated sites due to the proposed development in relation to air emissions.

It is not anticipated that the operational phase of the development has the potential to impact upon the listed habitats and species of the Lough Derg, North-East Shore SAC or Lough Derg (Shannon) SPA sites due to deleterious effects on water quality.

No significant impact on water quality would take place due to drainage from the site. As discussed in **Section 2**, stormwater from the site comprises of clean rainwater run-off from the roofs. Stormwater from the proposed structures would connect to this existing stormwater network prior to discharge to the Wilton Stream, located a significant hydrological distance from the SAC or SPA sites (greater than 22km).

There are no process effluent emissions from the site, with all animal manure stored within underground slurry tanks, awaiting collection for landspreading activities. All slurry tanks have been designed to ensure the site has sufficient storage capacity for any manure generated onsite. The existing slurry tanks are fitted with leak detection systems, which would also be incorporated within the proposed new slurry tanks, as discussed in **Section 2**.

The development could result in a potential impact upon the biodiversity of designated sites through the landspreading of pig manure as organic fertiliser, either through pollution of waterbodies or the enrichment of natural vegetation. However, manure is and would continue to be, collected by registered contractors / farmers, for application to lands held by third parties in the area. The transport and spreading of the manure is managed in compliance with the Nitrates Regulations (S.I. No. 605 of 2017). The regulations provide for controls designed to protect groundwater and surface water from impacts due to the application of fertiliser on agricultural lands. Acceptable spreading times are limited, prohibitions on weather and ground conditions are defined and set back distances from waterbodies and wells/springs and limitations for areas of extreme groundwater vulnerability are established.

The spreading of manure would be undertaken in accordance with the setback distances from surface waterbodies and abstraction points specified in the Nitrates Regulations. This would minimise the risk of any pollution occurring and protected sites being impacted due to the spreading of organic fertilisers. As manure from the development is a replacement for other chemical and organic fertilisers on the current, proposed and any future potential spreadlands, it is considered that the impact of manure being used as a fertiliser would have a neutral to no significant additional impact upon the biodiversity of landspreading areas.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Designated Sites – Scohaboy Bog NHA

The proposed development does not directly impinge on Scohaboy Bog NHA (Site Code: 000937) site and therefore would not be expected to have any in-situ effects through loss or destruction of habitat, fragmentation of habitat, disturbance of habitat or direct reduction in species density.

It is not considered that the proposed development would have the potential to significantly impact upon air quality within the area, with the potential to adversely impact upon the NHA. As discussed in the “*Designated Sites – SAC and SPA Sites*” section above, while ammonia emissions would increase in response to an increase in pig numbers at the proposed development site, the proposed development includes design measures which limit the potential for the generation of ammonia emissions to atmosphere. These design measures include the incorporation of a slurry cooling system, which has been estimated to reduce ammonia emissions by 25%, and the removal of slurry to an external slurry store. Given the incorporated design measures for the reduction of ammonia emissions at source and given the distance of the proposed development from the NHA (approximately 8.5km), no potential significant impacts are anticipated upon the Scohaboy Bog NHA due to the proposed development in relation to air emissions.

The proposed development site is not hydrologically connected to Scohaboy Bog NHA. Therefore, the proposed development would not have the potential to impact upon the NHA due to a potential deterioration in water quality.

The development could result in a potential impact upon the biodiversity of designated sites through the landspreading of pig manure as organic fertiliser, either through pollution of waterbodies or the enrichment of natural vegetation. However, as noted in the section above, manure is and would continue to be, collected by registered contractors / farmers, for application to lands held by third parties in the area and managed in compliance with the Nitrates Regulations (S.I. No. 605 of 2017).

Habitats and Flora

The proposed development would result in a change of habitat use at the proposed development footprint, resulting in the loss of recolonising bare ground (ED3), wet grassland (GS4) and scrub (WS1) habitats. The loss of ED3 habitat would not be considered significant, given that this habitat is modified and of low ecological value. As discussed in **Section 8.5.2**, the loss of wet grassland (GS4) and scrub (WS1) habitats would not be considered significant, given that wet grassland habitat is common in the general area and given that replacement planting would be undertaken, comprising of a new hedgerow of native species, measuring approximately 250m in length. The landscape and visual assessment recommendation of planting a treeline to the south of the existing piggery buildings would be a positive impact, particularly if native tree species are incorporated into the planting scheme.

As discussed in the “*Designated Sites –SAC and SPA Sites*” section above, the proposed development would generate ammonia emissions to atmosphere. Emissions of ammonia to atmosphere is undesirable from an ecological point of view, as it can have toxic, eutrophic and acidifying effects on certain ecosystems. In particular, the presence of high ammonia levels in

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

peatland ecosystems has been found to inhibit the growth of certain moss species, allowing sedge and grass species to outcompete.

While the proposed development would result in an increase of ammonia emissions in response to an increase in pig numbers, no adverse significant impact upon habitats and flora is anticipated, given that there are few peatland ecosystems in the area, with the two nearest bogs, Glenahilty Bog, located 300m north of the site and an un-named bog located approximately 3.4km to the north-east, currently worked and therefore of reduced ecological value and given that the land use of the area is mainly pasture land, which would not be particularly sensitive to ammonia emissions. Furthermore, the proposed development has incorporated design measures which limit the potential for the generation of ammonia emissions to atmosphere. These design measures include the incorporation of a slurry cooling system, which has been estimated to reduce ammonia emissions by 25% and the removal of slurry to an external slurry store.

Fauna and Avifauna

The alteration in habitat type at the site due to the proposed development would not be anticipated to have a significant impact upon the fauna of the area. A good proportion of the land take would comprise of buildings and artificial surfaces (BL3) and recolonising bare ground (ED3), which are considered modified and of low ecological value and therefore this land take would not be considered significant. While the proposed footprint would necessitate the loss of some wet grassland (GS4) and scrub (WS1) habitats, replacement planting in the form of a native hedgerow is recommended along the new northern site boundary. The landscape and visual assessment recommendation of planting a treeline to the south of the existing piggery buildings would be a positive impact, particularly if native tree species are incorporated into the planting scheme.

It is not envisaged that fauna would be significantly impacted upon by the development due to noise. No significant additional noise would be anticipated from the proposed new additions to the piggery facility. Fauna present within the Woodville Pig Farms site or immediate area would likely be accustomed to the facility's existing noise environment. Furthermore, a noise management plan accompanies this application (**Attachment 6.2**) and would be put in place for the development.

Rodent baiting at agricultural facilities has the potential to adversely impact upon fauna through secondary poisoning (for example birds of prey consuming rodents who have recently consumed poison). However, the site has in place a rodent control programme, as discussed in **Section 2.5.10**, which would be updated to include for the proposed development. The rodent control programme includes bait stations located in strategically designated areas onsite, baited with rodenticide. These stations are designed to exclude non-target animals, are monitored weekly by trained staff and are operated in accordance with the manufacturer's / supplier's instructions / recommendations. The rodent control programme is designed to ensure that excessive baiting is avoided, reducing the potential impact on non-target species.

The potential impact upon fauna due to a deterioration in water quality is discussed in the "*Water Quality and Biodiversity*" section below.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Bats

As noted in **Section 8.5.2** above, artificial lighting can potentially impact upon bat roosting sites, commuting routes and foraging areas. In the absence of mitigation measures, operational lighting has the potential to result in an adverse impact upon bat species.

Operational phase impacts on bats would be associated with permanent lighting associated with the facility. However, there are no external yard lights, with the exception of one light on the back door of the staff office. The proposed development would not require any additional lighting. It is therefore considered that the proposed development would not have significant impact upon bat species, should they be present within the immediate vicinity of the development site.

The operational phase of developments can result in an increase in human activity, which can potentially impact upon bat species due to increased noise and increased traffic. However, the proposed development would not be considered to cause a significant increase in human activity, given the nature of the development (indoor pig rearing) and given that any potential increases in traffic movements would be planned during normal day-time hours and therefore no significant impact upon bat species is anticipated.

Water Quality and Biodiversity

It is not anticipated that the operation of the proposed development would have a significant impact upon aquatic flora or fauna.

As discussed in **Section 8.5.2**, it should be noted that the potential for the development to impact upon water quality during the operational phase and thus aquatic biodiversity, is reduced, given the absence of any watercourses or drainage ditches within the immediate vicinity of the development site (with the nearest watercourse, the Wilton Stream, located approximately 220m from the main piggery facility).

No significant impact on water quality would take place due to drainage from the site. Stormwater from the site comprises of clean rainwater run-off from the roofs. Stormwater from the proposed structures would connect to this existing stormwater network prior to discharge to the Wilton Stream.

There are no process effluent emissions from the site, with all animal manure stored within underground slurry tanks, awaiting collection for landspreading activities. All slurry tanks have been designed to ensure the site has sufficient storage capacity for any manure generated onsite. The existing slurry tanks are fitted with leak detection systems, which would also be incorporated within the proposed new slurry tanks, as discussed in **Section 2.4**. The leak detection system comprises of a network of slotted drains in a herring bone arrangement beneath the floor of the slurry tanks, with the pipes feeding to an inspection chamber.

The landspreading of animal manure has the potential to impact upon biodiversity, either through pollution of waterbodies or the enrichment of natural vegetation. However, as discussed in the “*Designated Sites*” sections above, manure is, and would continue to be, collected by registered

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

contractors / farmers, for application to lands held by third parties in the area. The transport and spreading of the manure is managed in compliance with the Nitrates Regulations (S.I. No. 605 of 2017). The regulations provide for controls designed to protect groundwater and surface water from impacts due to the application of fertiliser on agricultural lands. Acceptable spreading times are limited, prohibitions on weather and ground conditions are defined and set back distances from waterbodies and wells/springs and limitations for areas of extreme groundwater vulnerability are established.

The spreading of manure would be undertaken in accordance with the setback distances from surface waterbodies and abstraction points specified in the Nitrates Regulations. This would minimise the risk of any pollution occurring and protected sites being impacted due to the spreading of organic fertilisers. As manure from the development is a replacement for other chemical and organic fertilisers on the current, proposed and any future potential spreadlands, it is considered that the impact of manure being used as a fertiliser would have a neutral to no significant additional impact upon the biodiversity of landspreading areas.

No adverse potential impacts upon water quality would be anticipated due to accidents and potential spills and leaks, given the absence of watercourses within the vicinity of the site, the low volume of stored chemicals onsite and given that chemicals and oils are stored upon bunds, in accordance with the site's Industrial Emissions (IE) Licence.

While no adverse impacts upon water quality, and thus aquatic biodiversity, are anticipated, measures are currently and would continue to be implemented by the applicant as a matter of good environmental management at the site and in accordance with the site's IE Licence, as outlined in **Section 8.6.2**, and further discussed in **Section 9**.

8.5.4 CUMULATIVE IMPACTS

The following plans and projects were reviewed and considered for in-combination effects with the proposed development:

- North Tipperary County Development Plan 2010 - 2016 (As Varied);
- Ballymackey/Ballinree Settlement Plan;
- Proposed and permitted developments in the area available on Tipperary County Council planning system.

The proposed development is located in a rural area, with some nearby residential properties located along the local road network. The land use of the area is mainly agricultural pasture, with some areas of arable land. The nearest village is Ballymackey, located approximately 2.7km to the south-west, while the nearest towns are Cloughjordan and Nenagh, located approximately 5.7km north and 9.6km south-west of the development site respectively. There are few commercial enterprises within the general area, with the exception of agricultural enterprises.

According to the Tipperary online planning system, planning permission was granted to Tipperary Milling Company Ltd. for a primary and secondary digester in 2007 (Planning Ref. 07510108). This application site is located approximately 640m to the east of the development site. However,

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

this development did not take place. An application by Bulrush Horticulture Ltd. is currently in the planning process for retention planning (Planning Ref. 19600859). This facility, involved in peat harvesting, is located approximately 1.3km to the north of the development site.

There is one EPA waste licenced facility located within 15km of the development; Advanced Environmental Solutions (Ireland) Limited (Nenagh), Waste Licence Ref. No. W0240-01, located approximately 12km to the south-west of the site. There are also a number of EPA IE / IPC licenced facilities located within 15km of the development site, as shown in the table below.

Table 8.18: EPA Licenced Facilities within 15km of the Development

LICENCE No.	LICENCE NAME	LICENCE TYPE (FIRST SCHEDULE OF EPA ACT, 1992, AS AMENDED)	APPROX. DISTANCE FROM DEVELOPMENT SITE
W0078-03	Ballaghveny Landfill	11.5 Waste	180m East
P0411-01	Mr. James and Ms. Nuala Gleeson	6.2 (a) Intensive Agriculture	2.3km South-West
P0375-01	Toomevara Farms Limited	6.2 (a) Intensive Agriculture	6.3km South-East
P0184-01	Anglo Beef Processors Ireland Unlimited Company	7.4.1 Food and Drink	9.5km West
P0791-02	Arrabawn Co-operative Society Limited	7.2.1 Food and Drink	10.1km South-West
P0067-01	Procter & Gamble (Manufacturing) Ireland Limited.	5.3 Chemicals	11.1km South-West

Potential cumulative impacts are discussed under the following headings.

Habitat Loss / Fragmentation

As discussed in **Section 8.5.3, “Habitats and Flora”**, the proposed development would result in a change of habitat use at the proposed development footprint, resulting in the loss of recolonising bare ground (ED3), wet grassland (GS4) and scrub (WS1) habitats. The loss of these habitats would not be considered significant, given that ED3 habitat is modified and of low ecological value, wet grassland habitat is common in the general area and given that replacement planting would be undertaken.

The surrounding land-use of the proposed development site is mainly agricultural pasture land, (best characterised as improved agricultural grassland (GA1) habitat), with some areas of arable land, which can be considered modified and of low biodiversity value. Areas of peatland are also noted within the vicinity, with some areas worked, therefore the biodiversity value would vary depending upon whether the peatland is being cut (low to moderate biodiversity value) or is untouched (high biodiversity value).

While no proposed developments were identified on the Tipperary County Council planning site within the immediate vicinity of the applicant’s proposed site, should future planning applications

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

be submitted for the area, it is likely that they would also be located on agricultural land, which would likely be of low ecological value. Therefore, there would be no cumulative habitat loss or fragmentation impacts which could pose a significant risk to biodiversity.

It is noted that Bulrush Horticulture Ltd. operate a peat harvesting facility at Glenahilty Bog, approximately 1.3km to the north of the site. While Glenahilty Bog may have habitats of ecological importance, given that the applicant's proposed development would not result in any impact upon peatland (in the absence of this habitat on site, or immediately adjacent the site), no in combination effects on habitat loss / fragmentation are anticipated.

Disturbance to Species

Disturbance to species may arise through noise emissions and human activity. The main in-combination noise and human activity effects would be from any commercial activities within the area. However, as noted above, there are few commercial enterprises located within the vicinity of the development site, with the general area around the development site mainly used for agricultural purposes and for some dispersed one-off housing. Therefore, owing to the distances of commercial activities and the EPA licenced facilities detailed in the table above from the development site and given the nature of activities at the proposed development site (internal rearing of pigs), it is considered that there would be no cumulative noise impacts, or other disturbance effects due to human activity, which would have the potential to adversely impact upon fauna in the area.

Air Quality

The main cumulative impacts of the proposed development with regards air emissions upon biodiversity would be the potential generation of ammonia emissions to air from agricultural activities. In particular, ammonia emissions have the potential to adversely impact upon peatland habitats, by inhibiting the growth of certain moss species, allowing grass and sedge species to outcompete. Ammonia emissions within the general area would be mainly associated with intensive agricultural facilities. In addition to the Woodville farm site, there are two EPA licenced intensive agricultural facilities (P0411-01 and P0375-01) located within 15km of the development site.

However, no significant cumulative impact upon habitats is anticipated, given that there are few peatland ecosystems in the area, with the two nearest bogs, Glenahilty Bog, located 300m north of the site and an un-named bog located approximately 3.4km to the north-east, currently worked and therefore of reduced ecological value and given that the land use of the area is mainly pasture land, which would not be particularly sensitive to ammonia emissions. Furthermore, the proposed development has incorporated design measures which limit the potential for the generation of ammonia emissions to atmosphere. These design measures include the incorporation of a slurry cooling system, which has been estimated to reduce ammonia emissions by 25% and the removal of slurry to an external slurry store.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Deterioration in Water Quality

Continued implementation of the Water Framework Directive would result in achieving, or maintaining, improvements to water quality in the Lower Shannon Catchment. Developments such as this proposed development could act in combination with existing environmental pressures on the Lower Shannon Catchment, including: agriculture, anthropogenic, domestic and urban waste water, urban run-off, industry (including extractive) and forestry. In particular, the proposed development could act in combination with other similar projects which are hydrologically connected with the Wilton Stream, Ollatrim River or Nenagh River.

The proposed development could act in combination with other developments with regards to the landspreading of manure / sludges. As discussed in **Section 8.5.3, “Water Quality and Biodiversity”**, pig manure from the development site is currently landspread and would likely continue to be landspread, on third party lands in the area. The landspreading of manure is undertaken in accordance with the Nitrates Regulations, such as complying with the timing of the landspreading, nutrient management planning and set-back distances around sensitive receptors and transport vectors. At least four of the facilities (Mr. James and Ms. Nuala Gleeson, Toomevara Farms Limited, Anglo Beef Processors Ireland Unlimited Company and Arrabawn Co-operative Society Limited) in **Table 8.18** above generate sludges from wastewater treatment or pig manure, with the sludges / manure landspread by farmers or contractors. However, the landspread of these sludges / manure would be required to be undertaken in compliance with the Nitrates Regulations. Therefore, no cumulative impacts upon water quality due to landspreading would be anticipated.

8.5.5 “DO-NOTHING” IMPACT

Should the development not be built, there would be no change to the environmental impacts of the existing site. The proposed development footprint would likely remain as buildings and artificial surfaces habitat and recolonising bare ground habitat, while the wet grassland area would potentially transition into scrub habitat. However, given the current use of the development site and ongoing activities, it is unlikely that the proposed site would be of significant ecological value in the future.

8.5.6 POTENTIAL IMPACTS PRE-MITIGATION

Table 8.19 below provides a summary of the potential impacts of the proposed development pre-mitigation, during the construction and operational phases.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 8.19: Summary of Predicted Impacts Pre-Mitigation

IMPACT	DEVELOPMENT PHASE	DIRECT / INDIRECT	LIKELIHOOD	DURATION	REVERSIBLE	SIGNIFICANCE	IMPACT TYPE
Habitat Loss	Construction & Operational	Direct	Certain	Permanent	No	Slight to Moderate significance	Negative
Introduction of Invasive Flora Species	Construction	Direct	Unlikely	Temporary	Yes	Slight significance	Negative
Fauna Disturbance	Construction	Indirect	Possible	Temporary	Yes	Slight significance	Negative
	Operational	Indirect	Unlikely	Permanent	Yes	Not significant	Neutral
Fauna Mortality	Construction	Direct	Dependent upon timing of works relevant to breeding season	Permanent	No	Moderate significance	Negative
Bats – Disturbance / Severance of Habitat	Construction	Direct & Indirect	Possible	Temporary	Yes	Adverse significance	Negative
	Operational	Indirect	Unlikely	Permanent	Yes	Not significant	Neutral
Surface Water Quality Deterioration	Construction	Indirect	Unlikely	Temporary	Yes	Not significant	Neutral
	Operational	Direct	Unlikely	Permanent	Yes	Not significant	Neutral
Designated Sites	Construction & Operational	Indirect	None	N/A	N/A	N/A	Neutral

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

8.6 MITIGATION MEASURES

8.6.1 CONSTRUCTION PHASE

The mitigation measures outlined below would be implemented to ensure there is no significant impact upon the biodiversity of the area and designated sites during the construction phase of the development.

General Mitigation Measures

- All construction works would be confined as far as possible to the development footprint;
- All plant machinery and equipment would be maintained in good working order and regularly inspected;
- Where possible, no construction works would be conducted outside of normal working hours.

Habitats and Flora

- Regular site inspections would be undertaken to ensure that no growth of invasive species has taken place;
- The construction works contractor would ensure that all equipment and plant is inspected for the presence of invasive species and thoroughly washed prior to arriving to the development site;
- All relevant construction personnel would be trained in invasive flora species (main species of concern, including Japanese Knotweed) identification and control measures;
- In the event of any invasive species listed in Part 1 of the Third Schedule appearing onsite, works within the immediate vicinity would cease until the invasive plant has been appropriately treated and disposed of, in accordance with Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011;
- Cognisance would be taken of National Roads Authority's Guidelines on "*The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*";
- Excavated soil during earth-moving activities and excavations would be segregated into subsoil and topsoil and reused in reinstatement and landscaping activities where possible. Natural recolonisation would be allowed to take place where possible;
- Replacement planting would be undertaken along the new northern site boundary. Approximately 250m of new hedgerow, comprised of native species such as Hawthorn and Willow, would be planted;
- The planting of a treeline to the south of the existing piggery facilities, as recommended in Section 7 Landscape & Visual, should incorporate native tree species.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Fauna

- As a minimum, the construction work contractor would comply with all legislative provisions relating to scrub / tree removal and the protection of birds and would have regard to reducing impacts on nesting birds;
- In instances where scrub / tree removal is required during the bird nesting season (1st of March – 31st August inclusive), the trees required for removal would be inspected by a suitably qualified ecologist prior to any removal works for the presence of breeding birds. Where nests are present, the ecologist would make a decision as to whether a “Licence to interfere with or destroy the breeding places of any wild animals”, is required from the NPWS. Alternatively, the ecologist may establish a suitable buffer zone around an active nest, with removal works rescheduled until chicks have fledged. Where no evidence of nests is found during inspection, hedgerow / tree removal works must be undertaken within three days of inspection;
- Should a protected fauna species such as badger or the common frog be found during the construction phase of the project, an officer of the NPWS would be notified prior to the resumption of construction works;
- Replacement habitat would be created via the planting of a hedgerow, approximately 250m in length, along the new northern site boundary, using native species;
- The planting of a treeline to the south of the existing piggery facilities, as recommended in Section 7 Landscape & Visual, should incorporate native tree species.
- To reduce the potential for disturbance due to noise, all plant and machinery would be maintained in good working order and regularly inspected, where possible vehicles would be equipped with mufflers to suppress noise and where possible, no construction works would be conducted outside of normal working hours.

Bats

Habitat Loss

- To off-set the removal of scrub habitat, replacement habitat would be created via the planting of a new hedgerow along the new northern site boundary, using native species such as Hawthorn.

Loss of Potential Roosts

- The mature Ash tree scheduled for removal, which has been assessed as having a moderate bat roost potential due to dense ivy cover, would be re-assessed by a suitably qualified ecologist prior to felling, or alternatively, would be soft-felled under supervision of a suitably qualified ecologist;
- Ivy on the mature Ash tree scheduled for removal would be cut in advance of re-assessment / soft-felling, to enable the ecologist to adequately assess the tree for any

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

previously hidden potential roost features. Should potential roost features be identified, the ecologist would advise if further survey work would be required.

Artificial Lighting

- Construction works in the hours of darkness, when bats are active (April – October), would be kept to a minimum;
- Lighting of hedgerows / treelines and woodland would be avoided where possible to ensure that potential commuting and foraging corridors are maintained;
- Should lighting be required during construction works, it would be of a low height (without compromising safe working conditions) to ensure minimal light spill. Where possible and where practicable to do so, timers or motion sensors would be used;
- Directional lighting would be used where possible, by use of louvres or shields fitted to the lighting;
- White light emitting diode (LED) would be used where possible, which is considered to be low impact in comparison to other lighting types.

Water Quality

As noted in **Section 8.5.2**, no adverse impacts upon water quality are anticipated. However, the following mitigation measures would be implemented by the construction works contractor as standard practice:

- The construction works contractor would adhere to standard construction best practice, taking cognisance of the Construction Industry Research and Information Association (CIRIA) guidelines “*Control of Water Pollution from Construction Sites; guidance for consultants and contractors*” 2001, “*Control of Water Pollution from Construction Sites – Guide to Good Practice*”, 2002, and the 2016 guidelines published Inland Fisheries Ireland, “*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*”;
- Excavations and earth-moving activities would be planned outside periods of heavy rainfall, to limit the potential for suspended solids to become entrained within surface water run-off;
- All construction plant machinery and equipment would be maintained in good working order and regularly inspected;
- The temporary site compound would be used for the storage of all machinery and plant when not in use, the re-fuelling of plant and the storage of all associated oils and fuels for plant;
- Any fuels, oils or chemicals would be stored in accordance with the EPA guidance on the storage of materials, in designated bunded areas at the temporary site compound, with adequate bund provision to contain 110% of the largest drum volume or 25% of the total volume of containers;

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

- Spill kits, adequately stocked with spill clean-up materials such as booms and absorbent pads, would be readily available onsite;
- Where construction plant shows signs of hydrocarbon leakage, site personnel would cease the operation of the item in plant in question and notify the Project Manager. Any defective plant would be kept out of service until the necessary repairs are undertaken;
- Any uncured concrete works would be supervised at all times and would be scheduled outside of periods of expected heavy rainfall;
- The wash-out of Ready-Mix Truck drums would not be permitted onsite, in the environs of the site, or at a location which could result in a discharge to surface water;
- Surplus uncured concrete would be returned to the batching plant where possible.

8.6.2 OPERATIONAL PHASE

The following mitigation measures would be implemented to ensure there would be no significant impact upon the biodiversity of the area and designated sites during the operational phase of the development;

- Good housekeeping practices would be observed throughout the site during the operational phase;
- The existing facility has a documented Environmental Management System, which would be updated to incorporate the proposed development;
- Native flora species would be incorporated in the landscaping of the site as much as possible;
- Rodent populations on the farm would be controlled by a combination of rodenticide (managed by the applicant as per their rodent control programme), high spec buildings, good housekeeping and well-designed storage and dispensing of feed.

As noted in **Section 8.5.3**, no adverse impacts upon water quality are anticipated during the operational phase. However, the following measures in relation to the protection of water quality would be implemented by the applicant as a matter of good environmental management at the site and in accordance with the site's Industrial Emissions Licence:

- The site would ensure that any fuels, oils or chemicals would be stored in accordance with the EPA guidance on the storage of materials, in designated, bunded areas, with adequate bund provision to contain 110% of the largest drum volume or 25% of the total volume of containers. Bunds and bunded areas would undergo integrity testing every three years, as is best practice;
- The site would ensure that an adequate supply of spill clean-up material is readily available, in the event of any spillages onsite;

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

- Surface water monitoring would continue to be undertaken on a quarterly basis for COD or BOD, and the stormwater inspection chamber would continue to be inspected on a weekly basis;
- All tanks would be fitted with a leak detection system, comprising of a network of slotted drains in a herring bone arrangement beneath the floor of the slurry tank. These pipes would feed to an inspection chamber.

8.6.3 “WORST CASE” SCENARIO

If the proposed development proceeded without the mitigation measures outlined in **Section 8.6.1**, there would be a potential moderate to adverse impact upon bat species due to the removal of habitat, in addition to lighting impacts during the construction phase. In the absence of mitigation measures, there would be a slight to moderate impact upon fauna due to habitat loss. There would also be a potential moderate impact upon fauna, should vegetation clearance be undertaken during the mammal and bird breeding season. However, this is unlikely to occur, given that there are legal restrictions under the Wildlife Act 1976 as amended, with regards the removal of vegetation from uncultivated land.

During construction works, there would be potential to inadvertently introduce invasive species to the area. However, even in the absence of mitigation measures, this would be considered unlikely given that there would be no significant import of materials to the site and given that delivery of materials would be inspected prior to removal from the site of origin. Where invasive species are confirmed, the loads would be required to be adequately treated or disposed of appropriately and therefore, would not be transported to the proposed development site.

8.7 PREDICTED IMPACTS WITH MITIGATION

The following table provides a summary of the residual effects the proposed development may have, once recommended mitigation measures are implemented. It is not envisaged that there would be any considerable adverse impacts upon biodiversity due to the proposed development.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 8.20: Summary of Residual Impacts Post-Mitigation

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
Habitat Loss	Construction & Operational	Slight to moderate significance	- Excavated soils would be segregated into subsoil and topsoil, and reused in reinstatement and landscaping works. Where possible, natural recolonisation would be allowed to take place - Replacement habitat would be created via the planting of a new hedgerow, approximately 250m in length, along the northern site boundary, comprised of native species - The planting of a treeline to the south of the existing piggery facilities, as recommended in Section 7 Landscape & Visual, should incorporate native tree species.	Not significant	Neutral
Introduction of Invasive Flora Species	Construction	Slight significance	- Construction plant would be inspected and washed prior to arriving onsite; - Regular site inspections for the presence of invasive species would be undertaken - Should invasive species appear onsite, works would immediately cease until the plant was appropriately treated and disposed of	Not significant	Neutral
Fauna Disturbance	Construction	Slight significance	- Where possible, no construction works would be conducted outside of normal working hours - All plant machinery and equipment would be maintained in good working order and regularly inspected - Where possible, vehicles would be equipped with mufflers to suppress noise	Slight significance	Minor Negative

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
			- As a minimum, the construction work contractor would comply with all legislative provisions relating to scrub / tree removal - Should a protected fauna species be found during the construction phase, the NPWS would be notified prior to the resumption of construction works		
	Operational	Not significant	None required	Not significant	Neutral
Fauna Mortality	Construction	Moderate significance	- As a minimum, the construction work contractor would comply with all legislative provisions relating to scrub / tree removal - Where scrub / tree removal works are required during the bird nesting season (1st March to 31st August), the sections / trees for removal would be inspected by an ecologist for the presence of breeding birds. Where nests are present, a decision would be made as to whether a licence is required from the NPWS, or whether a suitable buffer zone could be established around the active nest with removal works rescheduled until chicks have fledged	Slight significance	Minor Negative
Bats – Disturbance / Severance of Habitat	Construction	Adverse Significance	- Replacement habitat would be created via the planting of a new hedgerow along the northern site boundary, comprised of native species - The Ash tree scheduled for removal would be re-assessed by a qualified ecologist prior to felling or soft-felled under supervision of a qualified ecologist. Ivy would be cut in advance of re-assessment / soft-felling, to enable an assessment	Not significant	Neutral

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
			for potential roost features which may be obscured due to ivy cover - Measures would be implemented to reduce the potential for light pollution - Construction works in the hours of darkness would be kept to a minimum		
	Operational	Not significant	None required	Not significant	Neutral
Surface Water Quality Deterioration	Construction	Not significant	None required, however standard construction measures have been included within Section 8.6.1 which would be implemented as is standard best practice in the construction industry.	Not significant	Neutral
	Operational	Not significant	None required, however measures have been included with Section 8.6.2 which would be implemented by the applicant as a matter of good environmental management at the site and in accordance with the site's Industrial Emissions Licence.	Not significant	Neutral
Designated Sites	Construction & Operational	N/A	None required	N/A	Neutral

8.8 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

Survey limitations are discussed in detail in **Section 8.3.4**. No other difficulties were encountered in compiling this chapter.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
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9.0 LAND – SOILS, GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

9.1 INTRODUCTION

This chapter describes the soils, geology, hydrology and hydrogeology of the existing environment surrounding the proposed development site. The objective of this chapter is to determine the likely significant impacts on the soils, geology, hydrology and hydrogeology of the area arising from the proposed development and to propose measures to mitigate these impacts, if required.

This chapter has been prepared in accordance with guidelines from the Environmental Protection Agency (EPA) and the Institute of Geologists of Ireland (IGI):

EPA (2002). *Guidelines on Information to be contained in Environmental Impact Statements*.

EPA (2017). *Guidelines on the Information to be contained in Environmental Impact Assessment Reports – Draft*.

IGI (2013). *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements*.

A detailed description of the existing and proposed development is outlined in **Section 2** of this EIAR.

9.2 METHODOLOGY

The following works were undertaken to complete the assessment of the potential effects on soils, geology, hydrology and hydrogeology:

- Desk study to collate and examine available existing information on soils, geology, hydrology and hydrogeology for the proposed development site and surrounding area;
- Review of information for the proposed development with particular regard to proposed soil/subsoil excavations;
- Management of water, stormwater and water usage;
- Site walkover and drive over of the surrounding catchment on 12th April 2019;
- Interpretation of all data, assessment and reporting.

9.3 DESCRIPTION OF THE EXISTING ENVIRONMENT

This section describes the existing baseline environment in terms of the soils, geology, hydrology and hydrogeology of the proposed development site and the surrounding area. Based on this information, the potential impacts of the proposed development are identified, as are the measures required to mitigate any identified negative impacts.

9.3.1 LAND & SOILS

REGIONAL SOILS:

Figure 9.1 below shows the regional soil types in the area surrounding the proposed site.

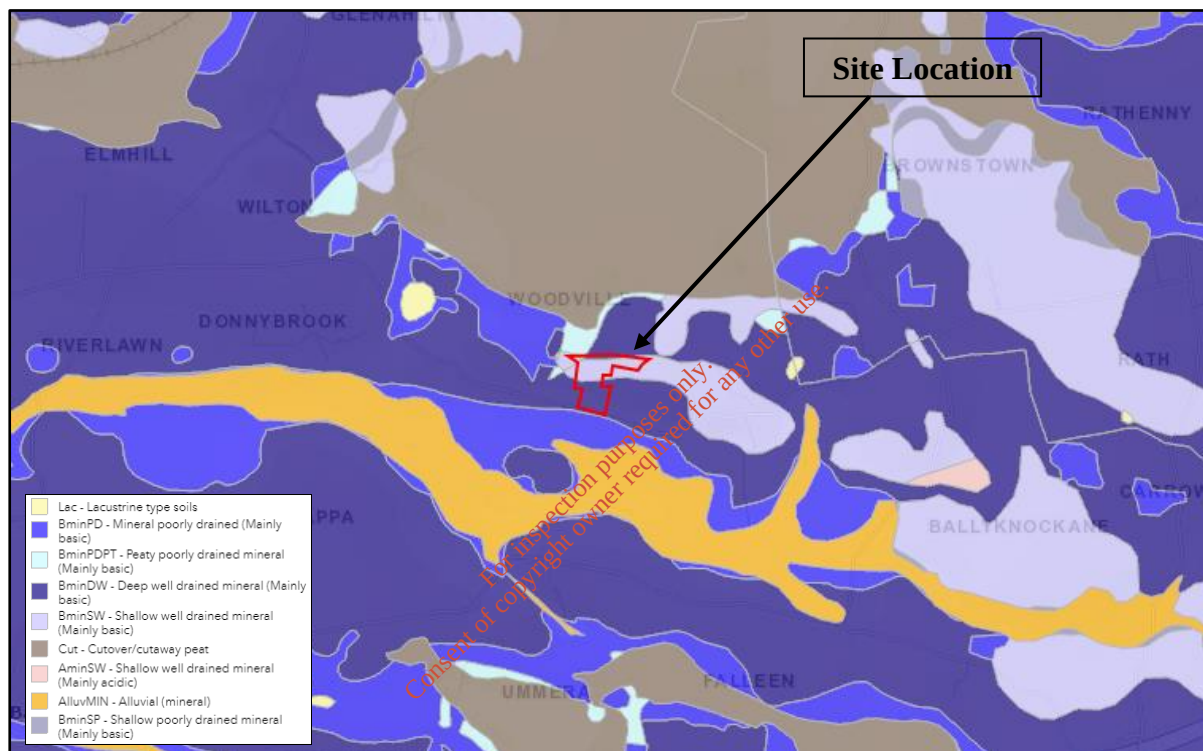


Figure 9.1: Teagasc Soils (GSI map)

GSI online mapping indicates that the soil underlying the majority of the site are classed as shallow, rocky, peaty/non-peaty mineral complexes that are mainly basic.

A small portion of the soil in the north is mapped as deep well drained mineral basic soil. These two soil types and poorly drained basic mineral soils are the predominant soil type in the surrounding area.

South of the site (c. 520m) and corresponding to the Ollatrim River are deposits of Alluvial minerals. The Ollatrim River is a tributary of the Nenagh River which flows into lough Derg north of the Tipperary village of Dromineer.

North of the site (c. 500m) is a large area of soil described as cutaway peat, which is common in the area and is also mapped in areas east, south and west of the site. There are also some lacustrine type soils dotted around the landscape.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

SUBSOILS:

The subsoils beneath the proposed site are mapped as limestone till (Carboniferous) and a small portion of bedrock at surface. This subsoil type is the dominant subsoil type in the immediate surrounding area see **Figure 9.2**.



Figure 9.2: SIS Soils (EPA map)

The subsoil beneath the proposed site is classified as Carboniferous limestone till (TLs). The sands and gravels associated with the Carboniferous limestone till were deposited by receding glaciers. The subsoils which underlie a proportion of the existing farm yard are classified as having bedrock near the surface.

The sand and gravel deposits are usually loosely packed. These deposits are very common in Ireland. All glacio-fluvial sands and gravels have very high permeability.

The subsoils within a 15km radius of the site are primarily composed of Devonian /Carboniferous Sandstone, shales, and till.

Carboniferous limestone till is found in much of the west and north-west region around the proposed site. Cutover peat is found throughout parts of the north and Devonian sandstone till to the south of the proposed site.

Conforming to the River networks in the area are alluvium subsoils. The alluvium is reshaped by water action and made up of unconsolidated soils and sediments.

BEDROCK GEOLOGY:

Carboniferous limestone is found under most of the lowlands in the north of County Tipperary (The Riding) where the site is located. Towards the southern “border” of the area are found old

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Red Sandstone (Devonian) raised together with Silurian shales. There is a geological fault across the limestone lowlands which is the source of successful heavy metal mining in the Silvermines village area.

On the south eastern side of the fault, the rocks consist of Silurian and Ordovician shales. Sandstone and conglomerates of the Devonian (Old Red Sandstone) Period are found on top of the Silvermines ridge. The same rocks form the crest of Keeper Hill and the hills to its south west. The rest of the Riding (lowlands) is composed of rock of Upper, Middle and Lower Carboniferous limestone.

