PREFACE

This Environmental Impact Statement (EIS) for the N9/N10 Kilcullen to Waterford Scheme: Waterford to Powerstown consists of the following documents:

Volume 1	Non-Technical Summary and Main Text
Volume 2 – Book 1	Drawings (containing the engineering drawings)
Volume 2 – Book 2	Drawings (containing the environmental drawings)
Volume 3	Appendices

The Non-Technical Summary is also available as a separate document.

ACKNOWLEDGEMENTS

This EIS has been prepared by Arup Consulting Engineers, Roughan & O'Donovan – FaberMaunsell Alliance and specialist environmental sub-consultants, with the assistance of Tramore House Regional Design Office, on behalf of Kilkenny County Council.

SPECIALIST ENVIRONMENTAL CONSULTANTS

Community	Patrick J. Newell Consulting Engineers
Noise and Vibration	AWN Consulting Limited
Air Quality	Arup Menzies
Landscape and Visual	Brady Shipman Martin
Terrestrial and Aquatic Ecology	Natura Environmental Consultants
Hydrogeology (Wetland Sites only)	Minerex Environmental Limited
Climate	AWN Consulting Limited
Agriculture	Crop Husbandry Advisory Services
Archaeology, Architecture and Cultural Heritage	Valerie J. Keeley Limited

SPECIALIST REPORTS

The reports prepared by each of the above specialists have been incorporated into this EIS document. Full, detailed reports were prepared for a number of aspects of the road development, which have been summarised for clarity in the EIS. The full reports for these aspects are available upon request, namely:

Reports on the Hydrogeological Impacts at Hugginstown Fen & Danganbeg Wetland – by Minerex Environmental Limited

Reports on the Archaeology & Cultural Heritage and Architectural Heritage – by Valerie J. Keeley Limited

NOTE ON STAGE OF DESIGN

All proposed road levels indicated in the Environmental Impact Statement or shown on drawings are based on the Preliminary Stage Design and may be revised at the Detailed Design Stage. Modifications may be made to avail of opportunities to improve the design in the light of experience of the ground conditions or other innovations, provided this has no significant adverse environmental effects.

NOTE ON CHAINAGE GAP

Chainages between Ch. 49+289 and 60+000 have not been used, to ensure that each Design Consultant has distinct chainages. Readers should note that the road alignment at Ch. 60+000 is a continuation of the alignment at Ch. 49+289.

TABLE OF CONTENTS (VOLUME 1 – MAIN TEXT)

The Main Text in Volume 1 contains the following:

- List of Abbreviations
- Glossary of Terms
- Non-Technical Summary (also available as a separate booklet)
- Main EIS Assessment Text (Chapters 1.0 to 21.0)

LIST OF FIGURES (VOLUME 2) - CONTENTS

There are two separate Books of Drawings (Book 1 and Book 2), which contain the EIS Figures and the lists of figures.

LIST OF APPENDICES (VOLUME 3) - CONTENTS

As there are no appendices to accompany Chapters 1 to 6, the first appendix is numbered Appendix 7 as this relates to Chapter 7 of the main text. The following Appendices are contained in Volume 3:

Appendix 7.1	Supplementary Community Assessment Tables
Appendix 8.1	Noise Survey and Model Data
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Appendix 11.1	Hugginstown Fen Ecological Report
Appendix 11.2	Danganbeg Wetland Ecological Report
Appendix 12.1	Biological Evaluation of Watercourses
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Appendix 13.2	Danganbeg Wetland Hydrogeological Report
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Appendix 18.1	Catalogue of Architectural Heritage Sites

LIST OF ABBREVIATIONS

Below is provided a list of abbreviations used in this report. The list is not exhaustive and the definitions therein are not to be taken as comprehensive, but solely as an aid to the non-technical reader.

