

The Wrexham (Gas Fired Power Station) Order

5.4 Level 2 Flood Consequence Assessment

Planning Act 2008 The Infrastructure Planning
(Applications: Prescribed Forms and Procedure) Regulations 2009

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Wrexham Energy Centre Level 2 Flood Consequence Assessment Wrexham Power Limited

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List of Abbreviations

AEP	Annual Exceedance Probability
BGS	British Geological Survey
CCGT	Combined Cycle Gas Turbine
CFMP	Catchment Flood Management Plan
CHP	Combined Heat and Power
CSM	Conceptual Site Model
DAM	Development Advice Map
DCO	Development Consent Order
EIA	Environmental Impact Assessment
FCA	Flood Consequence Assessment
HDD	Horizontal Directional Drilling
Km	Kilometres
LDF	Local Development Framework
LFRMS	Local Flood Risk Management Strategy
LPA	Local Planning Authority
M	Metres
m ²	Metres Squared
Mm	Millimetres
MWe	Mega Watt Electrical
NVZ	Nitrate Vulnerable Zone
PFRA	Preliminary Flood Risk Assessment
PPW	Planning Policy Wales
SPEN	Scottish Power Energy Networks
TAN	Technical Advice Note
UK	United Kingdom
WCBC	Wrexham County Borough Council
WFD	Water Framework Directive

◆ Executive summary

- I. This Flood Consequence Assessment (FCA) is based on available existing information (including the Local Flood Risk Management Strategy (LFRMS) for Wrexham County Borough Council (WCBC) published in April 2013¹) as well as other relevant publicly available information, to confirm the extent of flood risk at the Site. The report includes:
- II. This FCA includes a review of site specific information and likely extent of flood risk; identification of surface water management issues related to the Scheme that may warrant further consideration; identification, scoping and review of other flood risks as required i.e. groundwater flooding; and determining whether further assessment is required.
- III. This FCA goes on to conclude that the following sources of flood risk will not require further assessment and are unlikely to present a risk to the Site and surrounding area:
 - River flooding (fluvial) – works proposed within the Site falls within flood zone A and as such is considered to be at low risk from fluvial flooding, and hence will not require further assessment or the implementation of mitigation measures.
 - Coastal/ tidal flood risks – the Site is not near the sea.
 - Sewer flooding – the Order Limits contains no active sewer network.
- IV. Infrastructure failure – land within the Site is not impacted by the potential flood risk from reservoirs or lakes and therefore is not considered at risk of this source of flooding

¹ Wrexham County Borough Council, April 2013, Local Flood Risk Management Strategy

◆ Introduction

BACKGROUND

- 1.1 Wrexham Power Limited (WPL) is proposing to construct, maintain and operate a gas-fired power station on land at Wrexham Industrial Estate (WIE), to the east of Wrexham.
- 1.2 The Scheme includes a Combined Cycle Gas Turbine (CCGT) Power Station. To operate, it will require a connection to the gas transmission network for importing the natural gas fuel, and a connection to the electricity network to export the power generated.
- 1.3 The Power Station Complex Site and the Gas Connection (together they are referred to as the Wrexham Energy Centre ('WEC') or the 'Scheme') have separate consenting requirements. However, the Environmental Statement (ES) assesses both elements in order to identify, insofar as possible, the likely significant environmental effects of the Scheme as a whole. As such, this CTMP also considers the Scheme as a whole.
- 1.4 The Power Station Complex would be fuelled by natural gas and would have an electrical generation capacity of up to 299 megawatts (MWe). The electricity generated would be exported to the local 132kV electrical distribution network currently operated by Scottish Power Energy Networks (SPEN).
- 1.5 The location of the Scheme, which includes the Power Station Complex and Gas Connection (approximately 3.5 km in length). The Power Station Complex Site is situated to the immediate north-east of Wrexham Industrial Estate in an area dominated by industrial complexes, to the west and south, and by agricultural land, to the north and east. The Gas Connection Route runs through agricultural land to the south and east of Wrexham Industrial Estate to the Above Ground Installation (AGI) adjacent to the Maelor Gas Works approximately 2.5 km to the south-west.
- 1.6 The Scheme comprises:
 - a combined cycle gas turbine (CCGT) power station (the "Power Station Complex") (work numbered 1 in Schedule 1 to the Order) which would be fuelled by natural gas and would have an electrical generation capacity of up to 299 megawatts (MWe);
 - the temporary and permanent Laydown Areas (works numbered 2A and 2B respectively in Schedule 1 to the Order);
 - surface water drainage works (work numbered 3 in Schedule 1 to the Order);
 - the landscaping and ecological mitigation works (work numbered 4 in Schedule 1 to the Order);

- the alteration and use of the Kingmoor Park Access Road (work numbered 5 in Schedule 1 to the Order) (together the "Power Station Complex Site");
- the gas connection and an Above Ground Installation (AGI) (the "Gas Connection").

- 1.7 A description of the Scheme is provided in chapters 1 and 4 of the Environmental Statement (ES) (document reference 6.2). The Power Station Complex would be fuelled by natural gas and would have an electrical generation capacity of up to 299 megawatts (MWe).
- 1.8 Developments have the potential to be at risk from a range of flooding mechanisms that increase the potential flood risk to a development and the surrounding area. As such flood risk is assessed with respect to damage to properties, risk to human life, and the effect the development may have on surrounding bodies of water and drainage systems.
- 1.9 This Level 2 Flood Consequence Assessment (FCA) has been prepared based on the Level 1 FCA² which identified the Scheme as being at risk from flooding and includes fluvial flooding, groundwater flooding, overland flooding, flooding from canals and artificial waterways and reservoir / lake flooding.
- 1.10 The FCA has been prepared to examine the possible sources of flooding, in line with the guidance provided in the Technical Advice Notes (TAN); TAN 15 Development and Flood Risk³ and the policy and approach set out in the Planning Policy Wales (PPW)⁴ in relation to development and flooding.

REPORT SCOPE

- 1.11 The FCA is based on readily available existing information (including the Local Flood Risk Management Strategy (LFRMS) for Wrexham County Borough Council (WCBC) published in April 2013⁵), as well as other relevant publicly available information, to confirm the extent of flood risk at the Site.
- 1.12 The report includes
- a review of the Site information and likely extent of flood risk to the Site;
 - identification of surface water management issues related to the Scheme that may warrant further consideration;

² Atkins, 2012, Wrexham CCGT Power Station and Connections, Flood Consequence Assessment Level 1 - Screening Study

³ Planning Policy Wales, Technical Advice Note 15, Development and Flood Risk. Available at: <http://wales.gov.uk/docs/desh/publications/040701tan15en.pdf>

⁴ Welsh Government, 2016, Planning Policy Wales, Edition 8.

⁵ Wrexham County Borough Council, April 2013, Local Flood Risk Management Strategy

- identification, scoping and review of other flood risks as required i.e. groundwater flooding; and
 - determining whether further assessment is required.
- 1.13 An FCA should consider a range of flooding mechanisms to satisfy the following three key objectives to develop a full appreciation:
- of the consequences of flooding on the Scheme;
 - of the consequences (i.e. the overall impacts) of the Scheme on flood risk elsewhere within the catchment for a range of potential flooding scenarios up to that flood having a probability of 0.1 %; and
 - whether appropriate mitigation measures can be incorporated within the design of the Scheme to ensure that the Scheme minimises risk to life, damage to property and disruption to people living near the Site and working on the Site or elsewhere in the floodplain.
- 1.14 Flood risk should be considered alongside other spatial planning matters such as transport, housing, economic growth, natural resources, regeneration, biodiversity, the historic environment and the management of other hazards. Policies should recognise the positive contribution that avoidance and management of flood risk can make to the development of sustainable communities, including improving local amenities and better overall quality of life.
- 1.15 An FCA should be carried out to an appropriate degree at all levels of the planning process. It should assess the risks of all forms of flooding to and from the Scheme, taking into account climate change, and should inform the application of the sequential approach if applicable.
- 1.16 Construction Industry Research and Information Association (CIRIA) C624 “Development and Flood Risk – Guidance for the Construction Industry”⁶ recommends a phased approach with three levels of assessment as defined below:
- Level 1: Screening study to identify whether there are any flooding or surface water management issues related to a Scheme that may warrant further consideration. The screening study will ascertain whether a Level 2 or 3 FCA is required;
 - Level 2: Scoping study to be undertaken if the Level 1 FCA indicates that the Scheme may lie within an area that is at risk of flooding, or that the Scheme may

⁶ Construction Industry Research and Information Association (CIRIA), 2004, CIRIA C624: Development and Flood Risk – Guidance for the Construction Industry

increase flood risk due to increased run-off. This study should confirm the sources of flooding which may affect the Scheme; and

- Level 3: Detailed study to be undertaken if the Level 2 FCA concludes that the quantitative analysis is required to assess the flood risk related to the Scheme.

1.17 This report has been prepared to identify potential sources of flooding and the likely mechanisms by which flooding could occur with respect to the Scheme. Potential sources of flooding and associated mechanisms identified for review in the Level 1 FCA² are as follows:

- river (fluvial) sources - potential flooding resulting from watercourses;
- tidal flooding - potential flooding from the sea;
- groundwater flooding - potential flooding as a result of rising groundwater levels;
- overland/surface water (pluvial) flooding - potential flooding as a result of surface water flows from adjacent land;
- sewers and drains - potential flooding resulting from sewers or drains; and
- reservoir/lake flooding - potential flooding resulting from overtopping or bursting of reservoirs or lakes.

1.18 The Level 2 FCA presented includes:

- assessment of all forms of residual flood risk identified (fluvial flooding, groundwater flooding, overland flows, infrastructure failure);
- an assessment of the volume of surface water run-off likely to be generated by the development and proposals for its management;
- the likely impact of any displaced water on third parties caused by alterations to ground levels;
- estimates of how climate change could affect the probability and intensity of flood events with details of how the development remains safe without increasing flood risk for its design life; and
- consideration of the proposal relative to the existing WCBC LFRMS.

RELEVANT POLICY, LEGISLATION AND GUIDANCE

Overview

1.19 The Level 2 FCA has been undertaken using the following legislation and guidance:

- Flood and Water Management Act 2010⁷;
- Flood Risk Regulations 2009;
- Planning Policy Wales TAN 15 Development and Flood Risk; and
- LFRMS for Wrexham.

Planning Policy Wales

1.20 PPW (Edition 8) published in January 2016, is a key part of the Welsh Government's guidance in relation to flood risk. The Welsh Government's objectives are to:

- maximise environmental protection for people, natural and cultural resources, property and infrastructure; and
- prevent or manage pollution and promote good environmental practice.

1.21 The planning policy document states that *"all development on land within the flood plain of a watercourse, or drained via a culvert, or on low lying land adjacent to tidal waters, is at some risk of flooding and whilst flood risk can be reduced by using mitigation measures it can never be completely eliminated"*.

1.22 The Welsh Government's objective for sustainable development is to move away from flood defence and mitigate the consequences of new development in areas of flood hazard towards a more positive avoidance of development in areas defined as being of flood hazard.

1.23 There is a requirement for local planning authorities to take a strategic approach to flood risk and consider the catchment as a whole, with Natural Resources Wales (NRW) having a key role in advising and helping planning authorities and developers to understand the causes and effects of flooding within a river catchment.

⁷ Flood and Water Management Act 2010

Technical Advice Note 15 (2004) - Development and Flood Risk (TAN 15)

1.24 TAN 15 has a precautionary approach to ensure that development is steered into the lowest flood risk area. It also sets out a justification test for any development that has to be located within a high risk flood zone. Development Advice Maps (DAMs), published in conjunction with TAN 15, designate different flood zones according to the flood risk associated with them and are set out below:

- A: Considered to be at little or no risk of fluvial or tidal/coastal flooding;
- B: Areas known to have been flooded in the past evidenced by sedimentary deposits;
- C: Based on Environment Agency extreme flood outline, equal to or greater than 0.1 % (river, tidal or coastal);
- C1: Areas of the floodplain which are developed and served by significant infrastructure, including flood defences; and
- C2: Areas of the floodplain without significant flood defence infrastructure.

1.25 The precautionary framework identified in the TAN 15 categorises different uses by their vulnerability.

Vulnerability classification

1.26 The vulnerability of the land use development must be taken into account as the consequences of flooding may not be acceptable for particular types of development. The TAN 15 Guidance defines the 'Flood Risk Vulnerability' classification (as shown in Table 1 below. However the Gas Connection is for utilities infrastructure and as such would be considered "Less Vulnerable".

Table 1: Vulnerability classification

Vulnerability classification	Development types
Emergency Services	Hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood
Highly Vulnerable	All residential premises (including hotels and caravan parks), public buildings (e.g. schools, libraries, leisure centres), especially vulnerable industrial development (e.g. power stations, chemical plants, incinerators), and waste disposal sites

Vulnerability classification	Development types
Less Vulnerable	General industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites

- 1.27 As the Power Station Complex Site is considered highly vulnerable, it is suitable for DAM Zones A, B and C1 (see Table 2 below) where the Justification Test is carried out along with an assessment of the acceptability of consequences and surface water management considerations.

Table 2: Flood risk vulnerability and flood zone development compatibility

Flood risk vulnerability classification	Emergency services	Highly vulnerable	Less vulnerable	Flood risk vulnerability classification	Other
Flood zone	DAM A	✓	✓	✓	✓
	DAM B	✓ If site levels are greater than the extreme flood levels	✓ If site levels are greater than the extreme flood levels	✓ If site levels are greater than the extreme flood levels	✓ If site levels are greater than the extreme flood levels
	DAM C1	Justification Test required including acceptability of consequences and refer to surface water requirements	Justification Test required including acceptability of consequences and refer to surface water requirements	Justification Test required including acceptability of consequences and refer to surface water requirements	Application of acceptability of consequences and refer to surface water requirements
	DAM C2	✗	✗	Justification Test required including acceptability of consequences and refer to surface water requirements	Application of acceptability of consequences and refer to surface water requirements
Key:	✓ ✗	Development is appropriate, justification test not applicable, refer to surface water requirements Development is not appropriate			

Justification test

1.28 TAN 15 Guidance states that “new developments should be directed away from zone C and towards suitable land in zone A, otherwise to zone B, where river or coastal flooding will be less of an issue. In zone C the tests outlined in sections 6 and 7 will be applied, recognising, however, that highly vulnerable development and Emergency Services in zone C2 should not be permitted. All other new development should only be permitted within zones C1 and C2 if determined by the planning authority to be justified in that location. Development will only be justified if it can be demonstrated that:-

- *its location in zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; or*
- *its location in zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;*
- *it concurs with the aims of Planning Policy Wales and meets the definition of previously developed land; and*
- *the potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in sections 5 and 7 and appendix 1 of the TAN 15 guidance document is found to be acceptable.”*

Acceptability of consequences

1.29 Whether a development should proceed or not, will depend upon whether the consequences of flooding of that development can be managed down to a level which is acceptable for the nature/type of development being proposed, including its effects on existing development.