GSI and OS maps indicate the site of the proposed development is located on bedrock classified as Carboniferous limestones and shale **figure 9.3**.

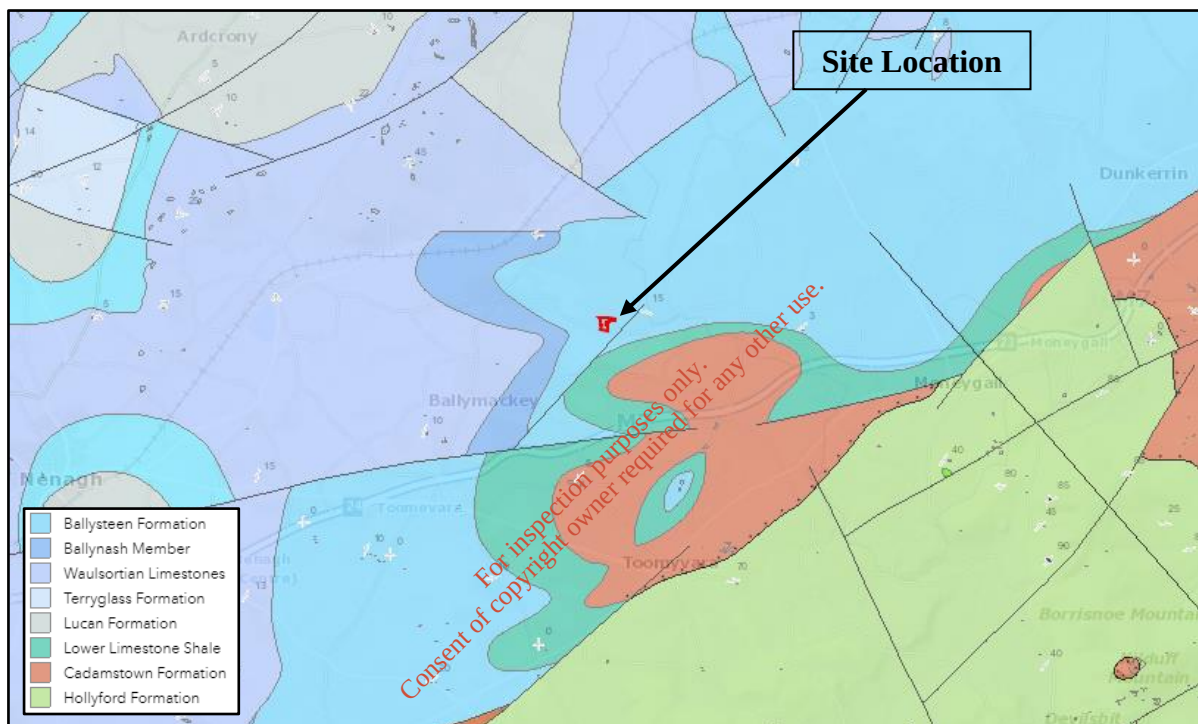


Figure 9.3: Bedrock Geology 100k (GIS map).

The site is located within the Carboniferous Ballysteen Formation. The Ballysteen formation is part of the Sub-Waulsortian Limestone group. It flanks the Castlecomer Plateau and Slievenamon, Slieve Bloom Mountains. Its lithology is described as irregularly bedded and nodular bedded argillaceous bioclastic limestone (wackestones and packstones), interbedded with fossiliferous calcareous shales.

The Ballysteen Formation comprises bioclastic argillaceous limestone interbedded with shales, becoming increasingly muddy upwards. Oolitic limestone are found at several intervals throughout the formation, including the Lisduff Oolite Member.

The Ballysteen Formation is equivalent to the Boston Hill Formation in Counties Kildare and Wicklow and also represents a widespread development throughout Westmeath and Longford.

9.3.2 Geological Heritage

The Irish Geological Heritage (IGH) Programme identifies and selects a complete range of sites that represent Ireland's geological heritage under sixteen themes ranging from Karst features to Hydrogeology.

The IGH Programme is a partnership between the GSI and the National Parks and Wildlife Service (NPWS) and sites identified as important for conservation are conserved as Natural Heritage Areas (NHA).

Reference to the GSI online database confirms there are no geological heritage sites within the perimeter of the site or within a 2.0 km radius of the site.

There is one geological heritage site located c. 9.4 km south-east of the proposed development site. The sites name is the Borrisnoe and Cloncannon and has a 200m buffer zone. The heritage site is located in the townland of Cloncannon, the districts of Borrisnoe/Roscrea and is summarily described by the GSI as "a fossil site, Wenlock Cooksonia locality, early land plants, graptolite dated".

The sites protection classification under the National Heritage Plan (2002) is geological.

The next closest geological heritage sites are located over 11.5 km further south. Both are associated with The Devils Bit summarily described by the GSI as a landscape evolution (Palaeo drainage system which has been upfaulted on Devonian conglomerates unconformable on Silurian slate).

These sites are also protected under the National Heritage Plan (2002).

CURRENT & HISTORIC LAND USE:

The available historic maps, aerial images and Tipperary Co. Co. online planning files were reviewed. The land in the immediate vicinity of the site and surrounding area is mainly used as low intensity agricultural grazing land with once off housing and occasional farmyards. Agriculture and sporadic settlement have been the predominant historic land use of the area.

The proposed site is located adjacent to the Ballaghveny landfill and recycling facility, which originated from a disused quarry.

The existing piggery facility is currently sited approximately 170m to the west of Woodville House, within part of the attendant grounds or landscaped demesne formerly connected with Woodville House. The attendant grounds include a roughly east-west orientated low ridge planted in mixed deciduous woodland, which was partly removed to facilitate the development of the existing Piggery facility.

To the north of the site, there is a large area of peatland. The peatland is currently used for the extraction of peat and commonage.

9.3.3 ECONOMIC GEOLOGY

According to the GSI's online Pits and Quarries database (2014) there are no active operational quarries in the immediate vicinity of the site. There are three active quarries within 10 km of the site.

The nearest record on the GSI's database of an active quarry is c. 8.0 km north-west of the site near the village of Ardcroney. The quarry operates under the name Spillane Sand and Gravel Ltd and is addressed at Coolderry, Ardcroney, Nenagh Co. Tipperary.

Activities on the site include Excavator, crushing, dry screening, grading, washing and screening, fixed plant, mobile plant.

The other two active quarries are located c. 9.0 km south-east of the site near the Borrisnoe Mountain.

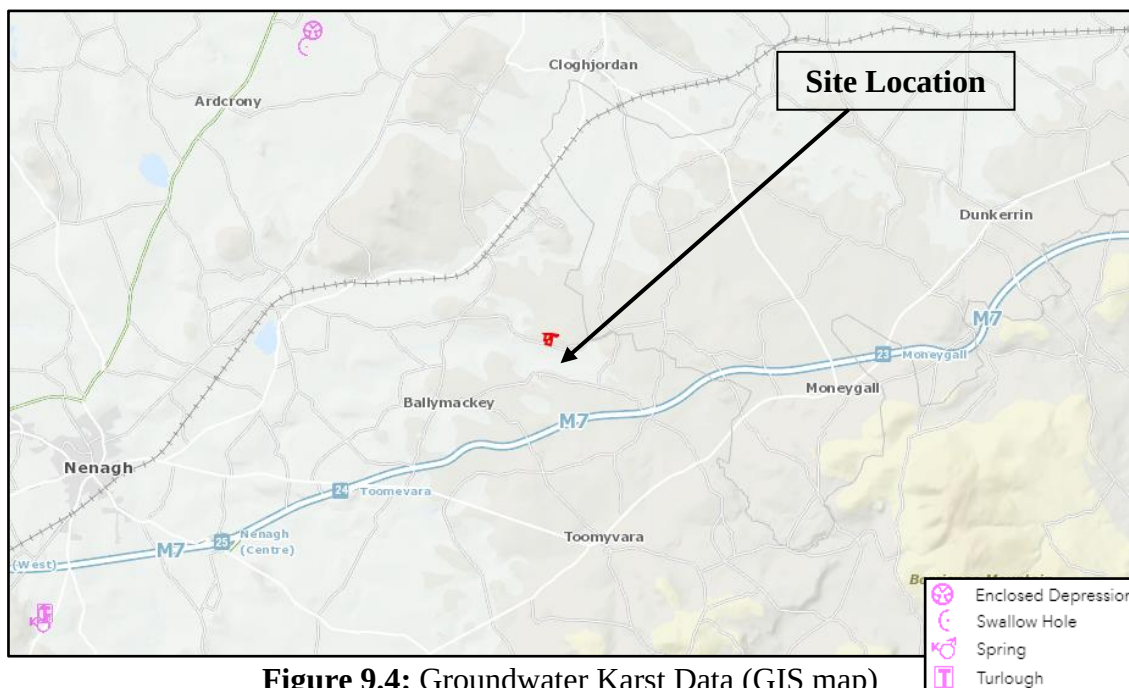
The Cloncannon Pit is operated by Harney Masonry Ltd and is addressed at Cloncannon, Moneygall, Roscrea Co. Tipperary and produces concrete blocks. The Ballybeg Pit addressed at Ballybeg, Toomevara, Nenagh Co. Tipperary is located just south of the Cloncannon Pit.

9.3.4 GEOHAZARDS

LANDSLIDES:

The GSI's online landslide database indicates there are no historic landslides recorded on the site or within a 2.0 km radius. The nearest recorded landslides are located c. 30 km north-east of the site and are associated with the Slieve Bloom Mountains.

KARST:



ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The GSI's karst database indicates there are no karst features mapped within 2.0 km of the proposed site, the closest karst features to the site are over c. 8.2 km north-west. **Figure 9.4** shows the Karst landform in the area.

The cluster of karst features to the north-east of the site include, two swallow holes, two springs and an enclosed depression. There is also a spring c. 17.8 km north-east of the site near the town of Roscrea.

The GSI's karst database is by no means comprehensive, and other karst features that are not mapped may be present in the area. No surface expression of karst depressions or collapse features have been observed on the site. However, such karst features may be present but not visible at surface. Detailed karst studies and site investigation would be required to establish this.

9.3.5 WATER

TOPOGRAPHY:

The topographic features of the region consist of limestone lowlands.

The topography of the area in which the proposed site is located is generally flat with gentle rises, the pig farm is positioned on one of these rises at an elevation of c. 104m above sea level. **Figure 9.5** below shows the topography within 2 km of the site.

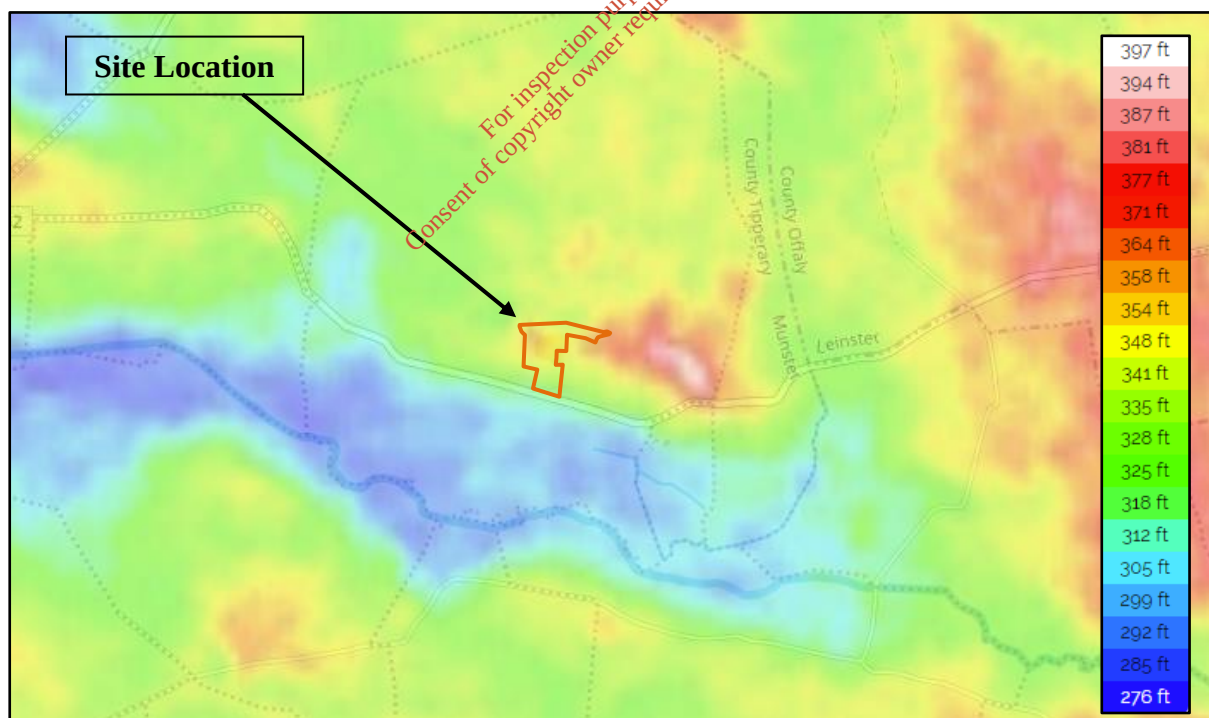


Figure 9.5: Elevation Data (Topography map 2km).

In the wider region, areas of elevation include the Silvermine Hills in which Keeper Hill (21km SW) rises to c. 694 m, the Arra Mountains (20 km W) which rise to c. 450 m and the Devils Bit range (12km SE) which rise to c. 478 m above sea level.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

RIVER BASIN & NEARBY SURFACE WATER FEATURES:

The site lies within the Shannon International River Basin District (SIRBD). The SIRBD is the largest in Ireland at more than 18,000 km² in area.

It stretches from the source of the River Shannon in the Cuilcagh mountains in counties Cavan and Fermanagh to the tip of the Dingle peninsula in north Kerry. As well as the natural drainage basin of the Shannon river itself, which drains an extensive area of central Ireland, it also includes coastal parts of Kerry and Clare which drain to the sea.

It drains 18 local authority areas and is also an international district as a small portion of County Fermanagh in Northern Ireland drains underground to the source of the Shannon where it rises to the surface at the Shannon Pot in County Cavan.

The SIRBD is a largely rural district with many protected sites that depend on water (54% of rivers have protected areas associated with them).

Water is critical to the economy of the SIRBD, generating and sustaining wealth through activities such as agriculture, forestry, aquaculture, power generation, industry, services, transport and tourism (Shannon River Basin Management Plan 2009-2015).

According to the water framework directive (WFD) the proposed site is positioned within the Lower Shannon Catchment, the Ollatrim River sub catchment and in the sub basin of the Ollatrim River.

The main surface water features in the vicinity of the site are the Wilton Stream and the Ollatrim River.

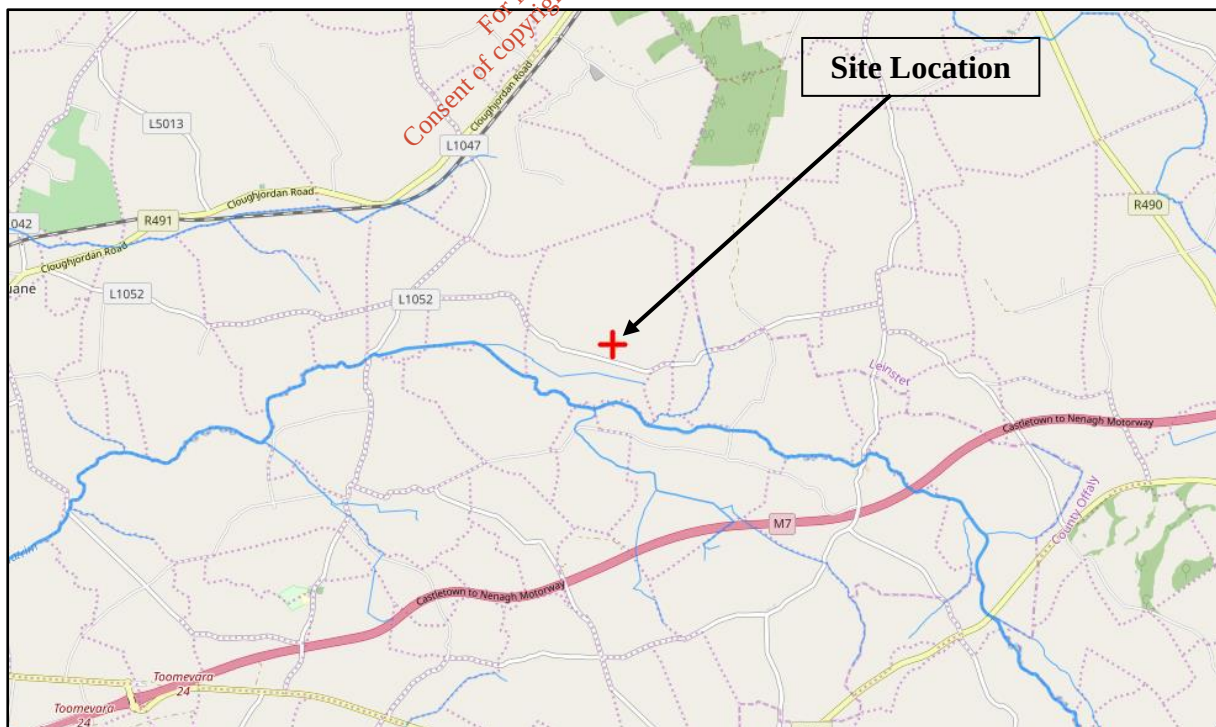


Figure 9.6: Surface Water Features (EPA map).

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The Wilton Stream is located directly south of the Woodville site (c. 125 m). The stream flows east to west for c. 1.27 km before it discharges into the Ollatrim River. The Wilton stream receives storm water discharge from the Woodville site and the stream discharges into the Ollatrim River c. 780 m from the Woodville site.

The Ollatrim River which is a tributary of the Nenagh River flows in a generally west by south-west direction for c. 7.6 km before it is met by the Ballintotty River.

The Ollatrim River then continues on for c. 2.6 km before it meets the Nenagh River in the Nenagh sub-catchment. The Nenagh River flows south to north-west from this confluence and eventually discharges into Lough Derg c 9.0 km further north. **Figure 9.6** shows some of the surface water features in the area.

The Wilton Stream is the closest surface water feature to the Woodville site. Further south c. 540 m is the Ollatrim River. The closest surface water feature to the Ballyknockane site (c. 610 m) is the Woodville stream.

SURFACE WATER BODY STATUS, PRESSURES & WATER QUALITY:

For the purposes of the Water Framework Directive (WFD) the water quality ‘status’ of the nearby surface water bodies has been categorised (2010-2018). In addition, the ‘risk’ of each water body not achieving ‘good status’ has also been assessed. The status and risk of the nearby surface water features are shown in **Table 9.1** below.

Table 9.1: Status and risk of nearby WFD surface water bodies.

River Water Body	Water Body Type	Status (2010-2018) Q values	Risk
Ollatrim River	River	‘Good’	‘Not at risk’
Nenagh River	River	‘Moderate’	‘At risk’

The confluence of the Wilton Stream and the Ollatrim River occurs between the EPA monitoring stations RS25O010250 Bridge Nr Riverlawn House (c. 1km d/s of confluence) and RS25O010150 Bridge d/s Ollatrim Br (c. 4.2 km u/s of confluence). Both monitoring locations were determined to be good status in 2018.

EPA River Quality Reporting for 2018 states the following for the Ollatrim River “The biological water quality assessments in the Ollatrim revealed a very disappointing trend: The uppermost site (Station 0040) remained in the poor ecological condition recorded in 2015 and the fauna of all the other four sites assessed indicated a decline in quality. The three sites that had been in high ecological quality in 2015 dropped to good and the other two that had been good dropped to moderate.”

The Nenagh and Ollatrim Rivers are not indicated as being salmonid on the EPA’s Catchment website, however, small stocks of Salmon and better stocks of brown trout are known to inhabit the river. The nearest salmonid protected river (S.I. 293: European Communities (Quality of Salmonid Waters) Regulations, 1988) is the Nore River, which rises c. 14 km east of the area in the Devils Bit range.

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SITE DRAINAGE:

All dirty yard areas (i.e. runs between buildings etc.) discharge to the slurry tanks underlying the pig houses.

Clean yards refer to hardstanding surfaced areas to which animals do not have access, from which water would percolate to the groundwater table.

Stormwater from roofs and clean yards is collected by the surface water drainage network.

The drain age network discharges to the Wilton stream and ultimately to the Ollatrim River which feeds into the Nenagh River.

All of the surface water collected on site is directed to the monitoring point SW2 near the front of the facility. From this point the surface water is discharged to a field drain / Wilton stream south of the site.

Based on the topography of the site (i.e. gently sloping from the north to the south) it would appear that the ground water flow is toward the Ollatrim River. However, because of the complexities of groundwater flow direction it is possible that underground drainage and groundwater flow do not simply follow surface topography.

The clean roof rainwater falling on the proposed buildings would be connected to the existing surface water drainage network. All soiled water is / would be diverted to the nearest slurry tank.

Under Schedule C.2.3. of the sites EPA IE licence (P0467-02), surface water monitoring points are visually inspected weekly and sampled quarterly (subject to rainfall collected at the sample point) for COD. **Table 9.2** below lists recent results from surface water analysis carried out at SW2 (Woodville site) for COD.

Table 9.2: Quarterly COD Measurements from SW2.

LOCATION	DATE	COD
SW2	05/12/18	26 mg/l O ²
SW2	08/05/18	< 3 mg/l O ²
SW2	22/02/18	< 3 mg/l O ²
SW2	14/12/17	< 3 mg/l O ²
SW2	29/08/17	5 mg/l O ²
SW2	14/06/17	0 mg/l O ²
SW2	01/02/17	0 mg/l O ²

FLOOD RISK:

A preliminary assessment of the risk of flooding at the site was undertaken as part of this EIAR. Preliminary Flood Risk Assessment (PFRA) Mapping for Ireland originally identified six past flooding events in Nenagh town and its environs.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The Catchment Flood Risk Assessment and Management (CFRAM) Programme which was developed to meet the requirements of the EU Floods Directive 2007/60/EC.

Has created flood risk and hazard maps for these areas which are available online at (www.floodmaps.ie). In order to assess the flood risk to the site, the Office of Public Works (OPW) indicative flood mapping website was consulted.

The proposed development is not situated within the flood plain of the Ollatrim River, and would not alter the flood characteristics of this water-body during high flow **figures 9.7 and 9.8**.

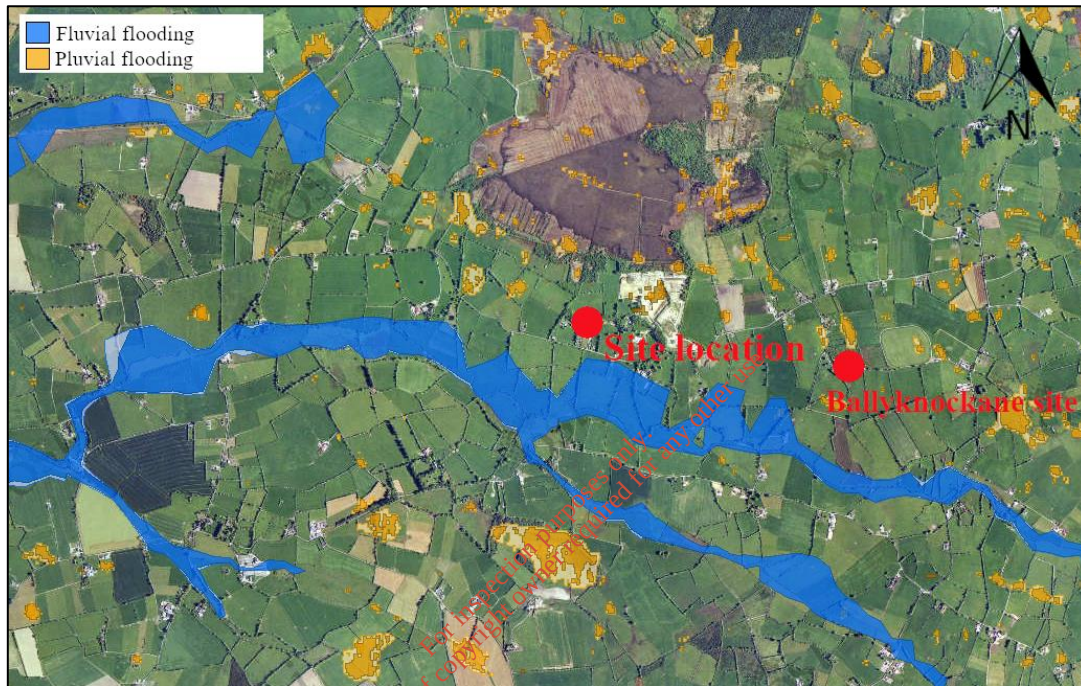


Figure 9.7: OPW Draft Flood Map.

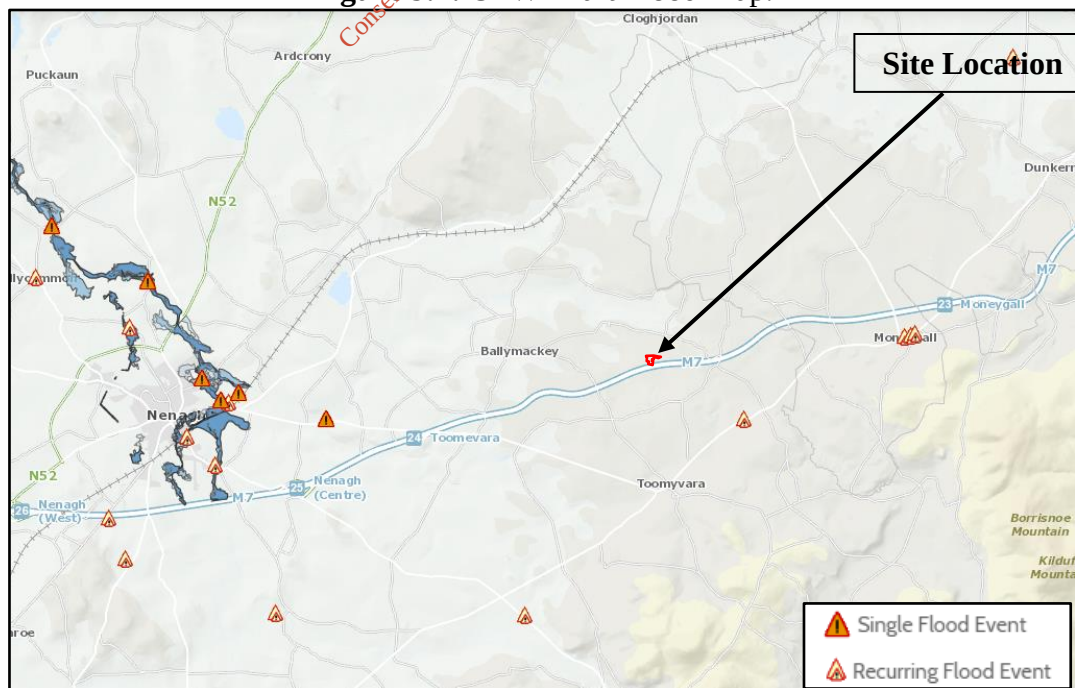


Figure 9.8: Past Flood Events (OPW map).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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The nearest flood zones delineated by the OPW are c. 8.5 km east of the site on the Nenagh River in Nenagh town and c. 17.5 km west of the site on the Bunnow River in Roscrea town.

According to the OPW there are two zones associated with recurring flooding events within a few kilometres of the proposed site, in the village of Moneygall c. 6.3 km south-east of the site and in woodlands near the village of Toomevara c. 4.3 km south of the site.

The alluvial deposit maps (Quaternary sediments) from the Geological Survey of Ireland (GSI) were consulted to assess the extent of any alluvial deposits in the vicinity of the proposed development site.

Alluvial deposits can be an indicator of areas that have been subject to flooding in the recent geological past. There are no alluvial deposits near the site, mapped alluvial deposits do occur south of the site and correspond to the Ollatrim River (**Figure 9.9**).

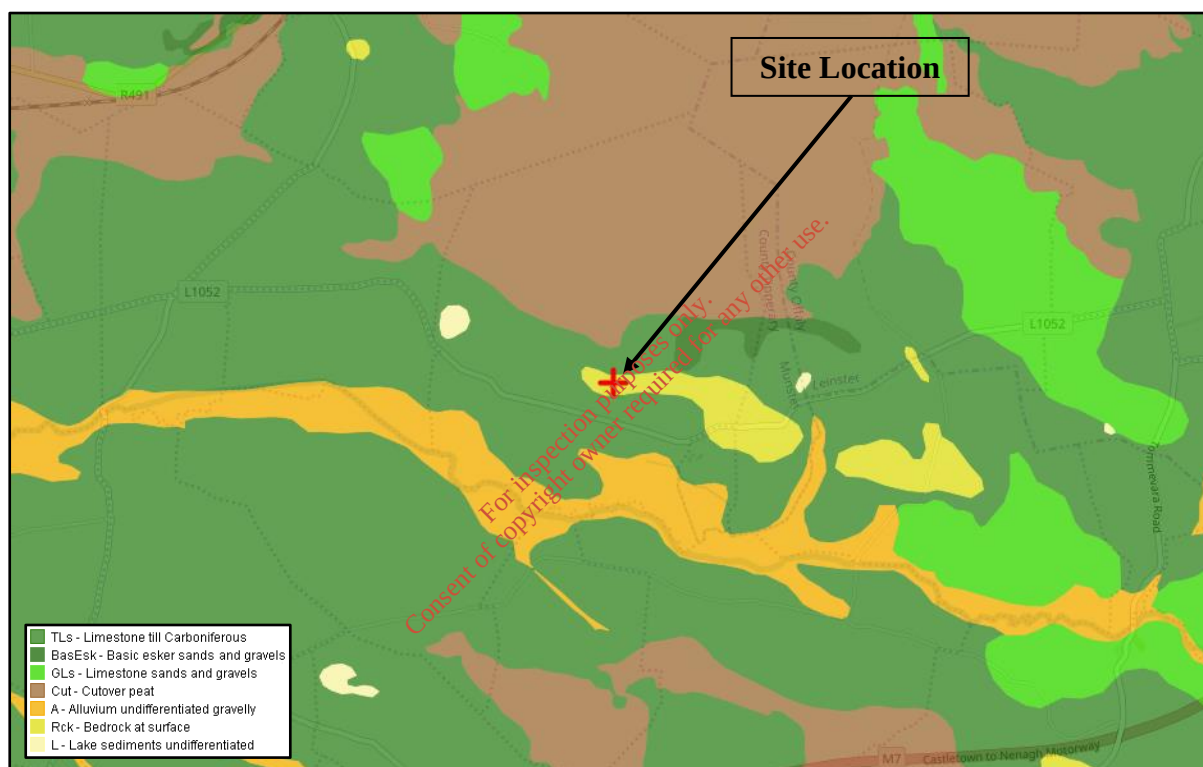


Figure 9.9: Subsoils (EPA map).

In summation, based on the collated mapping above, flood risk to the site is considered to be 'Low'. There are no mapped flood zones or no recorded flood events within or in the immediate vicinity of the site.

There is no perceivable conveyance or discharge mechanism based on the local topography that would permit floodwater to directly inundate the site.

In short, the proposed development would not be expected to result in an adverse impact to the hydrological regime of the area or to increase flood risk elsewhere and is therefore considered to be appropriate from a flood risk perspective.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
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WFD GROUNDWATER BODY STATUS:

The EU Water Framework Directive (2000/60/EC) (WFD) establishes a framework for the protection, improvement and management of surface and groundwater. The overall aim for groundwater was to achieve at least 'good quantitative status' and 'good chemical status' by 2015, as well as preventing deterioration in those waters that have been classified as 'good' status.

The EC Environmental Objectives (Groundwater) Regulations 2010 (S.I No. 9 of 2010) as amended by Environmental Objectives (Groundwater) (Amendment) Regulations 2016 (S.I. No. 366 of 2016) give effect to the criteria and standards to be used for classifying groundwater in accordance with the requirements of the WFD.

The Nenagh groundwater body (GWB) underlies the proposed development site and covers an area c. 756 km². The GWB is classified as being poorly productive bedrock.

Elevation within the GWB ranges from c. 30 m along the shore of Lough Derg to c. 489 m in the Silvermine Mountains in the south of the GWB. Rivers flows are predominantly northwards and westwards, to Lough Derg.

The groundwater body is large and with varied topography, hence the subsoil thickness varies widely. From available data, depth to bedrock ranges between c. 2.0 and over 60 m. It is particularly thick in the valley north of Silvermine Mountains where gravels have accumulated, and as alluvium along some of the river valleys.

Groundwater from all aquifers within this GWB have a calcium-bicarbonate signature. In the Lower Limestone, (where the site is positioned) groundwater is Hard to Very Hard (typically ranging between 380–450 mg/l) and high electrical conductivities (650–800 µS/cm) are often observed.

Alkalinity is also high, but less than hardness (250-370 mg/l as CaCO₃). Within the Impure Limestone, iron and manganese concentrations frequently fluctuate between zero and more than the EU Drinking Water Directive maximum admissible concentrations.

Hydrogen sulphide can often reach nuisance concentrations in these waters.

These components come from the muddy parts of these rock units and reflect both the characteristics of the rock-forming materials and the relatively slow speed of groundwater movement through the fractures in the rock allowing low dissolved oxygen conditions to develop

GROUNDWATER LEVELS & FLOW DIRECTION:

According to the GSI most bedrock in the Nenagh GWB is devoid of intergranular permeability so most groundwater flow occurs in fractures and faults.

The pure limestones may have had their transmissivity enhanced further by dissolution of calcium carbonate along fracture and bedding planes. Zones of high permeability can be encountered near fault zones and in areas of intensive fracturing.

Permeability in the upper few metres are often high although they decrease rapidly with depth.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Areas underlain by Limestones are generally well-drained. This is due to the presence of an epikarstic (upper part of a karst system) layer.

The site is underlain by Ballysteen Formation, lower impure limestone which is generally thought to have low bulk permeability with the possible exception of areas near faults.

Groundwater movement is mainly restricted to the weathered and shallow subsurface zone and is often concentrated in the upper few metres or tens of metres of fractured bedrock. The limited fracturing restricts groundwater storage and movement. In general, the rocks contain substantial amounts of clayey material and thus are not generally susceptible to solution or karstification.

Groundwater flow paths are generally short, with groundwater discharging to small springs, or to the streams and rivers that traverse the area.

In the low-lying areas underlain by limestones, groundwater levels are between 2 and 10 m. Next to the rivers, water levels are closer to ground level.

According to the GSI Groundwater data viewer, the closest borehole to the site was drilled as part of the Ballaghveny EIS in May 1998 (Borehole Name: 1717NEW113). The borehole would be located at the boundary of the proposed new site. The depth to bedrock is cited as 6.8m, and this would be expected to correspond closely with the depth to the groundwater table.

Based on topography and position of surface water features, shallow groundwater flow beneath the site would be expected to flow south toward the Wilton Stream while deeper, regional groundwater flow would be expected to be further to the south to the Ollatrim River. Boreholes within the locality predominantly cite depths to bedrock of c. 10-15m.

In general, Flow directions are expected to approximately follow the local surface water catchments.

GROUNDWATER/ AQUIFER/ VULNERABILITY:

Groundwater Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities.

All land area is assigned one of the following groundwater vulnerability categories:

- Rock near surface or karst (X)
- Extreme (E)
- High (H)
- Moderate (M)
- Low (L)

These categories indicate the likelihood of groundwater contamination and help to ensure that a groundwater protection scheme is not unnecessarily restrictive on human activities.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Where the subsoil thickness is less than 3.0 m, the vulnerability is rated as Extreme (the highest risk situation). Where the subsoil thickness is greater than 3.0 m, the vulnerability is rated as High, Moderate or Low (depending on the permeability and thickness of the subsoil).

The GSI's National Groundwater Vulnerability map indicates that the proposed site is evenly divided between two different groundwater vulnerability classes.

The south of the site is in a high risk groundwater vulnerability area and the north of the site is in an extreme risk groundwater vulnerability area.

The vulnerability of the groundwater within much of the site is interpreted as being high due to the high permeability of the sand and gravel subsoil and due to the sites position on a bedrock outcrop (**Figure 9.10**).