AADT	Annual Average Daily Traffic (total annual flows divided by 365)
ABP	An Bord Pleanála
BREEZE ROADS5	This is an air dispersion modelling package by Trinity Consultants designed to predict air quality impacts of carbon monoxide, nitrogen dioxide, particulate matter, and other inert pollutant concentrations from moving and idling motor vehicles at or alongside roadways and roadway intersections.
BTEX	This is an acronym for Benzene, Toluene, Ethylbenzene, and Xylene. This group of volatile organic compounds is found in petroleum hydrocarbons, such as gasoline, and other common environmental contaminants.
CCC	Carlow County Council
CDM	Clean Development Mechanism
Ch	Chainage
CH_4	Methane
CIRIA	Construction Industry Research and Information Association
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CPO	Compulsory Purchase Order
CRTN	Calculation of Road Traffic Noise
cSAC	candidate Special Area of Conservation
CSO	Central Statistics Office
dB	Decibel. The basic unit used for sound intensity. Decibels are measured on a linear scale which defines a logarithmic amplitude scale, thereby compressing a wide range of amplitude values into a small set of numbers.
dB (A)	A frequency weighting applied to sound measurements which approximates to the frequency response of the human ear.
$dBL_{A10(18\ hour)}$	The A-weighted sound level exceeded for 10% of an 18hr period. This index is used in the UK for measurement of road traffic noise for which the period is taken from 06.00 to 24.00hrs. It is the parameter typically used in Ireland for the purposes of assessing traffic noise.
DCMNR	Department of Communications, Marine and Natural Resources
DMRB	Design Manual for Roads and Bridges, UK
DOEHLG	Department of Environment, Heritage & Local Government
DTO	Dublin Transportation Office
EC	European Community
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESRI	Economic and Social Research Institute
ET	Emission Trading

EU	European Union
GAA	Gaelic Athletics Association
GHGs	Greenhouse Gases
g/km	Grams per kilometre
GSI	Geological Survey Ireland
GWP	Global Warming Potential
ha	Hectare
HCV	Heavy Commercial Vehicle
Hz (Hertz)	The frequency of sound is the rate at which a sound wave oscillates.
IPCC	Intergovernmental Panel on Climate Change
KCC	Kilkenny County Council
km	Kilometres
L_{Aeq}	The A-weighted equivalent continuous steady sound level during the sample period and effectively represents an average value.
L_{A90}	The A-weighted sound level that is exceeded for 90% of the sample period, it's generally used to quantify background noise.
L_{A10}	The A-weighted sound level that is exceeded for 10% of the sample period of one hour; this parameter gives an indication of the upper limit of fluctuating noise such as that from road traffic.
$L_{A10(1\ hour)}$	This is the noise level exceeded for just 10% of the time over the period of one hour.
$L_{A10(18\ hour)}$	This is the arithmetic mean of the values of $L_{A10(1\ hour)}$ for each of the one hour periods between 06:00 and 24:00hrs. $L_{A10(18\ hour)}$ is the parameter typically used in Ireland for the purposes of assessing traffic noise.
LOS	Level of Service
m^2	Square metre
m^3	Cubic metre
mm/s	Millimetres per second
mph	Miles per hour
m/s	Metres/second
Mt	Million tonnes
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NCCS	National Climate Change Strategy
NDP	National Development Plan 2000-2006
NHA	National Heritage Area
NIAH	National Inventory of Architectural Heritage
NMI	National Museum of Ireland
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen

NPW	National Parks and Wildlife
NRA	National Roads Authority
NRPMG	National Roads Authority Project Management Guidance
OPW	Office of Public Works
OS	Ordnance Survey
PC	Public consultation
PM_{10}	Fine Particles (airborne particles)
pNHA	Proposed National Heritage Area
PPV	Peak Particle Velocity
PSD	Prevention of Significant Deterioration; to ensure air quality remains good, while maintaining a margin for future growth
RMP	Records of Monuments and Places
RPS	Record of Protected Structures
SEHB	South Eastern Health Board
SMR	Site and Monuments Record
SO_2	Sulphur Dioxide
SPL	Sound Pressure Level
SRFB	Southern Regional Fisheries Board
UNFCCC	United Nations Framework Convention on Climate Change
USEPA	United States Environmental Protection Agency
VRT	Vehicle Registration Tax
WHO	World Health Organisation
$\mu g/m^3$	Micro grams per metre cubed

GLOSSARY OF TERMS

Below is provided a glossary of terms used in this report. This glossary is not exhaustive and the definitions therein are not to be taken as comprehensive, but solely as an aid to the non-technical reader.