1.30 Where development is justified, the assessment can be used to establish whether suitable mitigation measures can be incorporated within the design to ensure that development is as safe as possible and there is:

- *minimal risk to life;*
- *minimal disruption to people living and working in the area,*
- *minimal potential damage to property;*
- *minimal impact of the scheme on flood risk generally; and*
- *minimal disruption to natural heritage.*

- 1.31 The implementation of protection measures does not eliminate the risk of flooding and land protected by defences will be extremely vulnerable in the event of overtopping or breach due to the speed of the inundating flood waters.
- 1.32 The assessment should include:
- *the consequences of flooding for the type and nature of the proposal and the developments flood resilience;*
 - *measures to manage the consequences of flooding and ability to implement measures and their long term maintenance;*
 - *the effect of flooding on water or sewerage infrastructure which could impact on public health and the environment;*
 - *an assessment of the developments access and egress arrangements during a flood event; and*
 - *implications for developments on/adjacent to contaminated land.*

Flood risk and flood probability

- 1.33 Flooding is a natural process that can present a range of different risks depending on its form. Flood practitioners and professionals define the risks presented by flooding according to an Annual Exceedance Probability (AEP), or as having a 'return period'.
- 1.34 Flood Risk includes the statistical probability of an event occurring and the scale of the potential consequences. Flood risk is estimated from historical data and expressed in terms of the expected frequency of a flood of a given magnitude. The 10 year, 50 year and 100 year floods have a 10 %, 2 %, and 1 % chance of occurring in any given year, respectively. However, over a longer period the probability of flooding is considerably greater.
- 1.35 For example, for the 100 year return period flood:
- there is a 1 % chance of flood occurring or being exceeded in any single year;
 - a 26 % chance of it occurring or being exceeded in a 30 year period; and
 - a 51 % chance of it occurring or being exceeded in a 70 year period.
- 1.36 Table 3 below provides a summary of the relevant AEP and corresponding return period events of a particular severity.

Table 3: Definition of annual exceedance probability and return period flood events

Annual exceedance probability (%)	Definition
100	1 in 1 Year
10	1 in 10 Years
2	1 in 50 Years
1	1 in 100 Years
0.5	1 in 200 Years
0.1	1 in 1,000 Years

Preliminary flood risk assessment

1.37 A Preliminary Flood Risk Assessment (PFRA)⁸ for the Dee River Basin District was prepared in 2011 for WCBC in its capacity as a Lead Local Flood Authority (LLFA). The conclusions drawn from the PFRA are considered valid with respect to this Scheme. The PFRA reported that:

- the Wrexham Industrial Estate (Holt, Abenbury and Isycoed areas) lies within an indicative surface water flood risk area;
- Rhosllanerchrugog (Eclusham and Rhos areas) lie within indicative surface water flood risk areas;
- surface water flooding was the most prominent cause of flooding in the area studied;
- the assessment found no records of past groundwater flooding within the County Borough;
- anecdotal evidence suggested that surface water flooding is exacerbated in some areas, such as Bangor on Dee when the river is in flood; and
- no sewage flooding was found to have historically occurred near the Site.

1.38 The PFRA also proposed key projections for the Dee River Basin based on a medium future emissions scenario, predicting changes by the 2050s as follows:

- winter precipitation increases of around 10 % (very likely to be between 2 and 21 %);
- precipitation on the wettest day in winter up by around 8 % (very unlikely to be more than 21 %);

⁸ Wrexham County Borough Council. 2011, Preliminary Flood Risk Management Strategy.

- relative sea levels at Hoylake, Wirral, Merseyside are very likely to be up between 7 and 38 cm from 1990 levels (not including extra potential rises from polar ice sheet loss); and
- peak river flows in a typical catchment likely to increase between 7 and 12%.

Local Flood Risk Management Strategy (LFRMS) 2013

- 1.39 The LFRMS for Wrexham was published in April 2013⁹ and was based on the findings of the 2011 PFRA¹⁰. The strategy sets out principles, objectives and measures for the management of local flood risk (i.e. surface water run-off, groundwater and ordinary watercourses and included any lake, pond or other body of water that is fed by an ordinary watercourse).
- 1.40 The LFRMS is based on the core principles of sustainable development and accords to the objectives of the National Flood and Coastal Risk Management Strategy for Wales and is based on the central organising principle of sustainable development.

Environment Agency River Dee Catchment Flood Management Plan (2010)

- 1.41 Flooding has occurred within the River Dee Catchment Flood Management Plan (CFMP) area, mostly as a result of the River Dee itself and its major tributaries but the small watercourses within the catchment also contribute. Significant floods were recorded in 1890, 1946, and 2000 during which Wrexham was impacted at some time during these events.
- 1.42 In the County Borough of Wrexham there are considered to be 100-500 properties within Wrexham and Bangor on Dee at risk from flooding. The CFMP has six policy areas across the catchment. The key policies 4 for Wrexham include:
- Policy 2: Middle Dee, Bangor on Dee and East of the Borough - Areas of low to moderate flood risk where flood risk can generally be reduced by flood risk management actions; and
 - Policy 4: Wrexham (Rossett to Erddig and Rhostyllen) - Areas of low, moderate or high flood risk where flood risk is already being managed effectively.

⁹ Wrexham County Borough Council, 2013. Local Flood Risk Management Strategy

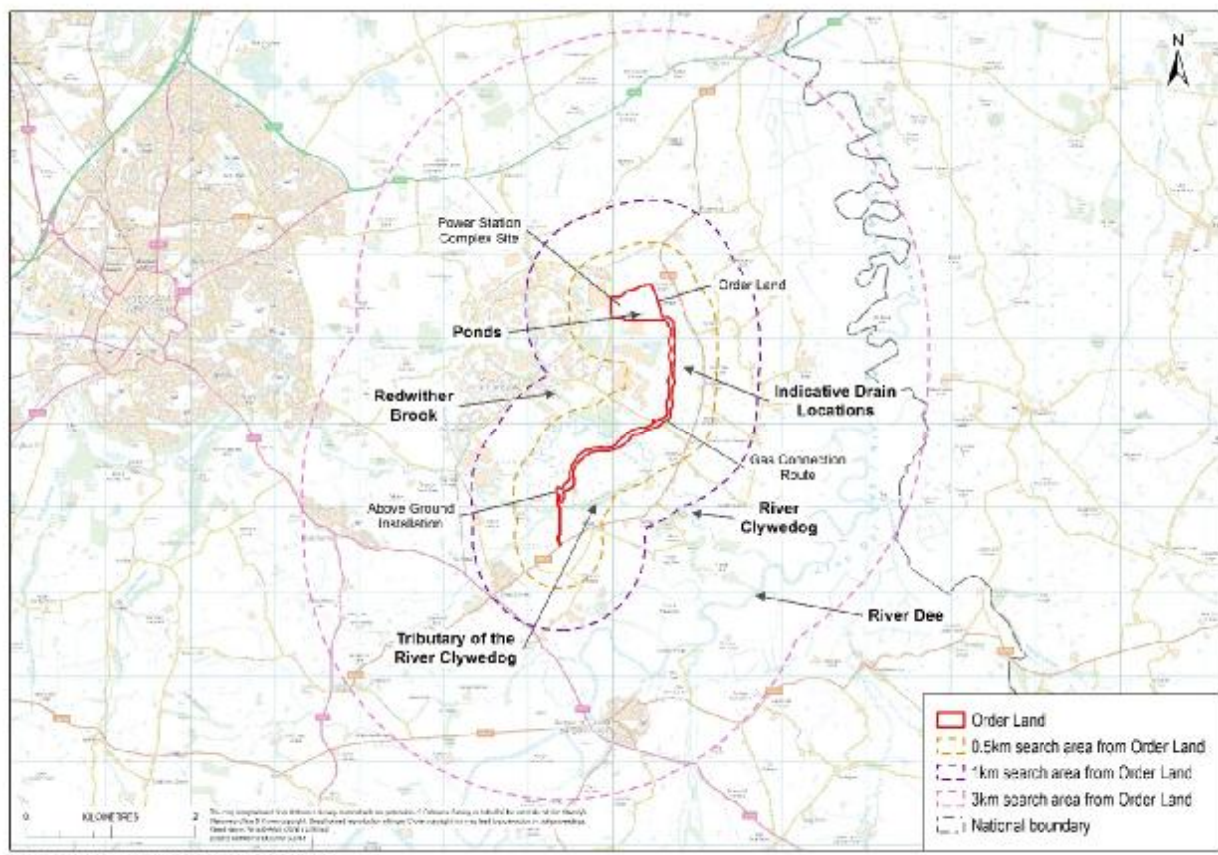
¹⁰ Wrexham County Borough Council, 2011. Preliminary Flood Risk Management Strategy

Chapter 2 ♦ Site and surrounding

SCHEME

- 2.1 A description of the Scheme is provided in chapters 1 and 4 of the Environmental Statement (ES) (document reference 6.2). The Power Station Complex would be fuelled by natural gas and would have an electrical generation capacity of up to 299 megawatts (MWe). Figure 1 below) shows the location of the Scheme.

Figure 1: Scheme location plan



SITE LOCATION

- 2.2 The location of the Scheme, which includes the Power Station Complex and Gas Connection (approximately 3.5 km in length). The Power Station Complex Site is situated to the immediate north-east of Wrexham Industrial Estate in an area dominated by industrial complexes, to the west and south, and by agricultural land, to the north and east. The Gas Connection Route runs through agricultural land to the south and east of

Wrexham Industrial Estate to the Above Ground Installation (AGI) adjacent to the Maelor Gas Works approximately 2.5 km to the south-west.

- 2.3 To the south of the Power Station Complex Site, there is a large logistics warehouse and distribution centre operated by Norbert Dentressangle. Immediately west of the Power Station Complex Site is a Kellogg's food processing complex. This includes a range of tall industrial structures, including chimneys.
- 2.4 The Power Station Complex Site comprises a parcel of partly brownfield and partly greenfield, with topography sloping gently to the north-east towards the brook on the northern boundary. The southern part of the Power Station Complex Site comprises brownfield land. This includes a level area of hardstanding that was used for staff car parking associated with the former Owens Corning fibre-glass factory. There are areas of land that appear to have been raised by deposition of demolition spoil and ponds set amongst areas of scrub. The northern part of the Power Station Complex Site comprises greenfield land with well-defined field boundaries featuring mature hedgerows, trees and the previously mentioned brook.
- 2.5 The Power Station Complex Site is bound along its eastern and northern boundaries by mature trees and hedges.
- 2.6 The Gas Connection largely crosses an area of agricultural land which is predominantly pasture and hedgerows, with pockets of woodland, numerous ponds and isolated properties. The Gas Connection crosses underneath Oak Road and the River Clywedog.

ENVIRONMENTAL SETTING AND FLOOD RISK DESCRIPTION

Topography

- 2.7 The Power Station Complex Site slopes down in a north easterly direction from approximately 32 m AOD in the south west to approximately 22.5 m AOD in the north east.

Hydrology

- 2.8 The Power Station Complex Site contains several ponds and is bounded by a field drain along the eastern boundary. A small unnamed brook flows from north to south just within the western boundary and then from west to east forming the northern boundary of the Power Station Complex Site. The Redwither Brook is approximately 1.2 km south-west of the Power Station Complex Site and west of the Gas Connection whilst the River Clywedog is located 1.4 km south of the Power Station Complex Site. The Power Station Complex Site is situated outside of fluvial flood risk in zone A.
- 2.9 Of the other ponds within the Power Station Complex Site boundary, two are located in the south and one is located in the north-east.