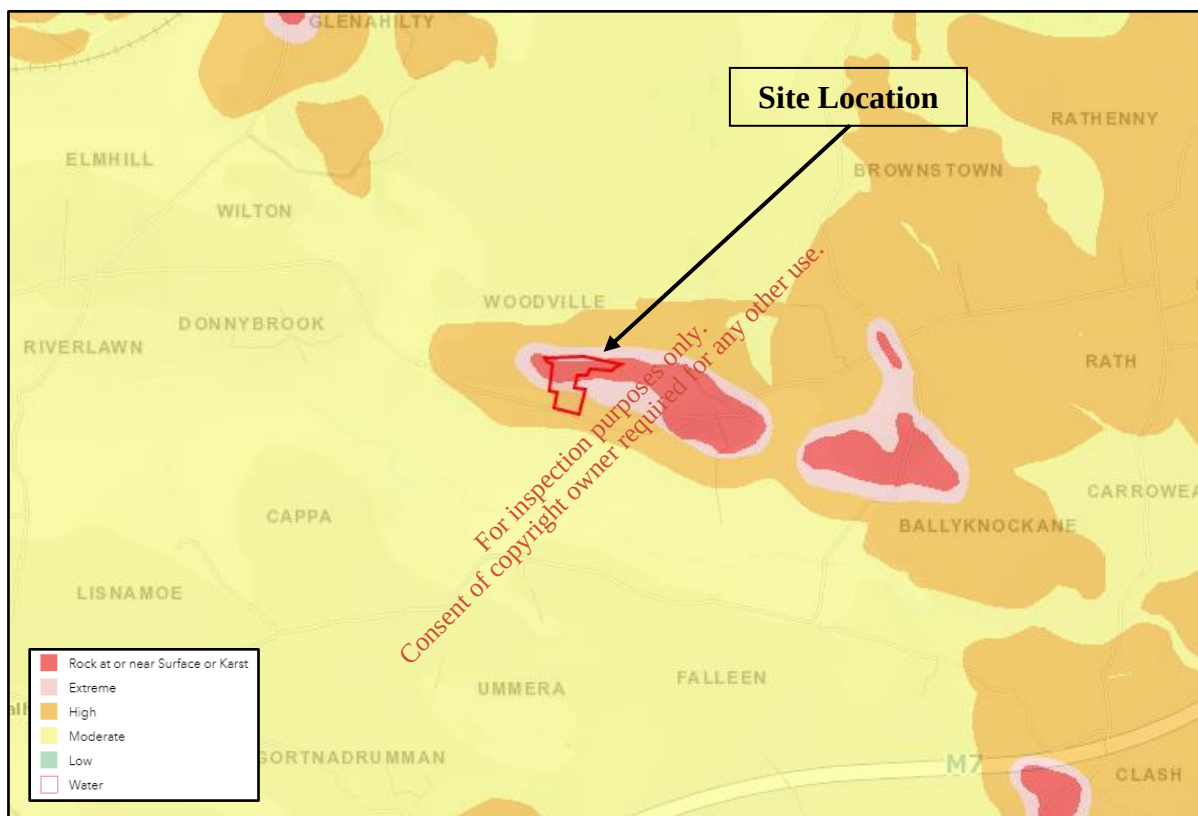


Figure 9.10: Groundwater Vulnerability (GIS map.)

The pig farm has been established at this location since the late 1970s. Over the decades the piggery has constructed and demolished several buildings and slurry tanks. In that time there have been no evidence of groundwater contamination.

All of the modern slurry pits on the site are fitted with leak detection systems and detection chambers. The groundwater is monitored by the site and by the sites neighbour, the Ballaghveny Landfill.

In Ireland the Geological Survey (GSI) classifies aquifers in terms of nine different categories which can be used to define the relative value of aquifers.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The classification system is based on the UNESCO-IHP system and on progressive developments within the GSI in consultation with the Irish hydrogeological community.

Different aquifers have differing abilities to store and transmit water. This means that the chances of obtaining large new groundwater supplies would vary with location. In risk terms, the environmental consequences of, for example, a groundwater pollution incident, would also vary.

GSI's aquifer classification map indicates that the site of the proposed development is situated on a bedrock aquifer, which is classified as a Locally Important Aquifer (LI).

The groundwater flow is through fractures and fissures in the bedrock (secondary flow) and groundwater yields available from the limestone and shale rocks within the succession are generally moderately productive in local zones (**Figure 9.11**).

The proposed site is not located on a gravel aquifer. Although, c. 3.0 km to the east of the site is located the South Offaly gravel aquifer group. This is classified as a locally important gravel aquifer (Lg).

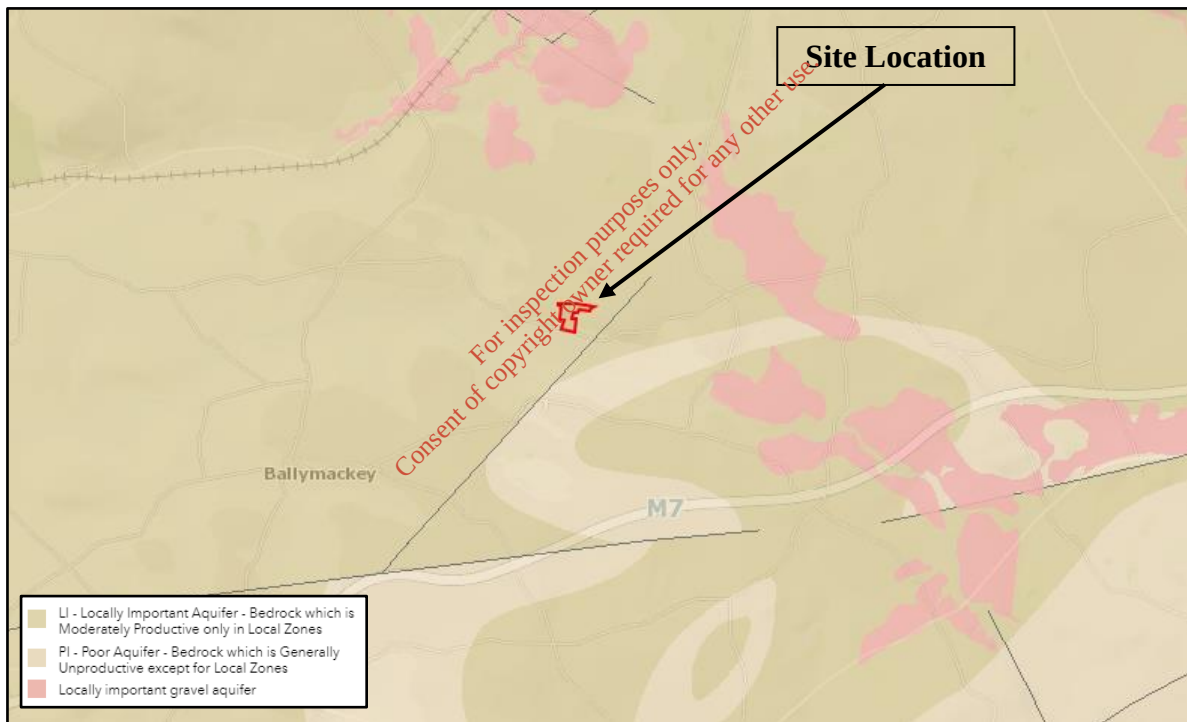


Figure 9.11: Groundwater Resources – Aquifer (GIS map).

The site is not located within or in the vicinity of a surface or groundwater source protection area.

There is a drinking water protection area c. 1.6 km north-west of the proposed site. The designated area is up gradient of the site at c. 109 m above sea level. The area covers c. 0.1 km² and is part of the Elmhill group water scheme.

Approximately 6.05 km south-west of the site there are three more drinking water protection areas (Rathvalla, Cunnahunt North and Cunnahunt South springs).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

East of the site at c. 5.3 km in County Offaly are located two groundwater protection zones associated with the Dunkerrin water supply scheme, Jone's and Guilfoyle's wells.

There are also several known spring and groundwater wells in the region, the closest cluster east of the site in the townland of Ballaghveny representing the monitoring boreholes for the landfill in **figure 9.12**.

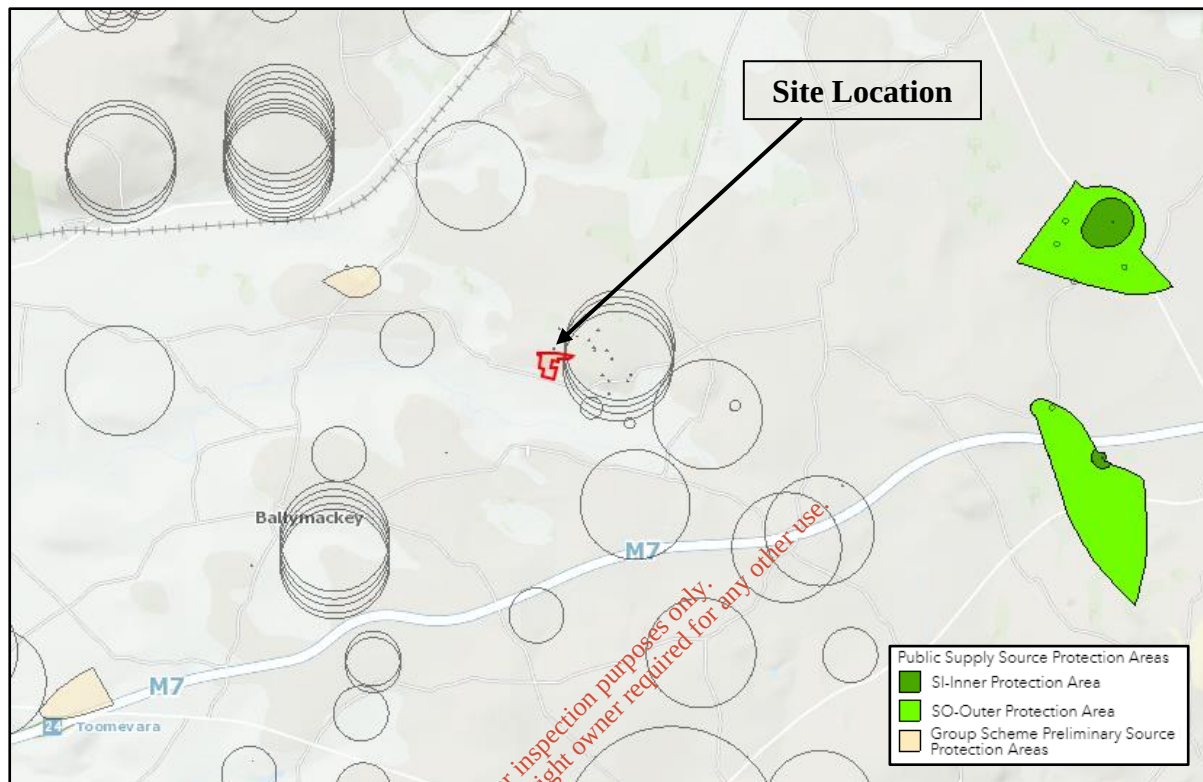


Figure 9.12: Source Protection Areas and Well & Springs (GIS map).

GROUNDWATER ABSTRACTION:

Water needs for the current piggery are provided through an existing groundwater well at the site (AGW1). This well would also be used to supply water and services to the proposed buildings.

The estimated amount of water currently used at the farm is c. 5,811 m³/year and the projected amount of water used at the site given the expansion of the development would be c. 16,333 m³/year. Although the above figures are only estimates, they may be used to appropriately scale water usage at the site.

The potential increase in groundwater abstraction would not be expected to cause a significant demand on the groundwater resources of the area and would not be expected to impact upon other abstractions processes locally.

Groundwater recharge is c. 526 mm/yr. in the karst area and c. 371 mm/yr. in the area of extreme vulnerability.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

GROUNDWATER QUALITY:

Under Schedule C.6.1. of the sites EPA IE licence (P0467-02), AGW1, AGW2, and AGW3 are monitored biannually for COD, Nitrate, Total ammonia, Faecal coliforms, and Total coliforms. **Table 9.3** below lists recent results from groundwater analysis carried out at monitoring points AGW1, AGW2 and AGW3.

There are no thresholds set on ambient groundwater monitoring at AGW1, AGW2 or AGW3 under the sites licence.

Groundwater Threshold Values (GTV) are derived from the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010). Drinking water limits (DWL) are derived from the European Union (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014)

Table 9.3: Quarterly Measurements from AGW1, AGW2 and AGW3.

LOCATION	DATE	NITRATE (mg/l)	TOTAL AMMONIA (mg/l)	FAECAL COLIFORMS (cfu)	TOTAL COLIFORMS (cfu)	COD (mg/l O ₂)
GTV	----	37.5	0.175	----	----	----
DWL	----	50	----	0	0	----
AGW1	11/02/19	5.2	0.015	0	0	< 3
AGW2	11/02/19	5.1	0.029	----	----	----
AGW3	11/02/19	5.1	0.017	0	0	< 3
AGW1	05/12/18	----	----	0	0	----
AGW2	05/12/18	----	----	0	0	----
AGW3	05/12/18	----	----	0	0	----
AGW1	22/02/18	5.2	< 0.01	0	0	< 3
AGW2	22/02/18	5.2	< 0.01	0	0	< 3
AGW3	22/02/18	5.2	< 0.01	0	0	< 3
AGW1	05/12/18	< 2	0.02	3	----	----
AGW2	05/12/18	6.0	< 0.01	4	----	----
AGW3	05/12/18	< 2	< 0.01	5	----	----
AGW1	14/12/17	6	0.01	0	0	< 3
AGW2	14/12/17	----	----	0	0	< 3
AGW3	29/08/17	----	----	0	----	----
AGW1	01/02/17	5.4	0	0	0	0
AGW2	01/02/17	5.5	0	0	0	0
AGW3	01/02/17	5.6	0	0	0	0

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

DESIGNATED SITES & GROUNDWATER DEPENDENT TERRESTRIAL ECOSYSTEMS:

There are no known protected groundwater dependant terrestrial ecosystems (GWDTEs) within 10.0 km of the proposed development site.

The nearest sites of ecological importance are the Scohaboy (Sopwell) Bog Special Area of Conservation (SAC) which is 9.6km north of the site, Kilduff, Devilsbit Mountain SAC which is c. 11.6 km south-east of the site (Site Code 000934) and the Slievefelim to Silvermines Mountains Special Protection Area (SPA) which is c. 14.3 km south-west of the site (Site Code 004165).

Scohaboy (Sopwell) Bog SAC is described as a degraded raised bog and would be groundwater influenced. The site has been rewetted and is managed in order to restore the ecological community and create active raised bog habitat.

While this SAC and the site fall within the catchments of rivers feeding Lough Derg, the Scohaboy Bog is located within the Ballyfinboy River catchment, which would be north of the Ollatrim River Catchment.

The Devilsbit Mountain SAC is described as European dry heaths (Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and sub-mountain areas, in Continental Europe).

Dry heaths typically occur on freely-draining, acidic soils with generally low nutrient content. The site is situated on the north-eastern slopes of Devilsbit Mountain, a flat-topped ridge composed of Silurian grits.

The Silvermines Mountains SPA is described as an extensive upland site much of which is over 200 m above sea level. The site is underlain mainly by Silurian-aged Sandstones. The sources of the rivers Mulkear, Bilboa and Clare can be found in the area. Half of the area is afforested and the other half is made up of grassland and blanket bog/heath.

The site is an SPA under the E.U. Birds Directive, of special conservation interest for the Hen Harrier (*Circus cyaneus*) species. The area supports c. 3.7% of the all-Ireland population of Hen Harrier.

The site is also known for Peregrine, Merlin (*Falco columbarius*) and Red Grouse (*Lagopus lagopus scotica*) activity. Merlin and Peregrine are also listed on Annex I of the E.U. Birds Directive.

An Appropriate Assessment Screening Report has been completed for the proposed development.

9.4 IMPACTS

9.4.1 CONSTRUCTION PHASE

The construction phase holds a number of activities which could potentially impact on the soils, geology and water environment. Potential construction phase impacts are detailed in the following sections.

SOIL REMOVAL:

It would be necessary to create some excavation on the site for foundations and to accommodate new slurry tanks beneath the propose buildings. These excavations would be c. 2.0 m deep.

Suitable fill, in most cases hardcore or non-hazardous building rubble would be used to screen the bottom of the excavated area prior to the installation of the leak detection system, concrete floor and mass concrete walls.

The areas outside the tank would be backfilled with suitable Fill and concrete footing / foundations would be poured to accommodate the steel structure of the building.

There would be no permanent removal of soil and subsoils from the proposed development site. During the site levelling and excavation phase it is expected that a large amount of soil and subsoil would be disturbed.

It is proposed to re-use all of the excavated soils and subsoils on the site for levelling and landscaping. The excavations would extend into the made-ground and natural subsoils that already exist on the site.

The excavation on the proposed development site itself would at its deepest point be c. 2.0 m deep to accommodate the 1.8 m deep slurry tank. Subsoils are between 3.0 and 6.0 m deep beneath the site so excavation of bedrock should not be required.

The removal and disturbance of soils and subsoils during the construction phase may also temporarily increase the risk to groundwater as the protective soil/subsoil layer is removed and the vulnerability of the groundwater to surface contaminants is increased.

Given the depth of the subsoil at the site and the short period of time it would take to finish the excavation phase of the project there should only be a *slight to moderate temporary impact* on groundwater vulnerability. The vulnerability would not change following backfilling and reinstatement.

BEDROCK EXCAVATION:

The excavation and construction of the proposed development would take place within the made-ground/ natural subsoils of the site. Bedrock excavation would not be required.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

VEHICULAR MOVEMENT & SOIL COMPACTION:

Soil compaction can occur due to movement of construction and maintenance traffic on the site. The majority of the areas to be trafficked are existing hardcore yard areas. Similar hardcore surfaces would be installed surrounding and leading to proposed structures. As the area would be small, this is considered to be a *negative slight long-term impact* on the soil and in-situ earth materials. Construction traffic occurring outside of planned road and yard areas would be minimal and any compaction of soils would be considered to be short term and not significant.

ACCIDENTAL HYDROCARBON LEAKAGE / SPILLAGE FROM MOBILE PLANT & EQUIPMENT:

Possible contamination of soil, subsoils, surface water and groundwater by accidental leakage or spillage of hydrocarbons from mobile plant and associated equipment has the potential to occur during the construction phase.

Because of the indications of subsoil depth (3.0 to 6.0 m) and the good permeability of the glacial till subsoil beneath the site, it is likely that contamination of the underlying groundwater would occur in the event of an accident / spill.

Any uncontrolled spillages / leaks would likely infiltrate through the subsoils and eventually move down slope towards the Wilton stream / field drainage south of the site. It is noted that the limited permeability of the underlying clayey limestones would limit the transmission of groundwaters underlying the site and migration to the Wilton Stream may take some time.

Depending on the magnitude of any uncontrolled leakages or spillages, they would have a *negative slight-moderate short-medium term impact* on the surface water quality of the Wilton stream, if not quickly contained and removed. An accidental hydrocarbon spillage would also have a *negative moderate short-medium term impact* on soil quality and groundwater quality.

It is noted that impacts would likely be very localised due to the limited size and connectivity of the aquifer beneath the site. Such an event may impact upon the viability of the underlying aquifer as the source of potable water for the animals at Woodville Pig Farm.

SEDIMENT LADEN RUN-OFF:

The construction of the proposed development would involve stripping and removal of some portion of topsoil and earthworks to facilitate the construction of the proposed buildings. There is potential for erosion of temporarily exposed soil during the excavation stage and consequently the generation of run-off with high levels of silt / sediment.

There are no drainage ditches in the area of the proposed construction activities. All rainwater (excluding that falling on roofs and clean yard areas) percolates to ground. In the event of sediment contamination of rainwaters, the sediment would be deposited to the surface of existing soils within the construction site.

It is expected that there would be very little run-off from uncovered soils on site given the limited time that soils would be exposed.

There would be *no impact* on downstream surface water bodies (e.g. Ollatrim River).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

SPILLAGE OF CONCRETE / CEMENT MATERIAL:

The spillage of concrete / cement material poses a potential risk to surface water and groundwater quality as this material is alkaline and corrosive. During the construction phase this risk may be realised during the construction of buildings and equipment cleaning.

As stated above with regard to sediments, cement material from a spill would be entrained within soils as rainwaters percolate to groundwater. In the event of a spill, there would be a *negative long-term significant* impact on the composition of the soil in the small area underlying the spill. However, this would have a similar effect to overlying soils with hardcore.

Such a spill would increase the alkalinity of the underlying groundwater. However, it is likely that there would be a degree of dilution with groundwater and percolating rainwater. Depending on the magnitude of any spills, the release of such cement material into nearby surface water would have a *negative slight-moderate short-term impact* on groundwater quality and potentially downstream in the Wilton stream.

PUMPING OF GROUNDWATER INGRESS TO EXCAVATIONS:

It is not anticipated that there would be any need for significant pumping of groundwater from excavations during the construction phase as the excavations are generally to a depth of c. 2.0 m only.

Some very localised pumping may be required to prevent ingress of any minor flows of shallow perched groundwater encountered. This would be discharged to the ground downslope of excavations. The impact on groundwater levels would be *negative temporary and slight*.

9.4.2 OPERATIONAL PHASE

During the operational phase of the proposed development there is a potential for impact on soils, geology and water.

STORAGE & RECOVERY OF SLURRY:

Pig slurry produced at the site has the potential to negatively impact on the water quality in the surrounding environment if not collected, stored and recovered appropriately.

The slurry from each building currently housing pigs on the site is stored in slurry tanks beneath the buildings. The proposed buildings would also be fitted with slurry tanks of sufficient capacity and a remote slurry storage tank.

The slurry is removed periodically from the existing buildings via slurry reception points. It is proposed to build a new slurry reception tank to accommodate some of the slurry that would be produced by pigs in the proposed buildings. This reception tank would act as an additional slurry collection point on the farm.

From the applicant's correspondences with Teagasc, it has been determined that the current slurry storage capacity of the piggery's slurry tanks is c. 9,405 m³.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The volume of all slurry currently produced at the site within 26 weeks by the existing amount of pigs is c. 3,673 m³ which is below the available storage capacity of c. 9,405 m³.

The combined volume of all slurry produced by the existing pigs and proposed number of new pigs at the site within 26-weeks would be c. 14,974 m³ which would be below the available storage capacity of c. 16,020 m³ provided by the developments.

All existing and proposed slurry tanks would be underlain by leak detection systems. These leak detection systems would be monitored in compliance with Schedules C2.4 and C2.5 of the sites EPA IE licence.

STORAGE OF SOILED WASH WATER:

Between pig batches, the existing and proposed pig pens would be “washed down”. The soiled wash water from this activity is and would be collected in the nearest slurry tank.

SPREADING OF SLURRY & SOILED WASH-WATER:

The soiled wash water is mixed in the slurry tanks with the pig slurry, as would be the case in the proposed buildings.

The mix of pig slurry and soiled wash-water would eventually be spread on agricultural land identified for such purposes in accordance with the *Good Agricultural Practice for the Protection of Waters Regulations 2017 (Nitrates Regulations)* and ‘*Landspreading of Organic Waste – Guidance of Groundwater Vulnerability Assessment of Land*’ (EPA, 2004).

There would be no significant impact to soils, groundwaters and surface waters if carried out in accordance with the legal requirements of the Nitrates Regulations.

FOUL WATER:

Currently wastewater from the existing office/tool shed and staff toilet on the site discharges to groundwater via a septic tank system. It is not proposed to have any other on-site facilities.

ACCIDENTAL LEAKAGE / SPILLAGE OF HYDROCARBONS:

Possible localised contamination of soils, subsoils, groundwater and the nearby Wilton stream by accidental leakage or spillage of hydrocarbons from vehicles, other machinery or on-site fuel tanks may occur during the operational phase.

Condition 3.4 of the sites IE licence requires that all tank, container and drum storage facilities are appropriate to the material contained and are bunded. It is not considered likely that there would be a significant risk of leaks or spillages of hydrocarbons during the operation of the proposed development.

It is unlikely other than in exceptional circumstances or prolonged uncontrolled releases that there would be significant contamination of the Wilton stream.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

FLOOD RISK:

The current surface water drainage network on the site that discharges into the Wilton stream is expected to have sufficient capacity to accommodate any new storm-water produced from the proposed development.

Overall it is assessed that there would be no increased risk of flooding on the site itself or downstream of the site arising from the proposed development. Thus the impact would be a neutral long term imperceptible impact and no further mitigation is required.

WATER USAGE:

The water for the proposed development would come from a groundwater well already installed on the site (AGW1). This groundwater well is currently supplying the water needs of the piggery. The potential increase in groundwater abstraction would not be expected to cause a significant demand on the groundwater resources of the area and would not be expected to impact upon other abstractions processes locally.

DISRUPTION OF GROUNDWATER FLOW PATHS:

Subsurface structures have the potential to impact on groundwater flow regimes if they are built in the aquifer's flow path. Theoretically, groundwater mounding can occur where large impermeable structures are placed perpendicular to groundwater flow paths.

The depth of the proposed excavations is unlikely to penetrate to bedrock. Taking this into account there would be a *neutral slight imperceptible impact* on the groundwater flow paths.

DISPOSAL OF CARCASSES:

Decaying animal carcasses have the potential to impact on surface and groundwater quality if not appropriately stored and disposed of.

Fallen animals are stored in several sealed water tight metal containers located around the site. These animals are collected periodically and removed off site by the authorised waste collector Beechfield Products and delivered to Premier Proteins Ltd. rendering plant in Ballinasloe.

Because of the above proposed measures there would be *no significant* impact on groundwater or surface water quality.

SOIL SEALING:

The proposed developments would cover an area greater than 6,000 m² (c. 1.5 acres of a c. 13.7-acre site). The soil within the area of the proposed developments is currently scrubland, farm yard and hard standing. This area of soil would be effectively sealed.

This sealing effect can impact on natural exchanges occurring between soils and the atmosphere which influence the natural function and associated biodiversity of soils. This would have a *negative slight permanent impact* on the soil.

9.4.3 “DO-NOTHING”

Should the proposed development not be built, Woodville Pig Farms would continue current pig farming operations at the site and the immediate area where the proposed development would have taken place would remain as farmyard. The demolition of three old pig houses would also not take place.

9.5 MITIGATION MEASURES

This section describes a range of mitigation measures designed to avoid, reduce or offset any potential adverse impacts identified. The main objective of the mitigation measures is to avoid any potential adverse impacts in the first instance, and where this is not possible then to reduce the effects of any impacts on the receiving environment.

Many of the mitigation measures below have been based on CIRIA (Construction Industry Research and Information Association, UK) technical guidance on water pollution control and on currently accepted best practice.

9.5.1 CONSTRUCTION PHASE

CONSTRUCTION MANAGEMENT:

In order to reduce the impacts on the soils, geology and water environment a number of mitigation measures would be adopted as part of the construction works on site as follows:

- The construction works contractor would adhere to standard construction best practice, taking cognisance of the Construction Industry Research and Information Association (CIRIA) guidelines “*Control of Water Pollution from Construction Sites; guidance for consultants and contractors*” 2001, “*Control of Water Pollution from Construction Sites – Guide to Good Practice*”, 2002, and the 2016 guidelines published Inland Fisheries Ireland, “*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*”;
- Excavations and earth-moving activities would be planned outside periods of heavy rainfall, to limit the potential for suspended solids to become entrained within surface water run-off;
- All construction plant machinery and equipment would be maintained in good working order and regularly inspected;
- Existing topsoil would be retained on site to be used for the proposed development. Topsoil would be stored in an appropriate manner on site for the duration of the construction works and protected for re-use on completion of the main site works;
- Top-soiling and landscaping of the works would take place as soon as finished levels are achieved, in order to reduce weathering and erosion and to retain soil properties;
- Stockpiled material would be covered/dampened during dry weather to prevent spreading of sediment/dust;
- The temporary site compound would be used for the storage of all machinery and plant when not in use, the re-fuelling of plant and the storage of all associated oils and fuels for plant;

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

- Handling, transport and storage of fuel and chemicals would be controlled e.g. oil and fuel stored on site would be stored in designated areas. These areas would be bunded and located away from any surface water drainage. Refuelling of construction machinery would be undertaken in designated areas located away from surface water drainage;
- Where construction plant shows signs of hydrocarbon leakage, site personnel would cease the operation of the item in plant in question and notify the Project Manager. Any defective plant would be kept out of service until the necessary repairs are undertaken;
- Spill kits shall be kept in these areas in the event of spillages;
- Controls for storage of any other potentially polluting materials/chemicals on-site e.g. any chemicals used on site would be required to be stored in designated bunded areas and the construction manager would be responsible for ensuring that a copy of all relevant material safety data sheet for each product is available at the site office;
- Any uncured concrete works would be supervised at all times, and would be scheduled outside of periods of expected heavy rainfall;
- The wash-out of Ready-Mix Truck drums would not be permitted onsite, in the environs of the site, or at a location which could result in a discharge to surface water;
- Surplus uncured concrete would be returned to the batching plant where possible;
- Wheel wash facilities to prevent soil and mud being tracked onto the adjoining roads would be provided.

CONTROLS ON DAMAGE TO UNDERLYING GEOLOGICAL MATERIALS:

The disturbing of soils and subsoils is an unavoidable impact of the development. One of the primary mitigation measures already employed at the preliminary design stage has been the minimisation of volumes of subsoil and bedrock that would be excavated.

It is proposed that all of the excavated subsoils removed during construction would be re-used on site in the form of landscaping. Specialist machinery (such as tracked machinery) would be used to minimise compaction of the subsoils.

CONTROL AND RE-USE OF POTENTIALLY CONTAMINATED MATERIAL ON-SITE:

It is not anticipated that any contaminated materials would be produced during construction of the proposed development. The removal of asbestos containing corrugated roof sheeting would be carried out by competent contractors at the beginning of the demolition process and would not be anticipated to contaminate any other materials onsite.

Should any material appear to be contaminated, samples would be analysed by an appropriate testing laboratory.

All potentially contaminated material would be either left in situ and characterised through laboratory testing; or segregated and stockpiled in a contained manner and characterised through laboratory testing. Any contaminated material would be appropriately disposed of or treated using a licensed waste contractor and in accordance with the Waste Management Regulations, 1998.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

CONTROL ON SOURCES OF FILL AND AGGREGATES:

All fill and aggregate imported for use on the proposed development site would be sourced from reputable suppliers. All suppliers would be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the project;
- Environmental Management status;
- Regulatory and Legal Compliance status of the Company.

9.5.2 OPERATIONAL PHASE

In compliance with the sites EPA IE licence, the existing facility has an Environmental Management System, which would be updated to incorporate the proposed development. Good housekeeping practices would be observed throughout the site during the operational phase.

STORAGE & LANDSPREADING OF SLURRY BY-PRODUCT:

The following measures would be undertaken to assist in minimising the volume and nutrient load of slurry generated.

- The leak detection systems would be visually assessed weekly, and any liquids within the system would be laboratory tested bi-annually, as required by the sites IE licence;
- Pigs would be fed a low protein diet to requirements only (i.e. pig class / stage dependent rations), minimising nitrogen and ammonia content;
- Pigs do not digest phosphorous or fibre well. Feedstuffs which optimise the digestibility in pigs would be used where possible;
- Drinkers (bowl drinkers) would be maintained in good working order such that leaks are prevented;
- Separation of 'clean' runoff from roofs and clean hardstanding area from soiled wash waters to minimise volumes of soiled water to be managed;
- All slurry / wash water mix would be land spread in accordance with the *European Union (Good Agricultural Practice for the Protection of Waters) Regulations 2017*.

TREATMENT & MONITORING OF STORM-WATER:

As indicated previously it is proposed that only rainwater from roofs and clean hardstanding areas would be collected and diverted to the existing surface water drainage network. Visual inspection of surface waters would occur weekly and laboratory testing would continue on a quarterly basis, as required under the sites IE licence.

Chemical and fuels would continue to be required to be adequately banded as part of ongoing management of the site under the existing IE licence. It is also a requirement that spill clean-up materials would be available onsite in the event of a spill.

All soiled wash water would be diverted and collected in the slurry tanks.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

FOUL WATER:

There are no plans to build more facilities. The septic tank would be maintained in good working condition.

FLOOD RISK:

Due to the fact that there is no perceivable flood risk and that there is an adequate surface water drainage network in place that would accommodate the new development, the flood risk remains low. As a result of this it is unnecessary to propose any mitigation measures.

9.6 RESIDUAL IMPACTS

The predicted residual impacts of the proposed development are outlined in the detailed assessment **Tables 9.4 and 9.5** below.

9.6.1 CONSTRUCTION PHASE

The predicted impacts of the construction phase are described in **Table 9.4** in terms of quality, significance and duration. The relevant mitigation measures are detailed and the corresponding residual impacts are determined which take account of these mitigation measures.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 9.4: Summary of Predicted Construction Phase Impacts.

ACTIVITY/ SOURCE	ENVIRONMENTAL RECEPTOR	IMPACT/EFFECT DESCRIPTION	QUALITY	SIGNIFICANCE	DURATION	MITIGATION	RESIDUAL IMPACT
Earthworks	Soils	Natural soil excavation for building foundations	Negative	Slight	Permanent	Material would be reused on site where possible	Not Significant
Earthworks	Soils	Vehicular movement and soil compaction.	Negative	Not Significant	Short-term	Specialist machinery (such as tracked machinery) would be used to minimise compaction of the subsoils.	Not Significant
Storage of potentially polluting materials	Soils / Bedrock / Groundwater	Potential leak or spillage from vehicles/machinery or construction related liquids on site resulting in soil/bedrock contamination	Negative	Slight - Moderate	Short-medium term	Good housekeeping during construction and proper handling, storage and disposal of any potentially polluting substances. Designated and bunded storage areas would be used and maintained. Designated refuelling areas would be used. Spill kits retained on-site.	Not Significant
Earthworks/ Excavations	Groundwater in the LI aquifer	Temporary removal of part of the protective soil/subsoil cover thus increasing groundwater vulnerability to contamination	Negative	Slight to Moderate	Temporary	Excavations would be backfilled as soon as is possible to prevent any infiltration of potentially polluting compounds to the subsurface and the aquifer.	Negative slight

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

ACTIVITY/ SOURCE	ENVIRONMENTAL RECEPTOR	IMPACT/EFFECT DESCRIPTION	QUALITY	SIGNIFICANCE	DURATION	MITIGATION	RESIDUAL IMPACT
Hydrocarbons from construction vehicles/machinery/equipment	Surface Water (site drain, Wilton stream)	Potential accidental leakage or spillage of hydrocarbons from vehicles/machinery resulting in groundwater contamination migrating to surface water	Negative	Slight	Short-term	Oil and fuel would be stored on-site in designated bunded areas located away from any surface water drainage. Refuelling of construction machinery would be undertaken in designated areas located away from surface water drainage. All machinery would be inspected at the start of each work shift for signs of leaking hydrocarbons. Parking areas would be inspected on a daily basis for evidence of hydrocarbons leaking from machinery. Spill kits would be kept on-site.	No Significant Risk
Cement material of other potentially polluting substances	Soils / Bedrock / Groundwater	Potential leakage or spillage of cement or other potentially polluting substances resulting in soil/bedrock/groundwater contamination	Negative	Slight-Moderate	Short Term	Good housekeeping during construction and proper handling, storage and disposal of any potentially polluting substances. Designated and bunded storage areas would be used and maintained. Spill kits retained on-site. Cement mixing would take place in designated areas on-site with impervious surface.	Not Significant

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

9.6.2 OPERATIONAL PHASE

The predicted impacts of the operational phase are described in **Table 9.5** below in terms of quality, significance and duration.

The relevant mitigation measures are detailed and the residual impacts are determined which take account of these mitigation measures.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 9.5: Summary of Predicted Operational Phase Impacts.

ACTIVITY/ SOURCE	ENVIRONMENTAL RECEPTOR	IMPACT/EFFECT DESCRIPTION	QUALITY	SIGNIFICANCE	DURATION	MITIGATION	RESIDUAL IMPACT
Oil/Hydro carbons from Vehicles. Machinery	Soils/groundwater/ surfaces water and Wilton stream	Accidental leakage/spillage of hydrocarbons resulting in localised contamination of soils/subsoils	Negative	Slight	Medium term	The sites existing IE licence included conditions for the minimisation of risk from containment of chemicals and fuels. All chemical containment is required to be appropriately bunded. Spill clean-up materials are required to be available onsite.	Not Significant
Storage of slurry	Soils/groundwater/ surfaces water and Wilton stream	Accidental leakage resulting in localised contamination of soils/subsoils and percolation to groundwater and surface water.	Negative	Moderate	Medium term	All existing and new pig houses would include a leak detection system underneath the slurry tanks. In compliance with the sites IE licence, the leak detection system would be required to be visually assessed weekly and collected water laboratory tested bi-annually.	Not Significant
Use of Slurry	Soils/groundwater/ surfaces water	Improper use could result in localised contamination	Negative	slight-moderate	Short term	The use of agricultural slurry as a fertiliser is regulated under <i>Good Agricultural Practice for the Protection of Waters Regulations 2017 (Nitrates Regulations)</i>	Not Significant

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

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10.0 CLIMATE

10.1 INTRODUCTION

Climate can refer to both the long-term weather patterns in an area and also to localised atmospheric conditions in a given area, referred to as the microclimate. Climate has implications for many aspects of the environment from soils to biodiversity and land-use practices.

In a global sense, much of the concern with facilities such as the applicant's proposed piggery expansion is the atmospheric emissions from the operation and the potential for increases in air pollutants, which may contribute to climate change.

10.2 DESCRIPTION OF THE EXISTING ENVIRONMENT

10.2.1 THE CLIMATE OF IRELAND

Ireland has a temperate oceanic climate according to the Köppen-Geiger Climate Classification System. This means, like most of North-West Europe it is mild, moist and changeable, with abundant rainfall and a lack of temperature extremes.

Due to its proximity to the Atlantic Ocean, Ireland has mild damp summers and cool wet winters and does not experience the temperature extremes of other countries at similar latitudes.

Ireland's weather patterns are characterised by the frequent passage of Atlantic low-pressure weather systems and associated frontal rain belts from the South-West. These moisture-laden fronts break on the mountainous west coast, resulting in the highest rainfall levels in the west.

Valentia Island of Kerry receives twice the level of rainfall to Dublin (1,684mm vs 884mm). In summer months, the influence of anti-cyclonic weather conditions results in drier continental air, in particular when winds are from an easterly direction are interspersed by the continuing passage of Atlantic frontal systems.

Occasionally, the establishment of a high-pressure area over Ireland and the UK results in calm, dry conditions. In the winter, these periods are characterised by the formation of low-level temperature inversions at night-time. Fog can occur in low-lying areas in the region under these conditions of slack winds and clear skies.

If anti-cyclonic conditions become established for a few days or more during the summer months, high daytime temperatures may be recorded, especially in Midland areas away from cooler coastal areas.

Prolonged dry weather conditions are relatively infrequent but, should easterly continental airflows persist, drought conditions may result in the region, which may last for up to 2 to 3 weeks.

