



**BARRY TOWN COUNCIL  
CYNGOR TREF Y BARRI**

**PURSUANT TO THE REQUIREMENTS OF THE ABOVE STATUTORY PROVISIONS, NOTICE IS HEREBY GIVEN THAT A MEETING OF FULL COUNCIL TO BE HELD REMOTELY ON MONDAY 10 JANUARY 2022 COMMENCING AT 7.00 PM FOR THE PURPOSE OF TRANSACTING THE BUSINESS SHOWN IN THE AGENDA SET OUT BELOW.**

**From 1 May 2021 The Local Government and Elections (Wales) Act 2021** makes provision for meetings to take place through a variety of arrangements, including multi-location meetings where all individuals are attending virtually and hybrid meetings where a number of individuals are attending in person at a designated location and others are attending virtually from a range of other locations. The Act makes permanent provision for remote meetings (multi-location) and electronic publication of documents

Yours faithfully

A handwritten signature in black ink, appearing to read 'Steffan Wiliam', written over a horizontal dashed line.

Councillor Steffan Wiliam  
Mayor of Barry

**AGENDA**  
**AGENDA**

1. **To receive apologies for absence**
2. **To receive declarations of interest under the Council's Code of Conduct** (Note: Members seeking advice on this item are asked to contact the Monitoring Officer at least 72 hours before the meeting)

**TO NOTE:** Councillors Aviet, Bailey, Brooks, Charles, Collins, Drake, Hampton, N Hodges, Johnson, Nugent-Finn, Perkes, Rowlands, Wiliam, Wilkinson and Wright have received dispensation from the Vale of Glamorgan Council to speak and vote on any item on this agenda relating to Reshaping of Services

Councillor Johnson has also been granted Dispensation to allow him to speak and vote on future matters appertaining to the Pioneer Hall and the proposed Community Hall at Cemetery Approach, by virtue that he is a Vale of Glamorgan Council Trustee for the Alexandra Gardens Community Association.

Councillor Rowlands has also been granted dispensation to speak only at all meetings of Barry Town Council on matters relating to the Youth Forum and the impact of the Forum on restructuring of the Youth Service and financial arrangements.

3. **Well-being of Future Generations (Wales) Act 2015**

**(To note)**

*Members will note that this Act sets out the requirement for a public body to act in a manner which seeks to ensure **that the needs of the present are met without compromising the ability of future generations to meet their own needs.***

*In order to act in that manner, a public body must take account of the following things:*

- (a) the importance of balancing short term needs with the need to safeguard the ability to meet long term needs, especially where things done to meet short term needs may have detrimental long term effect;*
- (b) the need to take an integrated approach, by considering how—*
  - i. the body's well-being objectives may impact upon each of the well-being goals;*
  - ii. the body's well-being objectives impact upon each other or upon other public bodies' objectives, in particular where steps taken by the body may contribute to meeting one objective but may be detrimental to meeting another;*
- (c) the importance of involving other persons with an interest in achieving the well-being goals and of ensuring those persons reflect the diversity of the population of the part of Wales in relation to which the body exercises functions;*
- (d) how acting in collaboration with any other person (or how different parts of the body acting together) could assist the body to meet its well-being objectives, or assist another body to meet its objectives;*
- (e) how deploying resources to prevent problems occurring or getting worse may contribute to meeting the body's well-being objectives, or another body's objectives.*

4. **To approve and sign the minutes of Full Council held on Monday 13 December 2021 (Pages 5754-5767)**

5. **Bio Mass Voluntary Retrospective Environmental Statement**  
**(Pages 5768-6063)**

6. **Date of Next Meeting**

To note that the next meeting of Full Council is scheduled to be held on Monday 7 February 2022 at 7pm

**Distribution**

The Mayor (Councillor Steffan Wiliam) plus all other Town Councillors (22)  
Others (Barry & District News, Barry Police and Barry Library) (3)

**This document is available in large print and other formats upon request/Cewch y ddogfen hon mewn pring bra**

**DRAFT MINUTES OF THE VIRTUAL MEETING OF COUNCIL HELD ON MONDAY  
13 DECEMBER 2021 AT 7PM**

**PRESENT:** The Mayor (Councillor Wiliam) together with Councillors Aviet, Bailey, Brooks, Charles, Clarke, Collins, Drake, Hawkins, N Hodges, S Hodges, Johnson, Lloyd-Selby, Nugent-Finn, Payne, Perkes, Rowlands and Wilkinson

**ALSO PRESENT:**

Mark Sims	-	Deputy Chief Officer
Amanda Evans	-	Facilities and Cemeteries Manager
Robyn Walsh	-	Community Engagement Officer
Beth Hillier	-	Sustainable Barry Project Officer
Rebecca Blackwell	-	Office Team Leader
Harry Evans	-	Vice Chairperson, Barry Youth Council

As it was the first meeting where a representative from Barry Youth Council was in attendance, all Councillors and staff introduced themselves and welcomed the Vice Chairperson to the meeting.

992. **APOLOGIES FOR ABSENCE**

Apologies were received from Councillors Hooper and Richardson, Apologies were also received from Ruby Matthews, the Chairperson for Barry Youth Council

993. **TO RECEIVE DECLARATIONS OF INTEREST UNDER THE COUNCIL'S CODE OF CONDUCT NOTING THE LOCAL AUTHORITIES (MODEL CODE OF CONDUCT) (WALES) ORDER 2008 AND THE LOCAL AUTHORITIES (MODEL CODE OF CONDUCT) (WALES) (AMENDMENT) ORDER 2016 ADOPTED BY COUNCIL ON 16 MAY 2017 (PAGE 16 PART 3)**

Councillors Aviet, Bailey, Brooks, Charles, Collins, Drake, N Hodges, Johnson, Nugent-Finn, Perkes, Rowlands, Wiliam, and Wilkinson noted that they were Councillors of the Vale of Glamorgan Council also and advised they had received dispensation to speak and vote on matters appertaining to Reshaping Services.

Councillor Johnson noted he had received dispensation to allow him to speak and vote on future matters appertaining to the Pioneer Hall and the Community Hall at Cemetery Approach, by virtue that he is a Vale of Glamorgan Council Trustee for the Alexandra Gardens Community Association.

Councillor Rowlands noted he has been granted dispensation to speak only at all meetings of Barry Town Council on matters relating to the Youth Forum and the impact of the Forum on restructuring of the Youth Service and financial arrangements.

Councillor Payne wished to make a declaration in the event of discussions relating to Youth services due to being the Vice Chair of the Vale of Glamorgan Youth Forum. Councillor Charles also wished to make the same declaration due to being a link Councillor on Barry Youth Council.

994.

**WELL-BEING OF FUTURE GENERATIONS (WALES) ACT 2015**

It was noted that this Act sets out the requirement for a public body to act in a manner which seeks to ensure **that the needs of the present are met without compromising the ability of future generations to meet their own needs.**

In order to act in that manner, a public body must take account of the following things:

- (a) the importance of balancing short term needs with the need to safeguard the ability to meet long term needs, especially where things done to meet short term needs may have detrimental long term effect;
- (b) the need to take an integrated approach, by considering how—
  - (i) the body's well-being objectives may impact upon each of the well-being goals;
  - (ii) the body's well-being objectives impact upon each other or upon other public bodies' objectives, in particular where steps taken by the body may contribute to meeting one objective but may be detrimental to meeting another;
- (c) the importance of involving other persons with an interest in achieving the well-being goals and of ensuring those persons reflect the diversity of the population of the part of Wales in relation to which the body exercises functions;
- (d) how acting in collaboration with any other person (or how different parts of the body acting together) could assist the body to meet its well-being objectives, or assist another body to meet its objectives;
- (e) how deploying resources to prevent problems occurring or getting worse may contribute to meeting the body's well-being objectives, or another body's objectives.

**RESOLVED: That the Well-being of Future Generations (Wales) Act 2015 be noted.**

995.

**TO APPROVE AND SIGN THE MINUTES OF FULL COUNCIL HELD ON MONDAY 27 SEPTEMBER 2021**

Members were provided with the minutes of the Full Council meeting held on Monday 27 September 2021.

**RESOLVED: That the minutes of Full Council held on Monday 27 September 2021 are approved and signed as a correct record.**

996.

**TO RECEIVE COMMUNICATIONS FROM THE MAYOR**

The Mayor updated members on the events that he had either attended or hosted. They were as follows, Dafydd ap Ffrancis-Meilir's Family Artist Opening at Art Central, held various surgeries at his Mayor on the Square events, visited Ty Hafan, attended the three Remembrance Services, visited the Cemetery to celebrate the award along with Councillor N Hodges and the late Sharon Harris and wished to convey his thoughts to Sharon's family and friends. He also attended the Race Riots event held at the Cemetery Approach Community Centre, visited Vale Foodbank who held an event for them being established for 10 years, held an interview with the relatives on Gareth Jones at his grave in Merthyr Dyfan Cemetery but advised that the audio quality was unusable. He also attended two events held by Metalidads, Pumpkins in the Park event hosted by Barry Town Council, the Vale of Glamorgan Council Mayors Civic Service, an evening with Barry Male Voice Choir, opened Penmark Scout Hall, Small Business Saturday and made members aware that there are over 100 small businesses on Holton Road, attended the Festival of Lights event part funded by Barry Town Council, Festive Market on King Square, Llandaff Cathedral, High Street Christmas Light Switch on, an event hosted by Barry Beavers and ran in the Town Council's Santa Fun Run. The Mayor wished to thank the Community Engagement Officer for the organisation of the Winter events and the wider team for their help, he added that he was proud of the Town Council for supporting so many great free events.