0dB	The threshold of hearing.
120dB	The threshold of pain.
ACCOMMODATION WORKS	Ancillary works carried out by the road authority to mitigate the effects of the construction of a development (such as a road to a property).
AMBIENT NOISE LEVEL	This is characterised by the Equivalent Continuous Sound Level parameter (L_{Aeq}).
ANCILLARY ROAD DEVELOPMENTS	Developments works additional to but associated with the main project, similar to accommodation works.
ANNUAL INCIDENCE	The frequency of an occurrence over a one year period (January to December)
ANTHROPOGENIC	Made by people or resulting from human activities
AQUIFER	A geological formation with sufficient interconnected porosity and permeability to store and transmit significant quantities of water under natural hydraulic gradients.
AQUITARD	Is a low permeability formation which stores water but cannot supply production wells.
AT-GRADE ROUNDABOUT	Roundabout where at least two roads converge at the same level.
ATTENUATION / BALANCE PONDS	Pond used for the collection and slow release of road run-off.
BACKGROUND NOISE LEVEL	This is characterised by the L_{A90} parameter; the noise level exceeded for 90% of a measurement period.
BAFFLES	Obstruction placed inside a culvert to deflect and reduce the velocity of the flow through the culvert.
BARROW	A barrow is a raised mound of earth. They tend to have outer features such as a fosse and bank outside the central mound, they were used for ritual burial and have been dated to the Prehistoric period from the Neolithic to the Iron Age.
BASELINE CONDITIONS	The conditions, which prevail just prior to opening in the absence of the road development.
BERN CONVENTION	The Convention on the Conservation of European Wildlife and Natural Habitats – also known as the Bern Convention. Adopted September 1979 in Bern (Switzerland) and came into force 1 June 1982.
BIOGENIC	Describing changes in the environment resulting from the activities of living organisms
BIVALLATE	Two sets of ramparts.
BULLAUN STONE	A Bullaun is the name given to a large stone with a basin-like depression on its upper surface. It is possible that they were used as fonts.
BUNKERING	Refuelling of vessels used in the context of HCVs.

BURIAL	Burial site is a track of land used for burials. Burials sites may date to any period. See also Cist burial, Barrow and Cairn.
CAIRN	Mound composed of stones, sometimes with internal structures, usually a burial monument, but sometimes used as a memorial.
CAMPILE FORMATION	Geological areas of fine grained igneous volcanic rock and dark grey slate.
CANDIDATE SPECIAL AREA OF CONSERVATION	Statutory designation that has legal basis in the EU Habitats Directive as transposed into Irish law through the European Communities (Natural Habitats) Regulations, 1997 (S.I. 94 of 1997). A candidate SAC is a site that has been transmitted to the EU Commission for designation but still awaits completion of the formal designation process.
CARBONIFEROUS	A period in geological timescale of between 355-290 million years ago.
CARRIAGEWAY	The particular part of the road used by vehicular traffic.
CASHEL	A ringfort with stone instead of earthen banks.
CHAINAGE (CH) (chainage 0m).	Length in metres from the start of the road development
CIST	A Cist is normally built with stone slabs. They generally contain cremated remains in a pot or crouched skeletal remains. Bronze Age in date they may also have associated grave goods.
CONFINED AQUIFER	An aquifer that is isolated by having confining layers to maintain the pressure in the system at a pressure greater than atmospheric pressure.
CORBELLING	Slabs fitted together, with successive layers built inwards to create a domed effect; found in megalithic tombs and in some early churches and souterrains.
CRANNÓG	A Crannóg is an enclose built on a natural or artificial island in a lake. They are difficult to date precisely without excavation and may have their origins in the Neolithic period.
CROPMARK	Where buried features such as ditches or walls affect the covering soil and alter the colour of the surface vegetation and/or crop.
CULVERT	Structure or drain for the diversion of a stream or river.
CUTTING (CUT)	Section of earthworks where the level of the proposed road is below the original ground level.
DANISH C-VALUES	Contribution value, this is the maximum amount of any pollutant a company is allowed to emit in the air as an emission, these values are set by the Danish Environmental Protection Agency.
DELISTED SITES	Sites that are no longer considered to be of archaeological importance i.e. non-archaeological in nature or post date 1700.
DEMESNE	Lands held by a house or manor for its own use and occupation.
DETAILED AIR DISPERSION MODEL	This model incorporates a computerised air dispersion model called BREEZE ROADS5 designed by Trinity Consultants in the USA.
DO MINIMUM SCENARIO	This traffic scenario assumes that basic maintenance of the road as well as some minor improvements are carried out such as provision of a quality pavement or improvement of roadside