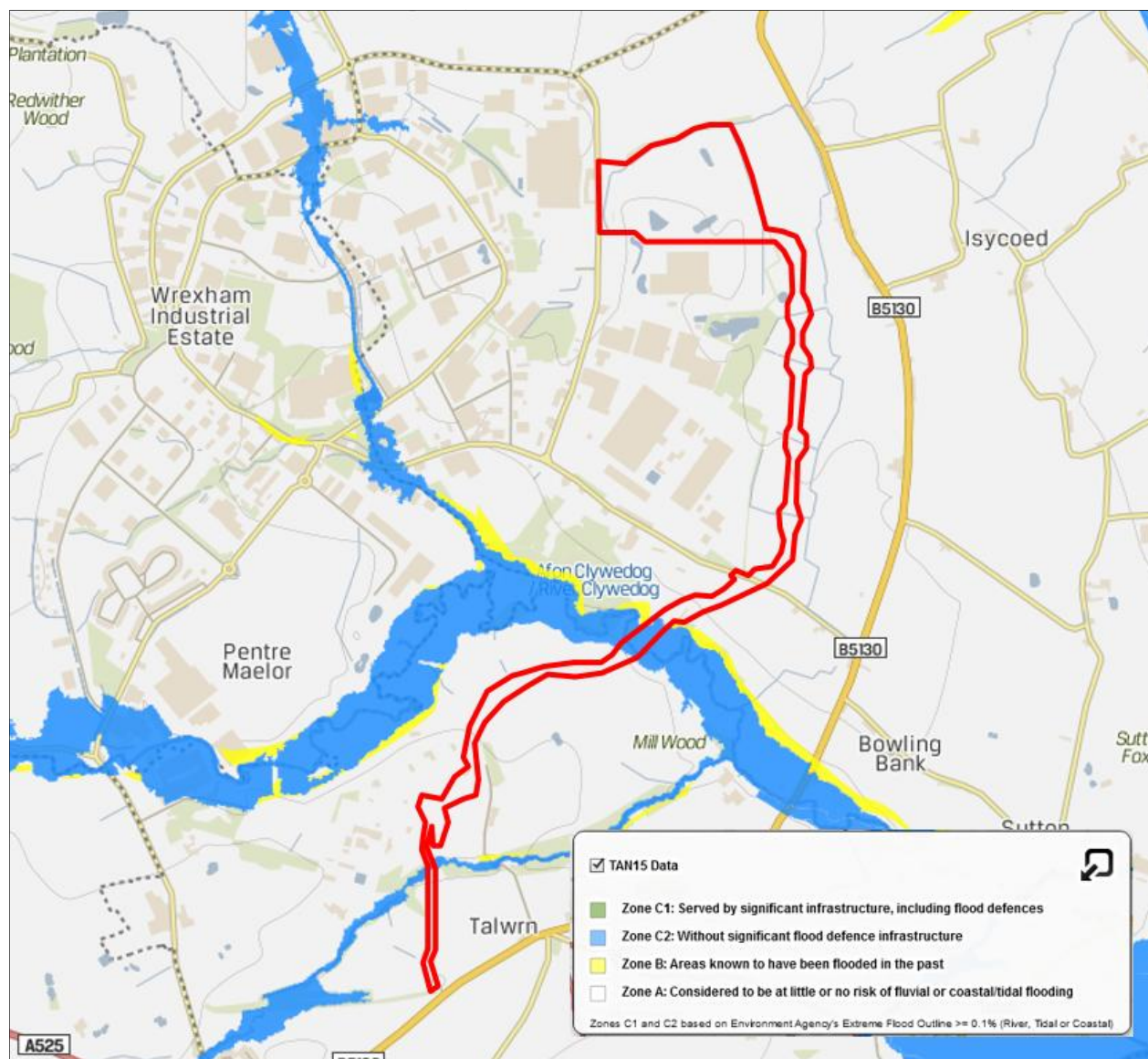
- 2.10 The Gas Connection runs from the south-east corner of the Power Station Complex Site in southerly direction under agricultural land, crossing drains, small ponds, Oak Road, and the River Clywedog. The River Clywedog flows south-eastwards towards its confluence with the River Dee (approximately 2.6 km to the east of the Scheme).
- 2.11 The watercourses have been assessed by the Environment Agency (EA)/Natural Resource Wales (NRW) within their Water Framework Directive (WFD) River Basin Management Plans¹¹. The local section of the River Clywedog has been assessed under the WFD as being of 'moderate' status ecologically and as being of 'fail' status chemically.

Fluvial flooding

- 2.12 The Power Station Complex Site and the AGI Site, which is part of the Gas Connection, are currently shown on the TAN 15 Development and Flood Risk map¹² as being located within Zone A, which is considered to be at little or no risk of fluvial or coastal/tidal flooding. In accordance with the TAN 15: Development and Flood Risk a Justification Test is not applicable and there is no need to consider fluvial flood risk further.
- 2.13 The TAN 15 Development and Flood Risk maps (Figure 2) show that sections of the Gas Connection, excluding the AGI Site, crosses flood plains associated with the River Clywedog and the tributary of the River Clywedog; therefore there may be some flood risk implications, as indicated in Figure 2.
- 2.14 The Gas Connection passes through areas associated with the River Clywedog that are designated as Zone C2; these are flood areas without significant flood defence infrastructure, whilst some areas are shown as Zone B, which are areas known to have been flooded in the past.
- 2.15 For the Gas Connection to cross the River Clywedog, a trenchless technique such as horizontal directional drilling (HDD) or microtunnelling will be used to pass underneath the watercourse. The long term implications of this, in terms of flood risk, are likely to be minimal; however, management of the activities during construction will be required to mitigate this risk.

¹¹ The Environment Agency River Basin Management Plan, <http://maps.environment-agency.gov.uk/wiyby> accessed 15 April 2014

¹² TAN 15 Development and Flood Risk, Development Advice Map: <http://data.wales.gov.uk/apps/floodmapping/> Accessed 11/12/2012

Figure 2: TAN 15 Development and flood risk – development advice map

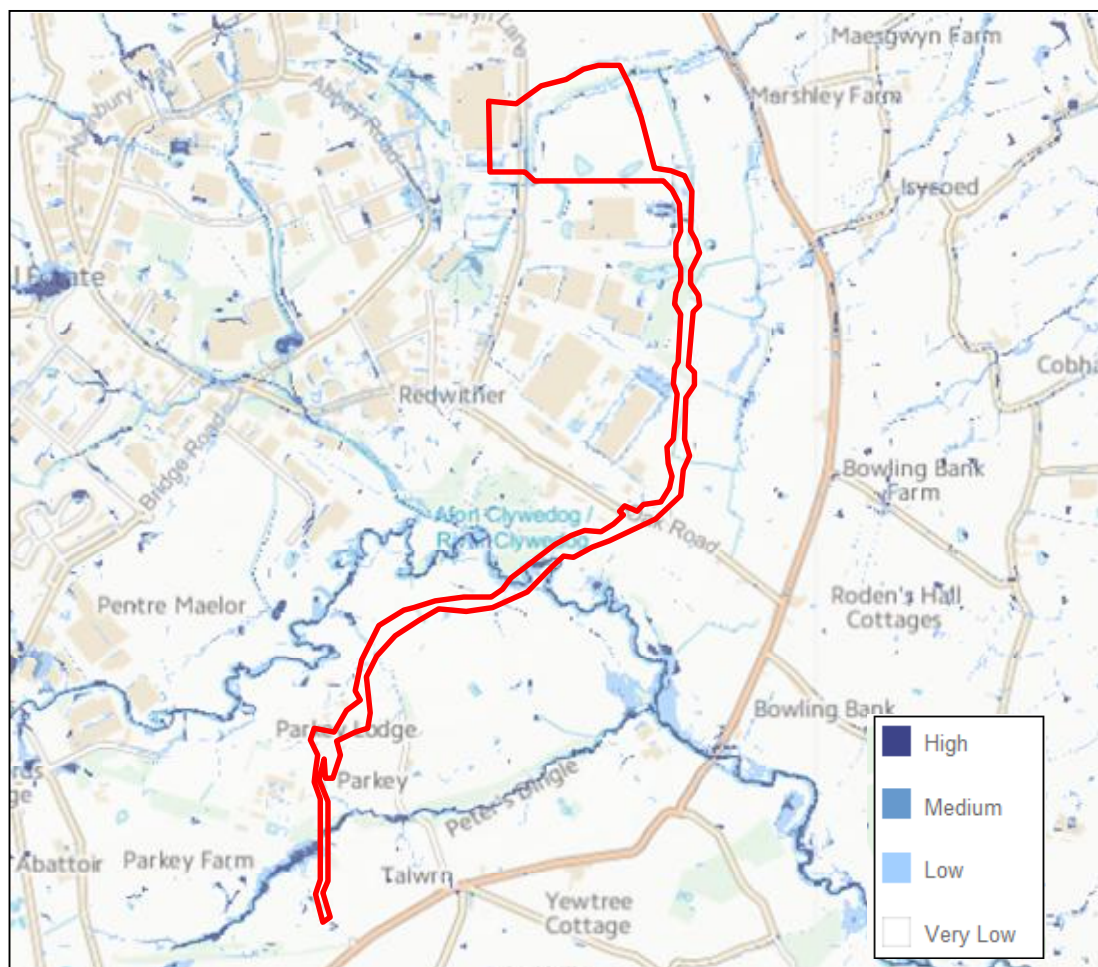
Source: Environment Agency Website

History of flooding

- 2.16 As detailed in section 1.47 of this report, flooding within the River Dee Catchment in 1890, 1946, and 2000 affected Wrexham. However, there are no specific details to confirm whether the Site itself was impacted. Nevertheless, part of the Gas Connection is in flood Zone B, suggesting the River Clywedog has flooded in the past, evidenced by sedimentary deposits along the Gas Connection Route.
- 2.17 No additional information on site-specific historical flooding has been provided at the time of writing this report.

Overland pluvial flooding

- 2.18 Pluvial and overland flooding results when rainfall fails to infiltrate the surface and travels over the ground surface. This is exacerbated by low permeability urban development or low permeability soils and geology (such as clayey soils). Overland flow is likely to concentrate at the base of slopes and low points in terrain. Local topography and built form can have a strong influence on the direction and depth of flow. The design of development can influence or exacerbate this. Overland flow paths should be taken into account in spatial planning for urban developments. In addition, surface water flooding can be exacerbated if development increases the percentage of impervious area.
- 2.19 It is understood that the Power Station Complex Site and the AGI Site (which is part of the Gas Connection) have not historically been substantially developed. The Power Station Complex Site has a large hard- standing area (former car park) located in the south-western corner associated with the former Owens Corning fibre-glass factory. It is therefore considered unlikely that any private drainage systems will be present within the Power Station Complex Site other than a minimal network of channels and gullies. In addition, there is no evidence of a piped land drainage system within the Power Station Complex Site. The ground conditions and topography suggest that run-off will tend to flow over the surface towards a number of ditches and watercourses within and around the Power Station Complex Site.
- 2.20 The EA (see Figure 3) has identified that most of the Site is at very low risk of pluvial flooding. However, there are some patches where water may pond and as a result a higher risk classification has been given. Areas of low (0.1 – 1 % risk annually) to high (3.3 % annually) risk of surface water flooding tend to be close to the watercourses or field drains.
- 2.21 Correspondence from WCBC (Appendix A in this report) has identified that a surface water flooding event has historically occurred at a distance of approximately 450 m from the Power Station Complex Site. No additional information is available.
- 2.22 Surface water flooding may be exacerbated if development increases the impervious area as it has the potential to change the surface water flow regime. The Power Station Complex area is greater than 1 hectare and the construction of new areas of hardstanding may prevent natural infiltration and increase surface run-off, if not mitigated. Temporary ground alteration or compaction at the Power Station Complex Site may also lead to similar consequences. Consideration may be necessary to control such flood risks, particularly as materials or machinery are to be stored in such areas.
- 2.23 The Site is known to be overlain by a large proportion of low permeability superficial strata (Devensian Till) which will prevent infiltration and as such rainfall leaves the Site as surface water run-off.

Figure 3: Environment Agency Pluvial Flooding Map

Source: Environment Agency Website

- 2.24 The Power Station Complex Site primarily drains via overland flows to the existing watercourses running along the western, northern and eastern boundaries. A small proportion of the run-off may be temporarily intercepted by the various ponds present on the Power Station Complex Site; however, as these do not have a formal outfall, there is a possibility that they will overflow and release overland flows towards the watercourses. The clay ground conditions mean that infiltration is not considered to be a significant component of the existing drainage regime.

- 2.25 The existing run-off flow rate generated by the Power Station Complex Site in its current condition has been calculated using IH124 Flood Estimation for Small Catchments, with modifications as described in the Interim Code of Practice for Sustainable Drainage Systems¹³. The calculations were undertaken using “MicroDrainage Source Control” and indicate that the 3.3 % AEP (1 in 30 year) run-off rate is 6.6 l/s/ha and 1 % AEP (1 in 100 year) is 8.1 l/s/ha.
- 2.26 It is recognised that development may increase the risk of flooding by reducing infiltration and increasing both the volume and speed of runoff. The Power Station Complex Site is likely, without any mitigation, to increase potential flood risk. Further consideration of this source of flooding is therefore required.

Tidal flooding

- 2.27 The Site is not located in an area impacted from tidal flooding and therefore tidal flooding is not considered further.

Groundwater flooding

Geology and hydrogeology

- 2.28 The British Geological Survey (BGS) maps Sheet 121 Wrexham and sheet 122 Nantwich indicate the entire Power Station Complex Site is underlain by superficial Devensian Till (Diamicton) deposits which is poorly sorted, unconsolidated sediment.
- 2.29 The bedrock beneath the western region of the Power Station Complex Site is the Salop Formation, comprising mudstone, sandstone, beds of pebbly sandstone and conglomerate. Thin limestone beds and caliche are present in the lower part of the unit. Beneath the south-eastern area of the Power Station Complex Site lies the younger (Early Triassic) Kinnerton Sandstone Formation (of the Sherwood Sandstone Group), comprising sandstone that is dominantly aeolian, fine-to medium- grained and generally pebble-free.
- 2.30 According to the BGS mapping, the Gas Connection is mostly underlain by superficial Devensian Till deposits; the route crosses occasional alluvial and River Terrace Deposits associated with the River Clywedog. The superficial geology is underlain by Kinnerton Sandstone Formation.
- 2.31 The EA mapping indicates that the Kinnerton Sandstone of the Sherwood Sandstone Group is a Principal Bedrock Aquifer and the Salop Formation, alluvium and river terrace deposits are Secondary A Aquifers. The Devensian Till, however, is an unproductive strata.