**RESOLVED that communications from the Mayor be received and noted.**

997.

**TO CONSIDER QUESTIONS FROM COUNCILLORS (STANDING ORDER 3 (E) REFERS)**

None were received.

998.

**TO CONSIDER QUESTIONS/COMMENTS FROM MEMBERS OF THE PUBLIC (STANDING ORDER 3 (F) REFERS)**

None were received.

999.

**TO CONSIDER MOTIONS SUBMITTED BY COUNCILLORS**

None were received.

The Mayor moved agenda item 27 forward

1000. **BARRY YOUTH COUNCIL**

The Vice Chair of Barry Youth Council provided members with an update on what the Youth Council have been focusing on and advised that they will be working on projects in the New Year along with some training. He also advised that the members of Barry Youth Council would like to continue to attend Full Council meetings, along with any other meetings where young people's views would be helpful.

Councillor Charles praised Barry Youth Council and advised that they are a wonderful group of young people.

**RESOLVED: That the update from Barry Youth Council be received and noted.**

1001. **TO RECEIVE THE MINUTES OF THE SHOP LOCAL BARRY ADVISORY COMMITTEE HELD ON 7 OCTOBER AND THE EXTRAORDINARY MEETING HELD ON 16 NOVEMBER 2021 TO GIVE CONSIDERATION TO ANY RECOMMENDATIONS THEREIN**

Councillor Perkes advised that Shop Local has had a very busy and successful period and thanked the Finance, Policy and General Purposes Committee for agreeing to urgent actions which allowed Shop Local to fund various Christmas projects which included, Santa's Post Office, High Street Christmas light switch on, supported traders to decorate shops for Christmas and helped fund the Winter Festive Market on King Square.

Councillor Payne wished to back Councillor Perkes, adding it was her suggestion to keep the Santa's Post Office a free event to be more inclusive for lower income families and congratulated the Shop Local Advisory Group for their hard work.

Councillor Nugent-Finn provided feedback in relation to the Barry Town Council stall at the Winter Festive Market advising that more literature for Children should be available.

**RESOLVED: That the minutes of the Shop Local Barry Advisory Committee held on 7 October and the Extraordinary Meeting held on 16 November 2021 be received and noted**

1002. **TO RECEIVE AND NOTE THE MINUTES OF THE PLANNING COMMITTEE HELD ON 12 OCTOBER AND 2 NOVEMBER 2021 AND TO GIVE CONSIDERATION TO ANY RECOMMENDATIONS THEREIN**

**RESOLVED: That the minutes of the Planning Committee meetings held on 12 October and 2 November 2021 be received and noted.**

1003.

**TO RECEIVE AND NOTE THE MINUTES OF THE FAIRTRADE ADVISORY COMMITTEE HELD ON 1 NOVEMBER 2021 AND TO GIVE CONSIDERATION TO ANY RECOMMENDATIONS THEREIN**

Councillor Johnson gave an update from the Fairtrade Advisory Committee noting that Kadun Rees from Fairtrade Wales attended the last meeting and talked about Fairtrade Fortnight and advised that himself and Councillor N Hodges dressed as bananas at the recent Santa Fun Run, handed out bananas to those who ran the race and thanked the team for organising the bananas.

**RESOLVED: That the minutes of the Fairtrade Advisory Committee held on 1 November 2021 be received and noted.**

1004.

**TO RECEIVE AND NOTE THE MINUTES OF THE HALLS, CEMETERIES AND COMMUNITY FACILITIES COMMITTEE HELD ON 8 NOVEMBER 2021 AND TO GIVE CONSIDERATIONS TO ANY RECOMMENDATIONS THEREIN**

Councillor N Hodges provided an update from the Halls, Cemeteries and Community Facilities Committee advising that all recommendations had been approved via the Finance, Policy and General Purposes Committee.

**RESOLVED: That the minutes of the Halls, Cemeteries and Community Facilities Committee held on 8 November 2021 be received and noted.**

1005.

**TO RECEIVE THE NOTES OF AN INFORMAL MEETING THE COMMUNITY PLAN WORKING GROUP HELD ON 15 NOVEMBER 2021 AND TO GIVE ANY CONSIDERATION TO ANY RECOMMENDATIONS THEREIN**

Councillor Brooks provided a detailed update in relation to the work discussed at the Community Plan Working Party advising that public consultation had started at the recent Winter Festive Market held on King Square which the Community Engagement Officer circulated the results prior to the meeting. Councillor Brooks also advised members that it will be a large piece of work but it will provide the stepping stones for the new administration in May 2022.

**RESOLVED: That the notes of an informal meeting of the Community Plan Working Group held on 15 November 2021 be received and noted.**

1006. **TO RECEIVE AND NOTE THE MINUTES OF THE PERSONNEL COMMITTEE HELD ON 15 NOVEMBER 2021 AND TO GIVE CONSIDERATION TO ANY RECOMMENDATIONS THEREIN**

Councillor Charles noted that the meeting was productive.

**RESOLVED: That the minutes of the Personnel Committee held on 15 November 2021 be received and noted.**

1007. **TO RECEIVE AND NOTE THE MINUTES OF THE SUSTAINABLE BARRY WORKING PARTY HELD ON 17 NOVEMBER 2021 AND TO GIVE CONSIDERATIONS TO ANY RECOMMENDATIONS THEREIN**

Councillor Clarke noted that it was a busy meeting and thanked the Sustainable Barry projects Officer for the successful School Eco Project held at Merthyr Dyfan Cemetery and hopes to see them continue. Councillor Clarke also advised members that the Town Council are working towards becoming a refill partner which will enable people to refill their own water bottles at different establishments in the Town.

**RESOLVED: That the minutes of the Sustainable Barry Working Party held on 17 November 2021 be received and noted.**

1008. **TO RECEIVE THE MINUTES OF THE COMMEMORATIVE NAMING ADVISORY COMMITTEE HELD ON 18 NOVEMBER 2021 AND TO GIVE CONSIDERATIONS TO ANY RECOMMENDATIONS THEREIN**

Councillor Payne wished to add that she had welcomed both Emma and Rachel Foley to the meeting, advising them that she knew their father very well but this was missing from the minutes. Councillor Payne also noted that it was a quick meeting. Councillor S Hodges thanked the Commemorative Naming Advisory Committee for their work and was pleased to hear that Emma Foley and Rachel Foley were part of the meeting.

The Community Engagement Officer requested a budget to enable the organisation of the reception. Members were happy to agree a budget of £250 which will come from the Civic Hospitality budget heading.

**RESOLVED:**

- 1. That the minutes of the Commemorative Naming Advisory Committee held on 18 November 2021 be received and noted**
- 2. That Janet Davies is awarded the first Bryan Foley Award**
- 3. That a prosecco reception is arranged in order to present the award to the successful nominee with a budget of £250 to come from Civic/Civic Hospitality expenditure heading.**

1009.

**TO RECEIVE THE MINUTES OF THE FINANCE, POLICY AND GENERAL PURPOSES COMMITTEE HELD ON 22 NOVEMBER 2021 AND GIVE CONSIDERATIONS TO ANY RECOMMENDATIONS THEREIN**

Councillor Brooks advised that the minutes were very detailed and that all recommendations were resolved. She also noted that there had been additional fund left in the Covid Grant pot and that grant funding had re-opened to help those who need it.

**RESOLVED: That the minutes of the Finance, Policy and General Purposes Committee held on 22 November 2021 be received and noted.**

1010.

**TO REVIEW THE COUNCIL'S APPROACH TO MEETINGS**

Members were provided with a report requesting members to review and agree the Council's approach to meetings for the remainder of the current schedule of meetings for 2021/22 leading up to the Council's Annual Meeting in May 2022.

The Deputy Chief Officer provided further information in relation to the on-going effects of Covid-19 and the Omicron variant. He also highlighted the effects on staff security at meetings where no members attend in person, noting a recent meeting as an example.

Councillor Brooks proposed that all meetings be remote with a review of the Covid-19 situation being presented to the meeting of Full Council scheduled for 7 February 2022.

Councillor S Hodges agreed and queried proposed Mayors events.

The Community Engagement Officer asked if the remote meetings would apply to the Youth Council.

The Deputy Chief Officer suggested that a review is undertaken in the New Year in relation to the Youth Council and that he would check with the Church on the position of holding the Mayors Christmas Carol Service proposed for Sunday 19 December 2021.

**RESOLVED: That all meetings up to and including the Full Council meeting being held on 7 February 2022 be remote only, with a review being presented to that meeting of Full Council on 7 February 2022.**

1011. **TO APPROVE THE TERMS OF REFERENCE FOR THE SUSTAINABLE BARRY WORKING PARTY**

Members were provided with the terms of reference for the Sustainable Barry Working Party which were approved at the Annual Meeting held on 17 May 2021. The Deputy Chief Officer advised of the amendment whereby the terms of reference should state 'Under Delegated Powers' and not 'By way of recommendation to Full Council or any other relevant Committee'. Members agreed to the amendment.

**RESOLVED: That the Terms of Reference for the Sustainable Barry Working Party be approved.**

1012. **OPEN LETTER FROM NATIONAL ASSOCIATION OF LOCAL COUNCILS, SOCIETY OF LOCAL COUNCIL CLERKS AND ONE VOICE WALES – TOGETHER WE CAN DO SO MUCH**

Members were provided with an open letter from the National Association of Local Councils, Society of Local Clerks and One Voice Wales.

**RESOLVED: That the open letter received from the National Association of Local Councils, Society of Local Clerks and One Voice Wales be received and noted.**

1013. **QUEEN'S PLATINUM JUBILEE**

Members were provided with a report relating to the plans announced for the Queen's Platinum Jubilee Central Weekend in June 2022.