	drainage. The scenario also includes other committed road developments.
DO NOTHING SCENARIO	This traffic scenario assumes that no improvements will be carried out on the existing road network other than a basic level of maintenance on the existing road.
DO SOMETHING SCENARIO	This scenario assumes that the proposed road is constructed as described, and includes other committed road developments.
DOWN DIP	Rock formations that are laid down horizontally can be subjected to tectonic forces which can cause folding and faulting. These forces can cause the previously horizontal formation to become angled to the horizontal plane. The dip of a geological formation is the angle that it makes with a horizontal plane. The term *down dip* is in reference to that part of a formation that is at a lower elevation due to the formation being at an angle to the horizontal.
DÚN	A ringfort, usually with earthen banks, but a name also given to prehistoric ceremonial enclosures.
EARTHWORK	Any monument made entirely or largely of earth.
ECCLESIASTICAL REMAINS	The remains of any of a range of ecclesiastical buildings or enclosure. This could be the remains of churches or round towers for example.
ECCLESIASTICAL SITE	Includes a range religiously associated buildings or structures, generally forming a complex of features. This would include churches, graveyards, enclosures and round towers for example.
EIA	The process of examining the environmental effects of development from consideration of environmental aspects at design stage, though to preparation of an Environmental Impact Statement, evaluation of the EIS by a competent authority and the subsequent decision as to whether the development should be permitted to proceed, also encompassing public response to that decision (EPA, 1995b).
EIS	A statement of the effects, if any, which the proposed development, if carried out, would have on the environment (EPA, 1995b).
EMBANKMENT	Mounded earth on which the roadway runs.
ENCLOSURE	This can be applied to any area that is defined by walls, banks or ditches.
EPA BIOLOGICAL INDEX	A standard technique for which the water quality of a watercourse is assessed.
EXCAVATION	As an archaeological term, excavation means the manual and mechanical excavation by an archaeologist-led team with specific objectives as regards information, preservation, recording, etc. of archaeological information. Its purpose is to fully investigate archaeological deposits and features.
FARM	A single farming enterprise. Some farms will comprise of just one holding but are made up of two or more holdings.
FAUNA	A collective term for the animals of a region.
FIELD	An area of land which is surrounded by a permanent boundary (fence, ditch, hedge wall, etc) and is not subdivided by any permanent boundary.

FIELD SYSTEM	Pattern of fields, now no longer in use, sometimes visible as low earthworks and often associated with medieval or earlier settlements.
FILL	Material used for the raising of the level of the ground.
FLORA	A collective term for the plants of a region.
FOSSE	A ditch.
FUEL ECONOMY LABELLING	A label which contains consumer information regarding the official fuel consumption and official specific emissions of CO_2 of the car.
FUGITIVE DUST EMISSIONS	Occur from the surface if the winds are sufficiently strong and turbulent and the surface dry and loose enough to cause re-suspension from the ground and road surfaces.
FULACHT FIADH	Fulachta fiadh tend to date from the mid to late Bronze Age (1500B. C. to 500 B.C. approximately). They are one of the most common field monuments in Ireland and are believed to have been used for cooking purposes.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY	This is a method for separating mixtures of compounds by partitioning the components between a flowing gas (mobile phase) and a non-volatile liquid phase (stationary phase). An additional separation according to mass takes place by bombarding the compounds with electrons, then separating by passing through a magnetic field.
GEOMETRICS	Details of the various vertical and horizontal curves and straights used to make up the road alignment.
GEOPHYSICAL SURVEY	A non-disturbance survey method involving one or more of the following: electrical resistivity, various types of magnetometry and ground penetrating radar.
GEOPHYSICS	A non-disturbance survey method involving one or more of the following: electrical resistivity, various types of magnetometry and ground penetrating radar.
GEOTEXTILES MATERIALS	Fleece lining providing a protection, separation or drainage layer used for example in road construction.
GOUGE CORES	Hand augers for bogs.
GRADE SEPARATED JUNCTION	Road junction at which at least one road passes over another.
GRAVEYARD	A graveyard is on consecrated ground with defined grave markers usually enclosed by a wall or bank and frequently associated with remains of a church.
GREENHOUSE GASES (GHG'S)	Gases which absorb the longer wavelength radiation that would otherwise be lost in space thus leading to an increase in the temperature of the earth. So far about 30 greenhouse gases produced by human activity have been identified. The main gases identified are carbon dioxide (CO2), methane (CH4), chlorofluorocarbons (CFCs) and nitrous oxide (N2O).
GROUNDWATER	Water that occupies pores and crevices in rock and soil, below the surface and above a layer of impermeable material.
HABITAT	The dwelling place of a species or community which provides a particular set of environmental conditions (e.g. forest floor).
HENGE	Large earthen embanked enclosure with an internal ditch and external bank.