¹³ Atkins, 20162014, Wrexham Energy Centre, Foul & Surface Water Drainage Strategy

- 2.32 Principal Aquifers have high intergranular and/or fracture permeability and therefore they usually provide a high level of water storage and may support water supply and/or river base flow on a strategic scale. Secondary A Aquifers have permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Unproductive strata are of low permeability with a negligible significance for water supply or river base flow.
- 2.33 Rest groundwater levels in the area have been recorded at circa 13.0 to 13.5 m below ground level¹⁴. However shallow perched groundwater may be present within the Devensian Till deposits.
- 2.34 There are no Nitrate Vulnerability Zones within 2 km of the Site.
- 2.35 The Power Station Complex Site does not lie within a Source Protection Zone (SPZ), but an SPZ 1 is present approximately 1.5 km south-west with the surrounding SPZ 2 and 3 located within approximately 1 km south-west. An SPZ 3 is also present approximately 1 km to the north-west.
- 2.36 The southern edge of the Gas Connection near to Parkey Farm is located within a SPZ 2 and 3. The AGI Site is located in a SPZ 2.
- 2.37 Groundwater flooding generally occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels. Groundwater flooding may take weeks or months to dissipate as groundwater flow is much slower than surface water flow and water levels thus take much longer to fall. Groundwater flooding is sporadic in time and location, but when it does occur, it usually lasts longer than surface water flooding and interferes with property and infrastructure (such as roads). Groundwater levels may also rise as a result of reactivating springs.
- 2.38 The Environmental Impact Assessment (EIA) Scoping Report¹⁵ for the water environment indicated that the Scheme is underlain by Devensian Till (40 to 60 m thick), with groundwater levels generally within the Permian and Sherwood Sandstone aquifers underlying this. However, shallow perched groundwater may be present within the River Terrace Deposits, Alluvium or Devensian Till deposits. The rest groundwater levels are circa 13.0 to 13.5 m below ground level¹⁴ and therefore the risk from groundwater flooding is considered negligible to low in the area. Whilst shallow perched groundwater may be present within the Devensian Till deposits, the potential to impact to groundwater flood risk is considered to be of negligible magnitude.

¹⁴ SKM Enviros, May 2011, Proposed Combined Cycle Gas Turbine Plant at Wrexham Industrial Park

¹⁵ Atkins, 2014/2012, Wrexham Energy Centre – EIA Scoping Report, The Water Environment

- 2.39 The presence of numerous surface water ditches and ponds within the locality may be due to the low permeability nature of the ground, which might mean that surface runoff is prevalent such that they are rainfall fed; however, these water features could indicate that groundwater might be encountered within approximately 2 m of the surface and therefore impact on the construction of the Gas Connection. There is no information as to whether these drains are ephemeral or perennial. However, based on the available information, the likelihood for localised groundwater flooding is low.
- 2.40 Correspondence (Appendix A of this report) with WCBC with respect to the flood risk for the Scheme has confirmed that the risk from groundwater flooding is considered negligible to low and is therefore not considered further in this FCA.

Existing infrastructure

Canals and artificial waterways

- 2.41 There are no canals or artificial waterways within 2 km of the Site and as such the potential flood risk which could occur should there be a failure of this type of infrastructure is not considered further.

Drains

- 2.42 There is no information available on highways and land drainage for the Site. The historical development in the area of the Power Station Complex Site is limited and therefore it is considered unlikely that any private drainage systems will be present within the Power Station Complex Site other than a minimal network of channels and gullies. There is also no evidence of any piped land drainage system within the proposed Power Station Complex Site. The ground conditions and topography are such that run-off will tend to flow over the surface towards a number of ditches and watercourses within and around the Power Station Complex Site.

Sewers and Water Mains

- 2.43 The potential risks to the Scheme from sewer or drain flooding is through the surcharging of foul sewers or drains due to a blockage which could result in a surcharge of manholes within the Power Station Complex Site.
- 2.44 Sewers records have been obtained from Welsh Water and are included in the Foul and Surface Water Drainage Strategy¹³. The records show that the majority of the public sewerage in the vicinity of the Site is located to the west of Bryn Lane within the WIE area. The network is wholly combined. The closest public sewer to the Site is located to the south immediately adjacent to the access into an amenity tip off Bryn Lane. No information has been provided regarding the size of this sewer.

- 2.45 To mitigate the risk from public sewer systems, all sewers will be designed and installed in accordance with British Standards and Building Regulations¹⁶, and, where appropriate, Sewers for Adoption¹⁷.
- 2.46 The Power Station Complex Site has had previous development on only part of the site and therefore is unlikely to contain any private water supplies. It is anticipated a new water main will need to be installed to provide potable water to the Power Station Complex.
- 2.47 However, if a private supply did exist, it is considered that bursts in these mains are likely to produce only small volumes of water and result in no greater risk of flooding than on a comparable site.
- 2.48 Isolation valves and stop valves will be installed to isolate mains in case of bursts. Therefore, bursts could be quickly isolated and will only produce small volumes of water, resulting in no greater risk of flooding than on a comparable site.
- 2.49 Welsh Water would also have a commitment to ensure to undertake prompt repairs to any damaged potable water pipework.

Flood defence structures

- 2.50 TAN 15: Development and Flood Risk Map shows that the Scheme is not protected by fluvial flood defences. Therefore, the potential residual flood risk which could occur should there be a failure of this type of infrastructure is not considered further.

Reservoirs

- 2.51 The EA's Flood map suggests that there are three reservoirs that should a breach occur could impact on the Gas Connection where it crosses the River Clywedog. The Power Station Complex Site itself would not be impacted.
- 2.52 Marchwiell Reservoir is located 4.57 km to the south west of the Power Station Complex Site and at its closest point is 3.4 km to the west of the Gas Connection.
- 2.53 Ty-mawr Reservoir is located approximately 11.5 km to the south west of the Power Station Complex Site and at its closest point is 10.4 km to the west of the Gas Connection. Cae-Llwyd Reservoir is a further 600 m to the west.

¹⁶ HM Government, 2010, The Building Regulations 2010, Part H: Drainage and Waste Disposal

¹⁷ WRCWRc Publications, March 2006, Sewers for Adoption

- 2.54 Reservoir flooding is extremely unlikely to happen as all large reservoirs must be inspected and supervised by reservoir panel engineers. However, in the unlikely event that a reservoir dam failed, a large volume of water would be released at once and flooding could happen with little or no warning. Due to the distances from the Site and the highly unlikely potential flood risk the reservoirs pose, flooding from this type of infrastructure is not considered further.

Chapter 3 ♦ Level 2 flood consequence assessment

ASSESSMENT OF FLOODING

- 3.1 The sources of flooding highlighted in TAN 15 Guidance have been considered in the previous chapter 2 of this report. It is concluded that the risk of flooding from the sea, groundwater, canals, artificial waterways, flood defence structures and reservoirs is sufficiently low that they can be screened out of any further consideration.
- 3.2 The risk of flooding from rivers, overland flow, drains and sewers has been highlighted as a potential risk and therefore will require further consideration.

Fluvial flooding

- 3.3 The Power Station Complex Site and the AGI Site are not at risk from fluvial flooding.
- 3.4 The Gas Connection will utilise 'special crossings' with trenchless techniques such as HDD or microtunnelling to pass underneath the River Clywedog and as such will not impact or be impacted by fluvial flooding. The long term implications of this in terms of flood risk are likely to be minimal; however; management of the activities during construction will be required to mitigate potential flood risk issues.

Overland flow/pluvial flooding

- 3.5 It is recognised that where it is proposed to increase impermeable areas as a result of development, there is the potential to increase runoff, particularly where permeable and/or vegetated surfaces are replaced with impermeable surfaces which incorporate drainage designed to remove water rapidly. This may lead to increased risk of pluvial flooding and increased flood magnitude down-gradient of the Scheme.
- 3.6 The Power Station Complex Site is served by a surface water management system as described below. Due to the size of the AGI (46 m x 47 m) and its relative permeable surface finish, no surface water drainage is proposed.

Surface water management

- 3.7 The Power Station Complex will discharge surface water into the watercourse running along the northern boundary of the Power Station Complex Site. In accordance with NRW and WCBC requirements, the maximum permitted discharge rate from the Power Station Complex Site into the local watercourse network will be limited to existing greenfield runoff rate. This flow rate will apply for all rainfall events up to and including the 1 in 100-year +20 % event.

- 3.8 The Foul and Surface Water Drainage Strategy comprises a single stage of construction with all surface water run-off from post development impermeable areas such as roofs, hardstanding and highway areas being directed via gullies and pipes to an attenuation pond from which it will be discharged via a control chamber to a proposed onsite ditch. It will then pass along the ditch via the ecological mitigation ponds and into the adjacent brook along the northern boundary of the Power Station Complex Site within a land drainage network; ultimately discharging downstream into the River Dee.
- 3.9 Any run-off from the construction laydown area will also be drained into the proposed ditch and into the ecological mitigation ponds as described in paragraph 3.8.
- 3.10 The performance requirements for the proposed surface water drainage system are detailed in the Foul and Surface Water Drainage Strategy¹³ (Appendix 14.4; Document reference 6.4.9) for a range of return periods, but are briefly summarised as follows for the 1 % AEP (1in 100 year) event:
- The surface water drainage system serving the Power Station Complex Site has a maximum permitted discharge rate of 12.2 l/s.
 - A total volume of 2,085 m³ is required to achieve this discharge rate for all events up to and including the 1 in 100-year +20 % rainfall event.
 - The impermeable areas within the Power Station Complex Site will be drained using a pipe network, via a retention pond and control chamber utilising a vortex type flow control device, out falling into an existing ditch/stream which is a tributary of the River Dee.
 - Simulations have shown that the system meets the required discharge rates and does not flood for events up to and including the 1 in 100-year +20 % event.
- 3.11 Following the implementation of a compliant drainage scheme for the Power Station Complex no further consideration is required.

Drains and sewers

- 3.12 There is no information available on highways and land drainage for the Scheme. Historical development in the area of the Power Station Complex Site is limited and therefore it is considered unlikely that any private drainage systems will be present other than a minimal network of channels and gullies. There is also no evidence of any piped land drainage system within the Power Station Complex Site. The ground conditions and site topography are such that run-off will tend to flow over the surface towards a number of ditches and watercourses within and around the Power Station Complex Site.

- 3.13 Sewers records obtained from Welsh Water show that the majority of the public sewerage in the vicinity of the Site is located to the west of Bryn Lane within the WIE area. The network is wholly combined. The closest public sewer to the Site is located to the south immediately adjacent to the access into an amenity tip off Bryn Lane. No information has been provided regarding the size of this sewer.
- 3.14 The Scheme is considered to be at low risk from sewer or drain flooding, however, as the Power Station Complex will require a domestic foul connection for amenities foul water will need to be managed in line with the drainage strategy to reduce the risk of flooding. It is assumed a peak foul water flow rate generated by the Power Station Complex will be 7.0 l/s. The foul water will be pumped into an existing Welsh Water combined manhole located adjacent to the amenity tip approximately 150 m south of the Power Station Complex Site.

Climate change

- 3.15 The River Dee CFMP considers climate change will have a great impact on the flood risk. Up to a 20 % increase in peak flow in all watercourses is expected, increasing the probability of large-scale flood events. The number of people at risk during a 1 % flood event is expected to reach 134,206 within the catchment.
- 3.16 However, the CFMP for the Clywedog sub-area (which covers the Site) considers the flood risk as a result of climate change to not increase considerably.
- 3.17 The potential impacts of climate change need to be considered and accommodated in a development for future sustainability. A precautionary approach should be applied to a development by recognising the need for flood storage and mitigation and adaption to changing environmental conditions.

APPLICATIONS OF FLOOD RISK POLICY

Compliance with TAN 15

- 3.18 As outlined in paragraph 1.28 above, the broad aim of TAN 15 is to ensure that development is encouraged into the lowest flood risk area. To achieve this aim, planning authorities are required to ensure that flood risk is adequately addressed during the initial planning stages of any development.

- 3.19 Responsibility for the assessment lies with the developers and they must demonstrate the following:
- whether the Scheme is likely to be affected by flooding;
 - whether the Scheme will increase flood risk to adjacent properties; and
 - that the measures proposed to deal with any residual flood risks are sustainable.
- 3.20 The developer must prove to the local planning authority and the EA/NRW that any existing flood risk or flood risk associated with a development can be satisfactorily managed.
- 3.21 As the Power Station Complex Site and the AGI Site are classed as highly vulnerable in terms of use but they lie within Flood Zone DAM A. It is therefore considered that these elements of the Scheme are appropriate and the justification test is not applicable; however, consideration of surface water is required. Surface water management has been considered and is included in the Foul and Surface Water Drainage Strategy¹³ and summarised in this report.
- 3.22 The Gas Connection, excluding the AGI Site, is classed as less vulnerable and lies within Flood Zone DAM C2, and thus the justification test is required including the acceptability of consequences and consideration of surface water.

Justification test

- 3.23 Development, will only be justified if it can be demonstrated that:-
- *“its location in zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement;*
 - *its location in zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;*
 - *it concurs with the aims of Planning Policy Wales and meets the definition of previously developed land; and*
 - *the potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in sections 5 and 7 and appendix 1 of the TAN 15 guidance document is found to be acceptable.”*

- 3.24 The Gas Pipeline is required to connect the Power Station Complex to the AGI. As the Gas Pipeline will be constructed underground and tunnelled under watercourses, it would have minimal impact in the long term on the fluvial flood risk of the area and therefore the resultant impact is deemed insignificant.
- 3.25 Surface water management is not required for the Gas Connection as the Gas Pipeline will be below ground.

Acceptability of consequences and consideration of surface water management

- 3.26 The flood risks that could affect the Scheme have been discussed in detail in the preceding chapters of this report and the main risks of flood are from rivers, overland flow and infrastructure.
- 3.27 It is anticipated that surface water runoff and resultant pluvial flooding will be managed by the implementation of a site specific Foul and Surface Water Drainage Strategy and summarised in this report.
- 3.28 Liaison with WCBC and Welsh Water should continue with respect to the potential flood risk from local sewers in combination with the production and implementation of the Scheme's drainage strategy.

Chapter 4 ♦ Conclusions and recommendations

CONCLUSIONS

4.1 This FCA concludes that the following sources of flood risk will not require further assessment and are unlikely to present a risk to the Site and surroundings:

- river flooding (fluvial) – the Scheme is considered to be at a low risk, and hence do not require further assessment or the implementation of mitigation measures;
- coastal/ tidal flood risks – the Site is not near the sea;
- groundwater flooding – WCBC considers the area to be at low risk from groundwater flooding and hence does not require further assessment or the implementation of mitigation measures; and
- infrastructure failure – reservoir flooding is considered extremely unlikely to happen as all large reservoirs must be inspected and supervised by reservoir panel engineers, the Scheme is at low risk of reservoir flooding.