Councillor Brooks suggested a street party grant for communities to hold street parties to celebrate, advising that it had been done previously. The Mayor suggested a budget of £5,000 be proposed to be given in the form of grants for people wishing to hold street parties. The Deputy Chief Officer advised that the finer details could be discussed closer to the event.

**RESOLVED: That a budget of £5,000 be included for the provision of street party grants and this is to be added to the Community Grants budget for 2022/23.**

1014. **COMMEMORATIVE BENCHES**

Members were provided with a report relating to a request for the Council to contribute towards installing a Commemorative Bench opposite the Memorial Hall and Theatre on Gladstone Road. Councillor Brooks advised that this had been discussed for a while and would be happy to support a bench being installed, asking which budget would it come from. The Deputy Chief Officer advised that it could come from the Corporate Events budget.

Councillor S Hodges advised that when the proposal was first discussed, the Town Council Offices were across the road from the proposed site and would have been fitting at that time. Now the offices have moved, Councillor S Hodges felt that it should be the responsibility of the Vale of Glamorgan Council and that the Memorial Hall and Theatre should be approached.

Councillor Lloyd-Selby took Councillor S Hodges point but advised that the Town Council should support a bench at this location as the Town Council support the Remembrance Sunday Service each year at the Cenotaph and it would be what the people of Barry would want the Town Council to commemorate.

Councillor Payne supported both Brooks and Lloyd-Selby saying that it will have a plaque to recognise the Town Council.

The Mayor asked that are the designs within the report the designs the Council has to choose from.

Councillor Lloyd-Selby suggested to ask members of the public via social media of their choices.

Councillor S Hodges wished to re-iterate what she had said adding that the area is not the responsibility of the Town Council and that it is the responsibility of the Vale of Glamorgan Council.

Councillor Wilkinson asked where did the request come from.

The Cemetery and Facilities Manager advised that she received an email from Miles Punter from the Vale of Glamorgan Council asking if Barry Town Council would like to be represented by purchasing a bench to be placed in that area.

Councillor Wilkinson advised that she wouldn't mind paying for one bench if the Vale of Glamorgan Council pays for the other.

Councillor N Hodges advised that there was the possibility of installing a bench at the Cemetery Approach gardens where the air raid shelter once stood. He also suggested that the Vale of Glamorgan Council approach the Royal British Legion.

Councillor Brooks agreed to look at a similar bench at cemetery Approach when the time comes but would like to proceed with purchasing a bench at this location due to the close proximity to the Cenotaph

Members took a vote

For – 9  
Against – 5

**RESOLVED:** That Council agree to the installation of War Horse design commemorative bench on one of the plinths on the seating area overlooking Blind Park, opposite the Memorial Hall Theatre and Cenotaph at a cost of £996.

1015. **TO APPROVE THE SCHEDULE OF PAYMENTS FOR DECEMBER 2021**

Members were provided with the schedule of payments for December 2021 for approval consisting of BACS payments and direct debits in the amount of £33,678.24

**RESOLVED:**

1. That the information set out in the report relating to salary payments for October and November 2021 inclusive, which has been certified and authorised by the appropriate officers in accordance with the requirements of Standing Order 19(c), be received and noted.
2. That the schedule of payments for December 2021 comprising of BACS payments and direct debits in the amount of £33,678.24 be approved, subject to the relevant papers being in order.

1016. **BUDGET MONITORING REPORT TO 30 NOVEMBER 2021**

Members were provided with information about the Council's income and expenditure in the 2021/22 financial year as at the end of November 2021.

**RESOLVED:** That the budget monitoring report for November 2021, indicating actual income and expenditure up to the end of month eight in the 2021/22 financial year, noting the projected underspend of £27,388 that will result in a net amount of £38,612 being transferred from reserves be received and noted.

1017. **DRAFT BUDGET 2022/23**

Members were requested to consider the Town Council's draft budget for 2022/23 that will go out for public consultation from 20 December 2021 to 23 January 2022. The draft budget will then be considered at the Town Council's meeting on 7 February 2022 to determine the precept to be levied on the Vale of Glamorgan Council.

The Deputy Chief Officer advised that an extra £5,000 will need to be added following the proposal of grants to celebrate the Queens Platinum Jubilee.

Councillor Brooks advised that this will be the last budget set by this administration and felt it was a fair budget by keeping the Cemetery fees and Charges low along with the hire charges for the Pioneer Hall and Cemetery Approach Community Centre.

Councillor Johnson wished to make a point on presentation in relation to the headline 'Restricted Grant to the Memorial Hall and Theatre 2019-2022' there should be an asterisk with an explanation of where the grant of £150,000 has gone following the end of the current agreement. He also advised that people may not understand what is meant by 'LGA 1972 Section 145 Expenditure' and it should come with an explanation.

Councillor S Hodges advised that there is sensitivity around these issue and the public may misunderstand but there is a provision for Arts. She also advised that sensitivity needs to be sought when presenting.

**RESOLVED: That the draft budget be approved for public consultation (subject to including an amount of £2,240 to be added to the General reserve) that provisionally sets a precept requirement of £1,265,916 being an increase to a Band D tax payer of 1.9% compared to 2021/22.**

1018.

### **SUSTAINABLE BARRY – WASTE MANAGEMENT**

Members were provided with information relating to Waste and Resource Management (data allowing) over all utilised premises for consideration.

The Sustainable Barry projects Officer gave members a detailed overview of her report.

Councillor S Hodges thanked the Sustainable Barry projects Officer for her comprehensive report and congratulated the Town Council on their hard work.

**RESOLVED:**

- 1. That the report be received and noted**
- 2. That Waste and Resource Management data is compiled and reported to Full Council annually**

1019. **DATE OF NEXT MEETING**

**RESOLVED** that the next meeting of Council is scheduled to be held on Monday 7 February 2022 at 7pm with an Extra-Ordinary meeting being held on 10 January 2022 at 7pm to consider the Council's response to the Consultation on the Barry Biomass Voluntary Environmental Statement.

1020. **EXCLUSION OF THE PRESS & PUBLIC**

**RESOLVED** that in accordance with section 1 (2) of the Public Bodies (Admission to Meetings) Act 1960, in view of the confidential nature of the business about to be transacted, it is advisable in the public interest that the press and public are excluded from the remainder of the meeting.

1021. **SUSPENSION OF STANDING ORDER 3(aa)**

**RESOLVED:** That Standing Order 3(aa) be suspended for a period of 30 minutes.

1022. **URGENT ACTIONS**

Members were provided with the details of any Urgent Actions that have been undertaken by the Deputy Chief Officer in conjunction with Group Leaders, since the last meeting of Council held on 27 September 2021.

**RESOLVED:** That members receive and note the Urgent Actions.

1023. **PUBLIC SERVICES OMBUDSMAN FOR WALES**

Members were advised that the Public Services Ombudsman have written to advise in confidence of his decision to refer a previous matter to the Standards Committee at the Vale of Glamorgan Council. The Deputy Chief Officer was unable to provide any further details.

**RESOLVED:** That the verbal update be received and noted.

1024. **MEMORIAL HALL AND THEATRE**

Members were provided with an update report in relation to the Memorial Hall and Theatre (MHT) Grant Funding Agreement.

A full and detailed discussion was had. A confidential note of the meeting is on record with the Chief Officer.

**RESOLVED:**

1. That Council write to the Auditor General for Wales to seek advice relating to the Council suspending funding payments as they have not received assurances in relation to the Grant Funding Agreement 2019-2022
2. That Council write to the Charity Commission to inform them that the Town Council remains disappointed that the Memorial Hall and Theatre have not fully satisfied the Council that the funding has been used for the purposes awarded in the restricted grant and advising that the Council have withheld payments due to all the concerns raised.

1025. **UPDATE ON DISCUSSIONS WITH GMB UNION REGARDING A POTENTIAL CHANGE OF HOURS FOR CEMETERY STAFF DURING THE SUMMER MONTHS (1 APRIL – 30 SEPTEMBER)**

Members were provided with an update in relation to the discussion with GMB Union regarding a potential change of hours for Cemetery Staff during the Summer months 1 April – 30 September.

**RESOLVED: That members receive and note the verbal update.**

1026. **LETTER FROM CHIEF OFFICER**

Members were provided with a letter from the Chief Officer relating to sick pay.