The potential effects of climate change on a global scale have been investigated by the Intergovernmental Panel on Climate Change (IPCC). The resulting impacts in Ireland are outlined in the National Climate Change Strategy 2007-2012 (Department of Environment Heritage and Local Government, 2007) and by the EPA's Climate Change Research Programme.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The potential impacts include the following:

- Significant increases in winter rainfall, of the order of 10% in the southeast, with a corresponding increase in the water levels in rivers, lakes and soils;
- Lower summer rainfall, of the order of 10% in the southern half of the country. Less recharge of reservoirs in the summer;
- An overall annual increase in rainfall in the north and west. An overall decrease in rainfall in the east of the country and a resultant decrease in baseline river-flows;
- An overall mean temperature increase (0.7° between 1890 and 2008). This trend is set to continue and possibly accelerate;
- An increase in extreme weather events: serious flooding more frequent than at present – particularly in the southeast. More regular and prolonged droughts and associated water shortages, particularly in the southern half of the country.

Further adverse climate change impacts are projected to affect Ireland in the coming decades and during the rest of this century. Uncertainties remain in relation to the scale and extent of these impacts, particularly during the second half of the century.

The greatest uncertainty lies in how effective global actions would be in reducing greenhouse gas emissions. Predicted adverse impacts include:

- Sea level rise;
- Further increase in intense storms and rainfall events;
- Water shortages in the summer in the east;
- Adverse impacts on water quality;
- Changes in distribution of plant and animal species;
- Adverse effects on fisheries.

10.2.2 LOCAL CLIMATE

In Tipperary, the climate is warm and temperate. There is a great deal of rainfall in Tipperary, even in the driest month. This climate is considered to be Cfb according to the Köppen-Geiger climate classification (Oceanic climate).

The nearest Met Éireann meteorological station providing monthly averages is situated within the grounds of Teagasc, Athenry, Co Galway (Easting: 148068.12 Northing: 226807.31), 40m above sea level).

In order to provide a representative description of the climate in the region 30 years' worth of average meteorological data is compared to climate data from more recent years.

Metrological data going back over 30-years was not available at the Teagasc, Athenry station. The nearest synoptic station that had sufficient historical data available was at Claremorris, Co. Mayo (Easting: 134685.65 Northing: 273563.42), 68m above mean sea level.

Data from this station was used to determine 30-year monthly averages for rainfall, mean maximum temperature, mean minimum temperature and mean wind speed. These measurements would be generally representative of prevailing conditions experienced in the vicinity of Woodville, Co. Tipperary.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The average temperature in Tipperary is 9.5 °C and precipitation averages at c. 1038 mm/yr.

The 2018 total monthly rainfall, mean maximum temperature, mean minimum temperature and mean wind speed from the Claremorris weather station have been compared to the 30-year averages (1988 to 2018) for each month to determine the degree of representation of the actual meteorological conditions versus what is experienced on average at the site. This comparison is presented in **Table 10.1**.

Table 10.1: 2018 Athenry Data and 30-Year Average Meteorological Conditions from the Claremorris Synoptic Station.

MONTH	RAINFALL		TEMPERATURE				WIND	
	2018 (MM)	AVERAGE (MM)	MEAN MAX 2018 (°C)	MEAN MAX AVERAGE (°C)	MEAN MIN 2018 (°C)	MEAN MIN AVERAGE (°C)	MEAN 2018 (KNOTS)	MEAN AVERAGE (KNOTS)
Jan	208.9	142.3	7.9	8	2.2	2.3	7.7	9.7
Feb	91.7	106.8	7.1	8.6	0	2.1	10.1	9.5
Mar	54.9	93.8	8.5	10.3	0.7	3	8.8	9.7
Apr	111.9	78.6	12.6	12.7	4.4	4	7.2	8.7
May	60.4	77.6	17.3	15.4	7.3	6.4	7.4	8.2
Jun	43.1	69.4	20.8	17.5	9.9	8.9	8.8	7.5
Jul	56.2	87.4	20.2	18.9	10.7	10.8	7.3	7.2
Aug	119.8	99.0	18.1	18.6	10.5	10.6	7.2	7.2
Sept	89.4	85.6	15.5	16.8	7.3	8.6	7.7	7.3
Oct	78.9	127.9	13	13.5	5.6	6.3	9.2	8.1
Nov	170	128.7	10.3	10.2	4.3	3.9	6.6	8.1
Dec	142.9	137.7	9.8	8.1	5	2.5	7.8	8.9
Annual	102.3	102.9	13.4	13.2	5.7	5.8	8.0	8.3

Rainfall during 2018 averaged at 102.3 mm, ranged from 43.1 to 208.9 mm and had a standard deviation of 50.8 mm. The 30-year rainfall data averaged at 102.9 mm, ranged from 69.4 to 142.3 mm and had a standard deviation of 25.3 mm.

A t-tests showed at (t-stat = -0.03, df = 22, p-value = 0.486) that there was no significant difference between 2018 and 30-year data. Overall, rainfall during 2018 only was 0.6 mm lower than the corresponding 30-year averages.

In 2018 January, April, August, September, November and December had on average higher rainfall than the 30-year average.

The mean maximum temperature for 2018 was 13.4°C, ranged from 7.1 to 20.8°C and had a standard deviation of 4.8°C. The mean maximum temperature for the past 30-years was 13.2°C, ranged from 8.0 to 18.9°C and had a standard deviation of 4.1°C.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

A t-tests between the 2018 and 30-year data showed at ($t\text{-stat} = 0.11$, $df = 22$, $p\text{-value} = 0.455$) that there was no significant difference between 2018 and 30-year data. The overall mean maximum temperature for 2018 was 0.2°C higher than the corresponding 30-year average.

Mean maximum temperatures were higher than average 30-year temperatures in 2018 during the months of May, June, July, August, September, October, November and December.

The mean minimum temperature for 2018 was 5.6°C, ranged from 0.1 to 10.7°C and had a standard deviation of 3.6°C. The mean minimum temperature for the past 30-years was 5.7°C, ranged from 2.1 to 10.8°C and had a standard deviation of 3.2°C.

A t-tests between the 2018 and 30-year data showed at ($t\text{-stat} = -0.29$, $df = 22$, $p\text{-value} = 0.385$) that there was no significant difference between 2018 and 30-year data.

Mean minimum temperatures were higher than average 30-year temperatures in 2018 during the months of April, May, June, November and December.

The average wind speed recorded during 2018 was 7.9 knots, ranged from 6.6 to 10.1 knots and had a standard deviation of 1.01 knots. The average wind speed recorded during the past 30-years was 8.3 knots, ranged from 7.2 to 9.7 knots and had a standard deviation of 0.95 knots.

A t-tests between the 2018 and 30-year data showed at ($t\text{-stat} = -0.88$, $df = 22$, $p\text{-value} = 0.191$) that there was no significant difference between 2018 and 30-year data. The overall mean wind speed for 2018 was 0.3 knots lower than the corresponding 30-year average.

Wind speed was higher than average 30-year wind speeds in 2018 during the months of February, June, July, September and October.

10.3 IMPACTS

10.3.1 “DO NOTHING” IMPACT

If the proposed development does not go ahead, the site would remain unaltered with the current piggery operation in use. The dominant greenhouse gas sources within the area, agriculture and vehicle traffic would not be altered.

10.3.2 “DO SOMETHING” IMPACTS

The proposed development would increase the volume of greenhouse gas emissions in the area, due to an increase in the proposed number of pigs. The construction phase would also lead to the presence of machinery and HGVs onsite.

The proposed development would impact upon traffic volumes in the area during the construction (temporary) and operational phases (increases deliveries / collections) which may subsequently impact the generation greenhouse gas emissions.

Traffic movements are expected to increase at the site during the operational phase due to the increase in animals and activities at the site (**Table 10.2**).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 10.2: Estimated Traffic Journeys Each Week at the Site.

ACTIVITY ¹	TRAFFIC MOVEMENTS / WEEK FOR CURRENT SITE	TRAFFIC MOVEMENTS / WEEK FOR PROPOSED SITE	INCREASE IN TRAFFIC MOVEMENTS / WEEK
Transport of pigs from site ²	2	4	2
Delivery of pig feed to the site (through Tipperary Milling Company Ltd.)	10	10	0
Transport of slurry from site ³	34	92	58
Operator/Staff transport ⁴	96	132	36
Service staff, sales etc.	6	6	0
Carcasses to rendering	1	1	0
Total	149	245	96

¹ Movements entering and exiting the site.

² Transport of weaners to Ballyknockane and transport of finishers from pre-finisher house to market.

³ Movements based upon Nitrates regulations estimated slurry storage, 26 weeks open landspreading period and 10 m³ tankers.

⁴ Assumes all staff travel to and from the farm alone and once per day, excluding Sunday.

This increase in traffic movements would be similar to the traffic movements of comparable facilities in Ireland. It is considered that even though the traffic movements are predicted to increase, the increase in greenhouse gasses emitted would not have a significant impact upon greenhouse gas emissions in the area.

Agriculture, residences and traffic within the area would remain the dominant sources of greenhouse gases – namely methane and carbon dioxide.

Due to the relatively small footprint of the proposed site, there would be no significant impact on the microclimate of the area. There are no significant direct impacts predicted on the macroclimate as a result of the proposed development.

10.4 MITIGATION

The proposed development and the supporting systems would be designed to the highest industry standard to ensure maximum efficiency of input to product ratio, i.e. the use of resources like pig feed, water and electricity.

The use of low emissions housing designs for the proposed developments would minimise the production of greenhouse gasses from the storage of slurry. The harvesting of heat from the slurry cooling system would also reduce the use of generated electricity

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The footprint of the proposed site would be comparable to other operations in the national context and therefore the increased numbers of animals onsite would have a minor impact on the microclimate of the area.

10.5 REFERENCES

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SECTION C

ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

This section of the EIAR examines the impacts of the proposed development on archaeology, architecture and cultural heritage.

Archeologically important sites, buildings of historic, artistic or architectural interest and sites of cultural heritage form part of the landscape of County Tipperary. As part of the scope and examination of alternatives phases of this development, every effort has been made to avoid known Archaeological, Architectural and Cultural Heritage sites.

This section of the EIAR examines the impacts of the development on known sites (which could not be avoided) or potential sites which have come to light during the field survey of the proposed development.

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11.0 ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

11.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the archaeological, architectural and cultural heritage effects of the proposal to extend the Woodville Pig Farms Ltd. piggery facility in Woodville, Ballymackey, Nenagh, Co. Tipperary (**Figure 11.1**).

The purpose of the chapter is to provide an archaeological, architectural and cultural heritage assessment of the receiving environment, to identify the likely and significant effects on the receiving environment and to propose ameliorative measures to mitigate these effects.

The assessment has been carried out by Marion Sutton MSc and Seán Shanahan MSc MIAI MIASP, of Shanarc Archaeology Ltd, on behalf of Woodville Pig Farms Ltd. and Panther Solutions Ltd., in support of a planning application to Tipperary County Council.

11.1.1 DEFINITION OF ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

The term ‘cultural heritage’ is broadly used to describe any combination of archaeological, architectural and cultural heritage features.

- Archaeological heritage comprises objects, monuments, buildings or landscapes that generally pre-date AD1700.
- Architectural heritage, also referred to as built heritage, comprises structures, buildings, their settings and contents that generally post-date AD1700.
- Cultural heritage also comprises less tangible aspects of heritage such as folklore and cultural associations.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

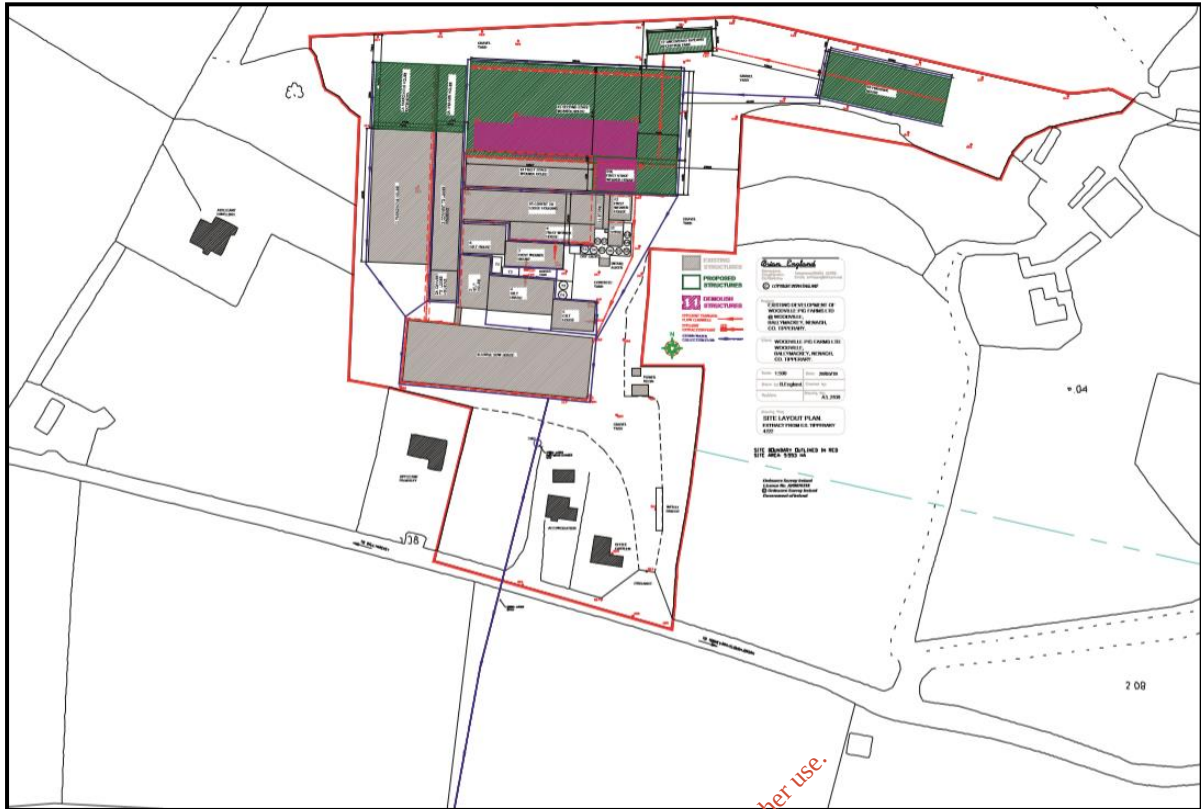


Figure 11.1: Proposed site layout plan (site boundary in red).

11.2 LEGISLATIVE FRAMEWORK & POLICY

11.2.1 LEGISLATIVE CONTEXT

Ireland has ratified several international and European conventions on the protection of cultural heritage, principally:

- UNESCO World Heritage Convention 1972;
- Charter for the Conservation and Restoration of Monuments and Sites (Venice) 1964;
- European Convention on the Protection of the Archaeological Heritage (Valletta Convention) 1992;
- European Convention on the Protection of the Architectural Heritage (Grenada Convention) 1985;
- EIA Directive.

National legislation protecting cultural heritage comprises:

- National Monuments Act 1930, amended 1954, 1987, 1994 and 2004;
- Heritage Act 1995;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999; and
- Planning and Development Act 2000 (as amended).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

In addition to standards and guidelines relating to the preparation of EIAR's, the following cultural heritage guidelines were consulted as part of this assessment:

- Frameworks and Principles for the Protection of the Archaeological Heritage (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- Policy and Guidelines on Archaeological Excavation (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- The Heritage Council, 2000. Archaeology & Development: Guidelines for Good Practice for Developers, The Heritage Council;
- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes (2005), National Roads Authority; and
- Guidelines for the Assessment of Architectural Heritage Impacts of National Roads Schemes (2005), National Roads Authority;

Architectural Heritage Protection Guidelines for Planning Authorities (2011), Department of Arts, Heritage, Gaeltacht & the Islands.

11.2.2 PLANNING POLICIES

The North Tipperary County Development Plan 2010-2016 (as varied) contains policies of relevance to archaeology, architecture and cultural heritage.

Policy LH13: Protected Structures states:

'It is the policy of the Council to encourage the sympathetic restoration, re-use and maintenance of protected structures thereby ensuring their conservation and protection. In considering proposals for development, the Council will have regard to the Architectural Heritage Protection Guidelines for Planning Authorities (DAHG 2011), or any amendment thereof, and proposals that will have an unacceptable impact on the character and integrity of a protected structure or adjoining protected structure will not be permitted.'

Policy LH16: Archaeology and Cultural Heritage states:

'It is the policy of the Council to safeguard sites, features and objects of archaeological interest, including monuments on the Sites and Monuments Record (SMR), the Record of Monuments and Places (as established under Section 12 of the National Monuments (Amendment) Act, 1994) and archaeological remains found within Zones of Archaeological Potential (ZAPs) located in historic towns and other urban and rural areas. In safeguarding such features of archaeological interest, the Council will seek to secure the preservation (i.e. preservation in situ or in exceptional circumstances preservation by record) and will have regard to the advice and recommendation of the Department of Arts, Heritage and the Gaeltacht.

Where developments, due to their location, size or nature, may have implications for archaeological heritage, the Council may require archaeological assessment to be carried out. This may include for a requirement for a detailed Visual Impact Assessment of the proposal and how it will impact on the character or setting of adjoining archaeological features. Such developments include those that are located at or close to an archaeological monument or site, those that are extensive in terms of area (1/2 ha or more) or length (1 kilometre or more), those that may impact the underwater environment and developments that require an Environmental Impact Statement.'

11.3 METHODOLOGY

The assessment of archaeological, architectural, and cultural heritage effects is based on a desk-top study of relevant archaeological, architectural and cultural heritage sources, supported by an on-site inspection. The following were the principal desk-based sources consulted:

National Monuments

Under the National Monuments Acts 1930-2004, archaeological sites in the ownership or guardianship of the State or a local Authority and sites under Preservation Orders are designated as National Monuments. Such sites are offered the highest level of protection under Irish legislation.

Record of Monuments & Places and Sites & Monuments Record

The Record of Monuments and Places (RMP) was established under Section 12 of the 1994 National Monuments (Amendment) Act. The statutory RMP is a list of archaeological monuments known to the National Monuments Service, and is based on the earlier Sites and Monuments Record (SMR) files housed at the National Monuments Service. The record is updated on a constant basis.

Topographical Files

The topographical files of the National Museum of Ireland (NMI) are the national archive of all known antiquities recorded by the NMI. These files relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous excavations. The find-spots of artefacts can be an important indication of the archaeological potential of an area.

Excavations Bulletin and Excavations Database

The Excavations Bulletin is a published annual directory and an on-line database (www.excavations.ie) that provides summary accounts of all the excavations carried out in Ireland – north and south – from 1969. The on-line database has been compiled from the published Excavations Bulletin from the years 1970-2010, with additional online-only material from 2011 onwards, and is updated on a constant basis.

Archaeological Inventory of County Tipperary

The Archaeological Survey of Ireland was established under the National Monuments Act 1930 to compile an inventory of the known archaeological monuments in the State, and remains ongoing. Amongst the publications on national monuments arising from the work of the Archaeological Survey of Ireland is the Archaeological Inventory Series. The inventory of Co. Tipperary, Vol. 1. North Tipperary was compiled by Jean Farrelly and Caimin O'Brien and was published by the Dublin Stationery Office in 2002.

North Tipperary County Development Plan 2010-2016 (as varied)

Each City and County Development Plan is compiled in accordance with the requirements of the Planning and Development Act 2000 (as amended) and contains lists of national monuments, recorded monuments, a Record of Protected Structures (a list of buildings which cannot be materially altered or demolished without grant of permission under the Act) and Conservation Areas and Architectural Conservation Areas (to protect and enhance the special character of an area). The North Tipperary County Development Plan 2010-2016 (as varied) sets out the policies and objectives of the Council in respect of archaeology, architecture and cultural heritage in Chapter 7 of the Plan. Policy to protect and preserve the character and

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

setting of protected structures and Architectural Conservation Areas is additionally set out in Chapter 10. The Tipperary Heritage Plan 2017-2021 developed by Tipperary County Council was also consulted.

National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) is an ongoing survey within the Department of Culture, Heritage and the Gaeltacht. The work of the NIAH involves identifying and recording the architectural heritage of Ireland, from AD1700 to the present day and includes country houses, churches, mills, bridges and other structures of note. As well as a survey of buildings and structures, the NIAH has also carried out a survey of historic gardens and designed landscapes. The objective of the latter is to better understand the extent of the country's historic gardens and designed landscapes. The Garden Survey does not as yet outline the heritage importance of the recorded gardens or designed landscapes. The NIAH building survey of north County Tipperary was carried out in 2004, and is a representative sample of the post-1700 architectural heritage of the northern part of the county.

Cartographic Sources

Information gathered from cartographic sources is fundamental to the identification of archaeological and architectural heritage sites, including cultural landscapes e.g. demesne landscapes, which, based on the level of landscape change, are now often identified from cartographic records alone. The earliest Ordnance Survey maps date to the late 1830s and early 1840s, but much change has occurred in the use and treatment of the landscape in the intervening years, particularly during the second half of the 20th century, making these a valuable resource in tracing the development of a study area.

Toponymy Sources

A townland name may preserve information relating to its archaeology, history, folklore, ownership, topography or land use. Most placenames were anglicised by the Ordnance Survey, which began in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable. The Placenames Database of Ireland website (www.logainm.ie) hosts online bi-lingual placename research and archival records for townlands.

Documentary Sources

Documentary sources are a valuable means of completing the written archaeological, architectural and cultural heritage record of an area, and of gaining insight into the history of the receiving environment. A list of all consulted documentary sources is provided in bibliographic form.

On-site Inspection

On-site inspection offers the opportunity to examine a study area in light of desk-based research and evidence. Inspection is essential in determining the nature and extent of any surviving above-ground evidence, and in predicting the potential effects of a proposal on potential below-ground remains. A site inspection of the piggery facility was conducted by Seán Shanahan, Shanarc Archaeology on 17th July 2019.

11.3.1 IMPACT ASSESSMENT CRITERIA

The impact assessment undertaken in this chapter is based on the methodologies presented in the Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, Draft August 2017).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

A potentially significant effect in terms of archaeology, architecture and cultural heritage is described as an impact to a potential feature/area of archaeological, architectural or cultural heritage that could be significant without mitigation measures being implemented, e.g. potential sub-surface archaeological remains.

11.4 DESCRIPTION OF THE EXISTING ENVIRONMENT

11.4.1 SITE DESCRIPTION

The Woodville Pig Farms Ltd. piggery facility is situated in a rural setting in Woodville townland, in the Barony of Ormond Upper and the Civil Parish of Ballymackey. It is located on local road L1052 approximately 4km northeast of Ballymackey and 9.6km northeast of Nenagh, in Co. Tipperary, less than 1km west of the county boundary with Offaly (**Figure 11.2**).

Woodville townland is part situated in the Ollatrim River Valley - the townlands southern boundary is delineated by the River - with topography rising to 100m OD with a maximum height of 110m at Woodville House, a late 18th century house sitting in much reduced attendant grounds, between the valley of the Ollatrim River to the south and raised bog to the north.

The existing piggery facility is currently sited approximately 170m to the west of Woodville House, within part of the attendant grounds or landscaped demesne formerly connected with Woodville House. The attendant grounds include a roughly east-west orientated low ridge planted in mixed deciduous woodland, which was partly removed to facilitate the development of the existing Piggery facility. The Ballaghveny Landfill and Recycling Centre (owned by Tipperary County Council) is located to the immediate east and northeast of Woodville House, and is also laid out in the attendant grounds formerly connected with the House. The landfill and recycling facilities originated from a disused quarry that straddled Woodville and neighbouring Ballaghveny townland, but which witnessed expansion in Woodville townland in the early 2000s.

Raised bog covers the northern third of Woodville townland, to the north of the existing piggery facility, the attendant grounds connected with Woodville House and the Ballaghveny Landfill and Recycling Centre. It straddles numerous townlands on both sides of the county boundary between Tipperary and Offaly. Agriculture is the principal land use around the periphery of the bog, and in the vicinity of the existing piggery facility and Ballaghveny Landfill and Recycling Centre.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

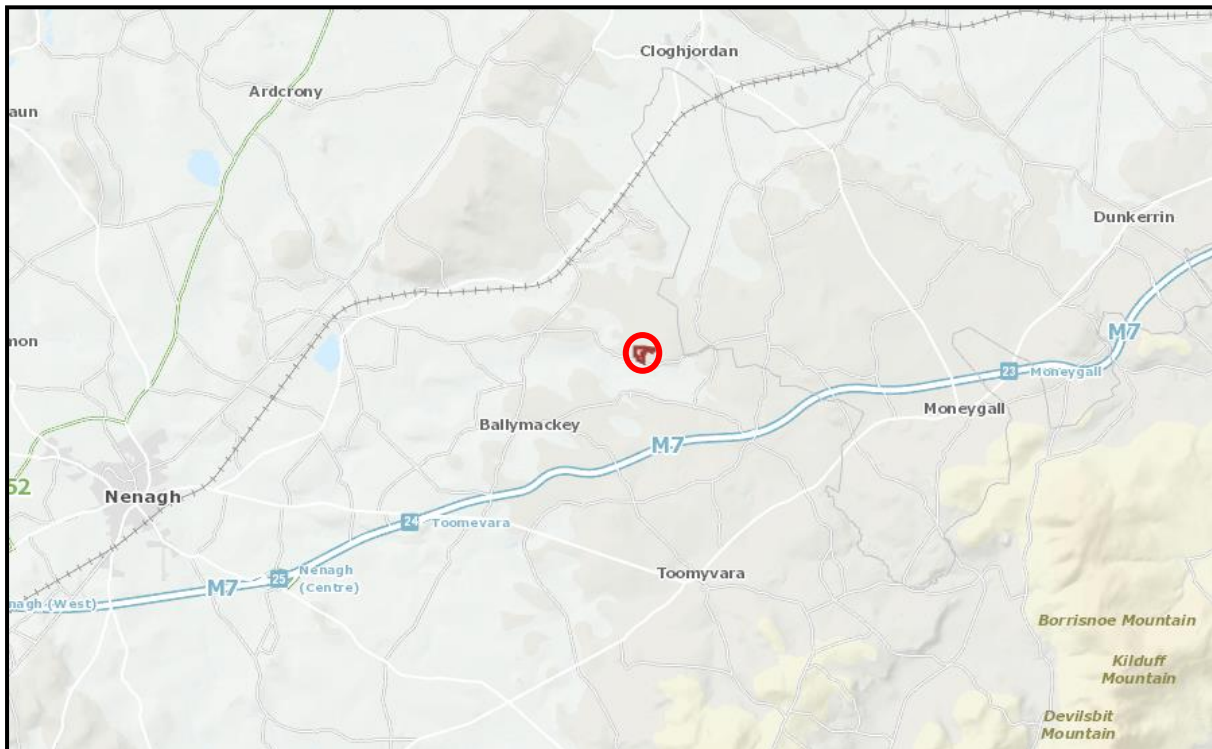


Figure 11.2: Location of site (circled red) within wider context (OSi Licence EN 0077919).

11.4.2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Introduction

The River Shannon is the major waterway and artery throughout the centre of Ireland and throughout human history has been used for communication, transport, trade, food, water and defence purposes. There is ample evidence of man's intervention on the river from the Mesolithic period onwards, with records of implements, fish traps, and fording points and the development of settlements. The north Tipperary side of the River Shannon basin, to the east of Lough Derg, lies generally below 120m and has been the subject of archaeological landscape analysis. According to Eoin Grogan (2005, 18), the peat and gley soils in the valleys of this region indicate the former presence of numerous small lakes and fens, which would have made the region difficult to traverse in prehistory, especially from north to south. Archaeological evidence from the wider vicinity around Woodville indicates that there has been settlement activity in this area since the prehistoric period, although there is less recorded prehistoric evidence in the immediate vicinity when compared with the medieval landscape.

Prehistoric Period (7000BC-500AD)

Archaeological work was carried out along the alignment of the M7 Castletown to Nenagh road scheme, which was constructed approximately 2km to the south of Woodville. Archaeological sites from various periods were discovered along the route, primarily dating from the Bronze Age onwards. Stone tools of Neolithic date were recorded in a number of townlands near Moneygall - Busherstown, Cullenwaine and Greenhills - and in Clash, Ballymackey Parish. Stone tools dating to the late Neolithic/Early Bronze Age were also recorded at Busherstown, Cullenwaine, Castleroan, Moatquarter, Drumroe and Greenhills near Moneygall, and in Derrybane near Toomevara (O'Faolain 2011a). A number of fulachta fiadh,

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

which is a prolific Bronze Age monument type, were recorded at Clashnevin, near Toomevara, as well as examples in Cullenwaine and six examples at three separate locations in Greenhills. Evidence of Bronze Age round houses was also recorded in Derrybane, near Toomevara, and in Clash, as well as cluster of pits of Early Bronze Age date in Killeisk (O'Faolain 2011b). Construction of the earlier Nenagh By-pass also revealed new prehistoric sites, including an area of Neolithic activity at Tullahedy (Farrelly & O'Brien 2002).

The region around Ardcroney was an important settlement centre since the middle Neolithic, with evidence of megalithic tombs and structures; intense occupation continued into the late Bronze Age (Grogan 2005). In addition to evidence of fulachta fiadh, barrows are recorded at Ballycapple (TN015-120), Bantis (TN015-104) and Moanfin (TN021-011), to the northwest and west of Woodville. All classified as ring-barrows, this monument type is part of the Bronze Age and Iron Age burial tradition. As well as a cluster of prehistoric activity at Ardcroney itself, there was also a distinct cluster at Kyle and at Ballycapple. According to Grogan (2005, 97), the Nenagh-Ollatrim watershed provides a natural southern boundary to this region. Bogs are well established as sources of prehistoric artefacts, and many artefacts have been recovered from raised bog in the North Munster region. No toghers or routeways through the raised bog in the North Tipperary region are as yet recorded.

Historic Period (500AD onwards)

Early Medieval Period (c.500AD-1100AD)

Much of the archaeological evidence in the wider area dates to the early medieval period. The introduction of Christianity to Ireland occurred during the 5th century A.D., and secular settlement during this era is represented by the ringfort, alternatively referred to as 'rath' 'lios' or 'dún' - to indicate an earthen bank and exterior ditch enclosing a central area - or 'cashel' to indicate a stone-walled enclosure. Usually circular or sub-circular and often sited on raised ground, there are over 45,000 currently identified in Ireland, making this the most common site type in the country. Smaller, 'univallate' examples were homesteads for lower ranks of society, while larger bi- or tri-vallate examples were used by lords or wealthy landowners.

A number of ringforts are located in the wider landscape, and show a tendency to be sited on gently sloping ground above the Ollatrim River Valley. A ringfort (TN015-103001) and enclosure in Elmhill are sited in undulating pasture above the 100m contour, as are two adjacent ringforts (TN021-021 and TN021-022) in Lisnamoe. In the latter case, the placename contains the Irish root word lios, which is indicative of a fort or enclosure. The Cloonmore ringfort examples (TN021-018 and TN021-019) are also located in very close proximity, and are situated next to the remains of a medieval church and graveyard (TN021-020001 and TN021-020002). The church was the old parish church of Ballymackey Parish. The ruins of a Protestant Church built in c. 1800 probably incorporate the fabric of the earlier church. According to the Ordnance Survey Letters, which for Co. Tipperary were written between 1839 and 1840, the church was situated in the centre of the graveyard and the north end of the west gable was all that survived at this time, incorporated in the east wall of a small school house. There is now no visible trace of the old school.

To the southeast of Woodville, ringfort TN022-002 in Park is situated on a natural hillock. Additional enclosures are recorded to the east, in Rathenny (OF046-001) and in Rath (OF046-003), both in Offaly. Both placenames contain the Irish root word 'rath,' meaning a ringfort or enclosure, although in both cases the antiquity of the enclosures is questioned in the absence of surface remains. Enclosures are defined as areas with an enclosing element (e.g. bank, wall,

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

fosse, scarp), or indicated as such cartographically, which occur in a variety of shapes and sizes. They may date to any period from prehistory onwards.

Medieval Period to Late Medieval (c.1100AD-1650AD)

The Anglo-Norman invasion from 1169AD had a huge impact on the landscape of the region, and the medieval landscape of the county is one of the richest in the country (Farrelly & O'Brien 2002). Tipperary has the second highest concentration of tower houses, after Co. Limerick (Farrelly & O'Brien 2002). Tower houses are defined as fortified residences that were constructed by a lord or landholder generally between the 15th and mid-17th centuries. Tower houses were built in Killowney Big - Castle Willington (TN021-015), Cappa (TN021-024001), Ballymackey (TN021-023001) and Glenahilty (TN015-090).

The tower house at Killowney Big was built on the immediate north bank of the Ollatrim River. It is described in the Civil Survey (1654-56) as a 'castle with a barbican.' Rory O Kennedy is listed as proprietor in 1640. Originally known as Killowney, it became known as Castle Wellington after a landlord by the name of Wellington erected an adjacent castellated house in the early 18th century. The name was subsequently recorded by the Ordnance Survey as Castle Willington.

The tower house at Cappa was built on the south bank of the Ollatrim River close to an earlier moated site (TN021-024002), indicating continued medieval settlement at the site. The earlier moated site would have been a late 13th-early 14th semi-defended residence of an Anglo-Norman settler (although in cases they were built by Gaelic lords). Moated sites are defined as a square, rectangular or occasionally circular area, sometimes raised above the ground, enclosed by a wide, often water-filled fosse with a wide causewayed entrance. A second moated site in the wider landscape is situated in Carrowea (TN022-001), to the north of the Ollatrim River, to the southeast of Woodville.

The tower house at Ballymackey is situated within a pig farm. The structure's well executed stonework, combined with internal features and decorative tooling suggest the tower house was later in date i.e. late 16th/early 17th century. According to the Ordnance Survey Name Books the castle is said to have belonged to the O'Kennedys. The 17th century witnessed a shift away from defence towards comfort (Farrelly & O'Brien 2002), and the Ballymackey tower house appears to have been extended as a residence (TN021-023002). The Ordnance Survey Name Books, produced at a similar period as the Ordnance Survey Letters, refer to an old house adjoining the south side of the tower house that at one time was a place of importance. The tower house at Glenahilty has also been modified, in this case incorporated into much later buildings.

Early Modern Period (c.1650AD-c.1850AD)

Country houses were to become dominate features of the cultural settled landscape in the early modern period, and several country houses, with ancillary outbuildings and gate lodges, set in demesne landscapes, were established in this part of Co. Tipperary.

Ballymackey parish is described by Samuel Lewis in 1837 in his Topographical Dictionary of Ireland. Lewis records that the Parish contained about 2000 acres of bog with the greater portion of land under tillage on limestone baserock. He goes on to list the numerous country seats in the Parish, including Castle Willington in Killowney Big townland, the seat of J. Willington Esq. Woodville was the property of Humphrey Minchin Esq. at this time, and

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

neighbouring Bessborough House was that of T. Sadlier, jun., Esq. The latter properties are described as 'both pleasantly situated in grounds tastefully laid out and kept in fine order.'

The first edition Ordnance Survey map was produced in a similar period to Lewis's Topographical Dictionary, and it clearly evidences a particular focus of country houses along the north bank of the Ollatrim River. From west to east, these gentlemen's residences ranged from Mount Pleasant and Heritage in Killowney Little, bordered by Castle Willington to the east, followed by Riverlawn House, Elmhill House, Wilton House and Donnybrook House, all situated in landscaped attendant grounds in the townland of the same name. Wilton House, Bessborough House and Ballyknockane House lay at the east end of this continuous formalised landscape. Houses to the south of the Ollatrim River are Camira in Cappa townland and Falleen House in Falleen townland. Mount Pleasant was the residence of a Captain Jackson; a W. Jackson was also proprietor of Hermitage in the same townland. Donnybrook was owned by W. Poe Esq., Elmhill by W. Middleton Esq., Camira by the Rev. P. Bolton and Falleen by G. Riall Esq.

Woodville House is described as a detached five-bay, two-storey house built in the late 18th century (c.1780). According to the Landed Estates Database, it was home to a branch of the Minchin family. Edward Minchin of Glenahilty, to the northwest of Woodville, was the sixth son of Charles Minchin. His third son Charles of Woodville and Ballygibbon married Elizabeth Massy of Stoneville, Co. Limerick in 1740, from who descend the Minchins of Woodville. The Minchins later leased the house. It was held by Reverend James Poe in 1814. The house and demesne, then the estate of the Reverend Henry Charles Minchin, were put up for sale in January 1869 when a James J. Poe was listed as the tenant. At this time the house was described as containing a basement storey, three large sitting rooms and five principal bedrooms. The Irish Law Times and Solicitors Journal, Vol 3, records the purchase of the lands of Woodville by Captain George W. Bunbury in 1869. The house and 237 acres were purchased for £4,250. George Bunbury is likely to have owned more land in the townland, as in the 1870s it is recorded that he owned 516 acres in Woodville. In the census in 1901, Alice Bunbury resided at Woodville with her daughter Kathleen and son George. The house was listed with a stable, coach house, harness room, fowl house and shed. There is a reference that Alice Bunbury held 235 acres of untenanted land in 1906. By 1911, the Bunbury family no longer resided at Woodville, as they are absent from the census of the townland in that year.

Nearby Bessborough House is described as a four-bay, two-storey house that was built by the early 19th century, with relatively unusual outbuildings and gateway to the current farmyard. It appears to have had a number of tenants. In 1814, the house was occupied by John Mahon, in 1837, by T. Sadlier Junior, while by c.1840, when the Ordnance Survey Name Books were compiled, the house was occupied by Mr. Cushin, a solicitor. The proprietor is recorded at this time as Mrs. Harding of Dublin. Griffith's Valuation, overseen by Sir Richard Griffith, was the first full scale valuation of property in Ireland. Published between 1847 and 1864, the survey provides a valuation of every taxable piece of agriculture or built property in Ireland, and is an important 19th century source for identifying property and property holders in mid-19th century Ireland. This resource records Dr John Armstrong as resident. He held the property from Mrs Harding and the buildings were valued at £20+. By 1894, the house is referred to as the residence of David E. Young, by which time it had been acquired from the Harding family.