HILLFORT	Large Late Bronze Age/Iron Age defensive hilltop enclosure defined by one or more large ramparts and consisting of banks with external ditches.
HOLY WELL	Holy wells were customarily visited for cures and are often associated with a local saint. The origins of their use are undateable but they were used throughout the early medieval period and many are still in use today.
IMPACT OF SIGNIFICANCE	Depends on the nature of the environment affected, the duration of the impact and the probability of its occurrence.
IMPACT	The degree of change in an environment resulting from a development (EPA, 1995b).
IN-SITU	In its original place, in relation to archaeology it refers to the preservation of archaeological sites/features without any disturbances.
INTERCHANGE	Road junction, generally grade separated.
INVERT	The lowest visible surface, the floor of a culvert, drain, sewer or tunnel.
IRON AGE	Prehistoric period from *c*. 500 BC to *c*. 500 AD. Also described as the Celtic period, when influences from central Europe and Britain led to the adoption of the Celtic language and the development of an Irish style of Celtic art.
JOINT IMPLEMENTATION	The Kyoto Protocol establishes a mechanism whereby a developed country can receive "emissions reduction units" when it helps to finance projects that reduce net emissions in another developed country (including countries with economies in transition).
KERBING/KERBSTONES	Large stones placed around the edge of a cairn or mound to define and consolidate the monument; a retaining wall; in passage tombs, they can be decorated with art.
KICK-SAMPLING	Kick sampling is the method of collecting biological samples from the watercourses by kicking the watercourse substrate for a set period of time to disturb the invertebrates present and allow them to be caught in the net.
KYOTO PROTOCOL	An international agreement reached in Kyoto at the Third Conference of the Parties to the U. N. Framework Convention on Climate Change (COP 3) in 1997. The Protocol established specific targets and timetables for reductions in greenhouse gas emissions to be achieved by the framework's signatories.
LAND HOLDING	An integral undivided area of land comprising one or more fields that is in single ownership. Where an area of land is in single ownership but has a public road passing through it the public road is considered to have divided or split the area of land into two land holdings.
LEVEL OF SERVICE (LOS)	The term used to represent an objective average journey speed, under ideal conditions, combined with satisfactory conditions for overtaking and driver operation (as defined by the USA Highway Capacity Manual).
LIGHT-OPES	Light openings