**RESOLVED: That sick pay at full pay for the Chief Officer be extended for two months to enable a full recovery and successful return to work due to the exceptional circumstances with the current pressures the NHS are facing during the Covid-19 Pandemic.**

The meeting closed at 8.59pm

Signed ..... Dated .....  
(Town Mayor)

**ACTION SHEET - FULL COUNCIL - 13 DECEMBER 2021**

MINUTE NO.	ACTION TO BE TAKEN	ACTION TO BE TAKEN BY	DATE ACTION TO BE CARRIED OUT	PROGRESS
1008(3)	That a prosecco reception is arranged in order to present the award to the successful nominee with a budget of £250 to come from Civic/Civic Hospitality expenditure heading.	DCO	Feb-22	Ongoing
1013	That a budget of £5,000 be included for the provision of street party grants and this is to be added to the Community Grants budget for 2022/23.	DCO	Feb-22	Ongoing
1014	That Council agree to the installation of War Horse design commemorative bench on one of the plinths on the seating area overlooking Blind Park, opposite the Memorial Hall Theatre and Cenotaph at a cost of £996.	DCO	Feb-22	Ongoing
1017	That the draft budget be approved for public consultation (subject to including an amount of £2,240 to be added to the General reserve) that provisionally sets a precept requirement of £1,265,916 being an increase to a Band D tax payer of 1.9% compared to 2021/22.	DCO	Feb-22	Ongoing
1018(2)	That Waste and Resource Management data is compiled and reported to Full Council annually	SBPO	Annually	Ongoing
1024(1)	That Council write to the Auditor General for Wales to seek advice relating to the Council suspending funding payments as they have not received assurances in relation to the Grant Funding Agreement 2019-2022	DCO	Feb-22	Ongoing
1024(2)	That Council write to the Charity Commission to inform them that the Town Council remains disappointed that the Memorial Hall and Theatre have not fully satisfied the Council that the funding has been used for the purposes awarded in the restricted grant and advising that the Council have withheld payments due to all the concerns raised.	DCO	Feb-22	Ongoing
1026	That sick pay at full pay for the Chief Officer be extended for two months to enable a full recovery and successful return to work due to the exceptional circumstances with the current pressures the NHS are facing during the Covid-19 Pandemic.	DCO	Feb-22	Ongoing

<b>FULL COUNCIL</b>	<b>10 JANUARY 2022</b>	<b>AGENDA ITEM: 5</b>
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## **BIO MASS VOLUNTARY RETROSPECTIVE ENVIRONMENTAL STATEMENT**

### **Report Author**

Mark Sims, Deputy Chief Officer

**Attached:** Appendix 1 - Barry Biomass Voluntary Environmental Statement - Volume 3 Non-Technical Summary (27 pages)

Appendix 2 - Barry Biomass Voluntary Environmental Statement - Volume 1 Main Text (267 pages)

**Also available:** Appendix 3 - Barry Biomass Voluntary Environmental Statement - Volume 2 Technical Appendices (947 pages)

### **Purpose of Report**

To request members to consider the Voluntary Environmental Statement and determine the Council's response.

### **Detailed Information**

A consultation is being undertaken on the Voluntary Retrospective Environmental Statement produced by Biomass UK (No. 2) (the Applicant) for the biomass fired renewable energy generation facility located at Woodham Road, Barry Docks within the Vale of Glamorgan, South Wales.

Although construction of the proposals commenced in 2016 (following outline planning approval 2015/00031/OUT and reserved matters approval 2016/00187/RES), in response to a number of environmental concerns raised by the public, the Developer has undertaken a Voluntary Retrospective Environmental Impact Assessment for the development in its current state and produce an Environmental Statement in order to provide the Welsh Government and the public with an objective account of the potential significant effects of the development.

The consultation was originally for 30 days from Monday 18th October to Wednesday 17th November 2021 however has been extended by two months.

Therefore, any person or group wishing to make representations about the Environmental Statement can now submit them up until **17<sup>th</sup> January 2022**, when the consultation period will end.

Representations can be made:

- • Online via: <http://barrybiomassconsultation.online/>
- • By email to: [biomassconsultation@wardell-armstrong.com](mailto:biomassconsultation@wardell-armstrong.com)
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ST1 5BD

Please note that **this consultation relates to the Environmental Statement only** and not the wider application.

Prior to the consultation period being extended, the Council's Working Party to consider Consultations met on 28 October 2021 where the Bio Mass Voluntary Retrospective Environmental Statement was considered, members resolved to:

1. Write to the Minister for Climate Change to request extending the consultation period (suggested a period of 3 months instead of by 17 November 2021)
2. Members of the CWP create bullet points for this consultation to take forward to an Extraordinary meeting of Full Council
3. That the decision on the Bio Mass Voluntary Retrospective Environmental Statement Consultation to be considered by all Councillors and then submit a formal comment.

Attached is the Barry Biomass Voluntary Environmental Statement - Volume 3 Non-Technical Summary (27 pages) and the Barry Biomass Voluntary Environmental Statement - Volume 1 Main Text (267 pages).

Also available in the drop box is the Barry Biomass Voluntary Environmental Statement - Volume 2 Technical Appendices (947 pages).

### **Recommendations**

Members are requested to consider the Consultation regarding the Bio Mass Voluntary Retrospective Environmental Statement and determine the Council's formal comment for submission prior to the closing date of 17 January 2022.



**VOLUNTARY RETROSPECTIVE ENVIRONMENTAL  
STATEMENT  
VOLUME 3 – NON-TECHNICAL SUMMARY**

**Biomass UK No.2 Ltd**

Prepared by:  
**Sol Environment Ltd**

Date:  
**March 2021**

Project Issue Number:  
**SOL2012PCML01**

VERSION CONTROL RECORD			
Contract/Proposal Number:		SOL2012PCML01	
Authors Name:		Steve Butler	
Signature:			
Issue	Description of Status	Date	Reviewer Initials
1	First Draft for Client Review	March 2021	EH
2	Revised following PINS consultation	June 2021	EH

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## 1 INTRODUCTION

1.1 This document comprises the Non-Technical Summary of a Voluntary Retrospective Environmental Impact Assessment (EIA) relating to the biomass fired renewable energy generation facility located at Woodham Road, Barry Docks within the Vale of Glamorgan, South Wales.

1.2 This document forms Volume 3 of the Environmental Statement (ES) that has been prepared as part of a suite of documents, for submission to the Welsh Government by Sol Environment Ltd (Sol) on the behalf of Biomass UK No.2 Ltd (the Owner or Operator).

1.3 The renewable energy generation facility on the site is authorised by planning permission 2015/00031/OUT granted by the local planning authority, The Vale of Glamorgan Council (the Council), on 31 July 2015 for "*a wood fired renewable energy plant*". The planning permission subsists and has been lawfully implemented; the development has been constructed substantially in accordance with planning permission 15/00031/OUT and reserved matters approval 2016/00187/RES.

1.4 The 2015 application was made to the Vale of Glamorgan Council, who screened the application and concluded that as the proposals met the definition of a Schedule II EIA development in accordance with the Environmental Impact Assessment (EIA) Regulations (Paragraph 11b) but that on the basis of its location and limited changes from the 2010 permission it was determined that an EIA was not required.

1.5 Since the commencement of the construction of the site in 2016, a number of environmental concerns have been raised by the public concerning the environmental and health impacts of the development.

1.6 As such, the Owner has agreed with a request from the Welsh Government to prepare this statement with a view providing an objective account of the likely significant environmental effects of the Biomass Facility by setting out the results of the EIA which has been undertaken of the 'As-Built' development. It is intended to provide the Welsh Government with sufficient information to evaluate the likely significant environmental effects of the Biomass Facility having due regard to the protection of the local amenity and the environment as a whole.

1.7 The ES has been prepared as far as possible, in line with the framework provided in The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (as amended) (the "EIA

Regulations") and The Institute of Environmental Management and Assessment's "Guidelines for Environmental Impact Assessment".

1.8 Due to the retrospective nature of the ES and the fact that the plant is fully constructed but not yet operating, it has been agreed with WG as part of a scoping exercise that certain aspects that might be considered in a pre-planning EIA are no longer relevant and should be scoped out (e.g. pre-development public consultation, assessment of alternatives, flood risk, on-site ecology, heritage etc). However, all assessments scoped-in have been carried out in accordance with latest best practice and guidance have regard to the EIA Regs as currently in force.

1.9 The ES identifies and records the results of the EIA undertaken to examine the impacts of the 'As-Built' Development. The assessment examines only the operational phase of the Development and considers the environmental effects the development will have on a range of topics, as agreed with Welsh Government. The EIA has been prepared in accordance with the scope and requirements agreed between the Owner and the Welsh Assembly Government and without prejudice to the 2015 Planning Permission.

1.10 The ES describes the range of measures that will be adopted to mitigate any identified effects and, should further mitigation measures than those already incorporated into the design of the 'As-Built' development to further prevent, reduce and, where possible, offset any adverse effects on the environment these have been identified within topic chapters, noting however that that this ES has not identified any harm that has not already been fully assessed and quantified within the previous technical evaluations.

1.11 The Structure of the ES is as outlined in Table 1.1 below.

**Table 1.2: Structure of ES**

**Volume 1: Text**

Chapter 1	Introduction	An overview of the project, the background to the Voluntary EIA
Chapter 2	Description of the Development	A detailed description of the 'As-Built' development as existing. The description is more detailed than previously provided in the 2015 applications and relies on the 'As-Built' construction plans, elevations and plant.

Chapter 3	Needs and Alternatives Considered	This section provides the layout alternatives considered during the detailed design process, prior to the finalization of the 'As-Built' construction.
Chapter 4	Environmental Assessment Methodology	Sets out the approach taken to EIA of the As-Built Development.
Chapter 5	Landscape and Visual	Assesses landscape and visual effects resulting from construction and operation of the Development.
Chapter 6	Noise and Vibration	Assesses noise and vibration related to the operation of the Development.
Chapter 7	Air Quality	Assesses air quality impacts relating to the point source and diffuse emissions arising from the operation of the development.
Chapter 8	Climate Change	Considers effect on climate change as a consequence of the impact of greenhouse gas (GHG) emissions resulting from Development
Chapter 9	Waste Management	Considers the impacts in relation to the on-site management and storage of hazardous and non-hazardous wastes from the development.
<b>Volume 2: Appendices</b>		
Including all figures, drawings and specialist reports forming technical appendices to the main text.		
<b>Volume 3: Non-Technical Summary</b>		
Non-Technical Summary		Summary of the ES using non-technical terminology

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## 2 DESCRIPTION OF DEVELOPMENT

2.1 The development is a renewable energy generation facility which has been designed to recover energy from pre-prepared mixed waste wood feedstocks using gasification. The gasification facility is an Advanced Thermal Treatment (ATT)<sup>1</sup> process that produces a combustible synthesis gas, which is then used to raise steam and generate electricity, through steam cycle turbine generation.