11.4.3 CARTOGRAPHIC ANALYSIS

Analysis of historic mapping shows how landscapes evolve. Comparing successive historic maps can show how archaeological and architectural sites have been created, altered or removed over a period of time. The following historic maps were consulted, of which relevant extracts are presented below.

- Down Survey map of Co. Tipperary, 1656-58 (**Figure 11.3**);
- Down Survey map of Barony of Ormond Upper, 1655 (**Figure 11.4**);
- Down Survey map of Civil Parish of Ballymackey (**Figure 11.5**);
- First edition Ordnance Survey 6" map, 1837-43 (**Figure 11.6**);
- Revised Ordnance Survey 25" map, 1888-1913 (**Figure 11.7**), and
- Revised Ordnance Survey 6" map, c. 1940s (**Figure 11.8**).

Down Survey Maps 1656-58

The Down Survey is a mapped survey carried out between 1656 - 1658 under the direction of Sir William Petty that recorded townland boundaries, their areas and proprietors with precision throughout Ireland. The resultant maps contain other detail, such as on roads, rivers, towns, churches, castles, houses and fortifications, as well as topographic and landuse detail.

The Down Survey map of County Tipperary (**Figure 11.3**), the map of the Barony of Ormond Upper (**Figure 11.4**) and the Civil Parish map of Ballymackey (**Figure 11.5**) all depict K:killagrenon or Knockillagrenan. The placename is depicted between bogland to the north and the valley of the Ollatrim River to the south, with landuse under arable and pasture. The accompanying terrier information describing the Barony of Ormond Upper records that there is 'very much building and improvements in this barony as Houses, Castles, Churches, Silvermyne, Silvermills and Corne Mills.' Reflecting this description, the maps depict a church in Balligibbon to the northwest, a large castle or house in Cappagh to the west, on the south side of the Ollatrim River, a tower house on the north side of the Ollatrim River in Killcownin or Killownin, and a settlement including a tower house and church in Ballimckey.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY



Figure 11.3: Extract from Down Survey map of County Tipperary, 1656-58.

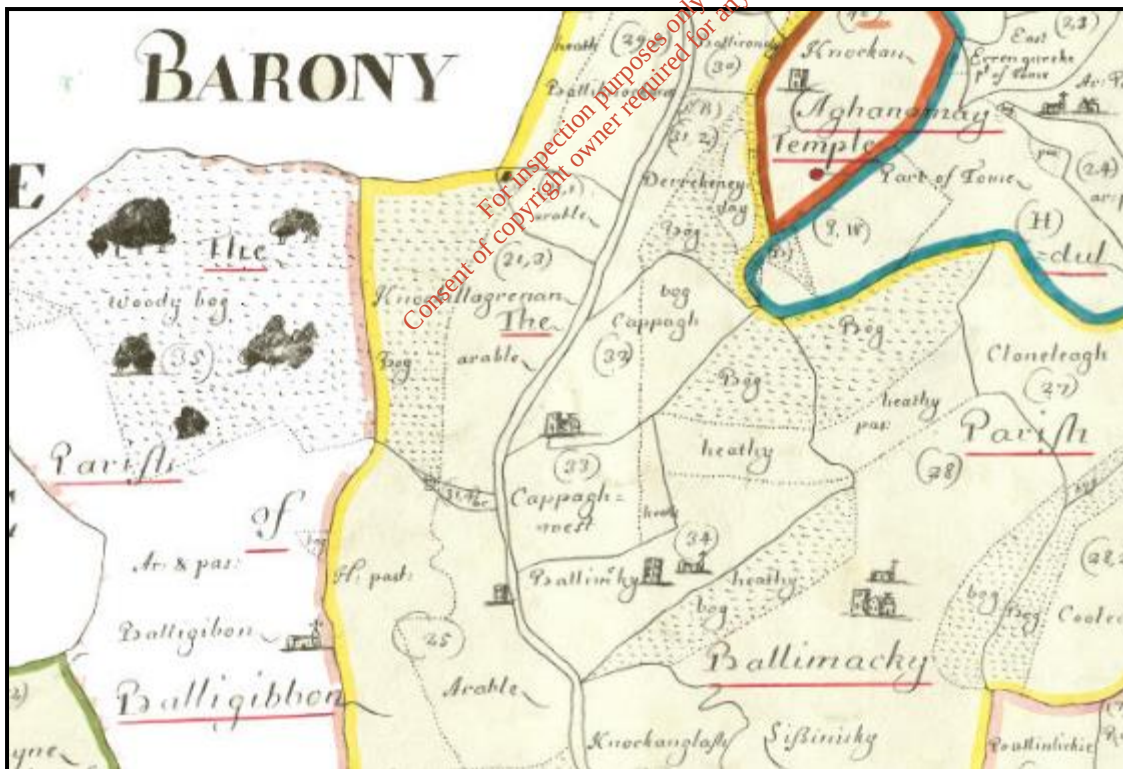


Figure 11.4: Extract from Down Survey map of Barony of Ormond Upper, 1656-58.

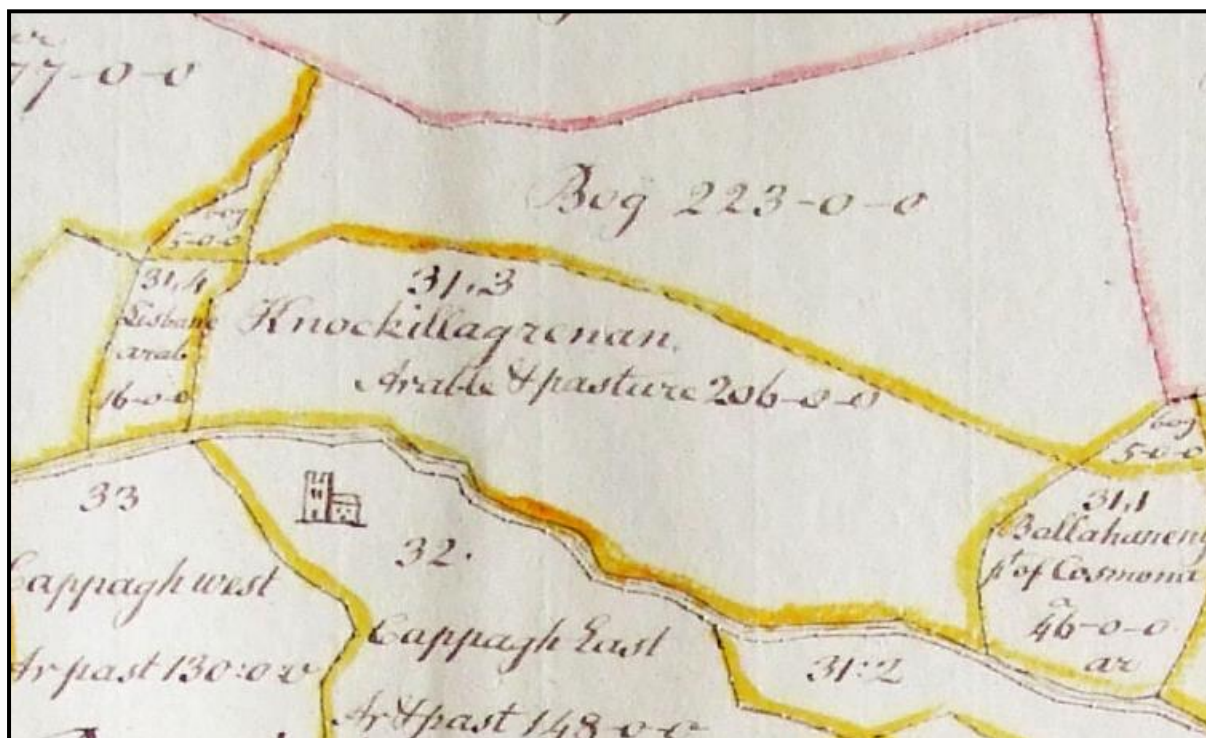


Figure 11.5: Extract from Down Survey map of Civil Parish of Ballymackey, 1656-58.

Ordnance Survey Maps

The first ever large-scale survey of Ireland was undertaken by the Ordnance Survey between 1829 and 1842, producing highly accurate maps at different scales. By the 19th century Knockillagrenan was known as Woodville, and the townland is recorded as such on the first edition Ordnance Survey 6-inch map, 1837-43 (**Figure 11.6**). In line with the cartographic evidence provided on the various Down Survey maps, the northern half of Woodville townland is comprised of bog. Boundaries indicate that there has been some enclosure or drainage of the bog, with a line of similarly shaped and sized parcels of bog abutting an access road or track to the north of Woodville House and its attendant grounds.

Woodville House and its attendant grounds dominates the townland, and is neighboured to the southeast by a large house, Bessborough House, situated within its own small townland of the same name. In addition to a complex of buildings at the main house, the attendant grounds include two gate lodges at the entrances to the house from the southwest and southeast. Buildings labelled as 'The Cottage' are located at the end of a track in the grounds to the northeast, on the townland boundary with neighbouring Ballaghveny, which borders Co. Offaly. The main house was constructed within a low ridge orientated approximately east-west, which was planted with trees - serving to enclose, shelter and screen the house - and laid out with a network of tracks. The west end of this landscaped feature appears to have contained a pond. A square shaped enclosed garden was developed on the north side of the landscaped ridge, to the northwest of the house, which appears to have been formally laid out as a parterre¹.

¹ A parterre is a formal garden consisting of level garden beds, often laid out symmetrical, which are separated by paths.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

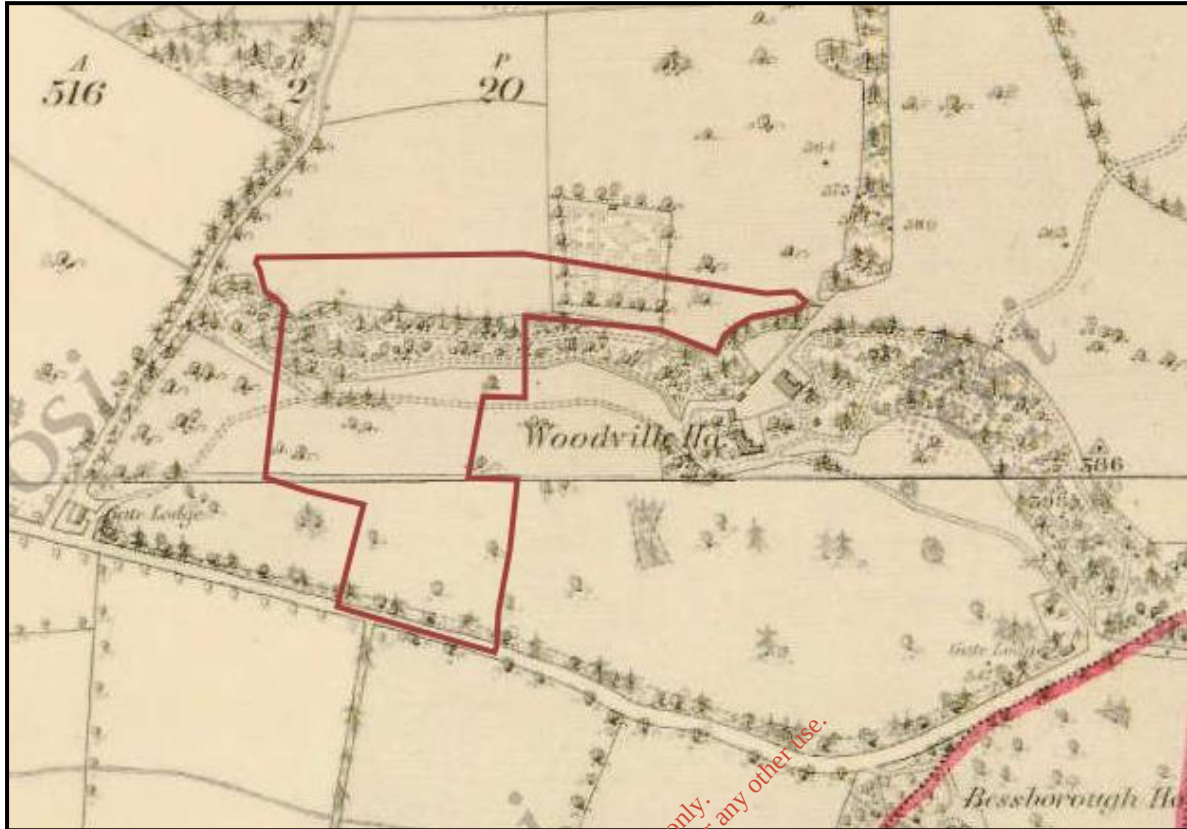


Figure 11.6: Extract from first edition 6-inch Ordnance Survey map, 1837-43 (OSi Licence EN 0077919) (application site boundary in red).

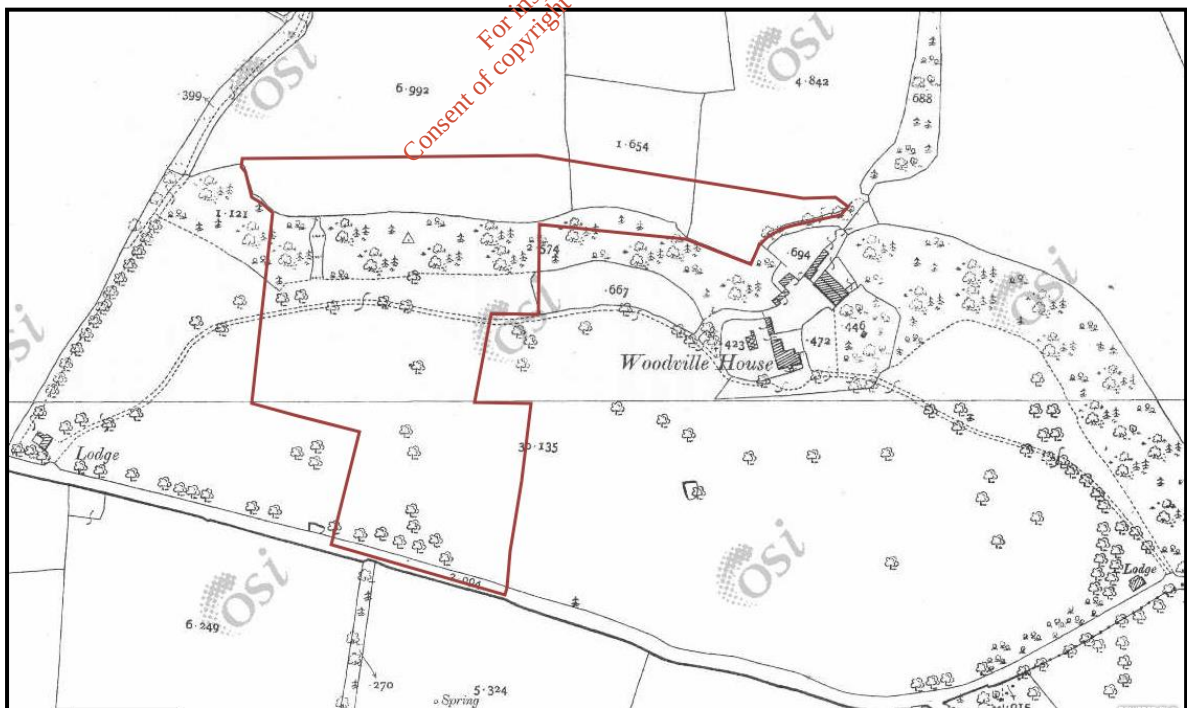


Figure 11.7: Extract from revised 25-inch Ordnance Survey map, 1888-1913 (OSi Licence EN 0077919) (application site boundary in red).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The garden or parterre was gone by the later 19th century - although the location is retained as a roughly square shaped field - as well as a clear link to 'The Cottage' to the northwest of Woodville House. Here, an L-shaped building remained with no annotation (**Figure 11.7**). Otherwise the attendant grounds at Woodville House, including its wooded ridge, remained largely unaltered. There appears to have been a phase of building development, as the footprint of both lodges to the southwest and southeast of the main house has enlarged. The footprint of the main house also appears to be slightly enlarged, and there are additions to the complex of associated outbuildings situated in an enclosed yard to the north of the house. No obvious changes have been made to the main complex of buildings, the lodges or the landscaped grounds by the time a revised 6-inch Ordnance Survey map was produced in the 1940s (**Figure 11.8**).

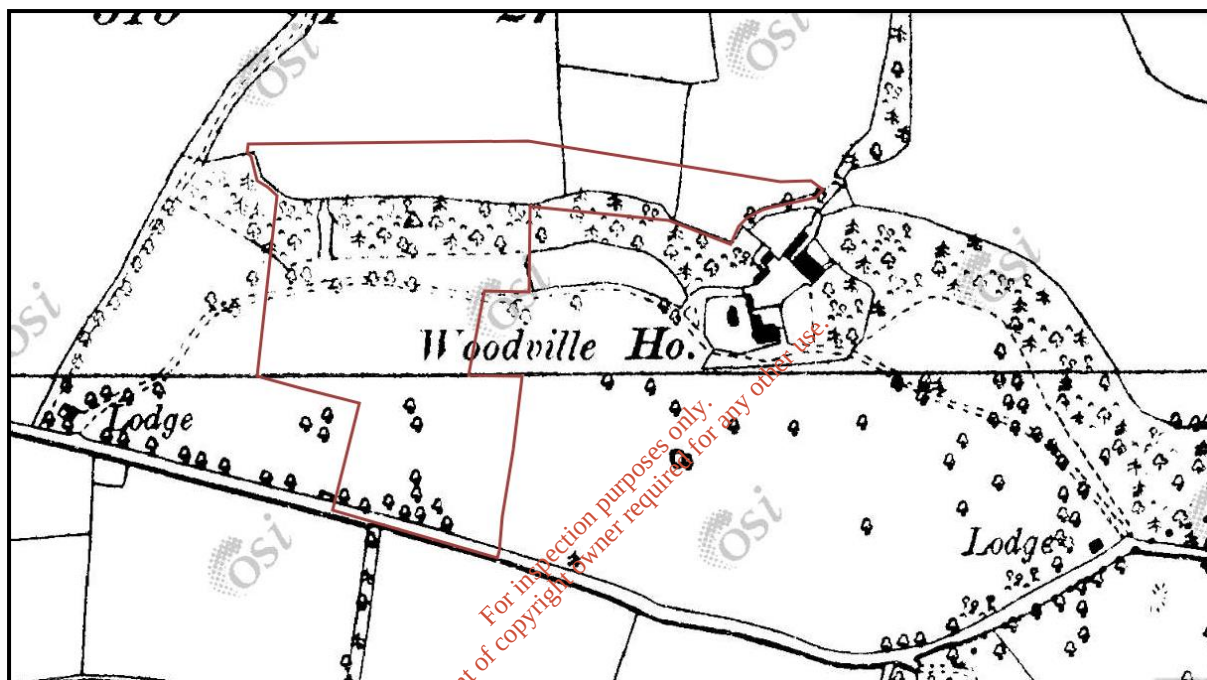


Figure 11.8: Extract from revised 6-inch Ordnance Survey map, c. 1940s (OSi Licence EN 0077919) (application site boundary in red).

11.4.4 TOPONOMY

The townland name, Woodville, is an English placename assigned to land previously known as Knockillegrenane, anglicised from the Irish Cnoc Coille Grianáin. The latter contains three common Irish root words, cnoc, which refers to a hill or high point, coill, a standard word for wood, and grianán, usually interpreted as meaning 'sunny place,' although it can also relate to a place with a view. In some cases throughout the country grianán was used metaphorically to mean 'important place' (Flanagan & Flanagan 2002).

The archives of the Placenames Database of Ireland contain documentation on research results of the Branch. The archive has traced the placename back to 1587, when it is referred to as Knockillegenan, and since that time the placename has been recorded under a range of spellings (www.logainm.ie/en/46206). Alternate spellings include the simple reference to Knock (1654), Cnocke (1659) or Nock (1760), all implying a hill or high point. In 1799, there is a reference recording that Knockillegrenane is now called Woodville.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

11.4.5 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Based on a search of the online Excavations database, one previous archaeological investigation has taken place in Woodville townland. The investigation (Excavations No. 2004:1646) was carried out for Tipperary County Council in 2004, and related to archaeological monitoring of an extension to the Council's Ballaghveny Landfill. The extension was located in undulating farmland and scrubby bog on the west side of the existing landfill facility, to the north of Woodville House. No archaeological features or deposits were identified during monitoring.

In the townlands bordering Woodville, test excavation was carried out to the north of Glenahilty tower house (TN015-090) in 2006 (Excavation No. 2006:1861). The tower house is sited within a farm yard to the northwest of Woodville, on the periphery of bogland. The archaeological investigation related to the construction of two slatted units in the zone of archaeological potential around the tower house. Previous groundworks had disturbed the investigated area and no archaeological features or deposits were identified.

Falleen is a large townland on the south side of the Ollatrim River, to the southeast of Woodville, and was archaeologically tested as part of the M7 Castletown to Nenagh national road scheme between July 2007 and March 2008 (Excavation No. 2007:1692). No archaeological features or deposits were identified on the road alignment in Falleen, although a group of 13 pits were recorded in Derrycarney and a hearth and three pits in Kilgorteen to the southwest and west of Falleen.

The M7 Castletown to Nenagh national road scheme, given its scale in size and geographic extent, has contributed to the archaeological record of the wider Woodville, Ballymackey and Nenagh landscape, and demonstrates the potential of development to expose previously unknown sub-surface archaeological features, finds and deposits.

Excavation records for Woodville townland, and the townlands immediately bordering Woodville, are listed in **Table 11.1**.

Table 11.1: Previous archaeological investigations in the vicinity of the proposed development site.

Licence No.	Excavation No.	Location	Site Type	Author
04E0600	2004:1646	Woodville/ Ballaghveny, Tipperary	No archaeological significance	Teresa Bolger
06E0624	2006:1861	Glenahilty Castle, Glenahilty, Tipperary.	No archaeological significance	Martin Doody
E003372	2007:1692	Killeisk/Derrycarney /Garrynafanna/Gortn adrumman/Kilgorteen/ Falleen/Knockane/ Clash, Tipperary	Pits and hearths	Finn Delaney

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

11.4.6 PREVIOUS ARCHAEOLOGICAL FINDS

No findspots of artefacts are recorded in the topographical files of the National Museum of Ireland for Woodville townland. The closest find, a wooden vessel (NMI 1990:108), is provenanced to neighbouring Wilton townland, approximately 1km to the northwest. The find is described as a churn-shaped wooden vessel with a lid, containing bog butter. It was found 1.5m deep in bog during machine turf cutting. The tradition of using bogs to store butter or to keep butter edible was a long-lived tradition that spans the period from around 1700BC to the 17th century. The Wilton example is understood to be of prehistoric date.

11.4.7 ARCHAEOLOGICAL HERITAGE

National Monuments

No National Monument either in the ownership or guardianship of the State or of Tipperary County Council is located in proximity to the existing piggery facility in Woodville.

Record of Monuments and Places (RMP)

No recorded archaeological monument is located in Woodville townland, or in proximity to the existing piggery facility. The Record of Monuments and Places (RMP) lists 6 monuments within a 2km radius, the closest of which, a tower house (TN021-024001) and moated site (TN021-024002) in Cappa are situated approximately 1.4km to the southwest, on the south side of the Ollatrim River. RMP sites within a 2km radius of the piggery facility are indicated on **Figure 11.9** and listed in **Table 11.2**.

Table 11.2: RMP sites within a 2km radius of the proposed development site.

RMP No.	Site Type	Townland	ITM Reference	Prox. (km)
TN015-090----	Castle - tower house	Glenahilty	595356, 683919	1.95
TN015-103001-	Ringfort - rath	Elmhill	594402, 682828	2.0
TN015-103002-	Enclosure	Elmhill	594402, 682808	2.0
TN021-022----	Ringfort - rath	Lisnamoe	594558, 681178	1.9
TN021-024001-	Castle - tower house	Cappa	595002, 681869	1.4
TN021-024002-	Moated site	Cappa	594969, 681870	1.4

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

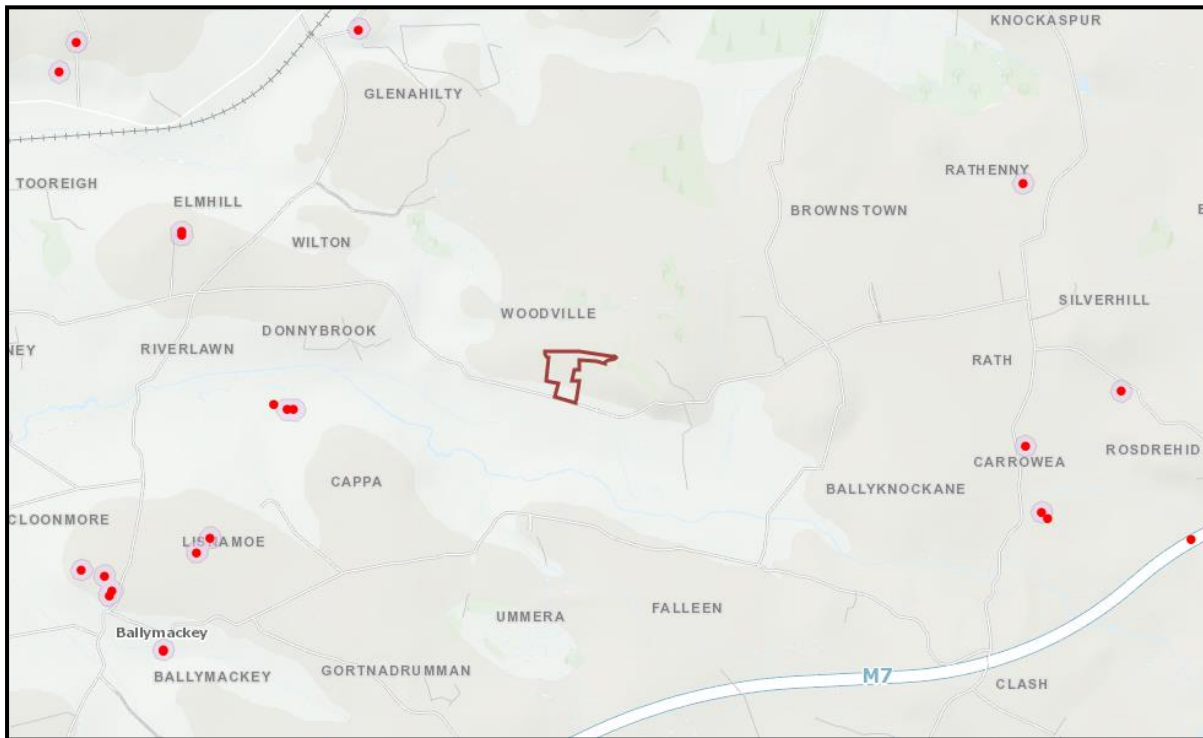


Figure 11.9: RMP sites (red dots) in relation to the proposed development site (outlined in red) (OSi Licence EN 0077919).

11.4.8 ARCHITECTURAL AND CULTURAL HERITAGE

North Tipperary County Development Plan Record of Protected Structures

The North Tipperary County Development Plan 2010-2016 (as varied) lists Woodville House in the Record of Protected Structures (RPS), RPS Ref. S404. Currently located approximately 170m to the east of the existing piggery facility, the House and its curtilage, inclusive of its associated outbuildings, are situated in closer proximity to the proposed development site boundary; the northeast boundary of the proposed development site abuts the outbuildings to the north of the House. The RPS lists an additional 5 protected structures within a 2km radius of the proposed development site, listed in **Table 11.3**.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 11.3: RPS sites within a 2km radius of the proposed development site.

RPS Ref.	Townland	Structure Name	Proximity (Km)
S52	Ballyknockane	Millgrove House	1.3
S93	Bessborough	Bessborough House	0.266
S153	Donnybrook	Donnybrook House	0.864
S161	Falleen	Faleen House	1.4
S177	Glenahilty	Glenahilty - additions to castle to form house.	1.95
S404	Woodville	Woodville House	0

National Inventory of Architectural Heritage

The Building Survey of the National Inventory of Architectural Heritage (NIAH) lists Woodville House, approximately 170m to the east of the existing piggery facility, and gives the house a rating of Regional Importance. A regional rating is assigned to "structures or sites that make a significant contribution to the architectural heritage within their region or area" (NIAH handbook, July 2012, 21). The NIAH lists an additional 3 houses within a 2km radius of the proposed development site, indicated on **Figure 11.10** and listed in **Table 11.4**.

Table 11.4: NIAH sites within a 2km radius of the proposed development site.

NIAH Reg	Name	Townland	Rating	Proximity (km)
22401520	Riverlawn House	Riverlawn	Regional	1.95
22401521	Donnybrook House	Donnybrook	Regional	0.864
22401522	Woodville House	Woodville (Templemore Pr)	Regional	0
22402102	Bessborough	Bessborough	Regional	0.266

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

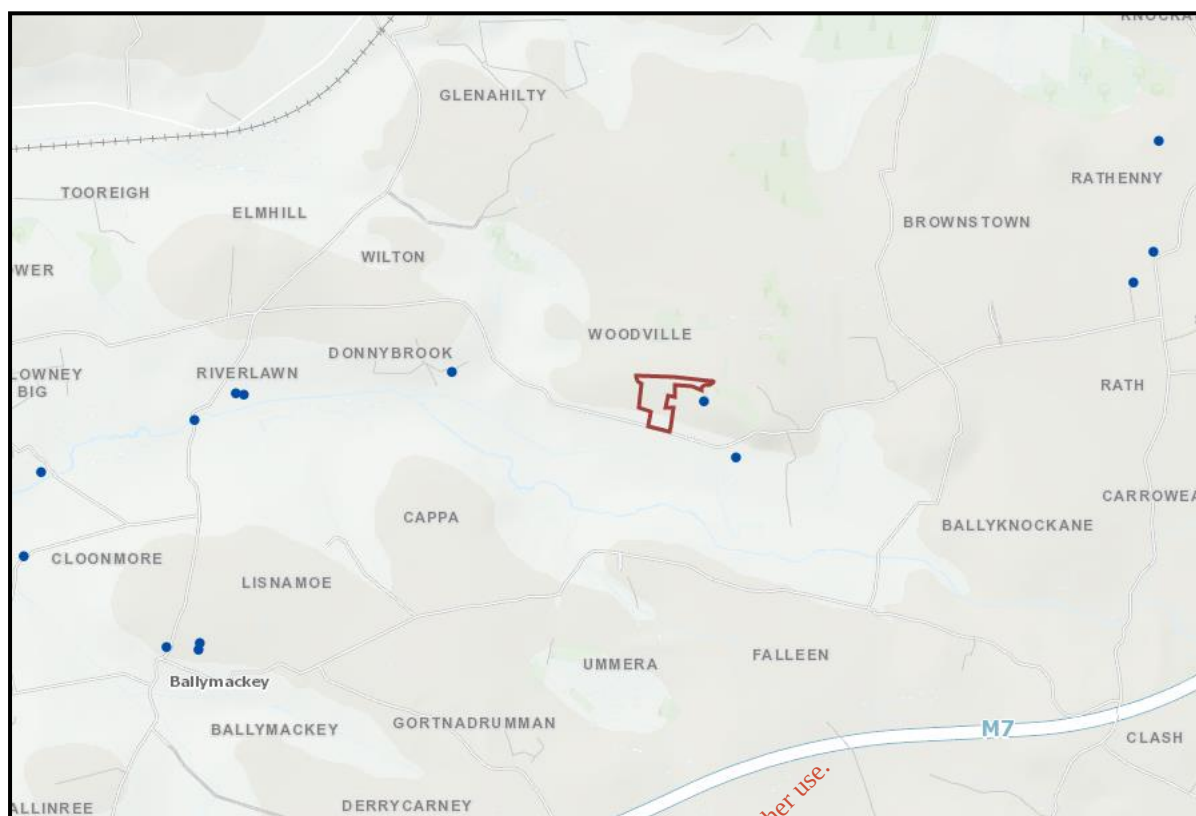


Figure 11.10: NIAH sites (blue dots) in relation to the proposed development site (outlined in red).

The Garden Survey of the National Inventory of Architectural Heritage (NIAH) also lists Woodville House. The Garden Survey is a desk-based assessment of the condition and survival of garden and landscape features at the site, and as such limited details are provided. Landscape features recorded in association with Woodville House by the Survey are the surrounding woodlands and remnant parkland. The NIAH lists an additional 2 houses subject to Garden Survey within a 2km radius of the proposed development site, listed in **Table 11.5**.

Table 11.5: NIAH Garden Survey sites within a 2km radius of the proposed development site.

NIAH Ref	Property	Site Condition	Proximity (Km)
TN-59-R-967821	Woodville House, Ballymackey	Main features unrecognisable – peripheral features visible	0
TN-59-R-968817	Bessborough House	Virtually no recognisable features	0.266
TN-59-R-954839	Glenahilty	Virtually no recognisable features	1.95

11.4.9 ON-SITE INSPECTION

The existing Woodville Pig Farms Ltd. piggery facility comprises a dense cluster of buildings in a yard set back from local road L1052 (**Plate 11.1**). The facility grounds incorporates two

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

cottages fronting the road, with an extended cottage at the site entrance used as an office canteen, and the second cottage used as accommodation (**Plate 11.2**). All of the facility buildings and structures are modern. The buildings proposed for demolition are constructed of concrete with lean-to roofs (**Plate 11.3**).



Plate 11.1: Vertical drone image of existing piggery facility (17th July 2019).

The topography rises from south to north, from local road L1052 to the rear of the existing facility. The rear section of the facility is sited on level ground, on a gravel platform formed by levelling part of a tree-covered glacial till ridge (**Plate 11.4**). The tree-covered ridge survives to the east and west of the rear part of the facility, and represents a landscaped feature that formed part of the attendant grounds of Woodville House. The ridge is elevated above the level of pasture on the periphery of bog to the north of the existing facility (**Plate 11.5**).

The perimeter of the existing facility is bounded by mature trees, including evergreens, on the eastern boundary, a mixture of mature trees, hedgerow and post and wire fence on the western boundary, with a broken line of trees and scrub on the northern boundary (**Plate 11.6**). Existing, mature vegetation plays a key role in screening the piggery facility within the surrounding landscape. The mature trees on the eastern boundary post-date the formal estate landscape at Woodville House, as no field divisions are shown on Ordnance Survey maps in the open demesne land that was laid out between Woodville House and local road L1052. The house was accessed by avenues from gate lodges fronting local road L1052. The avenues approached the house from both the southeast and southwest, and remains of the former western avenue survive on the immediate east of the proposed development site. The site of the lodge at the former western entrance remains occupied.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY



Plate 11.2: View to existing entrance on local road L1052 (17th July 2019).



Plate 11.3: View to southwest from northeast corner showing buildings proposed for demolition (17th July 2019).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY



Plate 11.4: View to east from rear of the existing facility showing gravel platform formed by levelling a tree covered glacial till ridge evident in the centre background (17th July 2019).



Plate 11.5: View to east from rear of the existing facility showing tree covered glacial till ridge elevated above pasture to left of photo (17th July 2019).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY



Plate 11.6: View to west from rear of the existing facility showing gravel platform and immature trees and scrub vegetation on the northern boundary of the proposed development site (17th July 2019).

No features of archaeological interest were noted in the pasture forming part of the proposed extended facility across the northern boundary. No trace of a former parterre garden shown on the first edition Ordnance Survey map on the north side of the landscaped glacial ridge is evident on the ground, although its location was maintained in field boundaries in the later 19th and into the 20th century, and remains visible as a cropmark (**Plate 11.7**).

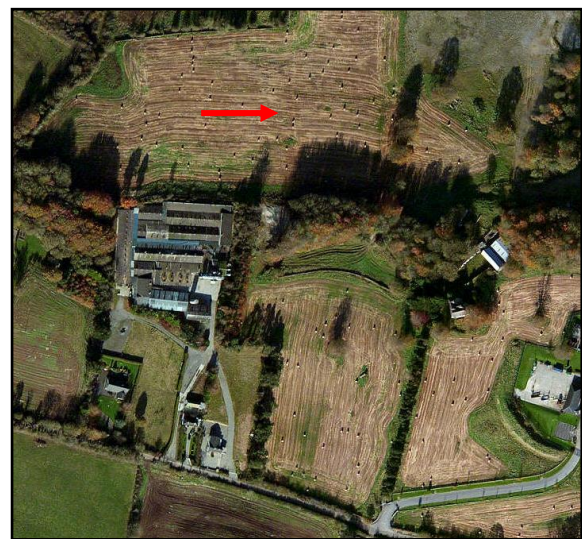


Plate 11.7: Aerial view of parterre location on aerial image dated 2005 (with field boundaries) to left, and on digital globe imagery dated 2011-2013 (without field boundaries) to right.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Bessborough House is sited on the south side of local road L1052 to the southeast of the existing Woodville Pig Farms Ltd. piggery facility and Tipperary County Council's Ballaghveny Landfill and Recycling Centre. Mature hedgerow enclosing local road L1052 and mature trees at Bessborough House play a key role in screening the latter from the existing piggery facility.

11.4.10 INVENTORY OF ARCHAEOLOGY, ARCHITECTURE AND CULTURAL HERITAGE AND FEATURES, INCLUDING AREAS OF ARCHAEOLOGICAL POTENTIAL

The following inventory details identified items of archaeological, architectural and cultural heritage interest within and in direct proximity to the existing Woodville Pig Farms Ltd. piggery facility (**Figure 11.11**). It consists of one area of archaeological potential (AP1), relating to the facilities siting on the periphery of a bog, and to two architectural heritage (AH) sites, Woodville House and nearby Bessborough House. Entries provide location information and a description of each site.



Figure 11.11: Location of Woodville House (A1), with wooded landscape feature (hachured green line), alignment of former avenue (blue line) and garden feature (yellow line), Bessborough House (A2), and Area of Archaeological Potential (AP1) in relation to the proposed development site (outlined in red).