4.2 The risks that this FCA has considered further include:

- Fluvial Flooding – the construction of the Gas Connection will utilise ‘special crossings’ and trenchless techniques such as HDD or microtunnelling to pass underneath the watercourses. The long term implications of this in terms of flood risk are likely to be minimal; however, management of the activities during construction will be required to mitigate potential flood risk issues.
- Overland/ pluvial flooding – the effective implementation of the drainage strategy for the Power Station Complex will manage surface water runoff reducing the pluvial flood risk on site. No management of surface water runoff is required for the Gas Connection.
- Sewer flooding – the Scheme is considered to be at low risk from sewer or drain flooding; however, as the Power Station Complex Site will require the implementation of the drainage strategy to manage surface and foul water.

RECOMMENDATIONS

- 4.3 Continued liaison should be undertaken with WCBC and Welsh Water regarding local drainage and sewerage systems to ensure the construction works for the Scheme will not result in damage to existing water infrastructure.
- 4.4 The proposed Foul and Surface Water Drainage Strategy¹³ should be followed, implementing the measures described during the construction phase of the Scheme. This will ensure the management of surface water and foul water and avoid the risk of flooding to the Site and surrounding areas throughout construction and continued operation of the Scheme.
- 4.5 Where necessary, appropriate procedures should be followed should the diversion of pipelines be required, or appropriate consents and agreements should be in place before construction works for the Scheme commence.

Appendix A ♦ Correspondence

Wong, Joan

From: Davies, Lois A. (Flood Risk) <Lois.A.Davies@cyfoethnaturiolcymru.gov.uk>
Sent: 10 February 2016 09:06
To: Brown, Chris (UK)
Subject: RE: Wrexham: Electricity Generating plant

Dear Chris,

You initially requested a Flood Map for Surface Water and information on previous flooding. I can confirm that the data is still the same, however please contact Wrexham County Borough Council to check that the Flood Map for Surface Water has not changed or if they have any record of non-main river or surface water flooding as the Council deals with Surface Water and non-main river issues.

Kind regards,

Lois Angharad Davies

Dadansoddi Risg Llifogydd/ Flood Risk Analysis
Ffordd Gaer, Bwcle, Sir y Fflint, CH7 3AJ/ Chester Road, Buckley, Flintshire, CH7 3AJ
Ffôn/Tel: 03000 65 3868
Ebst/Email: lois.a.davies@cyfoethnaturiolcymru.gov.uk
lois.a.davies@naturalresourceswales.gov.uk



www.cyfoethnaturiolcymru.gov.uk | www.naturalresourceswales.gov.uk



Siarad Cymraeg

*Our purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future
Ein diben yw sicrhau bod adnoddau naturiol Cymru yn cael eu cynnal, eu gwella a'u defnyddio yn gynaliadwy, yn awr ac yn y dyfodol.*

From: Brown, Chris (UK) [mailto:Chris.Brown2@atkinsglobal.com]
Sent: 09 February 2016 17:05
To: Davies, Lois A. (Flood Risk) <Lois.A.Davies@cyfoethnaturiolcymru.gov.uk>
Subject: Wrexham: Electricity Generating plant

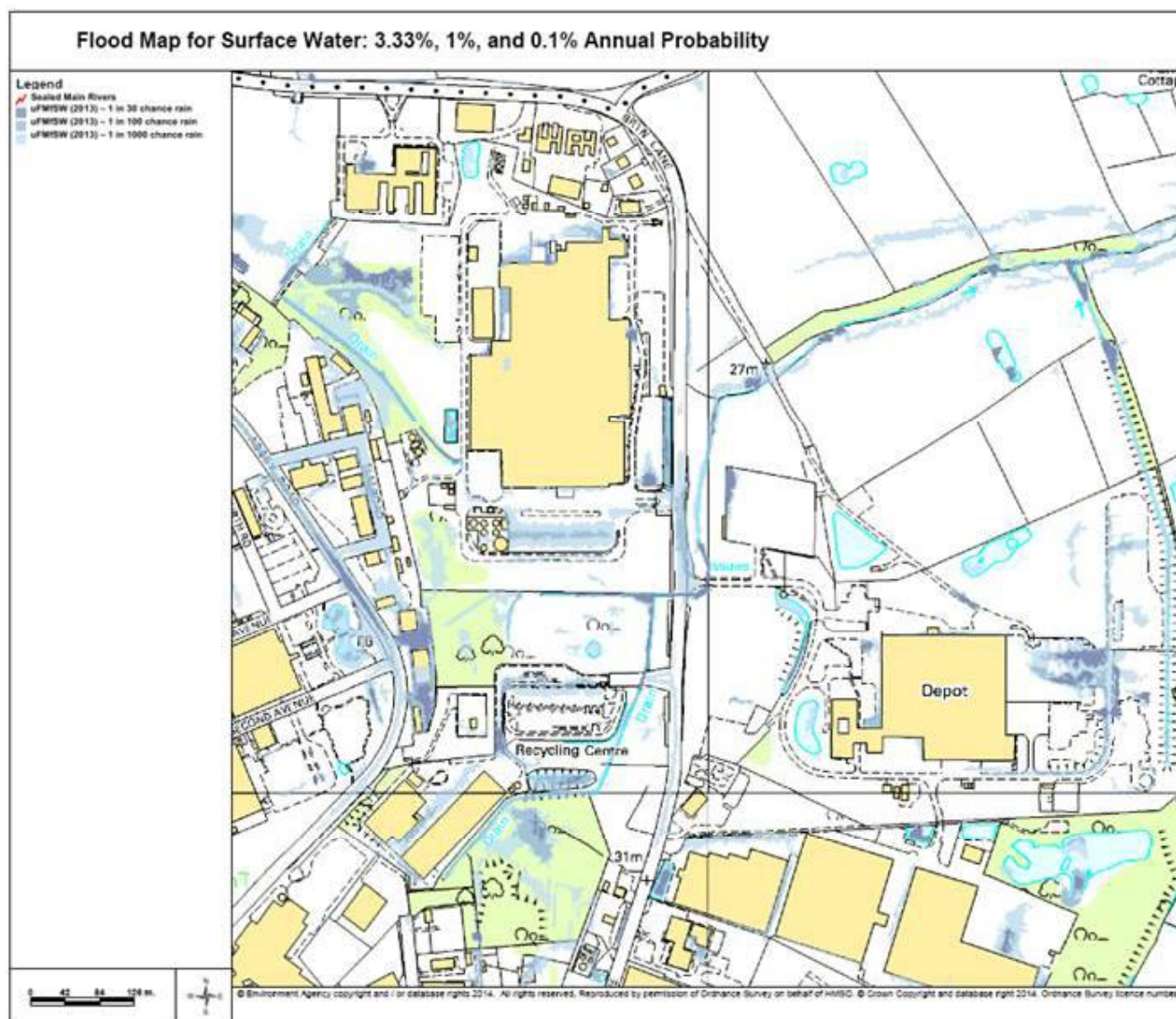
Dear Lois,

I am writing to enquire about the above-mentioned project.

Wrexham Energy Centre (WEC) comprises a combined cycle gas turbine Power Station Complex (PSC) with integral infrastructure works and an associated Gas Connection. Previously it was expected that the entire scheme would proceed under DCO. Whilst this is no longer the case, the EIA itself does not change, as it had already been undertaken taking the PSC and Gas Connection separately and then together. The ES will accompany both the DCO application and the local planning application

The FCA forms part of the input to the ES. Further to the email below, we are writing to enquire as to whether there has been any material changes to the data that was supplied for our FCA report in terms of the flood mapping. Please would you confirm whether that is the case. I have attached a plan of the original information that was issued to us.

Kind regards,
Chris



Regards,

Chris Brown BEng(hons), CEng, CEnv, MICE

Principal Civil Engineer
Water, Ground & Environment

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Twitter: [www.twitter.com/atkinsglobal](https://twitter.com/atkinsglobal) | Facebook: www.facebook.com/atkinsglobal |
LinkedIn: www.linkedin.com/company/atkins | YouTube: www.youtube.com/wsatinpsplc

From: Flood Risk Mapping [<mailto:flood.risk.mapping@cyfoethnaturiolcymru.gov.uk>]

Sent: 30 July 2014 13:29

To: Birkenshaw, Paul

Cc: Access to Information Team

Subject: RE: ATI-04839a Electricity Generating Plant in Wrexham

Dear Paul Birkenshaw.

You have requested a Flood Map for Surface Water and information of previous flooding from us. We can provide a Flood Map for Surface Water 1 in 30, 1 in 100, and 1 in 1000 year, however we have no record of previous flooding, Wrexham County Borough Council may have further information.

Please find attached the Flood Map for Surface Water. If you have any queries regarding this data, please contact the

Flood Risk Mapping team directly.

Kind regards,

Lois A. Davies

Aelod Tîm Dadansoddi Risg Llifogydd 2 / Flood Risk Analysis Team Member 2

Swyddfa Bwcle / Buckley Office

Cyfoeth Naturiol Cymru / Natural Resources Wales

☞ Chester Road, Buckley, Flintshire, CH7 3AJ

☞ 01244 89 4612

☞ lois.a.davies@cyfoethnaturiolcymru.gov.uk

Siaradwr Cymraeg

Ein diben yw sicrhau bod adnoddau naturiol Cymru yn cael eu cynnal, eu gwella a'u defnyddio yn gynaliadwy, yn awr ac yn y dyfodol.

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Wong, Joan

From: Thomas, Gareth <Gareth.Thomas@cyfoethnaturiolcymru.gov.uk>
Sent: 10 February 2016 09:55
To: Brown, Chris (UK)
Cc: Hughes, Tomos; Stephenson, Lucy; Davies, Lois A. (Flood Risk)
Subject: RE: Wrexham Energy Centre - FCA data
Attachments: NRW Wrexham.pdf

Dear Chris,

Thank you for your email. We do not have a copy of your FCA to hand. So that we can answer your query, could you please advise when it was dated, and the date of the information supplied by NRW (or its predecessor, Environment Agency Wales). Have we had the opportunity to comment on the FCA? The FCA report itself was not included as part of the EIA Scoping exercise in 2014.

My colleague, Tomos Hughes (copied in to this email) will be the NRW lead for this application/project going forward, so please confirm the above with him.

Kind Regards,

Gareth Thomas

Ymgynghorydd Cynllunio Datblygiad / Development Planning Advisor
Cyfoeth Naturiol Cymru / Natural Resources Wales

Ffôn/Tel: (0300) 065 3786 **Siaradwr Cymraeg / Welsh Speaker** 

E-bost/E-mail: Gareth.Thomas@cyfoethnaturiolcymru.gov.uk Gareth.Thomas@naturalresourceswales.gov.uk

Gwefan / Website: www.cyfoethnaturiolcymru.gov.uk / www.naturalresourceswales.gov.uk

Ein diben yw sicrhau bod adnoddau naturiol Cymru yn cael eu cynnal, eu gwella a'u defnyddio yn gynaliadwy, yn awr ac yn y dyfodol.

Our purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future.

From: Brown, Chris (UK) [mailto:Chris.Brown2@atkinsglobal.com]
Sent: 09 February 2016 17:28
To: Thomas, Gareth <Gareth.Thomas@cyfoethnaturiolcymru.gov.uk>
Subject: Wrexham Energy Centre

Dear Gareth,

I am writing to enquire about the above-mentioned project.

Wrexham Energy Centre (WEC) comprises a combined cycle gas turbine Power Station Complex (PSC) with integral infrastructure works and an associated Gas Connection. Previously it was expected that the entire scheme would proceed under DCO. Whilst this is no longer the case, the EIA itself does not change, as it had already been undertaken taking the PSC and Gas Connection separately and then together. The ES will accompany both the DCO application and the local planning application

The Flood Consequences Assessment (FCA) report that we produced forms part of the input to the ES . Further to the email/PDF attached, we are writing to enquire as to whether there have been any material changes to the data that was supplied to us for our FCA report. Please would you confirm whether that is the case or not.

Kind regards,
Chris

Regards,

Chris Brown BEng(hons), CEng, CEnv, MICE
Principal Civil Engineer
Water, Ground & Environment

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Helen Lancaster
Senior EIA and Land Rights Adviser
The Planning Inspectorate
3/18 Eagle Wing
Temple Quay House
2 The Square
Bristol
BS1 6PN

Dyddiad/Date: 25th April 2014

Annwyl Ms Lancaster / Dear Ms Lancaster,

CANOLFAN EJNI WRECSAM ARFAETHEDIG – YMGYNHORIAD CWMPASU AEA
PROPOSED WREXHAM ENERGY CENTRE - EIA SCOPING CONSULTATION
BRYN LANE, WREXHAM INDUSTRIAL ESTATE, WREXHAM, LL13 9UT

Diolch am y cyfle i gyflwyno sylwadau ar yr Adroddiad Cwmpasu ar Ganolfan Ynni arfaethedig yn Wrecsam a ddaeth i law ar 1 Ebrill 2014. Mae ein sylwadau fel a ganlyn:

Trwyddedu Amgylcheddol

Daw'r datblygiad arfaethedig o dan ofynion y Rheoliadau Trwyddedu Amgylcheddol (Cymru a Lloegr) 2010, fel y'i diwygiwyd (yn benodol y Gyfarwyddeb ar allyriadau diwydiannol) a hefyd ofynion yr holl gyfarwyddebau gan gynnwys Cyfarwyddeb 2012/27/EU ar Effeithlonrwydd Ynni.

Bydd unrhyw effeithiau ar aer a allai godi, ac felly, unrhyw fesurau rheoli, yn cael eu cynnwys yn y drwydded honno.

Rydyn ni'n argymhell yn gryf y dylai'r datblygwyr ddechrau trafod y broses hon gyda Chyfoeth Naturiol Cymru gynted â bo modd os nad ydyn nhw eisoes wedi gwneud hynny. Fe'u cynghorir felly i gysylltu â Julie Bradford, Swyddog Cefnogi Trwyddedu Technegol ar 01244 89 4560, neu'r Ganolfan Gefnogi Trwyddedu ar 0300 065 3000.