2.2 Within the ES documentation, the phrase ‘Barry Biomass Energy Facility’ or the term ‘Biomass Facility’ are used interchangeably to describe the development.

2.3 The Biomass Facility is permitted by Natural Resources Wales as a waste co-incineration activity and will be operated in accordance with the Environmental Permitting (England and Wales) Regulations 2016 and Chapter IV of the Industrial Emissions Directive (IED).

### LOCATION AND SURROUNDING AREA

2.4 The Barry Biomass Facility is located off Woodham Road, Barry, Vale of Glamorgan at NGR ST 12605 67691.

2.5 The development is located within the docks area of Barry on brownfield land immediately adjacent to industrial units on Woodham Road to the south west and Viaduct Road to the north east. The site is roughly rectangular, averaging approximately 60m in width, by 170m in length. The site is oriented roughly north-west/south-east. The land is flat, and prior to development was surfaced with a mixture of hardcore and compacted earth, with some areas of concrete with little vegetation evident on the site.

2.6 The site is bound by David Davies Road to the south and Ffordd-y-Mileniwm to the north. The eastern extent of the Barry Waterfront development is located approximately 200m to the west of the Installation and Dow Corning Chemical Works complex is located approximately 1km to the north east. The Installation occupies an area of approximately 0.74 hectares.

2.7 The nearest residential development is located on Dock View Road to the north and northeast of the site.

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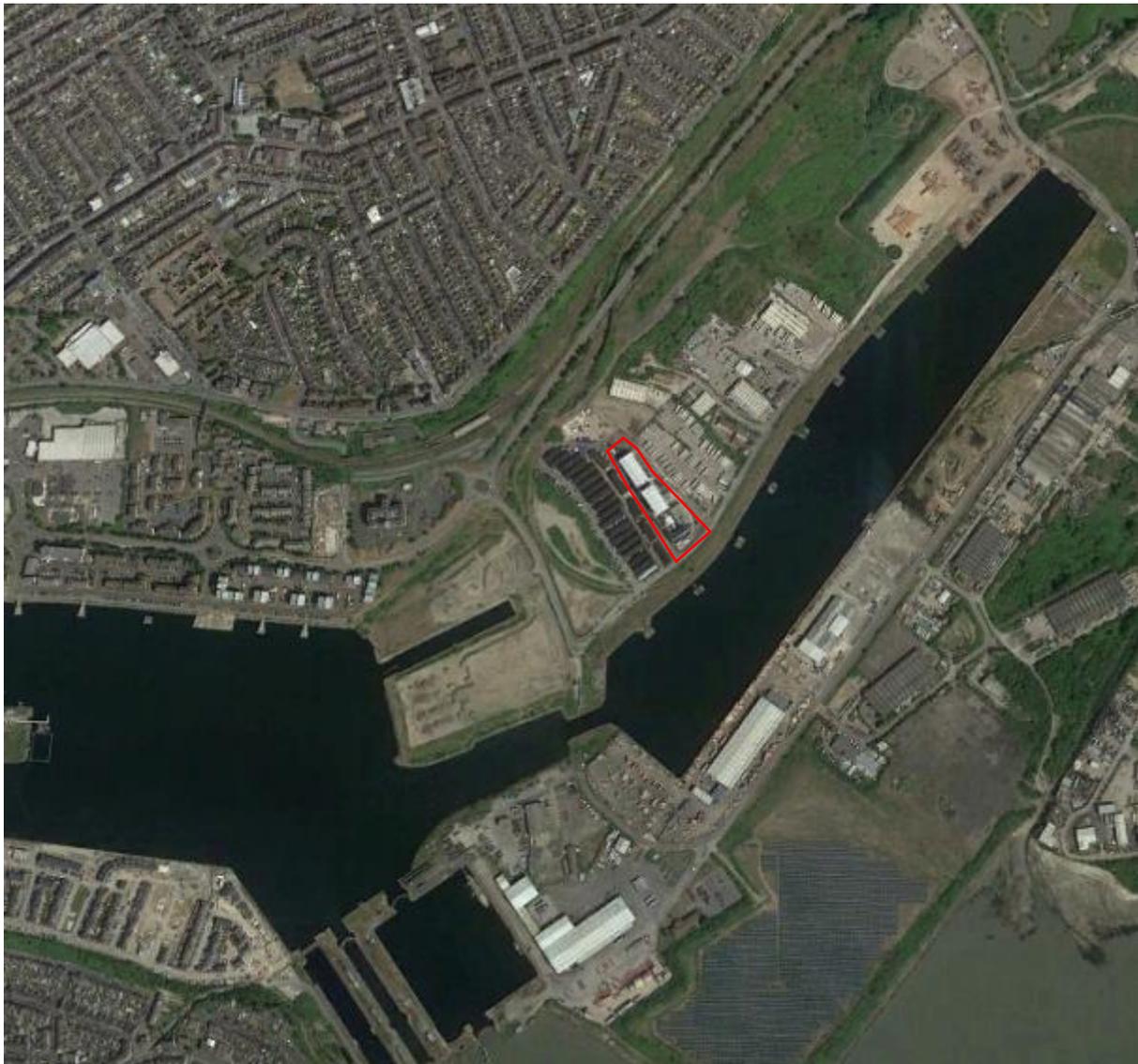
<sup>1</sup> Advanced Thermal Treatment technologies are primarily those that employ pyrolysis and/or gasification to process municipal solid waste (MSW). It excludes incineration of wastes which is already a mature and well established technology.

2.8 Access to the site is via Woodham Road, off the Ffordd-y-Milleniwm roundabout adjacent to the Council’s Dock Offices. The site is fully developed, with the construction of the Barry Biomass Facility being completed in January 2018.

2.9 The site is not located over a groundwater Source Protection Zone (SPZ).

2.10 There are no sites with sensitive flora or fauna having a statutory or local nature conservation designation within 500 metres of the site. The nearest designated site is the SSSI named Hayes Point to Bendrick Rock at a distance of 616 metres from the site.

2.11 The Site location in context with its surroundings is outlined in Figure 2.1 below.



**Figure 2.1:** Barry Biomass Facility in context of the surroundings (Credit Google Earth)

## **SITE DEVELOPMENT**

2.12 The outward appearance of the Barry Biomass Facility is that of a modern industrial development comprising three main buildings and a single freestanding stack, within an area that is industrialised in character.

2.13 The key elements of the Development are outlined in Table 2.1 below.

**Table 1.1: The Proposed Development**

Activity	Purpose	Dimensions (m) Approx.	Height (mAGL)
Fuel Storage Building	<p>All waste wood is delivered directly into the fuel storage building via electrically operated roller shutter doors.</p> <p>When required, the fuel is discharged onto the feedstock feed conveyor system and delivers into the gasification building via an external enclosed inclined conveyor.</p> <p>All fuel feedstock is supplied to the site via an approved third-party fuel provider who is contracted to provide material in accordance to the sites waste acceptance procedures and waste supply specifications.</p> <p>The biomass plant accepts up to 72,000 (dry) tonnes of mixed waste wood per annum.</p>	52.4 x 21.6	13.7
Main Process Building	<p>The main process building contains the fluidised bed gasification system, combustion, heat recovery boiler systems and associated water pumping systems.</p> <p>The gasification<sup>2</sup> plant partially combusts the fuel to produce a synthetic gas (syngas), which is subsequently combusted to produce a high temperature flue-gas.</p> <p>A steam boiler then recovers the heat from the combustion gases through the conversion into superheated steam.</p> <p>The building also contains the water treatment plant and associated dosing skids which feed directly into the feed line.</p>	41.4 x 20.4	23
Turbine, Welfare and Ancillary Buildings	<p>The superheated steam passes to a Steam Turbine and Generator, which generates electricity, which then exports an annual average of 10MWe (net) of renewable electricity to the Local Distribution Network.</p>	29.1 x 17.9	11

<sup>2</sup> Gasification: This technology uses waste and biomass feedstocks to produce either a synthesis gas (syngas) or liquid fuels (bio-oils) which can be used to generate electricity. Gasification is an example of advanced conversion technologies (ACTs).

	The building is sub-divided to include welfare, offices and the control rooms for the operation of the site.		
ACC Unit	The Air-Cooled Condenser is a stand-alone structure containing 8 axial fans and radiator cells on a traditional A-Frame structure. ACCs immediately condense the steam turbine exhaust flow and return condensate to the boiler without water loss.	32 x 14.5	20
External Equipment and Flues Gas Cleaning Equipment	<p>The external plant includes:</p> <ul style="list-style-type: none"> <li>Sealed ash silos for the containment of all fly ash and air pollution control residues.</li> <li>Flue gas treatment plant, comprising external enclosed fan plant and pollution control consists of urea injection for the reduction of NO<sub>x</sub>, lime injection for acid gas neutralisation and activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOCs and other substances. The flue gas cleaning system also incorporates a baghouse system, which is designed to remove submicron dust particles within anticipated emission limit values (ELV's) listed in Annex VI which are referenced by Chapter IV of the Industrial Emissions Directive (IED).</li> <li>Exhaust flue, comprising a single free standing 43m flue, with external platforming and associated continuous emissions monitoring equipment.</li> </ul>	<p>Ash Silos: 6.7 diameter</p> <p>FGT &amp; Stack: 1.6</p>	<p>Ash Silos: 18.4</p> <p>Stack: 43</p>
External Areas	External areas including car parking, vehicle weighbridge, security lodge, bike shed and small ancillary cabins.	N/A	N/A

2.14 The Owner has constructed a high efficiency energy generation plant that utilises advanced thermal technology, namely gasification, as a cost-effective means of processing fuel grade waste wood feedstock's to produce a synthesis gas which is used to raise steam and generate energy.