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

A1	Woodville House and designed landscape
TOWNLAND	Woodville
COUNTY	Tipperary
GRID REFERENCE	596702, 682056
IDENTIFICATION	RPS, NIAH, OS maps
SITE TYPE	House and attendant grounds
SITE NAME	Woodville House
RPS Ref. No.	S404
NIAH Ref. No.	22401522
PROXIMITY	0m - attendant grounds within extended Woodville Pig Farms Ltd. boundary
DESCRIPTION: A small late 18th gentry house/estate (built c.1780) on an elevated site in a broken up landscaped demesne. Elements of the landscaped demesne include a tree-covered glacial ridge orientated roughly east-west, which formerly contained a network of paths, and by which the House, with associated outbuildings, were sited. Two avenues led to the House in open ground, with vistas to the south, on the south side of the ridge. The avenues led from two gate lodges fronting local road L1052, to the southeast and southwest ends of the landscaped demesne. Remains of the avenue from the west remain between the House and the Woodville Pig Farms Ltd. boundary, and potential remains may survive as a cropmark to the west of the proposed development boundary. A square shaped, formal garden or parterre was sited to the north of the tree-covered glacial ridge in the early 19th century. The site of the formal garden is part located in the Woodville Pig Farms Ltd. boundary, and its location is visible as a cropmark on digital globe imagery 2011-2013 (Figure 11.7). A Cottage once existed to the northeast of the House and outbuildings on the townland boundary with Ballaghveny, in what are now the grounds of the Ballaghveny Landfill.	

A2	Bessborough House
TOWNLAND	Bessborough
COUNTY	Tipperary
GRID REFERENCE	596805, 681788
IDENTIFICATION	RPS, NIAH, OS maps
SITE TYPE	House and attendant grounds
SITE NAME	Bessborough House
RPS Ref. No.	S93
NIAH Ref. No.	22402102
PROXIMITY	0.266km
DESCRIPTION: A small early 19th century gentry residence (built c.1820) or house of a strong tenant farmer set back from local road L1052, and screened from the road by mature trees between the entrance and the House and associated outbuildings. Incorporates the fabric of an earlier building. Brick outbuildings and the gateway to the farmyard are described in the NIAH as being relatively unusual.	

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

AP1	Periphery of bog
TOWNLAND	Woodville
COUNTY	Tipperary
GRID REFERENCE	596467, 682151
IDENTIFICATION	Aerial photography; Site inspection
SITE TYPE	-
SITE NAME	-
RMP Ref. No.	N/A
REFERENCES	-
PROXIMITY	0m - in extended northern boundary
DESCRIPTION: Pasture on the periphery of bog in Woodville townland. No known archaeological sites are recorded to bog in Woodville and surrounding townlands, but the current archaeological record shows use of the bog for the deposition of artefacts and a wooden vessel with bog butter was recovered in Wilton townland to the northwest of Woodville. Bog margin, by its association with naturally wet ground, is known to have been exploited in the Bronze Age for fulachta fiadh, or cooking pits. Wet places, such as bogs, have also been frequently used for the deposition of hoards. Peatland tracks have also been constructed across bog from the Neolithic to the medieval period.	

11.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

A full description of the proposed development and all works to the existing piggery is detailed in Chapter 2 of the EIAR.

11.6 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

11.6.1 CONSTRUCTION PHASE

11.6.1.1 Potential Direct Impacts

The proposed development at the existing Woodville Pig Farms Ltd. piggery facility will not directly impact any known recorded monuments. No known monuments are recorded in Woodville townland, the closest monuments being a tower house (TN021-024001) and moated site (TN021-024002) in Cappa located approximately 1.4km to the southwest, on the south side of the Ollatrim River.

The proposed development at the existing Woodville Pig Farms Ltd. piggery facility will directly impact a zone of archaeological potential related to its location on the periphery of bog. Bogs were utilised for the deposition of artefacts, and a wooden vessel (NMI 1990:108) was recovered during turf cutting in Wilton townland, approximately 1km to the northwest. Bogs were traversed by wooden trackways, and margins were utilised for settlement related activities, including cooking in pits or fulachta fia.

The proposed development at the existing Woodville Pig Farms Ltd. piggery facility will directly impact the attendant grounds or setting of Woodville House, a protected structure, RPS Ref. S404. Woodville House was sited in an organised or designed landscape as was the tradition of country estates in the 18th and 19th centuries. Identified features of the setting include a wooded or landscaped ridge, the site of a formal garden or parterre, and the

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

alignment of an avenue that accesses the House from the west. The outbuildings in the curtilage of the House are located outside the northeast boundary of the proposed development and will not be directly impacted.

11.6.1.2 Potential Indirect Impacts

No potential indirect impacts are anticipated in respect of the proposed development at the existing Woodville Pig Farms Ltd. piggery facility during construction. Bessborough House is sited on the south side of local road L1052 to the southeast of the existing facility. Mature hedgerow enclosing local road L1052 and mature trees at Bessborough House play a key role in screening the latter from the existing facility.

11.6.2 OPERATIONAL PHASE

11.6.2.1 Potential Direct Impacts

No potential direct impacts are anticipated in respect of the proposed development at the existing Woodville Pig Farms Ltd. piggery facility during the operational phase. The majority of the proposed works are sited on existing buildings or immediately adjacent, and will not directly affect existing vistas from Woodville House. A new open slurry tank and new pre-finisher house will operate in previously undeveloped ground to the northeast of the existing facility. These will be screened from Woodville House by the existing wooded ridge. There is a potential that the new pre-finisher house will be visible from the outbuildings in the curtilage of the House.

11.6.2.2 Potential Indirect Impacts

It is the policy of Tipperary County Council to encourage the sympathetic restoration, re-use and maintenance of protected structures, thereby ensuring their conservation and protection. There is a potential indirect impact on potential future uses of Woodville House, with the increased proximity of the proposed development to the curtilage of the House and its outbuildings.

11.6.3 OPERATIONAL PHASE

The Woodville Pig Farms Ltd. existing facility is situated on land that formed part of the attendant grounds of Woodville House. Historically, the landholding associated with the house was broken up, and the existing piggery facility, a number of residences and Tipperary County Council's Ballaghveny Landfill and Recycling Centre have developed in the demesne grounds that once surrounded the house. The construction of existing piggery facility levelled part of the wooded landscaped ridge to the west of the House. The proposed expansion of the existing facility will increase the footprint of development within the attendant grounds of Woodville House.

11.6.4 “DO NOTHING” IMPACT

There will be no effects on archaeology, architecture and cultural heritage if the existing Woodville Pig Farms Ltd. piggery facility is not developed and expanded.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 11.6: Summary of Impacts

Impact Phase	Feature/Site/Structure	Likelihood	Impact	Quality	Significance	Extent	Duration	Mitigation	Residual Impact
Construction	A1 Woodville House attendant grounds/setting	High likelihood	Direct impact on attendant grounds	Negative	Moderate	Regional	Permanent	Avoidance of direct impact on wooded ridge and former avenue; pre-construction testing of former garden feature	Extended developed footprint in attendant grounds of Woodville House
	A2 Bessborough House	Low likelihood	Indirect	Neutral	Not significant	Local	Permanent	None proposed; sufficient existing screening	No impact
	AP1 Area of Archaeological Potential on margin of bog	High likelihood	Direct	Negative	Potentially significant	Local	Permanent	Pre-construction test trenching and construction phase monitoring	No impact
Operation	A1 Woodville House - potential future uses	High likelihood	Indirect	Negative	Significant	Regional	Permanent	Limit proximity of development to curtilage of house and outbuildings; maintain buffer; provide for screening	Potential restriction on future uses of Woodville House

11.7 MITIGATION MEASURES

Mitigation measures are required to be undertaken in compliance with national policy guidelines and statutory provisions for the protection of archaeological and architectural heritage, including the National Monuments Acts 1930-2004, the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 and the Planning and Development Acts 2000 (as amended).

11.7.1 PRE-CONSTRUCTION PHASE

11.7.1.1 Avoidance of Impact

Avoidance of direct impact on features identified in the attendant grounds of Woodville House - wooded landscaped ridge and alignment of former entrance avenue - is the preferred mitigation option with regards to the proposed development. It will be possible to preserve these features in-situ during the planning phase for the proposed development. In the event that the wooded ridge cannot be avoided in its entirety, the ridge will be subject to detailed inspection by an archaeologist to confirm the presence or absence of additional features, including former tracks.

11.7.1.2 Archaeological Test Excavation

It is recommended that pre-construction archaeological test excavation be undertaken to address the sub-surface archaeological potential of the proposed development site. Pre-construction archaeological test excavation will target the areas of archaeological potential identified in this impact assessment - extended north and northeast footprint on the margin of bog, and the location of a former garden or parterre. Archaeological testing should be undertaken well in advance of the construction phase. This will allow a satisfactory timeframe in which the mitigation measures can be undertaken and the results assessed without causing construction delays.

This work must be carried out under licence in accordance with Section 26 of the National Monuments Acts 1930-2004, and with a method statement agreed in advance with the National Monuments Service (Department of Culture, Heritage and the Gaeltacht) and the National Museum of Ireland. The results of this investigation will determine whether redesign to allow for preservation in-situ, full archaeological excavation and/or monitoring are required. The investigation report will include mitigation proposals for dealing with the discovery of archaeological deposits and material during development.

It is envisaged that the following will apply:

- i. Should investigation yield evidence of archaeologically significant material or structures, preservation in situ may be recommended. Strategies for the in situ preservation of archaeological remains are conducted in consultation with the statutory authorities, and may include avoidance, if possible, of the remains during construction, or preservation through redesign.
- ii. Should investigation yield evidence of archaeologically significant material or structures that cannot be preserved in situ, archaeological excavation and recording, to full resolution, is recommended.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

- iii. Should archaeological features or material be uncovered, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.

11.7.2 CONSTRUCTION PHASE

11.7.2.1 Archaeological Monitoring

It is recommended that archaeological monitoring be undertaken on site during the construction phase, principally in the extended north and northeast footprint on the margin of bog, and at the location of a former garden or parterre in the attendant grounds of Woodville House. The extent of archaeological monitoring at the construction phase will be informed by the results of pre-construction archaeological testing. Tree removal on the northern boundary of the proposed development site will not be carried out in the absence of an archaeologist or approval by an archaeologist.

It is envisaged that the following will apply:

- i. In the event of archaeological features or material being uncovered during the construction phase, it is crucial that machine work cease in the immediate area to allow the archaeologist to assess, excavate and record any such material.
- ii. Should archaeological features or material be uncovered during the construction phase, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.
- iii. This work must be carried out under licence in accordance with Section 26 of the National Monuments Acts 1930-2004, and with a method statement agreed in advance with the National Monuments Service (Department of Arts, Heritage and the Gaeltacht) and the National Museum of Ireland.

11.7.3 OPERATIONAL PHASE

To limit potential indirect impacts on the curtilage of Woodville House and potential future uses, it is recommended that a buffer be maintained between the proposed development and the curtilage of Woodville House, which includes its outbuildings. Screening should be considered to mitigate the potential visibility of the new pre-finisher house from the outbuildings in the curtilage of the House.

11.8 RESIDUAL IMPACTS

Residual impacts are the degree of environmental change that will occur after the proposed mitigation measures have taken effect. An extended developed footprint in attendant grounds of Woodville House, and potential cumulative attrition of the attendant grounds will be a residual impact of the proposed development on architecture and cultural heritage.

11.9 DIFFICULTY ENCOUNTERED IN COMPILING INFORMATION

No difficulties were encountered in compiling information for this report.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

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SECTION D

MATERIAL ASSETS

This section of the Environment Impact Assessment Report deals with material assets that would potentially be affected by the proposed development at Woodville, Co. Tipperary.

Material assets are grouped into:

Material Assets: **Agriculture** including all agricultural enterprises.

Material Assets: **Waste Management**, including all potential waste streams during both the construction and operational phases.

Material Assets: **Utilities** including electricity, gas, foul sewer and telecommunications.

Material Assets: **Natural or other resources** including mineral resources, land and energy.

Material Assets are generally considered to be the physical resources in the environment which may be either of human or natural origin. The object of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

Agricultural enterprises interact, to a large extent, with the natural environment in terms of climate, air quality, soil, hydrology and hydrogeology. Some domestic animals, such as horses and milking cows, may be impacted by traffic-generated noise.

Resources required for the proposed development include existing land, fill material which would have to be sourced from quarries and electricity required for the operation of the proposed development.

12.0 MATERIAL ASSETS - AGRICULTURE

12.1 INTRODUCTION

This section outlines the potential agricultural impact of the proposed development its construction and all ancillary site works and services.

The proposed development is to demolish a gilt house, two weaner houses and one first stage weaner house and to construct a modern second stage weaner house and extend farrowing Unit 1 with additional farrowing sow accommodation, convert farrowing Unit 2 to loose sow accommodation, extend Unit 2 to provide additional weaner accommodation, construct a new pre-finisher house for slow growing pigs and construction of a slurry reception tank at the site in Woodville, County Tipperary.

The proposed development would be situated primarily in a farmyard. The area where the new buildings are proposed to be built consists of made ground, concrete aprons and grassland.

The entire Woodville site occupies an area of c. 13.7 acres the area onto which the proposed developments are to be built occupy an area of c. 1.1 acres. The total built area, including the existing buildings, concrete apron, hardstanding, access road and areas of hard-core is c. 2.4 acres.

No other agricultural holdings would be directly impacted through the loss of land by the proposed development, as all lands proposed for development are held and operated by Woodville Pig Farms.

12.2 METHODOLOGY

Both a field survey and desktop study were carried out to assess the potential impact of the proposed development on agriculture in the area.

The field survey consisted of a walkover inspection of the site, which was conducted on Friday 04th April, 2019.

The desktop survey assessed potential impacts using statistical information from the CSO (Central Statistics Office) and mapping data from the 50,000 Discovery Series, 2,500 Ordnance Survey mapping, CORINE land use mapping and myplan.ie.

12.3 DESCRIPTION OF THE EXISTING ENVIRONMENT

12.3.1 AGRICULTURAL PIG ECONOMY

Economic activity in the agriculture sector in Ireland produces a far bigger return than equivalent activity in other traded sectors of the economy. Employment in the agri-food sector accounted for 173,400 jobs, 8.6% of total employment, on average in 2016.

In the Teagasc National Farm Survey (2017), a national population of c. 84,599 farms was calculated. According to the Irish Department of Agriculture Food and the Marine > 2,000 farms in Ireland keep pigs.

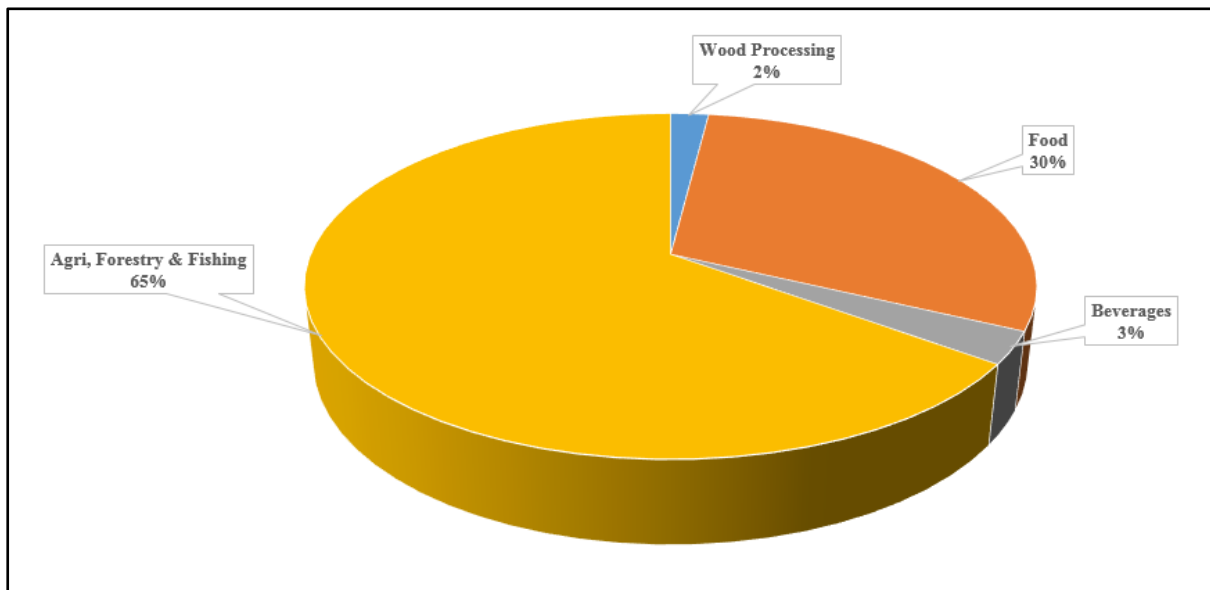


Figure 12.1: Employment in the Agriculture Sector.
(Fact Sheet on Irish Agriculture, January 2018)

Pig production ranks third in importance behind beef and dairy in terms of economic value at the farm gate in Ireland. Pig farming in Ireland has moved from being a common feature of thousands of farmyards to a highly specialised intensive operation.

The pig farming sector makes a very significant contribution to the Irish economy. According to the 2018 CSO Livestock Survey there were c. 1.62 million pigs in Ireland (2016 – c. 1.53 million) with over 320 commercial pig producers producing c. 3.5 million pigs annually.

In 2015, Ireland exported 230,000 tonnes of pig meat worth approximately €570 million. The UK was the most important market, accounting for 40% of all exports. Continental EU markets accounted for 25% of product and the rest to international markets.

In 2016, Ireland exported an estimated 235,000 tonnes of pig meat worth an estimated €615 million. The UK was the main market for Irish pig meat taking 56% of total exports. Continental EU markets accounted for 16% of exports while the remaining 28% went to international markets.

In 2017, Ireland exported an estimated 240,000 tonnes of pig meat worth approximately €792 million. The UK accounting for around 60% of all exports, non-EU markets accounted for over one third of Irish pig meat exports with the balance deriving from exports to continental EU markets.

In 2018, Ireland exported an estimated 264,000 tonnes of pig meat worth an estimated €666 million.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The National Pig Census 2017 (Irish Department of Agriculture Food and the Marine) reports the following statistics regarding pigs in Ireland:

- In 2017 the national herd consisted of 1,699,565 pigs, which comprised 151,188 breeding pigs, 1,546,495 fattening pigs and 1,882 non-production pigs;
- A total of 1,674 active herds were recorded – a fall of 12.5% on the 1,884 active herds* recorded 2016;
- Based on the census returns, the average active pig herd in Ireland was 1,015 pigs. This compares with an average herd size of 872 pigs in 2016.

The study reported that County Tipperary recorded the third largest pig population in Ireland at 181,780 pigs representing 10.7% of the total pig population. The study also reported County Tipperary and County Wexford had the second highest levels of pig herds in Ireland with 129 (7.7%) and 119 (7.1%) respectively (**Figure 12.2**).

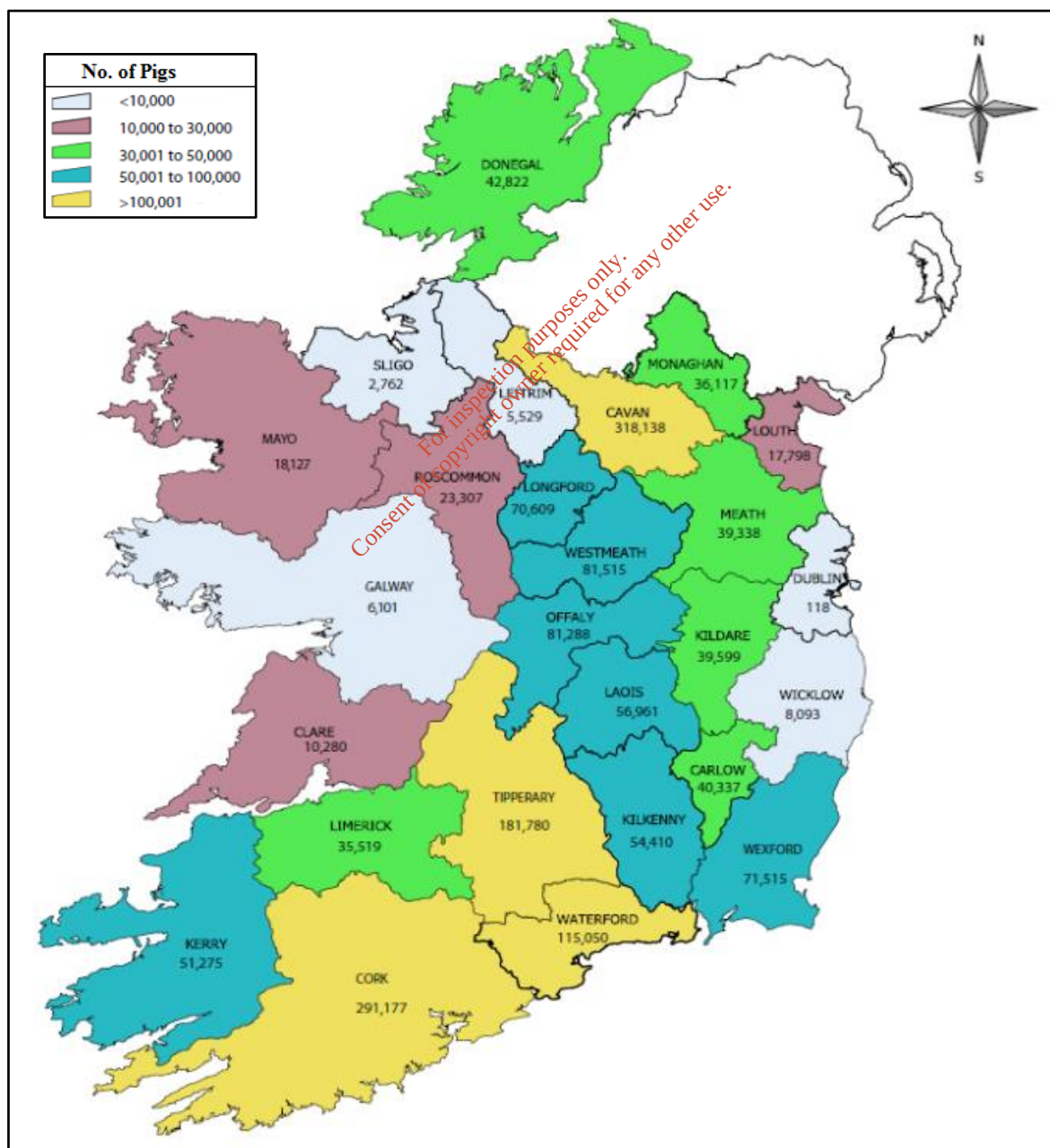


Figure 12.2: Number of Pigs in Ireland by County (National Pig Census 2017).

12.3.2 AGRICULTURAL LAND USE

The CSO in Ireland carries out an agricultural census every ten years the last agricultural land census was carried out in 2010.

In 2010, the Agricultural area used in Ireland, excluding Commonage, amounted to just under 4.6 million hectares. Almost 3.8 million hectares of this was grassland. A further 437,000 hectares was rough grazing, 274,000 hectares was used for cereals and the remainder (> 80,000 hectares) was used for other crops, fruit and horticulture (**Figure 12.3**).

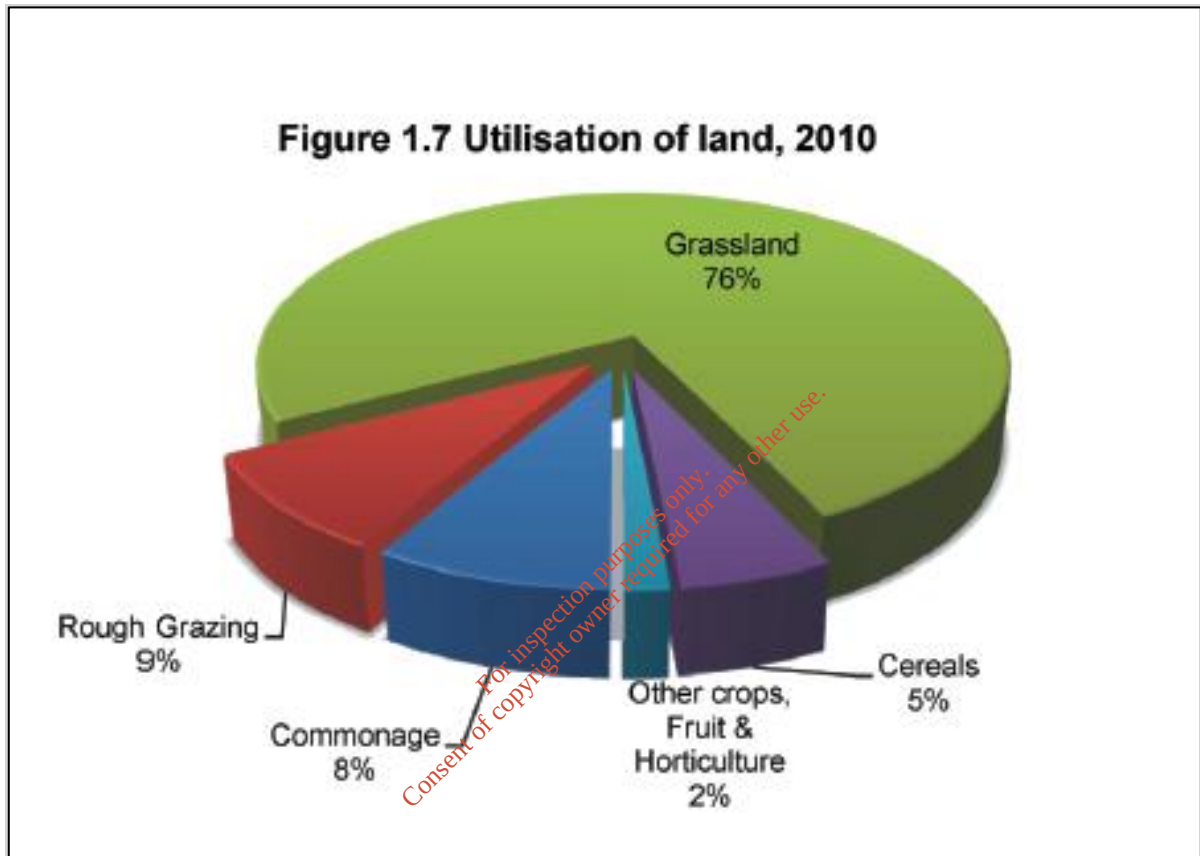


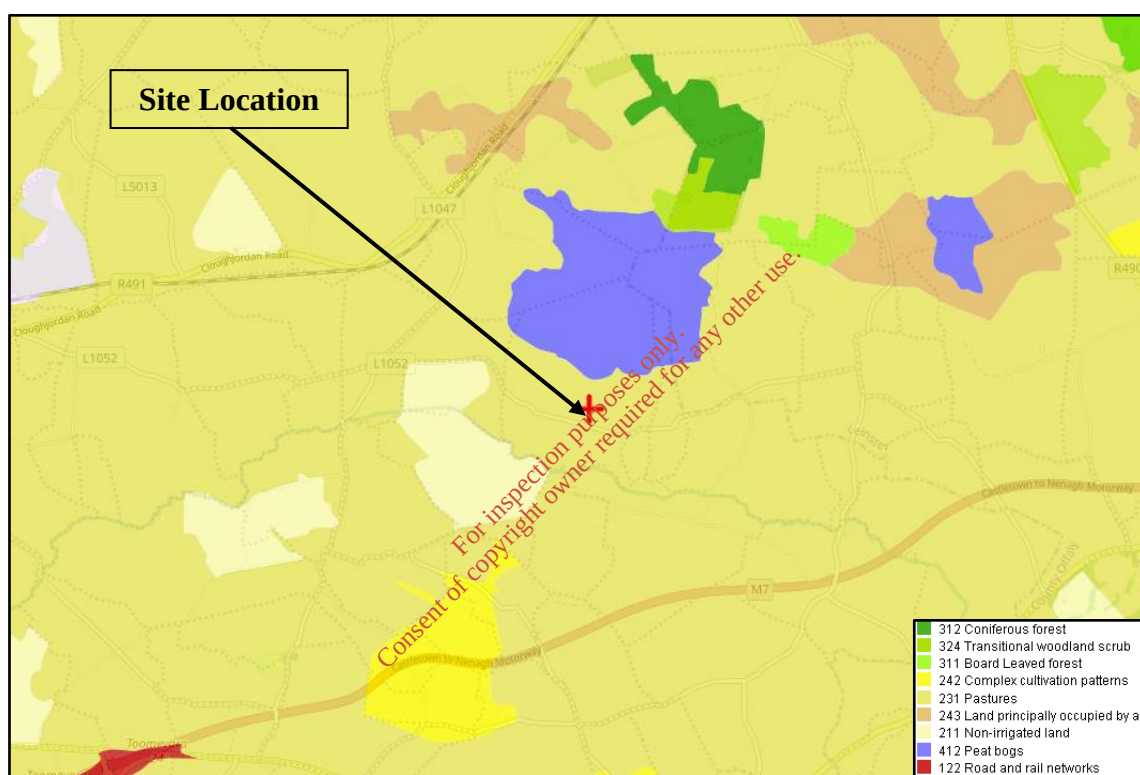
Figure 12.3: Land Use in Ireland as of 2010.

12.3.3 NORTH TIPPERARY

North Tipperary covers an area c. 202,430 ha. According to the Census of Agriculture (2010), there are approximately 150,686 hectares of agricultural land in North Tipperary; of which 140,840 hectares (93.5%) is pasture. The average farm size in North Tipperary is 39.2 hectares, which is above the national average of 32.7 hectares.

There are 3,805 farms in North Tipperary, the majority (58%) are specialist beef production farms, 17% are specialised dairy, 10% are mixed grazing livestock, 6% are mixed field crops and the remainder are specialist tillage, specialist sheep, mixed crops and livestock and 'other'.

The land use within the surrounding region according to the CORINE data series, is provided in **Figure 12.4** below.



This data series shows that the land within approximately 1km is used for pasture. There is a Cutover peat bog (wetlands) c. 500 m to the north, along with land principally occupied by forest with areas of natural vegetation.

North-east of the site are other wetlands and land associated with heterogeneous agriculture. The other land uses in the region are frequent small areas of non-irrigated arable land, coniferous and transitional woodland areas which are located primarily in upland areas.

Urban areas constitute a minority of the land-use cover. The majority of the urban fabric in the region is located in Nenagh. This is composed of discontinuous urban fabric with some areas of continuous urban fabric and industrial or commercial units.

Other land cover within the vicinity of the proposed site includes mineral abstraction sites, inland marshes mixed forests and sport and leisure facilities.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

12.3.4 WOODVILLE, CO. TIPPERARY

The site for the proposed development is in the townland of Woodville 4.5 km North of Toomevara, Co. Tipperary.

The existing and proposed buildings are situated on small rise in the land, in an area of gently rolling hills. The site is screened from the east and west by thick coverings of trees and hedges. The surrounding land-cover is predominantly agricultural lands, hedgerows and areas of woodland. A peat bog is located 1.1km to the north-west of the site.

The site itself is dominated by made ground, comprising gravel and hard-standing. The soils are well draining in the area. The lands relating to the proposed development are owned by the applicant and are currently used as farmyard for activities related to the piggery.

The subsoil beneath the proposed site is described as Carboniferous Limestone till with a fine loamy texture. The subsoil is part of the 1000 Typical Luvisols soil sub group and the Elton (1000ET) national soil series.

GSI online mapping indicates that the soil underlying the majority of the site are classed as shallow, rocky, peaty/non-peaty mineral complexes which are mainly basic.

A small portion of the soil in the north is mapped as deep well drained mineral basic soil. These two soil types and poorly drained basic mineral soils are the predominant soil type in the surrounding area.

12.3.5 AGRICULTURAL ENTERPRISES

In addition to the applicants licenced facilities at Woodville and Ballyknockane and agricultural farms and holdings, two agricultural enterprises are located within the surrounding area of the proposed development.

Table 12.1 outlines the facilities licenced by the Environmental Protection Agency (EPA) for a class of activity defined as “6.2 (a): Intensive Agriculture”, within 15 km of the proposed development.

Table 12.1: EPA Licenced Agricultural Enterprises within 15 km of the Proposed Development.

LICENCE NO.	LICENSEE NAME	AGRICULTURAL ENTERPRISE	APPROXIMATE DISTANCE FROM PROPOSED DEVELOPMENT
P0375-01	Toomevara Farms Limited	Integrated pig farming	6.5km SE
P0411-01	Mr James and Ms Nuala Gleeson	Integrated pig farming	2.6km SW

The licenced activities at Toomevara Farms Limited are described as the rearing of pigs in installations, within the same complex, where the daily capacity exceeds 3,000 units on soils other than gley soils and where units have the following equivalents: -1 pig = 1 unit and 1 sow = 10 unit, at Glenawinna, Toomevara, Nenagh, County Tipperary.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The licenced activities at the piggery of Mr James and Ms Nuala Gleeson are described as the rearing of pigs in installations, whether within the same complex or within 100 metres of that complex, where the capacity exceeds 1,000 units on gley soils or 3,000 units on other soils and where units have the following equivalents: 1 pig = 1 unit, and 1 sow = 10 unit, at Ballymackey, Nenagh, County Tipperary.

12.4 IMPACTS

12.4.1 “DO-NOTHING”

Under the ‘Do Nothing’ scenario the site would continue to be used as a piggery with the existing buildings and site infrastructure. The welfare of pigs at the farm would be negatively impacted, as larger modern litters would be farrowed in outdated smaller sized farrowing spaces.

The “Do nothing” alternative would also prevent the improvement of welfare and profitability for pre-finisher sized weaners, as these undersized pigs would not be separated from larger pigs at the time of removal to the pig finisher farm.

12.4.2 “DO-SOMETHING”

Should the proposed development be granted planning permission, there would be no change in the agricultural land-use of the site and there would be no significant impact to agricultural assets.

This owes to the fact that the lands proposed for the extension are wholly within the ownership of Woodville Pig Farms Ltd and are currently in use as farmyard and rough grassland with a small portion been taken up by three old existing pig buildings.

The specific development site is a made-ground and rough grassland with a small part surfaced with concrete. There would be a minimal loss of land (c. 1.1 acres) if planning permission was received for the new building, and this would constitute an improvement in the agricultural value of the land.

Noise from the operation of the proposed development would be unlikely to cause disturbance to livestock within grassland surrounding the site boundary, as the character of the noise would be typical of farm hubs. This would not result in a decrease or loss of material assets. Animals would quickly become acclimatised to the new noise environment adjacent to the development, as with similar projects such as new roads and motorways.

There is predicted to be an increase in traffic volumes on the local road infrastructure due to the operation of the proposed development. Traffic increases associated with the construction of the proposed development would only occur for a short period depending on the seasonality of operations, or during stocking and destocking.

The predicted Average Daily Traffic generated by the piggery in full production if planning permission was received is c. 96 traffic movements a week. This consists of staff cars, feed delivery vehicles, pig transfers, slurry transport from the site and service personnel.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The impact of this increased traffic is not expected to have a significant impact in the area. It is considered that the proposed development would not result in a decrease or loss of agricultural assets.

Overall the development would improve the environmental performance of the piggery and increase the supply of agricultural assets in the form of pig products to the market.

12.5 MITIGATION MEASURES

No mitigation measures are required as the development of this land would increase its material value to the landowner and not cause significant impacts upon the agricultural material assets of other parties.

12.6 CONSTRUCTION IMPACTS AND MITIGATION

12.6.1 CONSTRUCTION IMPACTS

There are a number of specific issues that may impact on agriculture during the construction phase of the proposed development. These include:

Noise: Increased noise from construction machinery has the potential to be an issue with certain sensitive livestock such as dairy cows and horses.

Traffic: There would be construction-related traffic during the construction phase of the proposed development.

Dust: The proliferation of dust during construction has a nuisance value and livestock are at risk to eye irritation from high levels of wind blowing dust particles.

12.6.2 MITIGATION

Noise: No mitigation is required; if a complaint is received, an investigation would be commenced.

Traffic: Discussions would take place with local landowners to ensure that construction traffic causes minimum interference with movements of stock and does not hinder farm operations.

Dust: Mitigation measures for construction dust are outlined in Section 5.7 above. These measures would be followed.

12.7 RESIDUAL IMPACTS

No significant residual impacts on agriculture as a result of the construction or operational phases are expected.

12.8 REFERENCES

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13.0 MATERIAL ASSETS – WASTE MANAGEMENT

13.1 INTRODUCTION

This chapter discusses the proposed waste management measures as part of the proposed development at Woodville, Co. Tipperary, in addition to assessing the potential impact of waste management upon the surrounding area. Waste management for both the construction and operational phases is addressed.

13.2 METHODOLOGY

A desktop study was undertaken to assess the potential impact of the proposed development on waste management in the area. The desktop study assessed potential impacts using EPA licensing and waste management information, relevant waste plans and strategic documents, and mapping data from EPA Envision and myplan.ie. The assessment of potential impacts arising from waste management at the proposed development has taken cognisance of the relevant legislation policies and plans.

13.3 LEGISLATIVE FRAMEWORK AND PLANNING POLICY

13.3.1 LEGISLATIVE CONTEXT

The primary legislation pertaining to waste management in Ireland and of potential relevance to the proposed development includes the following:

EU Legislation:

- Council Directive 1999/31/EC on the Landfilling of Waste;
- Waste Framework Directive 2008/98/EC;
- European List of Waste, Commission Decision 2000/532/EC;
- Council Directive 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC;
- WEEE Directive 2012/19/EU.