Bioamrwyiaeth

Safleoedd Statudol

Nid yw 'ôl troed' y safle na choridor y bibell nwy o fewn ffiniau unrhyw safleoedd o dan warchodaeth statudol Prydeinig nac Ewropeaidd. Mae llwybr arfaethedig y bibell yn croesi Afon Clywedog, llednant o Afon Ddyfrdwy, ac Ardal Cadwraeth Arbennig Llyn Tegid. Rydyn ni felly'n cynghori y gallai'r cynnig effeithio ar y safle Ewropeaidd hon. Bydd yn rhaid, felly, i gwmpawd yr Asesiad Effeithiau Amgylcheddol, gynnwys digon o wybodaeth ar gyfer dibenion yr asesu

Consultation with Other Bodies

We recommend that the applicants also consult the following bodies/organizations:

- (vi) National Trust;
- (vii) Butterfly Conservation;
- (viii) Amphibian and Reptile Conservation;
- (ix) North Wales Wildlife Trust; and
- (x) North East Wales Wildlife.

We consider the applicant should confirm what Non-Governmental Organisations they are consulting within the Scoping report e.g. Royal Society for the Protection of Birds (RSPB).

Water Framework Directive

Appropriate consideration of Water Framework Directive objectives to restore and conserve the natural water environment must form part of the EIA. We would expect this to include, but not necessarily be limited to:

- a. Considering and avoiding impacts of the preferred cooling mechanism on the water environment (e.g. use of a water cooling system and the effects of such a system on the water abstraction source, and the receiving environment for any water discharged)
- b. Considering and avoiding impacts on the water environment arising from the infrastructure required for operation of the plant. For example, the currently outlined gas pipeline route corridor to the south of the main site crosses a number of small watercourses and most significantly the River Clywedog. The temporary works (including time of year and fish spawning periods) and permanent infrastructure should take into account the sensitivities of watercourses and be as protective as possible of the natural form and function of the watercourses and associated riparian species, as well as complying with wildlife protection legislation. For the River Clywedog this should include consideration of natural functioning of the flood plain and likely future lateral migration or incision of the meandering river channel, i.e. the pipe should be placed sufficiently below floodplain ground level and current river bed level so that it will not interfere with geomorphological processes now and in the future, or require the need for future intervention in order to protect the pipeline from lateral or vertical river channel migration.

Drainage and Flood Risk

We welcome the commitment to produce a FCA (Flood Consequences Assessment) to support the proposed development and broadly agree with the approach outlined in section 6. The Scoping Report correctly identifies that the site is not within a flood zone identified in the TAN15 Development Advice Maps. There may, however, be flooding issues related to the smaller watercourses, surface water or groundwater - the Local Authority may be able to provide additional information on flooding from these sources. Parts of the site are shown to be at risk according to the Flood Map for Surface Water.

The Report identifies SuDS (Sustainable Drainage Schemes) as a means of controlling runoff from the site. We strongly suggest that, as part of the FCA, a surface water drainage design should be

produced which should use SuDS principals to ensure that the surface water runoff rate from the site is minimised. This will minimise the risk of flooding elsewhere. It is noted that there may be constraints on discharging to groundwater, however if this is the case, then other SuDS techniques will be viable e.g. balancing ponds.

The routes for the electrical grid connection and the natural gas connections both cross watercourses which are designated main-rivers. This is also true of the alternative routes. Any crossing of a main river - either beneath or above the channel - require Flood Defence Consent from Natural Resources Wales under the terms of the Water Resources Act 1991 (section 109). For further advice on the consent process, the applicant should contact Lucy Stephenson, Flood Risk Analysis Engineer on 01244 894582.

Groundwater

Our previous comments on the earlier version of the proposal and the EIA Scoping Report remain relevant and applicable. These are reiterated below.

Groundwater vulnerability and impacts from land contamination have been included in the scoping assessment and are to be included in the Environmental Impact Assessment.

We raise one point with respect to the assessment of groundwater vulnerability. Table 9: Importance of the environmental attributes of the water feature or resource, gives examples of the rank of importance, e.g. aquifer providing potable supply to large or small communities, etc. It is important to consider the future plausible resource of an aquifer. For example, while an aquifer may not be being currently exploited for drinking water, it may represent a future resource; this is particularly important in the light of climate change. The potential resources of the aquifers should not be underestimated and should be included as part of the evaluation of impact.

The following documents will be useful guidance and/or sources of reference with respect to assessing the risks to groundwater and contaminated land:

1. Environment Agency's Groundwater protection: Principles and practice (GP3)
2. Guiding principles for land contamination (GPLC) documents, three separate documents noted below
 - Guiding principles for land contamination – Overview
<http://publications.environment-agency.gov.uk/pdf/GEHO1109BRGY-e-e.pdf>
 - Guiding principles for land contamination – FAQs
<http://publications.environment-agency.gov.uk/pdf/GEHO1109BRGZ-e-e.pdf>
 - Guiding principles for land contamination - Good practice reporting
<http://publications.environment-agency.gov.uk/pdf/GEHO1109BRHA-e-e.pdf>
3. CLR11, Model Procedures for the Management of Land Contamination
4. "Piling into Contaminated Sites", publication number SCHO0202BISW-E-E, and
5. "Piling in layered ground: risks to groundwater and archaeology", Product code: SCHO0906BLLU-E-E

The latest versions of all the above documents should be available on the gov.uk website.

We would expect the developer to liaise with us once the build is confirmed to discuss the detail of methods of construction of the plant and gas pipeline so that environmental impacts can be minimised. There are important groundwater abstractions, with a Source Protection Zone (Calypso

Drinks) on the nearby Industrial Estate. We would expect to see all guidance contained within the Environment Agency's pollution prevention guidance documents adopted and followed as best practice.

Water Abstraction

We note that the favoured option is now air-cooling. If water cooling may still be an option, we remind the applicants that we would be unable to licence any consumptive abstraction from the river Dee upstream of Chester Weir. The surface water catchment is already "over-licensed" and water company abstractions have been constrained to less than licence entitlement to protect the "standards of service" for the river.

Planning Policy

In the Planning Policy section there should be a section setting out

- e. The European Level obligations such as the Wild Birds and Habitats Directives. The scope of policy needs to be extended to include UK and Welsh Energy Policy documents and obligations under various legislation such as Wildlife and Countryside Act 1981 etc;
- f. What range of parameters will the site operate within i.e. as in Rochdale Envelope;
- g. References in the document to Planning Policy Wales should be to version 6 (February 2014); and
- h. References to key planning policies of the UDP should ideally be placed at the beginning of each topic heading and details of how the EIA will address the policy issues. Relevant UDP policies include the following: PS4; PS6; PS11; GDP1; EC1; EC4; EC5; EC6; EC7; EC8; EC12; EC14; E3; T10;

We welcome reference to Green Travel Plan in the Scoping Report.

The EIA should include the project as a whole. In respect of Paragraph 5.3, the EIA will need to include cumulative impacts of other major developments within a defined study area.

We advise the reference in paragraph 6.17 should be to NRW.

If you have any queries concerning the above, please contact me on the details below.

Yn gywir / Yours' faithfully,



Mr. GARETH THOMAS
Swyddog Cyswllt Cynllunio / Planning Liaison Officer
Epost/Email: Gareth.Thomas@cyfoethnaturiolcymru.gov.uk
Deialu uniongyrchol/Direct dial: (01248) 48 4075

Wong, Joan

From: Brown, Chris (UK)
Sent: 11 February 2016 11:25
To: 'Jones-Hughes Henry'
Subject: RE: Wrexham Energy Centre

Hi Henry,
Thank you for your email. I'll pass this on to our project manager and see what they want to do.
Appreciate you keeping us updated upon your return. Thanks.
Kind regards,
Chris

From: Jones-Hughes Henry [mailto:Henry.Jones-Hughes@dwrcymru.com]
Sent: 11 February 2016 11:20
To: Brown, Chris (UK) <Chris.Brown2@atkinsglobal.com>
Subject: RE: Wrexham Energy Centre

Hi Chris

Just before I go, ive managed to get an update from our network operatives. We would be able to accommodate the domestic foul flows within the network but the trade effluent would cause problems. The network and the Industrial Estates pumping station would struggle to cope with these additional flows. We have recently worked with the Prison site to increase storage within the network so the flows from the prison can be accommodated. This work would have only provided storage for the additional flows from the prison site and would not have increased storage for any additional flows out side of this.

If both domestic and trade are proposed to go to the public sewer then we would need to assess the capacity and advise if any solutions would be required by carrying out a hydraulic modelling assessment. You can obtain a quote from us for a hydraulic modelling assessment by requesting a quote in writing and paying the fee (£250 plus VAT).

I have not yet had a response from my colleagues from the Treatment Works side of things but I expect that I will have a response by the time I return.

Regards
Henry



Henry Jones-Hughes
Development Control Officer | Developer Services | Dwr Cymru Welsh Water
PO Box 3146 | Cardiff | CF30 0EH | T: 0800 9172652 | F: 02920 740472 | Ext. 65813

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From: Brown, Chris (UK) [mailto:Chris.Brown2@atkinsglobal.com]
Sent: 10 February 2016 13:07
To: Jones-Hughes Henry
Subject: RE: Wrexham Energy Centre

***** External Mail *****

Hi Henry,
Thanks for your call.

Below is an extract from the Drainage Strategy:

- 1.1 The Power Station Complex will have domestic foul connection for amenities. This has been estimated to result in a total discharge rate of 1/l/s.
- 1.2 During operation, the Power Station Complex will produce a peak flow of 6l/s of trade effluent which will be discharged into the local foul water sewerage system unless the waste water is treated to a level where it can be accepted into the surface water system.

So in effect, there will be a total of 7l/s proposed to outfall to the local foul water sewerage network.

Kind regards,

Chris

Regards,

Chris Brown BEng(hons), CEng, CEnv, MICE
Principal Civil Engineer
Water, Ground & Environment

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LinkedIn: www.linkedin.com/company/atkins | YouTube: www.youtube.com/bsatkinsplc

From: Jones-Hughes Henry [<mailto:Henry.Jones-Hughes@dwrcymru.com>]

Sent: 10 February 2016 10:40

To: Brown, Chris (UK) <Chris.Brown2@atkinsglobal.com>

Subject: RE: Wrexham Energy Centre

Hi Chris

Could you provide me with more information about the type/level of flows that would be coming into the network.
Are we talking about domestic type flows?

Regards

Henry



Henry Jones-Hughes

Development Control Officer | Developer Services | Dwr Cymru Welsh Water

PO Box 3146 | Cardiff | CF30 0EH | T: 0800 9172652 | F: 02920 740472 | Ext. 65813

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From: services developer

Sent: 10 February 2016 09:05

To: NDC Planning

Cc: George Owain

Subject: FW: Wrexham Energy Centre



Fergus O'Neill

Developer Services Advisor | Developer Services | Dwr Cymru Welsh Water

PO Box 3146 | Linea | Fortran Road | Cardiff | CF30 0EH | 0800 917 2652 | Emails:
new.connections@dwrcymru.com



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From: Brown, Chris (UK) [<mailto:Chris.Brown2@atkinsglobal.com>]

Sent: 09 February 2016 17:16

To: services developer

Subject: Wrexham Energy Centre

***** External Mail *****

For the attention Owain George:

I am writing to enquire about the above-mentioned project.

Wrexham Energy Centre (WEC) comprises a combined cycle gas turbine Power Station Complex (PSC) with integral infrastructure works and an associated Gas Connection. Previously it was expected that the entire scheme would proceed under DCO. Whilst this is no longer the case, the EIA itself does not change, as it had already been undertaken taking the PSC and Gas Connection separately and then together. The ES will accompany both the DCO application and the local planning application

The Flood Consequences Assessment (FCA) report that we produced forms part of the input to the ES. Further to the letter attached, we are writing to enquire as to whether there has been any material changes to the data that was supplied to us for our FCA report. Please would you confirm whether that is the case.

Kind regards,
Chris

Regards,

Chris Brown BEng(hons), CEng, CEnv, MICE

Principal Civil Engineer
Water, Ground & Environment

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Wong, Joan

From: Carole Wright <Carole.Wright@wrexham.gov.uk>
Sent: 10 February 2016 10:07
To: Brown, Chris (UK)
Subject: RE: Wrexham Energy Centre

Dear Chris

Please be advised that there have been no changes to the information you received previously.
If you require any further information please do not hesitate to contact me

Kind regards

Carole Wright

Carole Wright - BA MBCS

Technical Flood Support Officer - [Swyddog Technegol Cefnogi Llifogydd](#)



01978 729735

Wrexham County Borough Council, Housing, Public Protection and Environment
Department Abbey Road South Wrexham Industrial Estate Wrexham LL13 9PW

Cyngor Bwrdeistref Sirol Wreccsam, Adran Tai, Gwarchod y Cyhoedd a'r
Amgylchedd De Ffordd yr Abaty Ystâd Ddiwydiannol Wreccsam Wreccsam LL13
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From: Brown, Chris (UK) [<mailto:Chris.Brown2@atkinsglobal.com>]
Sent: 09 February 2016 17:24
To: Carole Wright
Subject: Wrexham Energy Centre

Dear Carole,

I am writing to enquire about the above-mentioned project.

Wrexham Energy Centre (WEC) comprises a combined cycle gas turbine Power Station Complex (PSC) with integral infrastructure works and an associated Gas Connection. Previously it was expected that the entire scheme would proceed under DCO. Whilst this is no longer the case, the EIA itself does not change, as it had already been undertaken taking the PSC and Gas Connection separately and then together. The ES will accompany both the DCO application and the local planning application

The Flood Consequences Assessment (FCA) report that we produced forms part of the input to the ES . Further to the email & PDF attached, we are writing to enquire as to whether there has been any material changes to the data that was supplied to us for our FCA report. Please would you confirm whether that is the case.