2.15 A simplified process flow diagram is provided in Figure 2.2 overleaf and the as-built construction layout provided in Figure 2.3.

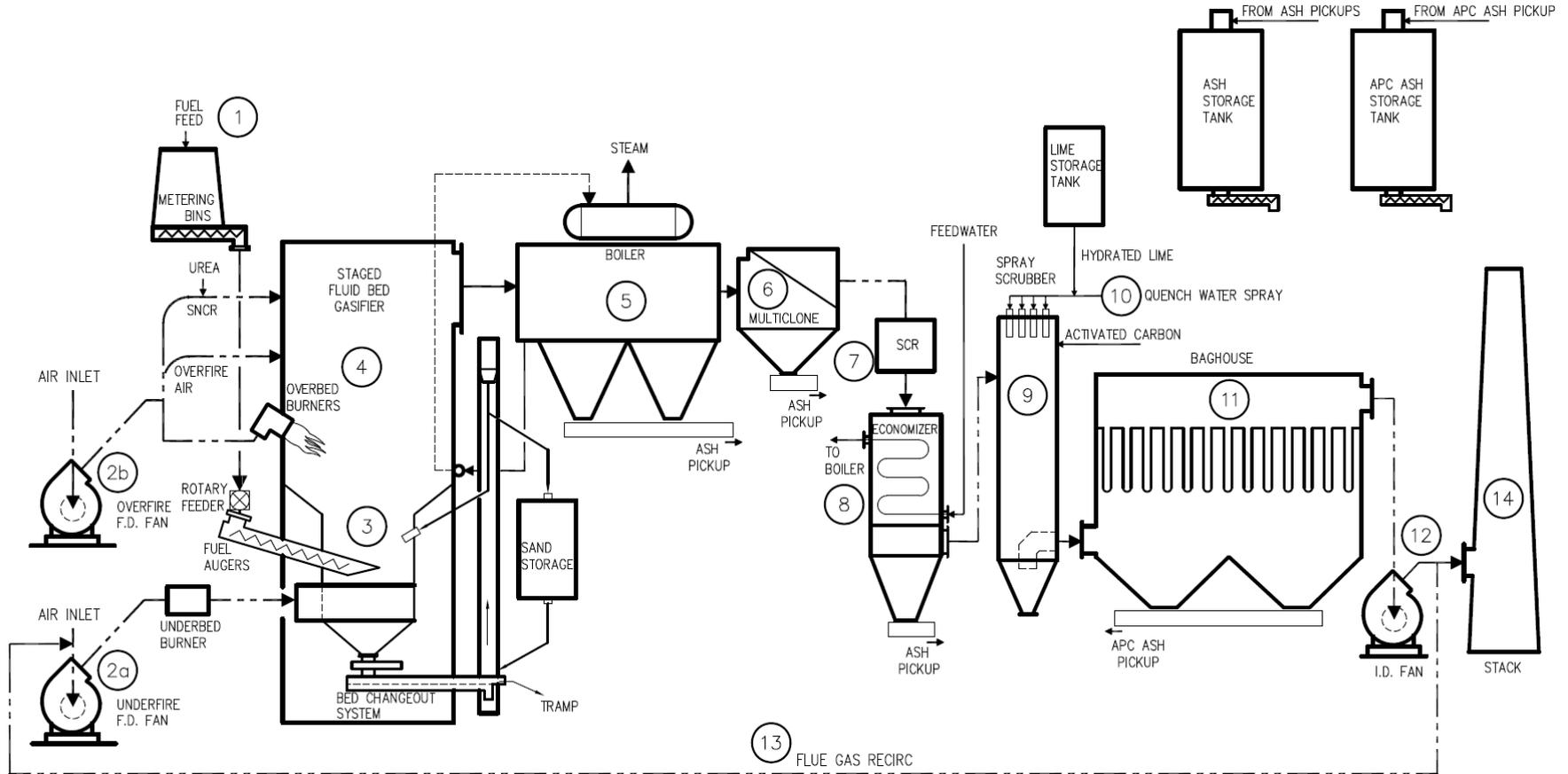


Figure 2.2: Simplified Process Flow



**Figure 2.3:** As-Built Construction Layout

2.16 In order to avoid or reduce the environmental effects, a number of measures have been designed into the project. Details of these can be found within each topic chapter of the ES and are summarised in Table 2.2.

Table 2.2 Schedule of Measures Adopted by the Project

Topic	Operational Control Measures
General / Design	The Development is entirely contained within the existing Biomass facility. All major plant items are sited away from sensitive habitats and sensitive receptors.
Historic Environment	None
Landscape and Visual	The plant has been designed with building fabric that is both in-keeping and suitable for the dockside development. The Landscape and Visual Impact assessment concludes that the visual impacts of the site are acceptable.
Ecology and Nature Conservation	Habitat protection: <ul style="list-style-type: none"> <li>• All process plant controls able to ensure that the plant operates within its consented limits at all times (i.e. will not be subject to uncontrolled emissions releases); and</li> <li>• Application of existing pollution incident prevention and control procedures apply to the developed site.</li> </ul>
Noise and Vibration	The site is subject to an NRW Environmental Permit Regulations (EPR) and has demonstrated Best Available Techniques (BAT) in terms of operational noise mitigation and control. The resultant noise control measures ensure that the overall noise impacts of the facility do not have a significant impact at the sites nearest sensitive residential receptors and comply with the 2015 Planning Permission.
Air Quality	The air emissions are fully mitigated to meet the IED BAT emissions requirements and ELVs stipulated in the Environmental Permit conditions. All assessed impacts relating to the operational air emissions have been assessed as part of this ES and determined not to have a significant impact and comply with the 2015 Planning Permission.
Climate Change	All direct Carbon Emissions meet the Ofgem definition of Renewable and therefore have a net 'neutral' impact.

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## 3 NEED AND ALTERNATIVES CONSIDERED

3.1 The ES chapter provides a summary of the need for the Barry Biomass Facility and provides a context for the construction of the plant. As the site has been constructed and is operational there is no discussion about viable alternative layouts and design options. The chapter includes layout options that were considered at the time of the plant design. Principally however this chapter provides the background to the need for the development and provides the background to the technology choice and site configuration.

3.2 These are summarised within the section below.

### NEED FOR THE DEVELOPMENT

3.3 The construction and planning approval for the Barry Biomass Facility was supported by the following key areas of planning policy:

- Energy security – through the provision of a facility capable of generating sustainable baseload electricity, displacing primary fossil fuels;
- Energy recovery – through the provision of a facility that generates power by combusting waste; and
- Zero landfill – through the provision of a facility that creates market demand for non-recyclable waste materials, which would otherwise be destined for landfill or other forms of disposal.

3.4 Sustainability, including:

- Efficient use of land;
- Use of low carbon energy sources;
- Minimisation, re-use and recycling of waste;
- Minimising risk of and from flood, sea level rise and impact of climate change;
- Encouraging economic diversification; and
- Conserving, enhancing and linking green infrastructure, protecting and enhancing the built and natural environment.

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## ALTERNATIVE TECHNOLOGIES

3.5 Prior to construction of the site a number of alternative technology solutions were considered, gasification combined with a heat recovery boiler and associated steam turbine generation was selected for the following reasons:

- Numerous environmental advantages over incineration and other technologies in terms of lower mass flow of air pollutants, lower water use and smaller footprint.
- Lower operating costs than conventional incineration due to lower air flows, smaller boilers and less fouling / maintenance.
- Reliable technology with numerous global reference sites.
- Gasification recognised by UK government as being a preferred technology as opposed to traditional ‘Mass Burn’ moving grate combustion processes.

## DESIGN EVOLUTION

3.6 The Owner confirmed a number of design options were considered at the site, with the as constructed plant being selected as being the preferred balance between access and internal site layout.

3.7 The final configuration of the site places all of the major plant and equipment including all major fan and combustion plant, boiler and cooling systems at the furthest point away from the sensitive receptors to the north of the plant.

## SITE SUITABILITY AND ALTERNATIVE SITES

3.8 The Barry Biomass Facility has been constructed on an existing development site within Barry Docks that has been both approved and promoted for industrial employment uses since 2008/2009. Given the policy SP8 of the LDP promotes the use of the operational Barry Docks for waste infrastructure, the development site has had long standing planning permission for an energy recovery facility and that no other site within the dock is available by the owners Associated British Ports, then this is the only site option considered.

3.9 Furthermore, a technically very similar development has been granted full planning permission, albeit not implemented on Atlantic Way (2009/00021/FUL: Land accessed off Atlantic Way), on the east side of Barry docks, indicating that the location is considered acceptable by the planning authorities.

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## 4 ENVIRONMENTAL STATEMENT METHODOLOGY

4.1 An EIA Scoping exercise for the voluntary retrospective ES has been undertaken and agreed by the Welsh Government to determine what topics the EIA should include. It was based on a review of the ‘as-constructed’ development, concerns raised by the public and transmitted to the Welsh Government and potential topics with ongoing impacts that may be deemed significant.

4.2 In summary the following environmental topics were scoped into the EIA and the overall findings for each are presented in this Summary. The following topics were scoped-in to the EIA:

- Landscape;
- Noise;
- Air Quality;
- Human Health;
- Climate Change; and
- Waste Management.

4.3 In addition to the operational impacts, consideration has also been provided within the ES and associated technical chapters relating to the potential impacts of maintenance and decommissioning.

4.4 An ES chapter is provided for each of the topics scoped into the EIA and the overall findings for each are presented in this NTS. For each topic, environmental baseline conditions and significance of environmental effects before and, where necessary, after mitigation were identified.