Irish Legislation:

- Waste Management Act 1996 as amended;
- Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. 821 of 2007) and (Amendment) Regulations (S.I. 86 of 2008, S.I. 320 of 2014, S.I. 198 of 2015);
- Waste Management (Licensing) Regulations 2000 (S.I. 185 of 2000), 2004 (S.I. 395 of 2004), (Amendment) Regulations 2010 (S.I. 350 of 2010);
- Waste Management (Planning) Regulations 1997 (S.I. 137 of 1997);
- Waste Management (Collection Permit) Regulations 2007 (S.I. 820 of 2007) and (Amendment) Regulations 2008 to 2016;
- Waste Management (Hazardous Waste) Regulations 1998 (S.I. 163 of 1998) and Waste Management (Hazardous Waste) (Amendment) Regulations 2000 (S.I. 73 of 2000);
- Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), European Union (Household Food Waste and Bio-waste) Regulations 2013 (S.I. 71 of 2013) and

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

European Union (Household Food Waste and Bio-waste) Regulations 2015 (190 of 2015);

- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (WEEE) (S.I. 149 of 2014);
- Litter Pollution Act 1997, Litter Pollution Regulations 1999 (S.I. 359 of 1999) and Litter Pollution (Increased Notice Payment) Order 2007 (S.I. 558 of 2007);
- Waste Management (Landfill Levy) Regulations 2015 (S.I. 189 of 2015);
- Waste Management (Prohibition of Waste Disposal by Burning) Regulations 2009 (S.I. 286 of 2009) and (Amendment) Regulations (S.I. 504 of 2013, S.I. 538 of 2015, S.I. 599 of 2017);
- European Communities (Waste Directive) Regulations 2011 (S.I. 126 of 2011), (Amendment) Regulations 2016 (S.I. 315 of 2016), and European Union (Properties of Waste Which Render it Hazardous) Regulations 2015 (S.I. 223 of 2015), European Union (Waste Directive) (Recovery Operations) Regulations 2016 (S.I. 372 of 2016);
- Local Government Act and associated regulations.

13.3.2 PLANNING POLICIES, PLANS AND OTHER GUIDANCE

Policies, plans and guidance documents pertaining to waste management and of potential relevance to the proposed development include the following:

- European Waste Catalogue and Hazardous Waste List (2002), Environmental Protection Agency;
- National Waste Prevention Programme Annual Report for 2016, Environmental Protection Agency;
- The Southern Region Waste Management Plan 2015–2021 and Associated Reports;
- Waste Management Plan of the Midlands Region 2005-2010;
- North Tipperary County Development Plan 2010–2016;
- Nenagh Town And Environs Plan 2013-2019;
- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (2006), Department of Environment, Heritage and Local Government.

The Southern Region Waste Management Plan 2015–2021

The Waste Management Plan for the Southern Region is the framework for the prevention and management of wastes in a safe and sustainable manner. The implementation of the Southern Region waste plan must ensure that European and national mandatory targets are achieved and, in doing so, that the health of communities in the region, its people and the environment are not compromised.

The region covered by the Waste Management Plan stretches from Wexford in the east to Kerry in the west and in total consists of 10 local authorities.

The region covers 42% of the land mass of the country, with a population of over 1.5 million people. The settlement patterns in the region are evenly split between urban and rural areas, with the four cities of Cork, Limerick, Kilkenny and Waterford having the highest population and strongest centres of economic activity.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The region has appointed Limerick City and County Councils and Tipperary County Council, as the regional leads, to act on behalf of the other authorities with responsibility for the successful implementation of the plan.

The proposed development site is located c. 9.6 km west of Nenagh, Co. Tipperary, within the area covered by the Southern Region Waste Management Plan. The vision of the waste management plan is as follows:

“The strategic vision of the regional waste plan is to rethink our approach to managing waste, by viewing our waste streams as valuable material resources, leading to a healthier environment and sustainable commercial opportunities for our economy”.

The plan sets out a number of waste management policies for the region, in accordance with the main strategic principals of the plan including waste management hierarchy, source segregation, opportunity, self-sufficiency and proximity, protection, co-operation, balanced and sustainable infrastructure and the polluter pays principle.

Targets of the South Region Waste Management Plan include a 50% reuse / recycling rate of municipal waste by 2020 and a 70% reuse / recycling / material recovery rate of construction and demolition waste (excluding soil and stones) by 2020.

THE NORTH TIPPERARY COUNTY DEVELOPMENT PLAN 2010-2016

North Tipperary County Development Plan 2010-2016 outlines five waste management objectives for the North of the County, of which some may be relevant to the proposed development outlined in **table 13.1** below.

Table 13.1: North County Tipperary Development Plan Waste Management Objectives.

REFERENCE	POLICY
Policy TI10:	Southern Region Waste Management Plan It is the policy of the Council, to implement the policies outlined in the Southern Region Waste Management Plan 2015-2021 (or any amendment thereof) and to ensure that waste disposal facilities are in compliance with all appropriate waste management legislative requirements.
Policy TI11:	Management of Agricultural Slurries It is the policy of the Council to ensure that proposals for agricultural developments, as appropriate, comply with the European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2010 or any amendment thereof.
Policy TI12:	Noise Emissions It is the policy of the Council to ensure that new development does not result in significant noise disturbance and to ensure that all new developments are designed and constructed to minimise noise disturbance in accordance with the provisions of the Noise Action Plan 2013, the Development Management Standards set out in Chapter 10 and relevant standards and guidance that refer to noise management.
Policy TI13:	Light Pollution It is the policy of the Council to ensure that new development does not result in significant disturbance as a result of light pollution and to ensure that all new developments are designed and constructed to minimise the impact of light pollution on the visual, environmental and residential amenities of surrounding areas in accordance with the provisions of the Development Management Standards set out in Chapter 10.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

REFERENCE	POLICY
Policy TI14:	Telecommunications It is the policy of the Council to facilitate proposals for masts, antennae and ancillary equipment in accordance with Telecommunications Antennae and Support Structure: Guidelines for Planning Authorities, DEHLG, 1996. Development proposals will be facilitated, where it can be established that there will be no significant adverse impact on the surrounding areas and the receiving environment, particularly in the following locations: - Primary and secondary amenity areas or locations that would be detrimental to designated listed views. - Within significant views or setting of national monuments or protected structures.

NENAGH TOWN AND ENVIRONS PLAN 2013-2019

The key waste management aims of the Nenagh Town and Environs Local Plan 2013-2019 are as follows.

- To promote the increased re-use and recycling of materials from all waste sources. The Councils' will co-operate with local retailers and resident's associations in managing collection points for recycling goods.
- To ensure that public areas and areas visible from tourist centres within the town are maintained free of litter.

The priority objectives of the strategy focus on prevention, minimisation, reuse and recycling of waste, and the application of the 'polluter pays' principle. For household recyclable waste, door-to-door collections have been set up in urban areas with kerbside collection reaching 100% of the population in Nenagh.

Objective ST18: It is an objective of the Councils', subject to resources, to implement the provisions of the Waste Management Plan of the Midlands Region, 2005-2010 (as may be amended)

Table 13.2: Nenagh Town and Environs Plan 2013-2019 Waste Management Objectives.

POLICY REFERENCE	POLICY
Policy ST15:	Recycling Facilities It is the objective of the Councils' to provide, maintain and improve infrastructure for re-use, re-cycling and disposal of residential waste, where feasible and where resources permit.
Policy ST16:	Waste Management Assessment It is the policy for the Councils' to seek a Waste Management Assessment for projects that exceed the following thresholds: - Residential developments in excess of 10 houses or more, - Developments with a gross floor area of 1,250m², - Development which involve refurbishment/renovation/demolition generating in excess of 100m³ in volume of construction and demolition waste. - Civil engineering projects producing in excess of 500m³ of waste, excluding waste materials used for development contribution on site.

13.4 DESCRIPTION OF THE EXISTING ENVIRONMENT

The collection of municipal and commercial waste in County Tipperary is undertaken by private waste contractors, who are regulated by Tipperary County Council. As outlined in the North Tipperary County Development Plan 2010-2016, the Council seeks to ensure that new developments contribute towards meeting the objectives of the Southern Region Waste Management Plan 2015-2021. In this respect all commercial developments shall ensure that appropriate waste facilities and management are implemented on site.

Tipperary County Council encourages kerbside segregated collection of household and commercial waste and supports the use of authorised bring centres as part of the integrated collection system. Waste contractors operating in the Nenagh region include AES, Clean Ireland Recycling and Mr Binman.

North Tipperary County Council operates a Recycling Centre at the Machinery Yard, Limerick Road, where household recyclable waste is accepted, including waste electrical and electronic equipment (WEEE).

Bring Banks are also being operated in Nenagh Civic Amenity Centre, Kenyon Street carpark, O'Connor's Shopping Centre and Tesco carpark.

In 1996 the Environmental Protection Agency (EPA) began licensing certain activities in the waste sector. These include landfills, transfer stations, hazardous waste disposal and other significant waste disposal and recovery activities. According to the EPA's website, there are two facilities licenced for waste activities within 20 km of the site, as outlined in the table below.

Table 13.3: Waste Licensed Facilities Within 20 km of the Proposed Development.

LICENSE NO.	APPLICANT / FACILITY	FACILITY TYPE
W0078-03 (IED)	Tipperary County Council / Ballaghveny Landfill, Ballymackey,	Landfill and Recycling Centre
W0240-02	Advanced Environmental Solutions (Ireland) Limited / Solsborough, Springfort Cross, Nenagh, Tipperary.	Waste Transfer Station

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

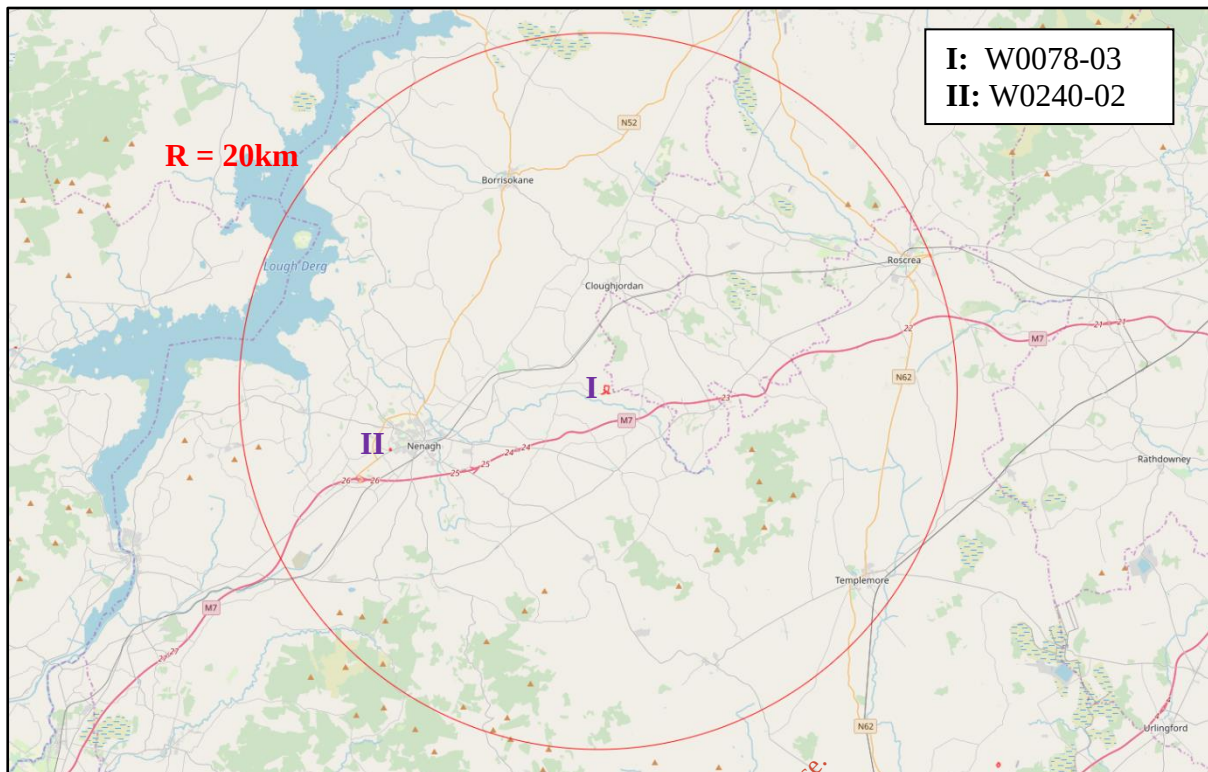


Figure 13.1: Waste Licensed Facilities within 20 km of the Proposed Development.

The Ballaghveny Landfill (W0078-03 IED) shares a boundary with the Woodville Pig Farm operation. The landfill is located in a rural area, which is not heavily populated, its surrounding lands consist of flat open fields screened by dense forestry and treelines.

The installation operates a non-hazardous waste landfill, accepting inert wastes from certain projects subject to agreement with Tipperary Co Co and operators. The landfill is not currently open to accept waste from the general public or waste contractors.

There are several Civic Amenity sites located in County Tipperary including; Cashel Civic Amenity Site & Waste Transfer Centre, Nenagh Recycling Centre, Carrigeen Clonmel Civic Amenity Site, and Roscrea Civic Amenity Site. Tipperary Local Authority also has a system of 135 bring Banks facilities located in in the County. Tipperary.

The Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008) provide for the certification of historic unlicensed waste disposal sites in operation between 1977 and 1996.

The Irish EPA has identified one such historic closed landfill in the County. The Landfill was located at Carrownreddy, Tipperary Town, County Tipperary (almost 50 km south of the proposed site) and was operated by the South Tipperary County Council (H0004-01).

13.5 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

13.5.1 CONSTRUCTION PHASE

During the demolition and construction phase of the development, construction and demolition waste (commonly referred to as ‘C&D waste’) would be generated at the site, with the main likely waste streams outlined in the table below.

Table 13.4: Predicted Main Construction Waste Streams.

WASTE TYPE	EWC CODE	ORIGIN
Concrete	17 01 01	Waste concrete may arise due to surplus concrete from pouring activities and demolition works.
Bricks	17 01 02	Damaged / defected brick waste may arise during the demolition of the agricultural units.
Tiles and Ceramics	17 01 03	Waste tiles / ceramics may arise during the construction activities.
Mixture of Concrete, Bricks, Tiles and Ceramics	17 01 07	As detailed in 17 01 01, 17 01 02 and 17 01 03 above.
Wood	17 02 01	Wood waste may arise in small volumes during construction works, including building and shuttering works, due to damaged / defected wood, off-cuts, surplus wood, and demolition works.
Glass	17 02 02	Glass waste may arise due to damaged / defected glass and accidental breakages.
Plastic	17 02 03	Plastic waste may arise due to damaged / defected products.
Metals (including alloys)	17 04 01 - 07	Waste metal may arise due to damaged / defected metal, off-cuts, surplus metal and demolition works.
Soils and Stones	17 05 04	Excavated soils and stones waste would arise during site excavations and earth-moving activities.
Insulation Materials	17 06 04	Waste may arise due to damaged / defected insulation panels, off-cuts and demolition works.
Asbestos	17 06 05*	Demolition materials containing asbestos, removal of roofing material.

The site administration building, which houses the site’s office and staff welfare facilities, would generate limited amounts of waste, including the following:

- Paper and cardboard – EWC 15 01 01 and EWC 20 01 01;
- Biodegradable / food waste – EWC 20 01 08;
- Plastics – EWC 15 01 02 and EWC 20 01 39;
- Metals – EWC 20 01 40;
- Mixed municipal waste – EWC 20 03 01;
- Sanitary waste – EWC 20 03 04.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Other waste materials which may arise during demolition and construction works in small volumes include:

- Waste Oils and Liquid Fuels – EWC 13 02 and EWC 13 07;
- Waste from Electrical and Electronic Equipment – EWC 16 02;
- Cables – EWC 17 04 11;
- Paints – EWC 20 01 28;
- Batteries – EWC 16 06;
- Asbestos – 17 06 05*.

Wastes from EWC fractions EWC 13 02, EWC 13 07, EWC 16 02 and EWC 16 06 may be hazardous. These wastes would be segregated, stored appropriately and collected by a suitably licenced hazardous waste contractor and treated at a licenced hazardous waste facility.

Asbestos waste from EWC fraction EWC 17 06 is hazardous and must be disposed of properly. Before any demolition work, identify which waste facility is licensed by the Environmental Protection Agency (EPA) for disposal of asbestos waste.

A specialist contractor would be engaged to remove asbestos products, particularly those that are worn or damaged.

In the case of asbestos products where the fibres are tightly bound (for example, in asbestos cement roofs), and the material is in good condition, specialist asbestos removal contractors may not always be necessary.

Hazardous waste transfer stations can accept asbestos waste and then arrange to have it disposed of at an appropriate facility here or abroad.

The following waste facilities are licensed by the EPA to accept asbestos waste:

Table 13.5: EPA Licenced Asbestos Waste Facilities

LICENSE NO.	APPLICANT / FACILITY	FACILITY TYPE
W0050-2	Veolia Environmental Services Technical Solutions Limited, Fermoy, Co. Cork	Hazardous Waste Facility
W0192-03	Rilta Environmental Limited, Rathcoole, Co. Dublin.	Waste Transfer Station

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The BRE Waste Benchmark Data, published in June 2012, provides guidance on the construction waste estimates based on the gross internal floor area of a project. **Table 13.6** below details the typical construction industry waste generation per 100m² floor area, of which, the industrial building would likely be most similar to the proposed agricultural houses.

Table 13.6: BRE Benchmarks for Predicting and Forecasting Construction Waste.

PROJECT TYPE	NUMBER OF PROJECTS DATA RELATES TO	AVERAGE TONNES/100M ²
Residential	256	16.8
Public Buildings	23	22.4
Leisure	21	21.6
Industrial Buildings	23	12.6
Healthcare	22	12.0
Education	60	23.3
Commercial Other	4	7.0
Commercial Offices	14	23.8
Commercial Retail	48	27.5
Total number of projects	471	-

The total building area of the proposed development was calculated at 6,339 m². Using the figures provided by the BRE Benchmarks for Predicting and Forecasting Construction Waste above in **table 13.6** the estimated tonnage of waste that could potentially be produced by the proposed development was calculated at c. 799 tonnes, as outlined in the table below.

Table 13.7: Estimated Tonnes of Waste Produced by Proposed Development.

UNIT	OVERALL BUILDING FOOTPRINT	AVERAGE TONNES OF WASTE PRODUCED / 100M ²	AVERAGE TONNES OF WASTE PRODUCED
Farrowing House (1A) Extension	792 m ²	12.6 t	100 t
Pre-finisher House (16)	1,190 m ²	12.6 t	150 t
Weaner House (2B) Extension	359 m ²	12.6 t	45 t
New 2nd Stage Weaner House (15)	3,127 m ²	12.6 t	394 t
New (14A) 1st Stage Weaner House	555 m ²	12.6 t	70 t
New Slurry Reception Tank (17)	316 m ²	12.6 t	40 t
Total	6,339 m²	12.6 t	799 t

Table 13.8 below outlines the typical breakdown of construction and demolition waste type expected to be generated from a typical site such as this, based on the EPA Waste Data, Construction & Demolition Waste Statistics for Ireland.

Table 13.8 also gives an estimate of the construction waste (breakdown) which might be generated based on information currently available.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Table 13.8: Waste Materials Generated and Estimated Construction Waste Quantities.

WASTE TYPES	PERCENTAGE (EPA FIGURES)	WASTE TONNES ESTIMATE
Soils and stones	80.6%	643.2
Mixed C&D waste	7.8%	62.2
Concrete, bricks, tiles and similar	6.6%	52.7
Metals	3.8%	30.3
Bituminous mixtures	0.9%	7.2
Segregated wood, glass, plastic	0.4%	3.2
Total	100 %	799 tonnes

While **Table 13.8** estimates that 643.2 tonnes of soils and stones would likely be generated, it should be noted that all subsoil and topsoil excavated on site is intended to be used at the site for landscaping and reinstatement.

Waste arising during the construction phase would be managed in accordance with the waste hierarchy, as per Section 21A of the Waste Management Act 1996, as amended.

Given that only suitably licenced waste hauliers, contractors and facilities would be used, it is not anticipated that wastes arising from the construction phase of the proposed development would have a significant impact upon the environment.

13.5.2 OPERATIONAL PHASE

During the operational phase of the development, the likely wastes that would be generated on site are provided in **Table 13.9**.

Table 13.9 lists the principal wastes and volumes predicted to be generated at the site during the operational phase. The table also includes the proposed storage and disposal methods of each type of waste mentioned. The data given in the table is taken from similarly sized facilities.

Table 13.9: Principal Waste Produced at the Site During the Operational Phase.

WASTE TYPE	EWC	SOURCE	QUANTITY	DISPOSAL
General waste	20 03 01	Work area & canteen	0.27 t/month	Clean Ireland Recycling Landfill
Animal tissue waste	02 01 02	Animal houses	2 t/month	Premier Proteins
Veterinary waste	18 02 02	Animal houses	0.0009 t/month	Healthcare Initial
Fluorescent tubes	20 01 21	Light through unit	0.0007 t/month	Local Civic centre
Animal slurry	19 06 05	Animal houses	1,419 m ³ /month	Landspreading

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

In addition to the above, limited volumes of the following wastes may be generated during the operational phase, all of which would be collected separately and treated appropriately:

- Waste cleaning detergents – EWC 14 06;
- Batteries – EWC 16 06, EWC 20 01 33*/34;
- Waste electrical and electronic equipment – EWC 20 01 35*/36;

Waste arising during the operational phase would be managed in accordance with the waste hierarchy, as per Section 21A of the Waste Management Act 1996, as amended. Woodville Pig Farms would appoint waste contractors to undertake the collection and treatment of the anticipated operational waste streams.

Given that only suitably licenced waste hauliers, contractors and facilities would be used, it is not anticipated that wastes arising during the operational phase of the proposed development would have a significant impact upon the environment.

Woodville Pig Farms keeps a register of all classes of hazardous waste produced by the site.

13.5.3 CUMULATIVE IMPACT

Considering the nature of the proposed development and nearby agricultural properties, there would be a potential cumulative impact upon waste management during both the construction and operational phases, with nearby properties generating similar types of waste as the proposed development.

However, the potential cumulative impacts would not be considered significant, as the area is suitably serviced by licenced waste contractors, and given that good waste management practices would be implemented on-site during construction works as standard practice.

13.5.4 “DO-NOTHING” IMPACT

Should the proposed development not proceed, wastes would not be generated at the site and therefore waste management would not be required.

13.6 MITIGATION MEASURES – CONSTRUCTION PHASE

THE WASTE HIERARCHY:

Throughout the construction phase, the construction works contractor(s) would manage the wastes generated in order of priority in accordance with Section 21A of the Waste Management Act 1996, as amended, as per the waste hierarchy below.

The waste hierarchy is a set of priorities listed in order for the efficient use of resources. It underpins the objectives of the Waste Avoidance and Resource Recovery Act 2001 and the Irish statutory instrument (S.I. No. 524/2008) - Waste Management.



Figure 13.2: Waste Hierarchy.

DEMOLITION AND CONSTRUCTION WASTE MANAGEMENT:

Waste materials generated by demolition and construction activities would be managed according to the Department of the Environment, Heritage and Local Government's 2006 Publication - Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects.

Prior to the commencement of development, the works contractor would identify a permitted waste contractor(s) who would be employed to collect and dispose of all wastes arising from the project works. In addition, the works contractor would identify all waste licensed/permitted facilities that would accept all expected waste exported off-site and would maintain copies of all relevant Waste Permits/Licences as required. Further details are provided in the sections below.

In order to ensure that waste is minimised and segregated correctly, the works contractor would ensure that all staff personnel, sub-contractors and any other relevant personnel are appropriately informed by means of clear signage, verbal instruction and induction training. Waste management training, as part of site induction, would discuss the waste hierarchy and detail the segregation of waste materials at source and storage methods, in addition to including a section on hazardous waste management. Site induction training, verbal instruction and signage would aim to train site personnel so that they are in a position to:

- Distinguish reusable materials from materials suitable for recycling;
- Ensure maximum segregation at source;
- Co-operate with the construction site manager on the best location's for stockpiling reusable materials;
- Separate materials for recovery;
- Identify and liaise with operators of waste collection and waste management operators.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

WASTE CONTRACTORS:

The collection of wastes from the site would be undertaken by suitably authorised waste hauliers, and would only be recycled / recovered or disposed of at suitably licenced waste facilities.

The works contractor would appoint a waste contractor(s) for the demolition and construction phase. The waste contractor(s) appointed for the project would have experience in demolition and construction waste management and would be appropriately licenced, holding the relevant waste collection permit and/or waste licences for the types of waste anticipated to be generated during construction works.

The waste contractor(s) used by the site are and would be appropriately licenced in compliance with the following regulations:

- Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007);
- Waste Management (Collection Permit) Amendment Regulations 2008 (S.I. No. 87 of 2008);
- Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821 of 2007);
- Waste Management (Facility Permit and Regulations) Amendment Regulations 2008 (S.I. No. 86 of 2008).

Waste Storage Area

A temporary location would be designated for waste receptacles on-site. Suitable waste receptacles would be provided by the appointed waste contractor(s) during the construction phase, with skips / bins allocated to specific waste streams to avoid contamination. The number and size of waste receptacles would be determined following the appointment of the waste contractor(s). Waste receptacles would be appropriately labelled.

Where waste fuels and oils are generated, they would be stored within a bunded container in a designated area of the site. Any hazardous materials would be stored separately from non-hazardous waste, and would be stored within bunded containers / upon a bund where appropriate.

The removal of waste from the site would be undertaken on a regular basis, preventing large volumes of waste accumulating onsite.

Waste Minimisation:

Where practicable, the construction works contractor(s) would reduce the generation of wastes at source through measures such as the following:

- The efficient ordering and purchasing of materials to reduce surplus materials;
- Materials would be ordered in appropriate sequence to minimise materials stored on site;
- The correct storage of materials to minimise the generation of damaged materials, for example keeping materials packaged until they are ready to be used and storing

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

materials which are vulnerable to water damage via precipitation under cover and raised above the ground;

- The handling of materials with care, to avoid undue damage;
- The return of uncured concrete to the batching plant where possible;
- The re-use of shutters for concrete works;
- Where practical and where permitted, certain waste streams would be used during infill works;
- Where possible, excavated subsoil and topsoil would be reused for the reinstatement and landscaping of the development site.

The construction works contractor would reuse materials onsite where possible. In particular, inert wastes (such as concrete (EWC 17 01 01), bricks (EWC 17 01 02) and soils and stones (EWC 17 05 04)) would be used for infilling activities where suitable (and where required). The inert wastes may be passed through a mobile crusher unit, which would render the backfill material into a uniform shape and size which would allow for improved backfilling and compaction to required engineering standards.

The reuse of materials onsite would reduce the requirement for imported material to the site, which would have the following positive environmental impacts to the construction phase:

- Reduction in imported materials to the site;
- Reduction in the requirement for virgin aggregate materials from quarries;
- Reduction in energy required to extract, process and / or transport virgin materials / aggregates;
- Reduced HGV movements associated with the delivery of imported materials to the site;
- Reduced noise levels associated with reduced HGV movements;
- Reduction in the amount of landfill space required to accept C&D waste.

Management of Waste Streams

Wastes generated will be managed by the demolition/construction works contractor(s) in order of priority in accordance with Section 21A of the Waste Management Act 1996, as amended. Wastes will be segregated as much as possible in order to avoid cross contamination.

Excavated Soils: Based on current calculations, it is estimated that approximately 643 tonnes of soils and stones of excavation materials would be generated for the proposed development. However, it is likely that this figure is an over-estimate as it is based upon EPA construction waste figures for the country as a whole.

Soils and stones arising from excavations would be reused in the reinstatement (for example as cut and fill activities and engineering fill) and landscaping processes where possible. This would be investigated by the construction works contractor and would be subject to appropriate testing to ensure the material is suitable for its proposed end use.

In the unlikely event of excess excavated soils, this would be collected by a licenced waste contractor and either reused for reinstatement / landscaping activities at other sites if suitable or disposed of as appropriate. Alternatively, the construction works contractor would investigate if excavated soils can be classified as a by-product under Article 27 of the Waste Directive Regulations, 2011. If a local use for the material is identified, and if the proposed end

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

use meets the requirements of the Article 27 regulations, there would be no requirement to send this material to a waste facility.

In the event of any evidence of soil contamination being found during work on site, the appropriate remediation measures would be employed. Areas of potentially contaminated soil would be isolated and tested for contamination in accordance with the 2002 Landfill Directive (2003/33/EC). Any work of this nature would be carried out in consultation with, and with the approval of, the EPA and the Environmental Department of Carlow County Council. Pending the results of laboratory testing, this material would be excavated and exported off-site, by an appropriately Permitted Waste Contractor holding an appropriate Waste Collection

Concrete, Bricks, Tiles and Ceramics: Surplus concrete would be returned to the batching plant where possible. An impermeable concrete washout area (separate to vehicle wheel wash) would be installed by the construction works contractor, if required. Excess concrete and washings from ready mix trucks would be deposited in the designated contained area only. The main contractor would arrange for removal from site of concrete at regular intervals. Where concrete, blocks and bricks, tiles and ceramics arise from construction activities, they would be crushed and used for ground-fill material where deemed suitable (should infill activities be required). Where these materials cannot be reused onsite, they would be diverted for recycling if possible.

Wood: Waste wood would be reused for shuttering where suitable. Wood that is uncontaminated (free from preservatives and paints) would be recycled. Any wood not deemed suitable for recycling would be disposed of as appropriate.

Metal: Metal is highly recyclable and has a considerable rebate value. Where metal cannot be reused onsite, the majority will be recycled.

Green Waste: Green waste may be sent for composting if not possible to reuse onsite during landscaping / re-instatement activities, or for disposal as deemed appropriate by the waste contractor.

Other Recyclables: These include plastic, cardboard and paper. Where possible, the different recyclables will be segregated on-site. With regards to packaging waste, the construction works contractor(s) would investigate the possibility of returning the packaging to the supplier.

Waste Electrical and Electronic Equipment (WEEE): This waste, if generated, would be stored separately from other waste streams and would be covered pending collection.

Canteen Waste: Canteen waste would include food waste and packaging waste. The existing site facilities are already equipped with waste management protocols (i.e. Designated receptacles for general, recycling, and food waste).

Mixed Municipal Waste and Other Non-Recyclable Waste: Wastes not suitable for reuse or recycling would be stored in separate waste receptacles. The existing site facilities are already equipped with waste management protocols.

Sanitary Waste: Sanitary waste from the site staff facilities/office building is discharged to the septic tank system. The existing septic tank system has the capacity to cope with any increase in staff numbers at the site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Asbestos Waste: A specialist contractor would be engaged to remove asbestos products, particularly those that are worn or damaged, to an approved waste transfer stations.

Hazardous Materials: Small quantities of hazardous waste may be generated onsite, such as waste fuels and oils, batteries and paints. Hazardous waste would be stored separately from non-hazardous waste and banded.

Hazardous waste would be managed in accordance with the Waste Management (Hazardous Waste) Regulations 1998 and 2000. The construction works contractor(s) would ensure that the waste contractor used is licenced to transport / accept hazardous waste prior to the waste leaving the site. Depending on the type of hazardous material, the waste may be recovered, recycled or disposed of appropriately.

Record Keeping

For each waste movement and for each type of waste, the construction works contractor would obtain a signed waste docket from the waste contractor, detailing the weight, type of material, destination of material and whether the material is going for recycling, recovery or disposal. The construction works contractor would retain copies of the waste contractors' relevant waste collection permits and waste licences on file throughout the construction phase.

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13.6.1 OPERATIONAL PHASE

The proposed development would manage all wastes generated during the operational phase in order of priority in accordance with Section 21A of the Waste Management Act 1996, as amended, as per the waste hierarchy.

The majority of waste arising at the facility would come under the broad European category of List of Waste 02 01 (01 to 10) – Wastes from Agriculture, Horticulture, Aquaculture, Forestry, Hunting and Fishing, Food preparation and processing.

WASTE MANAGEMENT:

Woodville Pig Farms would ensure that all waste hauliers that are contracted by the farm are suitably licenced to transport specific waste streams from the site, and that all waste would be going to facilities which are licenced to accept the waste.

Waste management training, which would discuss the waste hierarchy and the appropriate segregation of waste materials, is included in the sites training program for any new employees at the farm. Sub-contractors and relevant visitors are also made aware of the farms waste management ethos.

Wood: Waste wood, for example wooden pallets, would be directed for recycling r retuened to the supplier.

Metal: Metal waste produced on-site if any would also be directed for recycling.

Other Recyclables: These include plastic, cardboard and office waste such as paper. The different recyclables would be segregated on-site and sent for recycling.

Canteen Waste: The site staff facilities/office would continue to produce related waste which would easily be accommodated by the canteens designated receptacles for general, recycling, and food waste.

Mixed Municipal Waste and Other Non-Recyclable Waste: Wastes not suitable for reuse or recycling would be stored in separate waste receptacles.

Sanitary Waste: Sanitary waste from the site staff facilities/office building wouldbe discharged to the septic tank system.

Hazardous Materials: Any hazardous waste generated onsite would be managed in accordance with the Waste Management (Hazardous Waste) Regulations 1998 and 2000. Examples of potentially hazardous wastes include veterinary waste and fluorescent tubes.

Waste Electrical and Electronic Equipment (WEEE): This waste, if generated, would be stored separately from other waste streams and would be covered pending collection. WEEE can contain hazardous components such as batteries and mercury containing fluorescent tubes. All hazardous wastes would be stored in appropriate secure bunded containers prior to removal from site.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Animal Slurry: There is a healthy demand for pig slurry in the area. This demand would easily absorb the proportional increase in slurry produced at the site if the proposed development went ahead. The applicant maintains a register for all collections of slurry from the site.

Animal Carcasses: A covered and sealed (i.e. no odour) designated storage container for the temporary storing of animal carcasses is already in operation at the site. If the proposed development went ahead additional animal carcass storage containers would be used. Beechfield products regularly remove fallen animals from the site and deliver them to Premier Proteins in Ballinasloe. The site keeps a register for fallen animals.

WASTE CONTRACTORS:

The collection of wastes from current site operations is undertaken by suitably authorised waste hauliers, and only recycled / recovered or disposed of at suitably licenced waste facilities.

Currently the operational wastes produced by the site are disposed of as follows:

- General waste - Collection by Clean Ireland Recycling for landfilling
- Animal carcasses waste - Collection by Beechfield products for disposal at Premier Proteins at Ballinasloe.
- Veterinary waste - collection by Initial Healthcare for disposal at Sterile Technologies, Dublin.
- Fluorescent tubes - Local Civic centre in Nenagh Town
- Animal slurry – Local customer farmers for Landspreading

The above-mentioned contractors and methods of waste disposal would remain the same if the proposed development were to be constructed. The site maintains a register for all waste leaving the site.

Other wastes which may be generated during the operational phase would be managed by Woodville Pig Farms in order of priority in accordance with Section 21A of the Waste Management Act 1996, as amended.

13.7 MONITORING

13.7.1 DEMOLITION AND CONSTRUCTION PHASE

The demolition and construction works contractor(s) would maintain records and documentation of all waste transported off-site, with waste volumes tracked to measure overall environmental performance. The works contractor would ensure that copies of all waste contractors' collection permits and licences would be available for inspection.

13.7.2 OPERATIONAL PHASE

The applicant would maintain records and documentation of all waste transported off-site, with waste volumes tracked to measure overall environmental performance. The applicant would ensure that copies of all waste contractors' collection permits and licences would be available for inspection.

13.8 RESIDUAL IMPACTS

In the event of the proposed development being discontinued, the construction works contractor would undertake measures to ensure that wastes at the site would not impact upon the environment, including the following:

- All wastes present throughout the site would be transported to the site compound and segregated appropriately;
- Where possible, surplus building materials would be returned to the supplier, sold or sent for recycling;
- Waste contractors would be contacted to remove the remaining wastes at the site, for recovery / recycling or disposal at licenced waste facilities;
- Stockpiled soil would be used to reinstate areas where possible.

Following the implementation of mitigation measures outlined in Sections 16.7, and given that all wastes arising as part of the construction phase would be managed in accordance with the waste hierarchy as outlined in Section 21A of the Waste Management Act 1996, as amended, it is considered that the proposed development would have a short-term and negligible environmental impact.

The operational phase of the proposed development would give rise to a variety of wastes. However, waste management would be undertaken by suitably licenced waste contractors. Therefore, it is considered that the operational phase of the proposed development would have a long-term and negligible environmental impact.

13.9 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

No difficulties were encountered during the assessment of potential impacts of the proposed development on waste management.

13.10 REFERENCES

BRE Waste Benchmark Data (June 2012), Available at: http://www.smartwaste.co.uk/filelibrary/benchmarks%20data/Waste_Benchmarks_for_new_build_projects_by_project_type_31_May_2012.pdf [Accessed November 2019].

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Nenagh Town & Environs Development Plan 2013-2019.

North Tipperary County Development Plan 2010 – 2016.

14.0 MATERIAL ASSETS - UTILITIES

14.1 INTRODUCTION

This section outlines the utilities that would potentially be affected by the proposed development during both the construction and operational phases. Material assets are generally considered to be the physical resources in the environment, which may be either of human or natural origin.

The objective of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

Economic assets of human origin, i.e. utilities are considered in this section. Economic assets of natural origin are addressed in other sections of this EIAR, namely: *Land - Soils, Geology and Hydrogeology; Archaeological, Architectural and Cultural Heritage and Material Assets - Waste Management/Natural resources and Agriculture*. The purpose of this section is to assess the impacts of the proposed development on the existing utility network, which includes the following infrastructure:

- Electricity;
- Water;
- Wastewater;
- Natural Gas;
- Telecommunications.

14.2 METHODOLOGY

A desktop study was undertaken to assess the potential impact of the proposed development on the utilities of the area.