Kind regards,
Chris

Regards,

Chris Brown BEng(hons), CEng, CEnv, MICE
Principal Civil Engineer
Water, Ground & Environment

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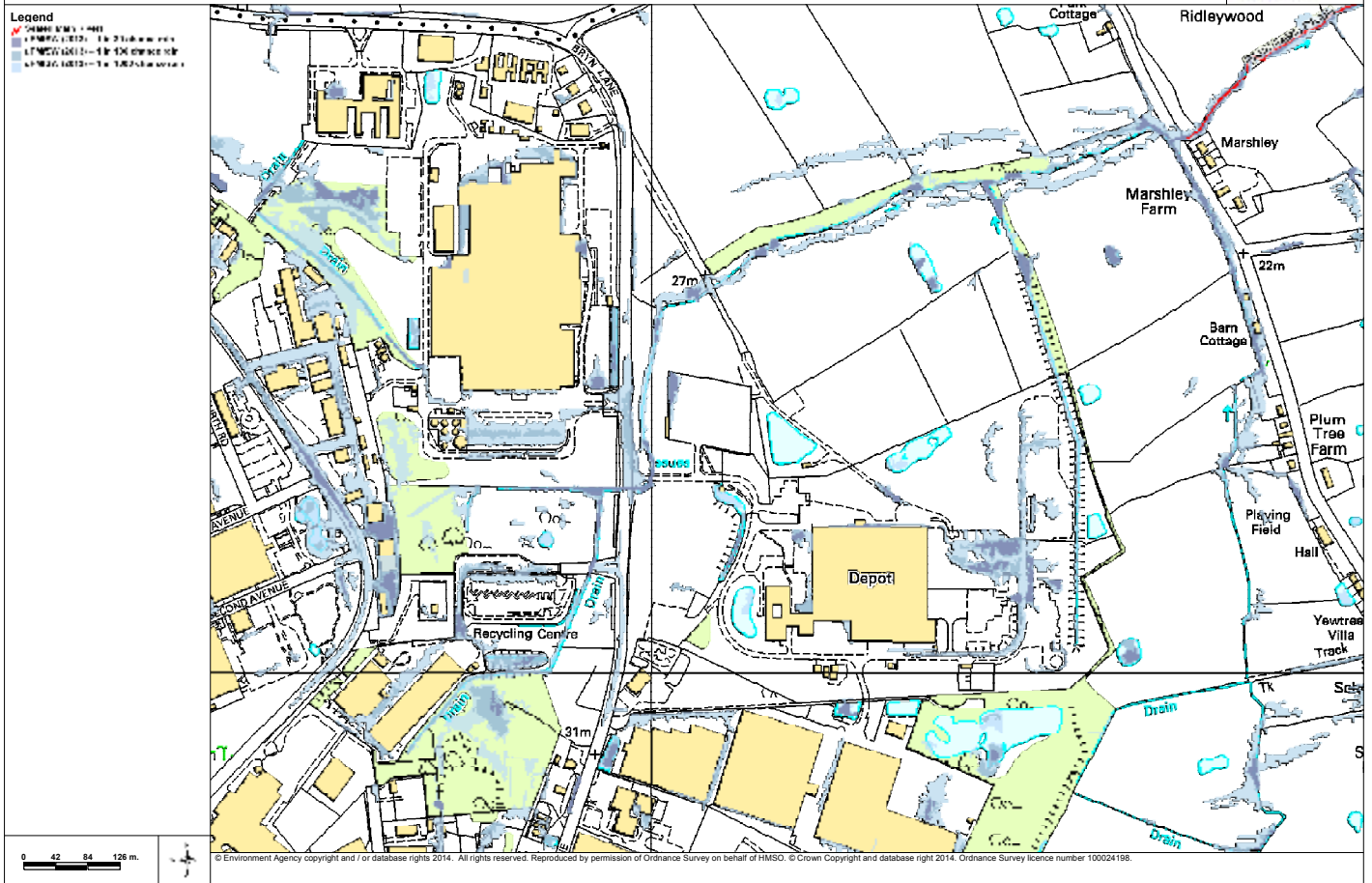
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 Environment
Agency

Risk of flooding from surface water

Understanding and using the map



Providing flood risk information

Surface water flooding occurs when intense rainfall overwhelms drainage systems. Around 35,000 properties were affected by surface water during the major floods of 2007.

Unlike flooding from rivers, surface water flooding can happen many miles from a river, often in places that people wouldn't expect because it's a long way from a river or stream – it happens simply because there is nowhere else for the rainwater to go. In 2013 a national map showing the risk of flooding from surface water was published online. The map uses the latest improvements in data, technology and modelling to help you understand how likely it is to flood where you live, travel or work.

Creating the map

Managing the risk of flooding from surface water is the responsibility of Lead Local Flood Authorities. Lead Local Flood Authorities are the unitary authority or if there is no unitary authority, the county council for the area. They work in partnership with other organisations, including the Environment Agency, district councils, water and sewerage companies to manage local flood risks.

The risk of flooding from surface water map has been produced by the Environment Agency on behalf of government, using information and input from Lead Local Flood Authorities. It has been developed using cutting edge technology, with flood experts using models to observe how rain water flows and ponds, and producing maps that take local topography, weather patterns and historical data into account.

Land heights

Surface water flooding is influenced by features in the landscape, particularly buildings and roads. A model was produced showing the height of the ground level based on 2 metre squares. Then, to get a better picture of where would be affected by surface water, we improved the way flow paths through structures such as bridges and rail embankments were shown.

Ground level was raised within building footprints by an average of 0.3 metres to represent the way that the average building would not flood internally until water outside is 0.3m deep. At that depth, the model allows water to flow slowly through the building. Roads were lowered by 0.125 metres, so that the model would reflect the way that surface water often flows along roads. Ground roughness was also varied to take into account different land use.

Rainfall

Models were run to represent different storm severities, different storm durations, and the variation in rainfall over the whole country. These were adjusted to better represent the effects of drainage and the differences between the way water soaks into the ground in urban and rural areas, .

Areas identified at risk

The effects of the remaining rainfall were modelled to assess how the water moves across the ground and see where the water flows and ponds.

Local knowledge and information

Lead Local Flood Authorities reviewed the model results and compared them with their local and historic knowledge. Where Lead Local Flood Authorities could provide better local maps, we included these to create the risk of flooding from surface maps.

Depth and speed of water

Information on the depth and velocity or speed of the surface water is included. On the map on the Environment Agency website you can view three different depth bands and two velocity bands.

Quality of information

The risk of flooding from surface water map was given a rating based on how well we think the model performs, how good the data is, and based on feedback from the Lead Local Flood Authorities' knowledge of the area. The results show how the map can be used.

Accessing and using the map

Access to the map

The risk of flooding from surface water map is available on the Environment Agency website – www.environment-agency.gov.uk/flood. If you don't have access to the Internet, you can get a copy of the map posted or emailed to you by calling Floodline on 0845 988 1188.

Using the map

You can search the risk of flooding from surface water map on the Environment Agency website (www.environment-agency.gov.uk/flood) by postcode or town name. You can zoom in or pan out depending on the area you are interested in.

Once you find the location you are interested in, you can click on the location and will be provided with further information including detail about the level of risk, the name of your Lead Local Flood Authority, and access to depth and velocity information. There are four levels of flood risk. These are:

- High - each year, the area has a chance of flooding of greater than 1 in 30 (3.3%)
- Medium - each year, the area has a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%)
- Low - each year, the area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%)
- Very low - each year, the area has a chance of flooding of less than 1 in 1000 (0.1%)

The map does not contain sufficient information for it to be used to determine flood risk to individual properties, but it does give you an indication of whether your area may be affected by surface water flooding and to what extent.

Floods can be devastating, so it is important to find out if you are at risk now rather than wait until it's too late. We do not currently provide flood warnings for flooding from surface water. The sporadic and intense nature of rainfall makes it very difficult to accurately predict when surface water flooding will happen. But there are simple steps you can take to prepare for this type of flooding.

- Check the [Environment Agency website](http://www.environment-agency.gov.uk) to see if you're at risk from other sources such as the river, the sea or reservoirs.

FLOODS
DESTROY
DESIRE
BE PREPARED

- Complete a simple [flood plan](#) - it only takes ten minutes and doing this in advance will save you valuable time and reduce damage if you're flooded.
- Check the three-day flood risk forecast on the [Environment Agency website](#). This provides a county view of flood risk from all sources, including surface water, based on weather forecasts and predicted rainfall.
- Find out how to prepare your property for flooding. Flood defences can't eliminate all risks of flooding but there are some practical steps which will help to protect your home.

Sharing data

The surface water map is available online for people and communities. Lead Local Flood Authorities and other risk management authorities also have access to the maps and data.

The surface water map and information is available on request, under licence to insurers and other commercial users. We share our information with guidance and terms & conditions which explain how it should and shouldn't be used. Sharing the data enables everyone to make more informed decisions about flood risk.

Insurance

The risk of flooding from surface water map and data is available to insurers who may use it alongside other information to inform their decisions. Insurers are free to use whichever data they like to determine whether to offer insurance and at what price. Some insurers already have and use their own surface water information. How insurers decide to set premiums and excesses is up to them. The Environment Agency and local authorities have no role in determining insurance cover.

If you are selling or buying a house, an assessment of flood risk is included in standard solicitor's searches. Whilst the Environment Agency's information is not property specific, making it available to be included in these assessments, allows the prospective purchaser to understand risks in the area of the property and make better informed decisions about their purchase.

Questions about the map

More information about your local flood risk

If you would like more information about your local flood risk from surface water or the management of surface water flood risk then you will need to contact your Lead Local Flood Authority. You can find out who this is either by clicking on the highlighted area of the surface water map or by using the postcode search on www.gov.uk/find-your-local-council.

If you disagree with the map

If you disagree with the surface water map then you will need to provide appropriate evidence to your Lead Local Flood Authority for consideration. If agreed that your evidence should be considered, they will discuss timescales for changes with you. Lead Local Flood Authorities will already have a programme for their own modelling and mapping updates, so any changes that may arise from your evidence will need to be prioritised against other work. Without appropriate evidence, Lead Local Flood Authorities won't recommend changes to the map. Anecdotal evidence will not be considered.

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O'Sullivan, Niamh

From: Birkenshaw, Paul
Sent: 30 July 2014 13:41
To: O'Sullivan, Niamh
Subject: FW: ATI-04839a Electricity Generating Plant in Wrexham
Attachments: ATI-04839a.zip

FYI – something else to build into the FCA.

From: Flood Risk Mapping [mailto:flood.risk.mapping@cyfoethnaturiolcymru.gov.uk]
Sent: 30 July 2014 13:29
To: Birkenshaw, Paul
Cc: Access to Information Team
Subject: RE: ATI-04839a Electricity Generating Plant in Wrexham

Dear Paul Birkenshaw.

You have requested a Flood Map for Surface Water and information of previous flooding from us. We can provide a Flood Map for Surface Water 1 in 30, 1 in 100, and 1 in 1000 year, however we have no record of previous flooding, Wrexham County Borough Council may have further information.

Please find attached the Flood Map for Surface Water. If you have any queries regarding this data, please contact the Flood Risk Mapping team directly.

Kind regards,

Lois A. Davies

Aelod Tîm Dadansoddi Risg Llifogydd 2 / Flood Risk Analysis Team Member 2
Swyddfa Bwcle / Buckley Office
Cyfoeth Naturiol Cymru / Natural Resources Wales

✉ Chester Road, Buckley, Flintshire, CH7 3AJ

☎ 01244 89 4612

✉ lois.a.davies@cyfoethnaturiolcymru.gov.uk

Siaradwr Cymraeg

Ein diben yw sicrhau bod adnoddau naturiol Cymru yn cael eu cynnal, eu gwella a'u defnyddio yn gynaliadwy, yn awr ac yn y dyfodol.

Our purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future

----- Original Message -----

From: Paul.Birkenshaw@atkinsglobal.com
Received: 6/18/2014 9:47 AM
To: Enquiries Queue
Cc: Niamh.OSullivan@atkinsglobal.com
Subject:

Dear Sir,

We have been commissioned to prepare a Flood Consequences Assessment and Drainage Strategy for a proposed electricity generating plant in Wrexham. A site location plan is attached. It should be noted that not the whole site area is proposed for development. The grid reference for the approximate centre of the site is 339120, 350400.

To inform this work, we have the following queries which we would appreciate your assistance in answering:

- The proposed development site is shown on the Flood Map to be located within Flood Zone A (TAN15 Development Advice Map), please could you confirm this?
- Does Natural Resources Wales have any records of flooding, from any source, either within or close to the proposed development site?
- We are currently determining suitable surface water outfalls from the proposed development site. Please could you confirm your requirements in terms of maximum permitted discharge rate should a watercourse or land drainage ditch be identified as a suitable outfall.
- Can you please advise regarding the cost to supply surface water flood maps for the site and the surrounding area?
- Do you have any specific requirements with regard to water quality in the area and the means by which water should be treated prior to discharge from the proposed development?
- Are there any other specific issues related to this site or relevant information that you believe should be considered within a Flood Risk Assessment and Drainage Strategy for the proposed development?

We look forward to hearing from you soon. If you have any queries or would like to discuss any of the above further, please give me a call.