4.5 A number of assessment criteria have been used to determine whether or not the potential effects of the ‘as-built’ development are significant. Where possible the effects have been assessed quantitatively.

4.6 The significance of effects have been assessed using one or more of the following criteria:

- International, national and local standards;
- Relationship with planning policy;
- Sensitivity of receiving environment;

- Reversibility and duration of effect;
- Inter-relationship between effects; and
- The results of consultations.

4.7 The effects that were considered to be significant prior to mitigation have been identified within the ES. The significance of these effects reflects judgement as to the importance or sensitivity of the affected receptor(s) and the nature and magnitude of the predicted changes. For example, a large adverse impact on a feature or site of low importance will be of lesser significance than the same impact on a feature or site of high importance.

4.8 The following terms have been used to assess the significance of effects where they are predicted to occur:

- Substantial Adverse effect – where the development would cause international, national or regional deterioration to the existing environment;
- Major Beneficial or Adverse effect – where the development would cause a significant improvement (or deterioration) to the existing environment;
- Moderate Beneficial or Adverse effect – where the development would cause a noticeable improvement (or deterioration) to the existing environment;
- Minor Beneficial or Adverse effect – where the development would cause a barely perceptible improvement (or deterioration) to the existing environment; and
- Negligible – no discernible improvement or deterioration to the existing environment.

4.9 Where individual assessment sections deviate from these terms, the alternative terminology has been explained as appropriate within the relevant chapter.

4.10 Cumulative impacts from proposed or committed developments in the vicinity of the proposed development have been considered within each of the following technical Chapters. It is noted that developments that are built and operational at the time of the baseline assessment (2015/2016) have been considered to be part of the existing baseline conditions.

4.11 Each chapter of the ES seeks to not only address the identified and foreseeable emission impacts of the development, but also cross-references and addresses the findings made by WSP in their independent review of the previous Environmental Statements that have been produced in relation to this project.

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## 5 LANDSCAPE AND VISUAL IMPACTS

5.1 This chapter provides a Landscape and Visual Impact Assessment of the ‘As-Built’ Barry Biomass Facility, incorporating a review of the areas considered to be deficient in the voluntary ES undertaken by WSP in 2019. The scope of the LVIA, including methodology and approach was formally agreed with the Welsh Government prior to commencement.

5.2 The methodology, content, format and conclusions drawn by the LVIA have been peer reviewed in line with LI Technical Guidance Note 1/20, by an independent Chartered Member of the Landscape Institute (CMLI).

5.3 The LVIA assesses the landscape and visual effects of the as-built development, including the building heights as specified in the planning application which are now apparent on the ground. Full consideration of the sensitivity of receptors and the magnitude of change which has occurred as a result of the development was undertaken.

5.4 In particular, the LVIA addresses the additional elements of the site that are considered by the Vale of Glamorgan planning team to differentiate from the approved development drawings, generally comprising the water tank, pump house and other minor additional structures. It is noted that all of these structures are ancillary to the main development and would either not occur in isolation or are considered too small and localised to have any effect on the character of the landscape.

5.5 The effects of the as-built fully constructed development on all identified landscape and visual receptors, for both day time and night time views are considered to be **Not Significant**.

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## 6 NOISE AND VIBRATION

6.1 This chapter provides an assessment of the likely environmental effects with respect to noise from the Barry Biomass Facility undertaken in accordance with BS 4142:2014+A1:2019. This included a background noise survey to determine the baseline noise environment and noise modelling using Cadna-A software to determine calculated rating levels of the plant and associated excess noise levels over background.

6.2 The assessment has been based on the computer noise model and been informed and validated using environmental noise measurements and data provided for the plant items.

6.3 The facility has been designed with a number of noise control measures and mitigation measures incorporated into the basic design of the plant and is operated in accordance with the NRW approved Noise Management Plan.

6.4 The assessment, based on the information provided in conjunction with measurements undertaken at existing sites, indicates nearby receptors will experience **Negligible** significant effects during typical onsite activities.

6.5 This assessment opinion is consistent with the conclusions made by the NRW following their permit determination and public consultation process and aligns with the regulatory guidance relating to the control and management of noise impacts from EPR Installations.

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## 7 AIR QUALITY AND HUMAN HEALTH

7.1 Due to the nature of the development, air emissions have the most significant potential to impact the environment and human health. Air emissions from the Barry Biomass Facility predominantly relate to combustion products, acid gases and halides. The operational facility is regulated by Natural Resources Wales via the Environmental Permitting (England and Wales) Regulations 2018 (As Amended) which ensures all emissions from the plant are in line with Chapter IV of the Industrial Emissions Directive and the Waste Incineration BREF BAT Conclusions.

7.2 The EIA has included an assessment of local air quality and human health impacts associated with the operation of the Barry Biomass Facility.

7.3 Exhaust gases from the facility are treated through the abatement plant and discharged via the 43m exhaust stack.

7.4 Detailed air quality modelling using the AERMOD 7 dispersion model has been undertaken to predict the impacts associated with stack emissions from the Site. As a worst-case, emissions from the development have been assumed to be at IED limits. Actual emissions from the Site are likely to be significantly lower.

7.5 The assessment has shown that the pollutant concentrations are predicted to be below the relevant air quality assessment levels at both the sensitive human receptors in the vicinity of the Site and on nearby sensitive ecological habitats. The significance of the impacts has been assessed as **Negligible** in accordance with the Environment Agency's criteria.

7.6 Maximum impacts both off-site and at sensitive receptors have also been determined for a number of potential abnormal emissions scenarios for the facility, including failure of the Urea injection operation. Predicted short-term concentrations of all affected pollutants are of **Negligible Significance** compared with the relevant air quality standards.

7.7 Consideration was given to potential emissions during abnormal operation and the modelling was risk assessed with regard to different modelling tool results potential and coastline affects.

7.8 The assessments carried out in support of the ES and Environmental Permitting application conclusively demonstrate that the impact from the plant during operation will not have an adverse impact on the local and regional air quality or habitats.

7.9 The impacts of the proposed development are therefore considered to be **Negligible** in terms of air quality and human health.

---

## 8 CLIMATE CHANGE

8.1 The ES provides an assessment of the potential climate change impacts, using the UK Government 2019 Greenhouse Gas Emissions Reporting calculators.

8.2 The operation of the Barry Biomass Facility provides a modern renewable energy facility that directly displaces the grid electricity and the associated carbon emissions.

8.3 The project directly aligns with and meets UK and local energy and decarbonization policy and facilitate the removal of biodegradable wastes to landfill. The project therefore provides a current and ongoing reduction in baseline greenhouse gas emissions.

8.4 The proposals would deliver carbon equivalent savings of -51,570.26 tCO<sub>2</sub>e/annum under normal operating conditions (assuming no offsite heat export).

8.5 The conclusion of the chapter is the that Proposed Development has a positive benefit in terms of carbon and climate change and provides a significant beneficial and meaningful reduction of carbon emissions when compared to the baseline.

8.6 The impacts of the proposed development are therefore considered to be **Moderate Beneficial** in terms of climate change.

---

## 9 WASTE MANAGEMENT

9.1 The Barry Biomass Facility will accept and process up to 72,000 dry tonnes of non-hazardous mixed waste wood per annum, via a gasification technology producing waste residues comprising predominantly ash streams.

9.2 As the development is fully constructed, with all construction management of wastes controlled through the construction site waste management plan (SWMP) which had been approved by the Vale of Glamorgan planning authority, only the solid and liquid waste management aspects of the operational development have been considered in this EIA chapter.

9.3 The facility accepts and processes only non-hazardous waste wood which is accepted in accordance with a strict specification (PAS 111 Grade C Waste Wood). Wastes produced by the process include ash residues, extracted metal and oversize from processing of incoming waste streams and separated bed materials, domestic/office general wastes and specialist oils/chemicals from plant maintenance.

9.4 Ash residues can be separated into two main streams from the plant; non-hazardous mixed bottom ash and fly ash and hazardous APCr. All ash residues are collected, stored and handled in such a manner as to minimise potential fugitive emissions from the site.

9.5 Where possible all wastes produced by the plant are recycled.

9.6 Releases relating to the storage of wastes, principally releases from the fuels storage buildings, ash silos and handling systems, have the potential for localised onsite and offsite impacts and are limited to dust and particulate emissions only.

9.7 The site is to be operated under a permit regulated by the Environment Agency under the Environmental Permitting (England and Wales) (Amendment) Regulations 2016 (Permit Ref: EPR/AB3790ZB). As such, all potential emissions of dust from the site are managed and regulated in accordance to an agreed Dust and Emissions Management Plan approved by the NRW as part of the permitted management activities and in accordance with BAT.

9.8 As such the assessment considers that under normal operating conditions the magnitude of the impacts arising from the storage and handling of waste materials is **Negligible with a Negligible significance**.

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9.9 In the event of a significant on-site emergency, such as a major fire, the control measures employed at the facility are adequate to ensure the impacts are **Minor, Local and Short Term** only

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## 10 CONCLUSIONS

10.1 Biomass No.2 Ltd is submitting this Voluntary Retrospective Environmental Statement at the request of the Welsh Government for the previously consented and ‘As-Constructed’ Barry Biomass Facility.

10.2 The Barry Biomass Facility comprises three industrial buildings; the main process building housing the gasification equipment, a fuel storage and feed building and the turbine, welfare and ancillary building along with external equipment including an ACC unit, two ash silos and a 43 m high chimney stack.