LIME KILN	A stone and brick structure utilised for the burning of lime. Mostly built in the eighteenth and nineteenth centuries when the burning of lime as an agricultural fertiliser was widespread.
LIMIT VALUE	Specified in European Union air quality Directives as a concentration of a pollutant, which must not be exceeded in order to protect health.
MASS PATH	Locally known path that leads to secret mass site, often located on poor land or near watercourses where footprint can not been traced.
MEGALITHIC TOMB	Literally 'large stone,' a Neolithic tomb.
MESOLITHIC	Middle Stone Age (*c*. 10,000–4000 BC).
METHODOLOGY	The specific approach or techniques use to analyse impacts or describe environments (EPA, 1995b).
MILLRACE	A millrace is the current of water that drives a mill wheel.
MITIGATION	To mitigate means to ease or soothe the effect of. Mitigation measures suggest ways to avoid or lesson the negative effects of a project on the environment.
MOATED SITE	Generally a rectangular or square earthwork with a most. Common in the southeast of the country and generally associated wit the Anglo-Norman settlements. They tend to date to the late thirteenth and early fourteenth centuries.
MONTREAL PROTOCOL	Treaty signed in 1987 by 24 nations to cut the emissions of chlorofluorocarbons (CFCs) into the atmosphere.
MOTTE	A raised, flat topped mound of earth. They were the earliest earthwork defences of the Anglo Normans. They date to the late twelfth and thirteenth centuries.
MOUND	The term "mound" is used when a site cannot be identified as a tumulus or barrow, due to usual morphology, or where the siting might indicate a possible modern origin. See burial and barrow.
MULTIVALLATE	More than two sets of ramparts.
NATIONAL CAR TEST	The National Car Test is a compulsory test to ensure vehicles comply with set standards in terms of road safety and environmental protection.
NATIONAL GHG INVENTORIES	A national greenhouse gas inventory is a record of the emissions by sources and uptake by sinks of greenhouse gases and their precursors that arise from human activities in a country over a year.
NEGATIVE IMPACT	A change, which reduces the quality of the environment.
NEOLITHIC	Pertaining to the New Stone Age *c.*4000–2500 BC, when agriculture and cattle husbandry was developed in Ireland.
NEUTRAL IMPACT	A change, which does not affect the quality of the environment.
NEW SEVERANCE	New road or increased traffic on an existing road forms a barrier between people and community facilities.
OCCUPATION SITE	A settlement site; the term is usually used to indicate a prehistoric site.

OVERBURDEN	Any non-lithified material that rests upon solid rock. Lithification is defined as the process, which results in the formation of massive rock from a loose sediment.
PASSAGE TOMB	Megalithic tomb dating to the Neolithic characterised by an oval or circular mound, kerbing, and a passage, often terminating with a chamber in which cremated burials were placed; often situated on hilltops.
PERCENTILE	This is a value on a scale of one hundred that indicates the percent of a distribution that is equal to or below it.
PHOTOSYNTHESIS	A chemical process that occurs in green plants in which glucose and oxygen are produced from carbon dioxide and water in the presence of chlorophyll and light energy.
PILING	Process of placing into the ground a timber, steel or reinforced concrete post, usually vertical, to carry vertical or horizontal.
PIT	Any artificially dug hole over a certain size may be described as a pit. They are a common feature in all periods of archaeology.
POLLUTION	The direct or indirect alteration of the physical, chemical, thermal biological, or radioactive properties of any part of the environment in such a way as to create a hazard or potential hazard to the health, safety or welfare of living species.
POSITIVE IMPACT	A change, which improves the quality of the environment (for example, improving landscape diversity; removal of existing negatively impacting aspects; etc).
POST-ESTABLISHMENT IMPACT	In relation to landscape, impact is assessed in the 15th year opening. At such stage proposed landscaping will have developed as effective mitigation.
POTENTIAL SITE	This is the term given to any site that has archaeological potential. It may have been identified due to the presence of earthworks for example but no definitive dating evidence may be forthcoming form them. Potential sites could belong to any archaeological period.
PREDICTOR	Sound Level Analyser, proprietary noise calculation package for computing noise levels in the vicinity of noise sources.
PRE-ESTABLISHMENT IMPACT	In relation to landscape, the assessment is made in the winter period following construction at initial operation of the road winter proposed landscaping still has to develop as effective mitigation, usually 5 to 7 years after planting and continues in effectiveness with continued maturity.
PROPOSED NATURAL HERITAGE AREA	This is a statutory designation that replaced the previous 'Area of Scientific Interest (ASI)', under the Wildlife (Amendment) Act, 2000. pNHAs are legally protected from damage from the date that they are formally proposed.
PUBLIC TRANSPORT MEASURES	In the context of greenhouse gas emissions, measures to increase the utilisation and appeal of public transport such as increase provision and frequency of rail and bus routes.
Q VALUE SYSTEM	The 'Q value' system is based on the sensitivity or tolerance of various groups of invertebrates to pollution, and is used to evaluate water quality by identification of invertebrates.
RAHEEN	Small fort.