14.3 DESCRIPTION OF THE EXISTING ENVIRONMENT

14.3.1 Electricity

The proposed development would be connected to the electrical mains supply. There are multiple power line systems within the vicinity of the site.

One of the two 400 kv power line systems in Ireland running from Ireland's largest electrical power generation station the Moneypoint station near Kilrush, County Clare, to the Dublin area runs from west to east only a few kilometres south of the site.

Electricity supply and transmission is available throughout the county on the low (38kV, 20kV, and 10kV) and high transmission networks. High voltage transmission within the county is available at 110kV, 220kV and 400kV and there is one transmission connected generation point in the county at Lisheen. There is one further transmission generation point at Cauteen in South Tipperary. Both are powered by wind energy.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

There are also two 110 kv stations within c. 10 km of the site one in Nenagh Town the other in the townland of Ikerrin. The largest and closest power generation station is the Ardnacrusha hydrogeneration station near Limerick City (**Figure 14.1**).

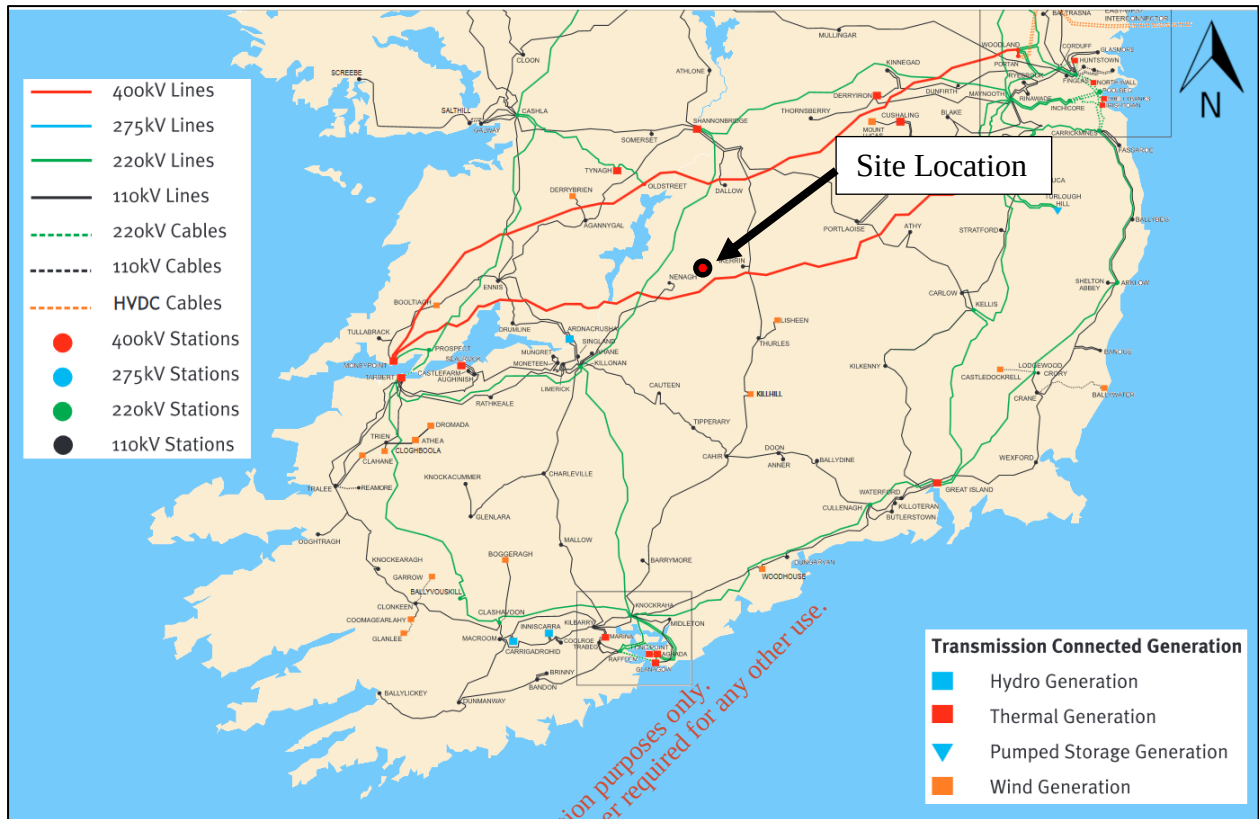


Figure 14.1: Irish Electrical Grid Map.

14.3.2 WATER

Water needs for the current piggery are provided through an existing groundwater well at the site (AGW1). This well would also be used to supply water and services to the new proposed buildings. The site currently uses c. 5,811 m³ of water per year which would be expected to increase to c. 16,333 m³ per year if the proposed development/expansion went ahead.

Although the above figures are estimates, they may be used to adequately describe water usage at the site. Further information regarding the calculation of water usage at the site is included in the Description of Development Section.

The potential increase in groundwater abstraction would not be expected to cause a significant demand on the groundwater resources of the area, and would not be expected to impact upon other abstractions locally.

Groundwater recharge is c. 526 mm/yr. in the karst area and c. 371 mm/yr. in the area of extreme vulnerability. The site is not located within a surface or groundwater source protection area.

Moneygall, Nenagh, Roscrea, Nenagh and surrounds are served by public mains water, supplied by several water treatment plants operated by Irish Water. The mains water supply for

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

the area is supplied by the Dunkerrin public water scheme (Jones's Well) and is maintained by Irish Water. **Figure 14.2** below shows the locations of waste water treatment plants (WWTP) and areas where river water is abstracted for drinking water in the area.

14.3.3 WASTEWATER

There is a septic tank present at the site, servicing the staff toilet and facilities. The septic tank is in place for the disposal of domestic sewage from the site.

All wastewater generated by the showers, toilets, etc. in the staff accommodation/office building is discharged to the septic tank system. The percolation area of the septic tank is the source of the only emission to the ground from this facility.

The septic tank is constructed of blow moulded plastic and has a capacity of 3,000 litres. The integrity of the tank was tested in 2008 as per BS 8007 Section 9 and found to be fit for purpose.

There would be no planned impact upon municipally operated wastewater schemes from the proposed development. The nearest Waste Water Treatment Plant (WWTP) to the site is in the town of Nenagh west of the site.

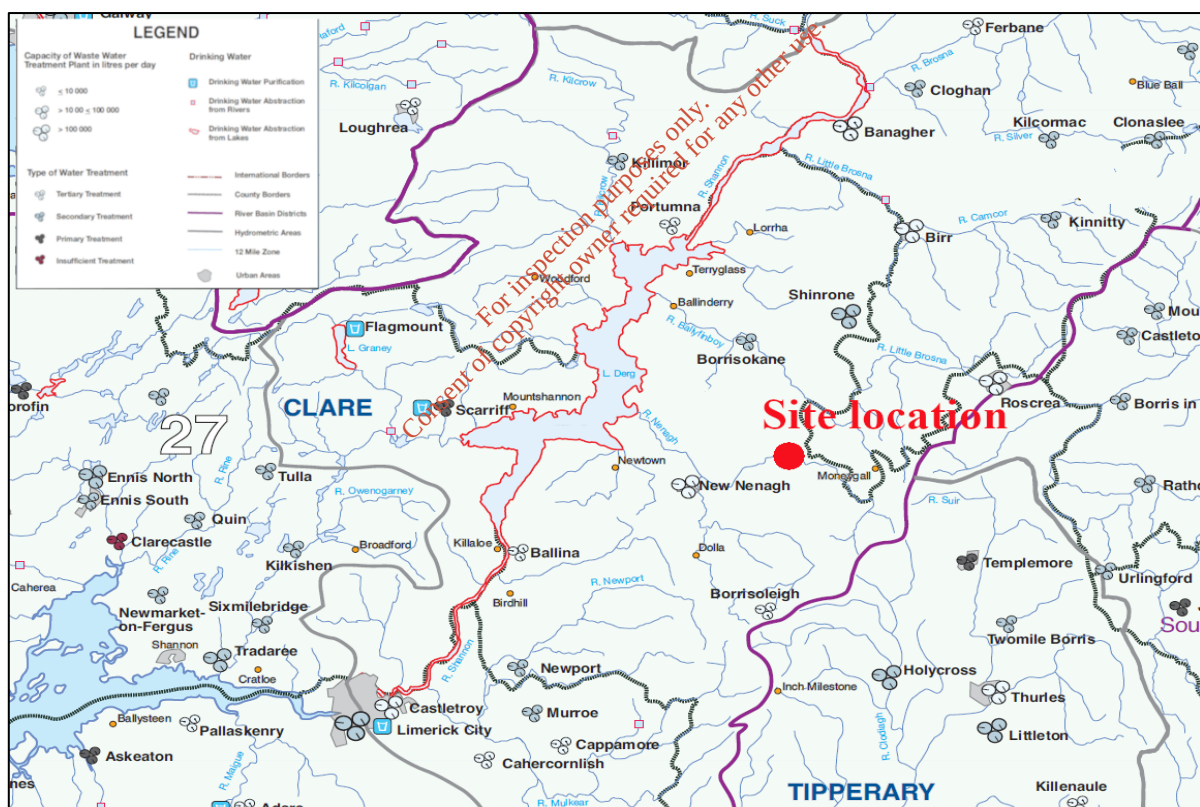


Figure 14.2: Map of Public Water Abstraction, Purification and Waste Treatment Sites.

Nenagh WWTP (Kyleeragh Bridge, Old Birr Road, Nenagh) is operated by the North Tipperary Co. Council and holds a Waste Water Discharge Licence with the EPA (D0027-01). There is also a small WWTP plant in the town of Moneygall which serves a p.e. < 500.

The WWTP in Nenagh provides tertiary treatment of wastewater. The WWTP has the capacity to serve a population equivalent (p.e.) size of 18,000. The WWTP discharges to the Nenagh River.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The Nenagh River rises in the Silvermine Mountains and flows east of Nenagh and into Lough Derg just north of Dromineer village (**Figure 14.2**).

The site has an effective stormwater drainage network already installed. This system would easily accommodate any new stormwater generated by the roof and hardstanding areas of the proposed buildings.

14.3.4 GAS



Figure 14.3: Gas Network of Ireland.

The site does not currently use gas nor do the proposed developments include the integration of any gas services.

Gas Networks Ireland has responsibility for developing, maintaining and operating the natural gas transmission and distribution networks in Ireland. The region in which the site is not

directly serviced by a major gas network line. The nearest gas line is at Nenagh Town, west of the site (**Figure 14.3**).

14.3.5 TELECOMMUNICATIONS

The county broadband services have improved significantly over the past number of years. The area has a number of broadband, phone and television channel providers, including Digiweb[®], Eir[®], pure-telecom[®], Sky[®], Virgin[®] and Vodafone[®].

The Government's 2012 National Broadband Plan National Broadband Plan which will provide basic broadband services in areas that cannot be commercially served, and the Metropolitan Area Networks (MANs) plan should provide fibre-based connectivity in over 90 towns across Ireland.

These towns include Nenagh and Roscrea in North County Tipperary. According to the Irish governments national broadband plan, high speed broadband should be made available to c. 32% of the state in the near future.

14.4 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

14.4.1 CONSTRUCTION PHASE

Electricity and water would be required during construction activities. The development site would be connected to the local electricity grid network system and the sites own groundwater supply. Given the scale and temporary nature of construction works, the electrical demand on the local electrical network would not be considered insignificant and would not be anticipated to impact upon local power supply.

Facilities including toilets, showers and a canteen are already provided at the site which would easily accommodate the extra persons on site during the construction phase.

Telecommunications requirements during the construction phase would be provided using mobile phones/broadband. There would be no anticipated impacts to the local telecommunications system.

The construction works contractor would liaise with the relevant utilities provider prior to works commencing, with ongoing consultation throughout the proposed development. Where new services would be required, the construction works contractor would apply to the relevant utility provider and adhere to the requirements outlined in the connection permit/licence.

14.4.2 OPERATIONAL PHASE

Following site clearance and excavations, works would commence on the installation of underground utilities to the site required for water supply, domestic wastewater, electricity and telecommunications.

14.4.3 POTENTIAL CUMULATIVE IMPACTS

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

The proposed development is located within an agricultural landscape, with sparse residential properties located to the east and west of the site along local roads.

The area also supports a number of other small-scale agricultural holdings. The Woodville site is in an area classified as open countryside in the North Tipperary County Development Plan 2010 – 2016. The site is not located in a primary or secondary amenity area of the county.

It is considered that the main potential cumulative impacts would be an increased demand on water and electrical utilities and a slight increase in traffic volumes.

It is considered that groundwater and electrical utilities in the area have adequate capacity to accommodate the estimated requirements of the proposed development, during both the construction and operational phases, and therefore there would be no significant cumulative impact upon local utilities. No significant cumulative traffic impacts are anticipated.

14.5 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

14.5.1 CONSTRUCTION PHASE

The Contractor would be obliged to put measures in place to ensure that there are no interruptions to existing services unless this has been agreed in advance with the relevant service provider.

All works in the vicinity of utilities apparatus would be carried out in ongoing consultation with the relevant utility company or local authority and would be in compliance with any requirements or guidelines they may have.

Where new services or diversions to existing services are proposed, the Contractor would apply to the relevant utility company for a connection permit where appropriate, and would adhere to their requirements.

14.5.2 OPERATIONAL PHASE

The proposed development would be serviced by existing utilities, with the capacity to accommodate the proposed development. Therefore, no mitigation measures are necessary.

The development would require power during the operational development for normal day-to-day operations. The estimated power requirement would not be considered significant in the overall context of the proposed development, and would not be anticipated to significantly impact upon the local power supply.

Given the range of telecommunications providers in the area, the proposed development would not have a significant impact upon local telecommunications.

Water demand during the operation of the development would not be anticipated to have a significant impact on the regional groundwater supply.

14.5.3 CUMULATIVE IMPACT

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

Considering the nature of the proposed development, it is considered that the main potential cumulative impacts would be an increased demand on local utilities, including mains power, water supply and telecommunications, in addition to increased traffic volumes.

However, it is considered that utilities in the area have adequate capacity to accommodate the estimated requirements of the proposed development, during both the construction and operational phases, and therefore there would be no significant cumulative impact upon local utilities.

14.5.4 “DO-NOTHING” IMPACT

Should the proposed development not take place, there would be no changes or impacts upon utilities including the national power grid, local water supply and telecommunications.

14.6 RESIDUAL IMPACTS

Given the nature of the proposed development and following the implementation of mitigation measures it is considered that residual impacts would be imperceptible.

14.7 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

No difficulties were encountered during the assessment of potential impacts of the proposed development on utilities.

14.8 REFERENCES

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15.0 MATERIAL ASSETS – NATURAL AND OTHER RESOURCES

15.1 INTRODUCTION

This section of the EIAR outlines the potential impacts on natural and other resources of the proposed development and all ancillary site works and services at Woodville, Co. Tipperary.

The proposed development is to demolish a gilt house, two weaner houses and one first stage weaner house and to construct a modern second stage weaner house and extend farrowing Unit 1 with additional farrowing sow accommodation, convert farrowing Unit 2 to loose sow accommodation, extend Unit 2 to provide additional weaner accommodation, construct a new pre-finisher house for slow growing pigs and construction of a slurry reception tank.

15.2 METHODOLOGY

A desktop study was undertaken to assess the potential impact of the proposed development on the natural and other resources of the area. This included a review of available data on the Geological Survey Ireland Spatial Resources, Teagasc Subsoil Mapping and EPA Envision Online Mapping websites.

15.3 DESCRIPTION OF THE ENVIRONMENT

The area in the immediate vicinity of the proposed development is rural in nature, with much of the land in agricultural use. A network of utilities associated with residential houses, agricultural and commercial operations are all available in the general hinterland.

15.3.1 LAND USE AND SOIL

Following construction of the proposed development, the total surface area of the proposed buildings would cover an area greater than 6,000 m² (i.e. c. 1.5 acres of a c. 13.7-acre site).

The land within c. 1 km of the site is predominantly used for pasture. There is a Cutover peat bog (wetlands) c. 500 m to the north, along with land principally occupied by forest with areas of natural vegetation.

North-east of the site are other wetlands and land associated with heterogeneous agriculture. The other land uses in the region are frequent small areas of non-irrigated arable land, coniferous and transitional woodland areas which are located primarily in upland areas.

Urban areas constitute a minority of the land-use cover. The majority of the urban fabric in the region is located in Nenagh. This is composed of discontinuous urban fabric with some areas of continuous urban fabric and industrial or commercial units.

Other land cover within 15km of the proposed site includes mineral abstraction sites, inland marshes mixed forests and sport and leisure facilities.

According to the Geological Survey of Ireland's online mapping tool the soil underlying the majority of the site are classed as shallow, rocky, peaty/non-peaty mineral complexes which are mainly basic. A detailed description of the existing soil environment is provided in the Land – Soils, Geology and Hydrogeology section.

15.3.2 TRANSPORT NETWORK

The proposed development site is located in the townland of Woodville, near the village of Toomevara, Co. Wexford (i.e. c. 4.5 km south of the site). The village is situated at the junction of the R445 and R499 regional roads in the north of Co. Tipperary.

Access for the site is taken from a local country road which connects the R491 road to Nenagh Town to the R490 and R445 regional roads near the village of Moneygall.

The M7 motorway from Dublin to Limerick runs from east to west c. 2.0 km south of the site and can be accessed with an on-ramp at Upper Clashnevin c. 5.4 km south-west of the site where the R445 regional road intersects the motorway. The M7 is serviced by the following facilities: in Moneygall – by The Barrack Obama Plaza, Topaz, at Junction 23 and in Bardhill – by Applegreen, at Junction 27.

The site is centrally located between the Irish Rail network lines connecting Limerick and Cork to the Dublin Railway line, which provides frequent and efficient access to and from the county. The line connecting Limerick to the Dublin line runs c. 2.1 km north of the site between the Cloughjordan and Nenagh stations.

Bus Éireann and a number of private operators provide long distance express services as well as local bus services within the county. Long distance express bus services in the county serve Dublin, Cork and Limerick on a high frequency basis. Community bus services within the rural areas are supported by the Rural Transport Programme.

15.3.3 ECONOMIC MINERALS

There are no operational quarries within the immediate vicinity of the site. Three operational quarries are located within 15 km of the proposed development site, as detailed in the table below.

Table 15.1: Operational Quarries Within 15 km of the Proposed Development.

QUARRY NAME	QUARRY TYPE	APPROX. DISTANCE FROM PROPOSED DEVELOPMENT
Coolderry Pit	Sand and Gravel	7.7 km north-west
Cloncannon Pit	Crushed Rock	8.3 km south-east
Ballybeg Pit	Crushed Rock	8.2 km south-east

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

GSI online web mapping indicates the following mineral localities within the vicinity (5.0 km) of the proposed development:

- Area of Clay Pipe, 9.2 km north-west of the site; (Non Metallic)
- Area of Lead, 9.1 km south-west of the site; (Metallic and Non Metallic)
- Area of Phosphate, 8.2 km south of the site; (Non Metallic)
- Area of Chalcopyrite, 9.6 km south of the site; (Non Metallic)
- Area of Galena, 6.1 km south of the site; (Metallic)
- Area of Sandstone, 8.9 km south of the site; (Non Metallic)
- Area of Shale, 11.4 km south-east of the site; (Non Metallic)
- Area of Sand and Gravel, 8.4 km south-east of the site; (Non Metallic)
- Area of Sand and Gravel, 8.2 km south-east of the site; (Non Metallic)
- Area of Lead, 3.6 km south-east of the site; (Metallic)
- Area of Pyrite, 8.5 km north-east of the site; (Metallic)
- Area of Lead, 4.2 km north-east of the site; (Metallic)
- Area of Limestone, 6.2 km north of the site; (Non Metallic)
- Area of Sand and Gravel, 2.5 km north of the site; (Non Metallic)
- Area of Sand and Gravel, 2.6 km north of the site; (Non Metallic)

15.4 IMPACT AND MITIGATION

Overall, the proposed development would have a minor negative impact on natural and other resources. Any disruption to services and existing transport networks would be minimal and of a temporary nature during the construction phase of the development.

15.4.1 LAND AND SOIL

In total, the proposed piggery would occupy an estimated 1.5 acres of existing farmyard within the lands operated by the applicant. As such, it is considered that there would be no significant impact on land or soil material assets. Impacts on the agricultural use of land are discussed in the Material Assets – Agriculture section.

15.4.2 TRANSPORT NETWORK

During the construction stage, the presence of HGVs and small commercial vehicles for deliveries of construction materials and transport of construction workers would be noted.

Upon completion of the construction phase, there would be a maximum of 245 traffic movements per week on the site. However, as discussed in previous chapters, the estimated traffic movements would be similar to the traffic movements associated with the existing piggery at the site when operating at full capacity.

Therefore, the expected volume of traffic on the road network would have a negligible additional effect on the structural integrity of the road network and its on-going maintenance costs.

15.4.3 ECONOMIC MINERALS

It is considered that the proposed development would have no significant impact on mineral resources in the vicinity of the area.

15.4.4 RAW MATERIALS REQUIRED

Construction material, when needed, would be sourced from nearby sources such as local quarries where practical. The amount of raw materials needed is not expected to place any stress on natural resources.

15.5 RESIDUAL IMPACTS

No significant residual impacts are predicted.

15.6 POTENTIAL CUMULATIVE IMPACTS

It is considered that the main potential cumulative impacts would be a slight increase in traffic volumes. Although, no significant cumulative traffic impacts are anticipated.

15.7 PREDICTED IMPACTS WITH MITIGATION

Given the nature of the proposed development and following the implementation of mitigation measures as outlined in previous sections, it is considered that residual impacts would be imperceptible.

15.8 DIFFICULTIES ENCOUNTERED IN COMPILING INFORMATION

No difficulties were encountered during the assessment of potential impacts of the proposed development on natural or other resources.

15.9 REFERENCES

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SECTION E

INTERACTIONS AND INTER-RELATIONSHIPS

In line with requirements of EC Directive 85/337/EC (as amended) and the Planning and Development Regulations 2001, any interactions/inter-relationship between the various environmental factors was also taken into account as part of the EIAR scoping and assessment.

Where a potential exists for interaction between two or more environmental topics, the relevant specialists have taken the potential interactions into account when making their assessment and where possible complementary mitigation measures have been proposed. An overview of these potential interactions is provided in **Table 16.1**, with the main interactions or inter-relationships discussed in **Sections 16.1 to 16.13** below.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

16.0 INTERACTIONS AND INTER-RELATIONSHIPS

Table 16.1: Summary of Potential Interactions/Inter-Relationships.

Receptor Source	Human Beings	Air	Noise	Landscape & Visual	Biodiversity	Water	Soils	Climate	Material Assets	Cultural Heritage
Human Beings		✓	✓	✓	✓	✓	✓	✓	✓	✓
Air	✓		x	x	✓	x	x	✓	✓	x
Noise	✓	x		x	✓	x	x	x	✓	x
Landscape & Visual	✓	x	x		x	x	x	x	x	✓
Biodiversity	✓	✓	✓	✓		✓	x	✓	x	x
Water	✓	x	x	x	✓		✓	x	x	x
Soils	✓	✓	x	x	✓	✓		x	✓	✓
Climate	✓	✓	x	x	✓	x	x		x	x
Material Assets	✓	✓	✓	x	✓	x	x	x		✓
Cultural Heritage	✓	x	x	✓	x	x	x	x	✓	

- ✓ - Anticipated Interaction
x - No Anticipated Interaction

16.1 AIR AND SOILS

Excavations and earth moving operations during construction works may generate quantities of dust, which have the potential to impact upon air quality in the vicinity of the proposed development. Consequently, an impact upon air quality has the potential to impact upon human health, cause dust nuisance and cause disturbance to fauna (further discussed in **Section 16.3**).

The extent of dust generation depends on the nature of the construction dust (soils, sands, gravels, silts etc.) and the construction activity. The potential for dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

Mitigation measures to control dust emissions would be implemented, which would include good working practices, dust suppression measures and the undertaking of reinstatement works as soon as practicable.

16.2 AIR AND CLIMATE

The proposed development has the potential to impact upon air quality and climate through air emissions, including potential greenhouse gases, arising from the rearing of pigs and exhaust fumes from traffic.

The greenhouse gases, methane and ammonia, would be generated from the digestive processes and slurry of the pigs. The greenhouse gases potentially released to the atmosphere from the proposed development would be typical of the industry and would be anticipated to have no significant impacts on air quality or climate in the regional context.

There would be a small increase in traffic during the construction phase, however, this would not be considered significant given the transient nature of works. The operation of the proposed development would result in c. 245 traffic movements a week at the site.

The estimated traffic movements would be similar to the traffic movements associated with the existing piggery at the site when operating at full capacity (i.e. an increase of c. 96 movements/week). Therefore, traffic associated with the development would not be considered to have a significant impact upon air quality or climate of the area.

16.3 AIR, HUMAN HEALTH AND BIODIVERSITY

An adverse impact on air quality has the potential to impact upon human health, cause dust nuisance to humans and has the potential to adversely impact upon flora by blocking leaf stomata, interfering with photosynthesis, respiration and transpiration processes. The risk to air quality as a result of the proposed development would not be considered significant, both at the local community level and on a broader national/global scale.

During the construction phase of the development, there would be potential for dust emissions, which could impact upon the communities and residents on the roads to the site and flora in the surrounding area. The potential impact of dust would be temporary, given the temporary nature of construction works. Dust control would be an integral part of construction

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

management practices, with mitigation measures implemented where required, including sweeping of roads and hardstand areas, appropriate storage and transport of material and dust suppression measures where required.

Odour is another aspect of air quality with the potential to impact upon human beings, in the context of nuisance. The high standard of design of the proposed pig houses, coupled with continued good housekeeping practices currently in place at the site, would serve to ensure the effective control odour and air emissions, and mitigate the risk of environmental impact and nuisance to sensitive receptors associated with the site.

It should be noted that an important interaction exists between air quality and flora, whereby vegetation can play an important role in acting as an air purifier by absorbing carbon dioxide and giving out oxygen. It would therefore be anticipated that potential carbon dioxide emissions generated through pig respiration and discharged via vehicle exhausts would be somewhat mitigated by vegetation in the environs of the site.

The proposed development would generate ammonia emissions to atmosphere. Emissions of ammonia to atmosphere is undesirable from an ecological point of view, as it can have toxic, eutrophic and acidifying effects on certain ecosystems. In particular, the presence of high ammonia levels in peatland ecosystems has been found to inhibit the growth of certain moss species, allowing sedge and grass species to outcompete. While the proposed development would result in an increase of ammonia emissions in response to an increase in pig numbers, no adverse significant impact upon habitats, and thus biodiversity, is anticipated, given that there are few peatland ecosystems in the area, the two nearest bogs, Glenahilty Bog, located 300m north of the site, and an un-named bog located approximately 3.4km to the north-east, are currently worked and therefore of reduced ecological value, and given that the land use of the area is mainly pasture land, which would not be particularly sensitive to ammonia emissions. Furthermore, the proposed development has incorporated design measures which limit the potential for the generation of ammonia emissions to atmosphere. These design measures include the incorporation of a slurry cooling system, which has been estimated to reduce ammonia emissions by 25%, and the removal of slurry to an external slurry store.

16.4 NOISE, HUMAN HEALTH AND BIODIVERSITY

Noise generated during the construction and operational phases of the proposed development has the potential to impact upon human beings and fauna within the vicinity of the site.

During the construction phase, it would be anticipated that there would be an impact, for a limited period of time, on local residences within close proximity to the proposed development. Control and mitigation measures to reduce the potential for noise are outlined in **Section 6.0 Noise**. Given the transient nature of construction works and provided the recommended control and mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings, or upon fauna, in the area.

No significant additional noise impact would be anticipated during the operational phase of the proposed development. During the normal operation of the ventilation system, noise is predicted to be inaudible at the nearest noise sensitive locations.

While noise occurring during the construction phase of the development may disturb fauna in the area, high noise levels would be intermittent and would only occur over brief periods of the

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

planned 3-4 month construction works. Noise from the operation of the farm would be typical of farm hubs in rural areas and would be unlikely to have a negative impact upon biodiversity.

16.5 MATERIAL ASSETS AND HUMAN BEINGS

The proposed development would be constructed on made-ground/hardstanding within the bounds of an existing piggery farm yard and on rough agricultural grassland in the ownership of Woodville Pig Farms. Therefore, there would be no land use change from agricultural activities at the proposed development site. The proposed development would improve the efficiency of the existing pig rearing operation, and would improve the agricultural value to the operator of the lands currently used as grassland.

During the construction phase, there would be an increase in traffic volume using the local road network. However, given the nature of activities and temporary duration of construction works, this would not be considered significant. There should be no major impact upon traffic volumes during the operational phase, as traffic volumes would be similar to the traffic movements associated with the existing piggery at the site when operating at full capacity.

The potential of the proposed development to create short-term employment during the construction phase and additional permanent employment during the operational phase would positively impact on the material assets/human beings of the region.

The proposed development would increase the abstraction and use of groundwater at the site. Groundwater in the area is localised and has poor movement. There are no groundwater abstractions, other than that used by Woodville Pig Farms, within close proximity to the site. It is unlikely that the use of groundwater at the site would impact upon human beings.

Should waste be incorrectly handled or stored at the development site, it has the potential to cause an adverse impact upon human beings through nuisance, including visual, odour, pests, and pollution to groundwater and surface-water.

During the construction phase, wastes would be segregated and stored in suitably contained waste receptacles at the site compound. This would considerably reduce the potential risk of pollution to groundwater. Waste would be removed from the development on a regular basis, to avoid the accumulation of high waste volumes, which could cause nuisance. It should also be noted that given the inert nature of the majority of C&D waste types, it is unlikely that issues regarding odour or pests would arise.

Any hazardous waste generated during the construction phase would be managed in accordance with the Waste Management (Hazardous Waste) Regulations 1998 and 2000, and would be stored separately from non-hazardous waste, appropriately labelled and stored upon bunds where appropriate.

The operational phase of the proposed development would give rise to a variety of waste types, with waste management undertaken by suitably licenced waste contractors. Collections of waste / recyclables would be undertaken on a regular basis, therefore the potential for odour and pest nuisance would not be considered significant.

16.6 MATERIAL ASSETS, BIODIVERSITY, WATER QUALITY AND SOILS

The proposed development would alter flora cover and the species of fauna supported due to land take, comprising of recolonising bare ground (ED3), wet grassland (GS4) and scrub (WS1) habitats, and soil disturbance works. However, this impact would be minor, given that ED3 habitat can be considered modified and of low ecological value, given that wet grassland habitat is common in the general area, and given that replacement planting would be undertaken to compensate for the loss of WS1 habitat.

Waste has the potential to impact upon water quality and biodiversity during both the construction phase and operational phase, by causing pollution to soils and water through leaching of materials, and subsequently to aquatic biodiversity, and by potentially attracting pests / vermin to the site. However, as discussed in Section 13, wastes generated during the construction phase would be stored in suitably contained waste receptacles at the site compound, with the majority of the waste inert in nature, reducing the potential of pollution to soils and water.

It is not considered that there would be any significant impact upon soils and water, and thus biodiversity, due to waste management during the operational phase, given that waste would be collected by licenced waste contractors and recovered, recycled or disposed of at appropriately licenced waste facilities, which would have environmental controls in place as standard.

16.7 MATERIAL ASSETS AND NOISE

The proposed development is located in a rural agricultural area, primarily dominated by pastureland. Increased noise emissions during the construction or operational phases would have the potential to impact upon livestock due to disturbance. The potential for noise associated with the proposed development on livestock would be considered low, given the temporary duration of construction works and given that no significant increase in noise emissions would be anticipated for the operation of the proposed development. Furthermore, the character of noise from the existing and proposed farms would be similar and any livestock within the immediate area of the proposed development would be acclimatised to the existing farm noise environment.

16.8 MATERIAL ASSETS AND AIR

As noted above, the proposed development is located in a rural agricultural area. The proliferation of dust during construction has a nuisance value and livestock would be at risk to eye irritation from high levels of wind blowing dust particles. Given the proposed mitigation measures for dust control and dust suppression, in addition to the transient nature of construction works, the potential for dust to impact upon livestock would be considered low.

16.9 WATER QUALITY AND SOILS

It is considered unlikely that there would be a potential impact on water quality during the construction phase of the proposed development due to the potential release of suspended solids during soil disturbance works. The proposed construction area contains no field drainage or or farmyard drainage pipes. Rainwater in the area drains directly to ground, with any suspended entrained solids being deposited on the soil surface.

16.10 WATER QUALITY AND HUMAN BEINGS

A deterioration in groundwater quality has the potential to impact upon human beings by adversely affecting drinking water quality. The proposed development would have the potential to impact on groundwater quality during both the construction and operational phases.

During the construction phase, the development would have a potential impact on groundwater quality due to potential hydrocarbon and uncured concrete spillages. Groundwater would be protected through the implementation of mitigation measures, which include the appropriate storage of potentially polluting substances, the regular inspection and maintenance of construction plant, the provision of spill kits onsite and supervised concrete works.

The operational phase of the development has the potential to impact upon groundwater and surface water quality through surface-water run-off emissions.

The site drains naturally through a field drain and ultimately to the Ollatrim River south of the site which feeds into the Nenagh River. Stormwater from roofs and clean yards would discharge through the surface water collection network. This water should be uncontaminated and therefore should have no impact on surface or groundwater.

There is a septic tank present, servicing the staff toilet/facilities on site. The septic tank is in place for the disposal of domestic sewage from the site. The percolation area of the septic tank is the source of the only emission to the ground from this facility.

Slurry is stored at the site pending despatch to farmers who order a supply for landspreading purposes as an organic fertiliser on their lands. Slurry storage is fitted with leak detection, and monitoring of leak detections systems is required under the sites IE licence.

Groundwater in the Woodville area is localised and has poor movement through the shallow epikarstic fissures common in Ballysteen Formation bedrocks. There are no groundwater abstractions, other than that used by Woodville Pig Farms, within close proximity to the site. In the unlikely event of groundwater contamination at the site, there would be no significant risk of impacts upon human beings.

16.11 WATER QUALITY AND BIODIVERSITY

The construction phase of projects has the potential to impact upon flora and fauna due to a deterioration in water quality. Risks to water quality could arise due to the potential release of

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils).

However, it should be noted that in the absence of any watercourses or drainage ditches within the vicinity of the development site, and with the nearest watercourse (Wilton Stream), located approximately 300m from the proposed development footprint, and given that there are no open stormwater drains or gullies into which potential run-off from construction activities could enter, the potential for construction works to impact upon surface water quality, and thus aquatic biodiversity, would not be considered significant.

It is not anticipated that the operation of the proposed development would have a significant impact upon aquatic biodiversity. No significant impact on water quality would take place due to drainage from the site. Stormwater from the site comprises of clean rainwater run-off from the roofs. Stormwater from the proposed structures would connect to this existing stormwater network prior to discharge to the Wilton Stream.

There are no process effluent emissions from the site, with all animal manure stored within underground slurry tanks, awaiting collection for landspreading activities. All slurry tanks have been designed to ensure the site has sufficient storage capacity for any manure generated onsite. The existing slurry tanks are fitted with leak detection systems, which would also be incorporated within the proposed new slurry tanks.

The landspreading of animal manure has the potential to impact upon biodiversity, either through pollution of waterbodies or the enrichment of natural vegetation. However, manure is, and would continue to be, collected by registered contractors / farmers, for application to lands held by third parties in the area. The transport and spreading of the manure is managed in compliance with the Nitrates Regulations (S.I. No. 605 of 2017).

The spreading of manure would be undertaken in accordance with the setback distances from surface waterbodies and abstraction points specified in the Nitrates Regulations. This would minimise the risk of any pollution occurring and protected sites being impacted due to the spreading of organic fertilisers. As manure from the development is a replacement for other chemical and organic fertilisers on the current, proposed and any future potential spreadlands, it is considered that the impact of manure being used as a fertiliser would have a neutral to no significant additional impact upon the biodiversity of landspreading areas.

No adverse potential impacts upon water quality would be anticipated due to accidents and potential spills and leaks, given the absence of watercourses within the vicinity of the site, the low volume of stored chemicals onsite and given that chemicals and oils are stored upon bunds, in accordance with the site's Industrial Emissions (IE) Licence.

16.12 LANDSCAPE AND VISUAL, SOILS AND HUMAN BEINGS

There would be no significant effect on the visual landscape due to the proposed development, the visibility of the development would be limited to parts of the roofs of the proposed buildings when viewed from the south of the site.

This character proposed development would be in conformance with the character of the existing agricultural environment. The proposed structures would have the same design (i.e.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
WOODVILLE PIG FARMS LTD, BALLYMACKEY, CO. TIPPERARY

colour, height) characteristics as the existing buildings at the site helping to reduce any visual impact.

Given the nature, location and design features of the proposed buildings, it is considered that the proposed development would have a non-significant Minor-Negligible effect on the level of landscape and visual impact in the area.

16.13 CULTURAL HERITAGE, SOILS AND HUMAN BEINGS

Archeologically important sites, buildings of historic, artistic or architectural interest and sites of cultural heritage form part of the landscape of North County Tipperary. Potential impacts to archaeological, architectural and cultural sites may occur during excavation and soil movements during the construction phase of the development.

There are no protected archaeological, architectural or cultural heritage sites within the immediate proposed development site. The nearest recorded monument is approximately 1.4km from the site, which is also the nearest visible monument.

The protected structure Woodville House, (RPS Ref. S404) is located approximately 170m to the east of the existing piggery facility. The House and its curtilage, inclusive of its associated outbuildings, are situated in closer proximity to the proposed development site boundary; the northeast boundary of the proposed development site abuts the outbuildings to the north of the House.

No works are proposed within close proximity to Woodville House or the associated outbuildings. However, excavation works would occur within the curtilage of the historic grounds of the residence. Mitigation measures have been proposed, including recommended avoidance, pre-construction archaeological test excavations, and archaeological monitoring during construction.