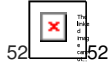
Regards,

Paul Birkenshaw
Civil Engineer, Water & Environment

ATKINS

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The Axis, 10 Holliday Street, Birmingham, B1 1TF | Tel: +44 (0)121 4835000 | Direct: +44 (0)121 483 5267 | Fax: +44 (0)121 483



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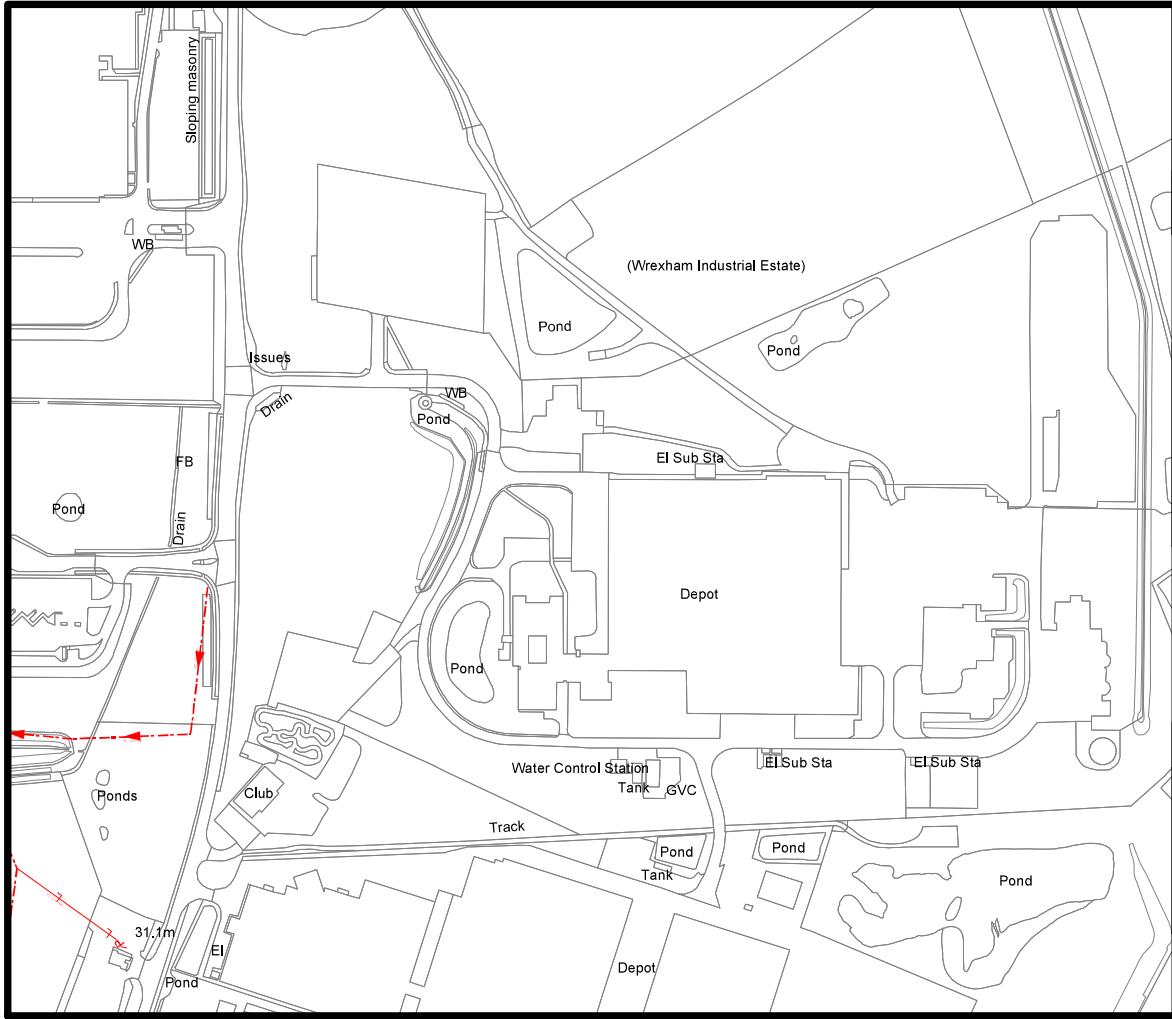
Email: paul.birkenshaw@atkinglobal.com | Web: www.atkinglobal.com |
Twitter: www.twitter.com/atkinglobal | Facebook: www.facebook.com/atkinglobal |
LinkedIn: www.linkedin.com/company/atkins | YouTube: www.youtube.com/ws Atkins plc

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LEGEND(Representative of most common features)

Water main	Gas main	Electricity main	Telecoms main
Drain	Stormwater drain	Manhole	Access point
Valve	Isolation valve	Pressure release valve	Flow meter
Flow meter	Flow meter	Flow meter	Flow meter
Flow meter	Flow meter	Flow meter	Flow meter
Flow meter	Flow meter	Flow meter	Flow meter
Flow meter	Flow meter	Flow meter	Flow meter
Flow meter	Flow meter	Flow meter	Flow meter
Flow meter	Flow meter	Flow meter	Flow meter
Flow meter	Flow meter	Flow meter	Flow meter

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWM assets, there is a possibility that in some cases pipe material (other than asbestos, concrete or plastic) may be found to be asbestos cement (AC) or Pitch Faced (PF). It is therefore advisable that the presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation.

Dŵr Cymru Cyl gives this information as to the position of its underground apparatus by way of general guidance only on the understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Company's apparatus and any area of locating the apparatus before carrying out any excavations rests entirely on you. It must be understood that the foregoing information is given without prejudice to the protection of the New Roads and Street Works Act 1991 and of the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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Map Ref:
Map scale: 1:3,250
Printed by:
Printed on: 04/11/2014



Developer Services
PO Box 3146
Cardiff
CF30 0EH

Tel: +44 (0)800 917 2652
Fax: +44 (0)2920 740472
E.mail: developer.services@dwrcymru.com

Gwasanaethau Datblygu
Blwch Post 3146
Caerdydd
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Ffacs: +44 (0)2920 740472
E.bost: developer.services@dwrcymru.com

Mr Rupert Wood
Wrexham Energy Ltd
Unit E1
St Modwen,
1st Floor The Courtyard
Alban Court,
Hatfield Road
St Albans
AL4 0LA

Date: 01/10/2014
Our Ref: PPA0000580

Dear Mr Wood

Grid Ref: SJ3928850386 339288 350386
Site: Wrexham Energy Centre Wrexham Ind Estate
Development: Wrexham Energy Centre

We refer to the pre-planning enquiry relating to the above site, and we can provide the following comments in respect to the proposed development.

SEWERAGE

In relation to capacity to accept sewage flows from the proposed development we would confirm the following:

As you may observe from the attached public sewer record plan, the public sewerage system in the vicinity of the proposed development is generally of a combined type.

The foul only discharge from the proposed development can be accommodated within the public sewerage system.

In relation to the surface water flows from the proposed development, these will have to be disposed of separately by other means, such as using soakaways or discharging directly to a watercourse in liaison with the Land Drainage Authority and / or Environment Agency.

Please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.



Welsh Water is owned by Glas Cymru – a 'not-for-profit' company.
Mae Dŵr Cymru yn eiddo i Glas Cymru – cwmni 'nid-er-elw'.

We welcome correspondence in
Welsh and English

Dŵr Cymru Cyf, a limited company registered in
Wales no 2366777. Registered office: Pentwyn Road,
Nelson, Treharris, Mid Glamorgan CF46 6LY

Rydym yn croesawu gohebiaeth yn y
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.

The Welsh Government have introduced new legislation that will make it mandatory for all developers who wish to communicate with the public sewerage system to obtain an adoption agreement for their sewerage with Dwr Cymru Welsh Water (DCWW). The Welsh Ministers Standards for the construction of sewerage apparatus and an agreement under Section 104 of the Water Industry Act (WIA) 1991 will need to be completed in advance of any authorisation to communicate with the public sewerage system under Section 106 WIA 1991 being granted by DCWW.

Welsh Government introduced the Welsh Ministers Standards on the 1st October 2012 and we would welcome your support in informing applicants who wish to communicate with the public sewerage system to engage with us at the earliest opportunity. Further information on the Welsh Ministers Standards is available for viewing on our Developer Services Section of our website - www.dwrcymru.com or on the Welsh Government website - www.wales.gov.uk

If any onsite or offsite sewers are to be offered for adoption they must be constructed to conform with the publication "Sewers for Adoption"- 7th Edition.

Please note that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. Should any drains or sewers be found that are not recorded on the public network plan please contact us to establish the location and status of the sewers as the presence of such assets may affect your proposal. Under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

If a connection is required to the public sewerage system, the developer is advised to contact us on Tel: 0800 917 2652.

SEWAGE TREATMENT

No problems are envisaged with the Waste Water Treatment Works for the treatment of domestic discharges from this site.



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Welsh and English

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Rydym yn croesawu gohebiaeth yn y
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.

We trust the above information is helpful. Our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation.

If you have any queries please contact Developer Services on 0800 917 2652 or via email at developer.services@dwrcymru.com

Please quote our reference number in all communications and correspondence.

Yours faithfully,



Owain George

Lead Development Control Officer

Enc. Sewer Plan

Demands upon the water and sewerage systems change continually; consequently the information given above should be regarded as reliable for a maximum period of 12 months from the date of this letter.



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Welsh and English

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Gymraeg neu yn Saesneg

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Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.

O'Sullivan, Niamh

From: Carole Wright <Carole.Wright@wrexham.gov.uk>
Sent: 27 June 2014 12:50
To: Birkenshaw, Paul
Cc: O'Sullivan, Niamh; Charlotte Beattie
Subject: RE: Flood Consequences Assessment enquiry

Follow Up Flag: Follow up
Flag Status: Completed

Dear Mr Birkenshaw

- Does the Council have any records of flooding, from any source, either within or close to the proposed development site?
[Please see attached factsheet/report.](#)
- It is our intention to use sustainable drainage systems (SUDS) within surface water drainage strategy for the proposed development. Please could you advise regarding Wrexham County Borough Council's current policy for the adoption of SUDS and how this might change with the introduction of the SUDS Approval Bodies in the future?
[WCBC would support integral use of SuDS. The local flood risk management strategy \(adopted April 2013\) Measure L2 promotes use of suDS and successful development plan approach. Unlikely to change significantly alter principles with introduction of SAB although criteria itself will be more detailed and process will be more formalised with associated fee and forms etc.](#)
- Do you have any information relating to highway drainage, land drainage and other waterbodies within and in the vicinity of our site?
[Highways and land drainage information can be obtained from the Highways department. Contact details are 01978 298989. Waterbodies data should be gained from Environment Agency.](#)
- We are currently determining suitable surface water outfalls from the proposed development site. Please could you confirm your requirements in terms of maximum permitted discharge rate should a local watercourse or land drainage ditch be identified as a suitable outfall.
[Discharge rates will depend of acceptability of proposed suDS scheme proposed.](#)
- Do you have any requirements in terms of water quality and how surface water should be treated prior to discharge from the site.
[Water quality integral part of suDS scheme-use pollution train etc should be in compliance with BS8582:2013 and C697 suDS manual.](#)
- Are there any other specific issues related to this site or relevant information that you believe should be considered within a Flood Consequences Assessment and Drainage Strategy for the proposed development?
[Site investigations, soil and geology and typical site survey/investigations that should inform drainage/design of site.](#)

If there is anything further you require please do not hesitate to contact me.

Regards

Carole Wright

Carole Wright - BA MBCS
Technical Flood Support Officer



01978 298829



16 Lord Street, Wrexham, LL11 1LG



16 Stryt yr Arglwydd, Wrecsam, LL11 1LG



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“Wrexham is proud to host the North Wales Armed Forces Day on 21 June 2014 in Wrexham town centre

Mae'n bleser gan Wrecsam gynnal Diwrnod Lluoedd Arfog Gogledd Cymru ar 21 Mehefin 2014 yng nghanol tref Wrecsam.”

From: Birkenshaw, Paul [mailto:Paul.Birkenshaw@atkinsglobal.com]
Sent: 18 June 2014 10:48
To: flooding
Cc: O'Sullivan, Niamh
Subject: Flood Consequences Assessment enquiry

Dear Sir,

We have been commissioned to prepare a Flood Consequences Assessment and Drainage Strategy for a proposed electricity generating plant in Wrexham. A site location plan is attached. It should be noted that not the whole site area is proposed for development. The grid reference for the approximate centre of the site is 339120, 350400.

To inform this work, we have the following queries which we would appreciate your assistance in answering:

- Does the Council have any records of flooding, from any source, either within or close to the proposed development site?
- It is our intention to use sustainable drainage systems (SUDS) within surface water drainage strategy for the proposed development. Please could you advise regarding Wrexham County Borough Council's current policy for the adoption of SUDS and how this might change with the introduction of the SUDS Approval Bodies in the future?
- Do you have any information relating to highway drainage, land drainage and other waterbodies within and in the vicinity of our site?
- We are currently determining suitable surface water outfalls from the proposed development site. Please could you confirm your requirements in terms of maximum permitted discharge rate should a local watercourse or land drainage ditch be identified as a suitable outfall.
- Do you have any requirements in terms of water quality and how surface water should be treated prior to discharge from the site.
- Are there any other specific issues related to this site or relevant information that you believe should be considered within a Flood Consequences Assessment and Drainage Strategy for the proposed development?

Thank you for your assistance and we look forward to hearing from you soon. If you have any queries or would like to discuss any of the above further, please give me a call.

Regards,

Paul Birkenshaw
Civil Engineer, Water & Environment

ATKINS
75 years of design, engineering and project management excellence

The Axis, 10 Holliday Street, Birmingham, B1 1TF | Tel: +44 (0)121 4835000 | Direct: +44 (0)121 483 5267 | Fax: +44 (0)121 483 5252
Email: paul.birkenshaw@atkinsglobal.com | Web: www.atkinsglobal.com |
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Local Flood Risk Site Enquiry Report



Customer Details

Enquiry Number WBCENQ2

Name Mr Paul Birkenshaw

Organisation Atkins

Address The Axis
10 Holiday Street
Birmingham
B1 1TF

Site Details

Post Code

NGR 339120, 350400

Address Wrexham Electricity Generating Plant
Land adjacent to Kelloggs
Bryn Lane
Wrexham Industrial Estate
Wrexham

Groundwater Class >25% <50%

Flood Type Superficial deposits flooding

Nearest Watercourse Unknown

Nearest Flood Incident Distance (m) 450

Preliminary Flood Risk Assessment (2011) ☒

Groundwater Risk Class Negligable - Low

Watercourse Distance (m) 0

Nearest Flood Incident Type Surface water flooding

PFRA (2011)Area Wrexham Ind Est East

Flood Zone: None

Officer Summary

Site is bordered by unknown ordinary watercourse to North and East. Park Farm Drain lies 255m to upper East of site. PFRA site 'Wrexham Industrial Estate East' borders the West edge of the site. There are 1in30, 1in100 and 1in1000 surface water indicated following the unknown watercourse bordering the site with some other incidences mainly around the pond areas.

Disclaimer

Please be advised that the flood information provided in this report is supplied to WCBC from Environment Agency mapping service.

This report is a desk top study. Further studies or assessments may be required by a qualified professional.

Further information can be found at:

http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopicslang=_e