RATH	A ringfort, usually with earthen banks, or any circular enclosure.
REVEAL	The side of an opening in a wall between the framework and the outer face of the wall.
RIBBON-TYPE DEVELOPMENT	The development of single dwelling units along the roads, which radiate out of a town.
RING BARROW	Barrow with raised or domed central area.
RING DITCH	Barrow with flat or dished central area.
RINGFORT	A ringfort is a roughly circular area enclosed by a bank and ditch. Their diameter varies greatly and it is believed that they were used as enclosed farmsteads or cattle enclosures. They date from the early Medieval period onwards.
RING-WORKS	Ring-works comprised of slightly raised circular or near-circular area enclosed by a substantial inner bank and outer ditch and are thought to have been an alternative defensive structure to the motte.
RIPARIAN ECOLOGY	Ecology adjacent to a river/ stream.
RUN-OFF	The gravity flow of water in open channels.
SALMONID WATERS	High quality waters suitable for the maintenance of viable self-sustaining populations of wild salmon and trout.
SCREENING AIR MODEL	This model incorporates the screening spreadsheet given in the Design Manual for Roads and Bridges. Reference DMRB (2003) *Volume 11 - Environmental Assessment, Section 3, Part 1*
SENSITIVE RECEPTORS	Any element in the environment, which is subject to impacts (EPA, 1995b).
SETASIDE	Areas of arable land left uncultivated.
SHORTENED MEASUREMENT PROCEDURE	This is a method whereby $L_{A10(18\ hour)}$ values are obtained through measurement and calculation.
SKEWED BRIDGES	Bridges not perpendicular to the roadway.
SOFFIT	The underside of an opening in a building, such as an arch, window or door.
SOUTERRAIN	Underground passages probably built for storage purposes or possibly as temporary refuges; often associated with ringforts.
STANDING STONE	A Standing Stone is simply an upright stone. They probably date to the Bronze Age.
SURROUND	A frame, as of any architectural feature, like a door-surround.
SUSTAINABLE DEVELOPMENT	Defined by the Bruntland Commission (1987) as “development that meets the needs of the present without compromising the ability of the future generations to meet their own needs”
TEST EXCAVATION	A form of archaeological excavation where the purpose is to establish the nature and extent of archaeological deposits and features present in a location that is proposed for development. Its purpose is not to fully investigate those deposits or features.
TEST TRENCHING	see Test Excavation.
THERMAL DESORPTION	This is the process of removing an adsorbed material from the solid on which it is adsorbed by the use of heat.

TOGHER	A Togher is a wooden trackway across a bog or marshy area. Excavated examples date from the Neolithic up until the later Medieval period.
TOPONOMY	The study of placenames. Where a monument has been forgotten or destroyed, a place name may still refer to it and may indicate the possibility that the remains of certain sites survive below the surface.
TOWER HOUSE	Tower Houses date to the fifteenth or sixteenth centuries. They are usually rectangular in design and three to five stories in height.
TOWNLAND	Townlands originally consisted of a number of sub-divisions such as gneeves and ploughlands but they are now recognised as the smallest administrative division in the country.
TRACKWAYS	Trackways and routes through the landscape are known from the Neolithic to the post-Medieval periods. See also togher.
TRAFFIC MANAGEMENT MEASURES	Measures to such as bus routes, park & ride, cycling and improved traffic signalling and signposting, which will reduce congestion and increase fuel efficiency.
TUMULUS	Burial mound composed of earth, sometimes with internal structures.
UNCONFINED AQUIFER	An aquifer whose upper surface is at atmospheric pressure.
UNCOURSED	Masonry laid in a random form.
UNDERBRIDGE	An underbridge allows the proposed road to pass over the existing road/railway.
UNIVALLATE	Single set of ramparts.
VISUAL INTRUSION	The impact on a view without blocking.
VISUAL OBSTRUCTION	The impact on a view involving blocking thereof.
VOUSSOIR	A wedge-shaped stone or brick forming part of an arch or vault.
ISOMER	This is a chemical term for where a molecule has the same number and kind of atoms and hence the same molecular weight, but differs in respect to the arrangement of atoms and therefore may display different properties.
ZONE OF ARCHAEOLOGICAL POTENTIAL	An exclusion area around an archaeological site or monument where potential greatness exists for the recovery of archaeology associated with a site or monument.