10.3 In accordance with the EIA Regulations 2017 (as amended) and the Scoping Opinion agreed by Welsh Government, this Environmental Statement has considered the main potential environmental effects of the operational development. It has concluded that the consented and as-built development has no unacceptable significant adverse environmental impacts.

10.4 When existing mitigation is taken into account, the as-built development is not considered to have a significant adverse visual impact on the surrounding industrial landscape, on the amenity or health of neighbouring users, or the air quality or noise climate of the surroundings.

10.5 In overall conclusion, it is considered that the consented and as-built development does not give rise to likely significant environmental effects.



**VOLUNTARY RETROSPECTIVE ENVIRONMENTAL  
STATEMENT  
VOLUME 1 – MAIN TEXT**

**Biomass UK No.2 Ltd**

Prepared by:  
**Sol Environment Ltd**

Date:  
**March 2021**

Project Issue Number:  
**SOL2012PCML01**

VERSION CONTROL RECORD			
<b>Contract/Proposal Number:</b>		SOL2012PCML01	
<b>Authors Name:</b>		Steve Butler	
<b>Signature:</b>			
Issue	Description of Status	Date	Reviewer Initials
1	First Draft for Client Review	March 2021	EH
2	Second draft following PINS Consultation	June 2021	EH

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# 1 INTRODUCTION

## BACKGROUND TO THE ENVIRONMENTAL IMPACT ASSESSMENT

1.1 The principle of locating a biomass gasification plant on the site was established by a planning application reference 2008/01203/FUL. which, following refusal by the Council, was granted on appeal on 2 July 2010 under reference APP/Z6950/A/2114605 (the 2010 Permission). The 2010 Permission was supported by an environmental statement (see **Appendix 1.1**) that was voluntarily prepared as part of the appeal process (the Council had screened the development out of EIA and this was ultimately supported by Welsh Ministers).

1.2 Certain elements of the development proposal authorised by the 2010 Permission were subsequently amended by way of a new outline planning permission reference 2015/00031/OUT (The 2015 Permission) (see **Appendix 1.2**). The 2015 Permission was granted by the Council on 31 July 2015 with landscaping being the only reserved matter. Reserved matters approval was granted by the Council on 29 April 2016 under reference 2016/00187/RES. Pre-commencement conditions attached to the 2015 Permission was discharged under reference 2015/00031/5/CD and development of the Biomass Facility subsequently began lawfully in 2016. The 2015 Permission is therefore the subsisting operative planning permission for the Biomass Facility.

1.3 The application for the 2015 Permission was made to the Vale of Glamorgan Council in January 2015, who screened the application (see **Appendix 1.3**) and concluded that as the proposals met the definition of a Schedule II EIA development in accordance with the EIA Regulations (paragraph 11b) (as then in force). The Council's view (with which the Welsh Government concurred following a request for a screening direction) (**Appendix 1.4**) was that the likely significant environmental effects associated with the revised proposal were not sufficiently different to the impacts considered and mitigated under the 2010 Permission. Although the application for the 2015 Permission was not supported by an ES at the time, free-standing assessments relating to matters such as noise, traffic, environmental controls, air quality, visual impact, ecology, geology, ground stability and flood risk were submitted. The reserved matters application in 2016 was also screened out of EIA by the Council. A summary of the full planning history is described within **Appendix 1.5** of the ES.

1.4 Numerous technical submissions and environmental assessment documents have been submitted in relation to the various phases of planning and construction of this project, with the most recent being

made in 2019 in support of a [subsequently withdrawn] S73 application relating to the construction of the water tank on the southern boundary of the site.

1.5 The 2019 environmental assessment was, at the request of the Welsh Government, prepared using the original technical assessments prepared for the purposes of originally supporting the 2015 (extant) planning permission submission.

1.6 An independent technical review of the 2019 Environmental Assessment by WSP Ltd (**Appendix 1.6**) was commissioned by the Welsh Government which identified an number of areas where the ES submission either was considered to deviate from the strict requirements of the EIA regulations, was not considered to be technically robust, or did not accurately reflect the 'As-Built' construction of the facility.

1.7 Although none of the identified issues within the WSP report are considered to materially change the stated impacts of the scheme or the conclusions made by the planning authority in granting the 2015 permission, the Owner has agreed with a request from the Welsh Government to prepare this voluntary ES with a view to objectively demonstrating that any likely significant environmental impacts of the consented scheme and 'As-Built' development as approved by 2015/00031/OUT have been mitigated and are acceptable and that the development does not have a significantly adverse impact to the environment or human health.

1.8 Given that all previous planning related technical studies were completed both prior to the completion of the technical assessments required in support of the NRW Environmental Permit and without the benefit of detailed technical and thermal design, a number of additional technical assessments have been completed which more closely assess the 'As-Built' construction of the scheme.

1.9 It has been agreed that where relevant, these 'newer' assessments should form the basis of a new EIA assessment and that the consultation on the new EIA will enable all interested parties to evaluate and comment on a single comprehensive document.

1.10 Accordingly, this ES provides the findings of the EIA of the consented scheme and 'As-Built' scheme using the pre-development environmental background information assuming a 2015 assessment baseline and neither assesses construction nor pre-development aspects or impacts. The EIA has been prepared in accordance with the scope and requirements agreed between the Owner and the Welsh Assembly Government and without prejudice to the 2015 Planning Permission.

## SITE LOCATION

1.11 The Biomass Facility has been constructed within the Barry Docks area, within the town of Barry in the Vale of Glamorgan administrative area. The development site is located on existing industrial land within the Port of Barry which is an established business and industrial area in the Vale of Glamorgan.

1.12 Figure 1.1 provides the location of the development, with Figure 1.2 providing the planning boundary of the 'As-Built' development site.

1.13 All of the above site figures are provided in **Appendix 2.1**.

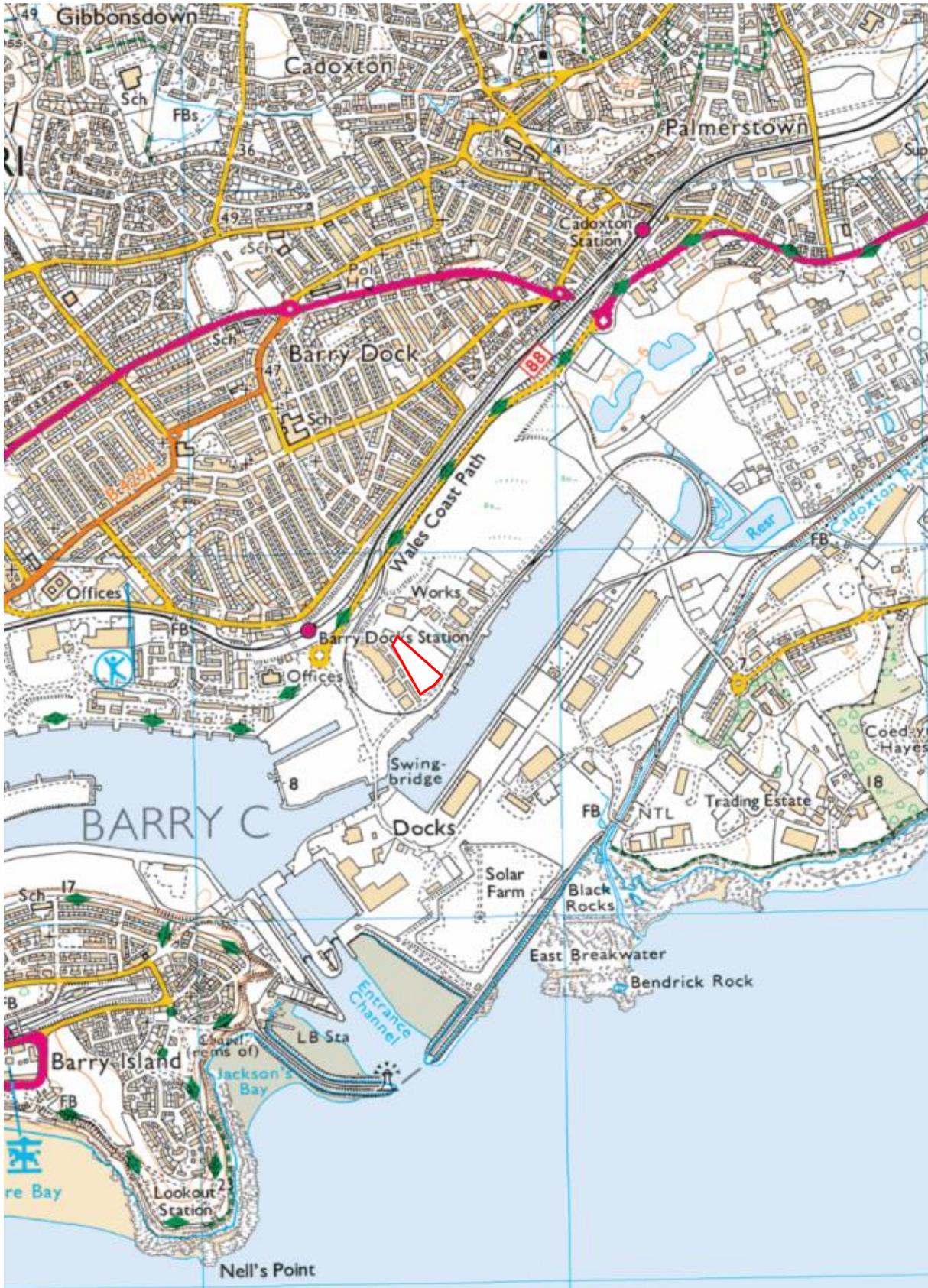


Figure 1.1: Site Location Contains Ordnance Survey data © Crown copyright and database right 2017

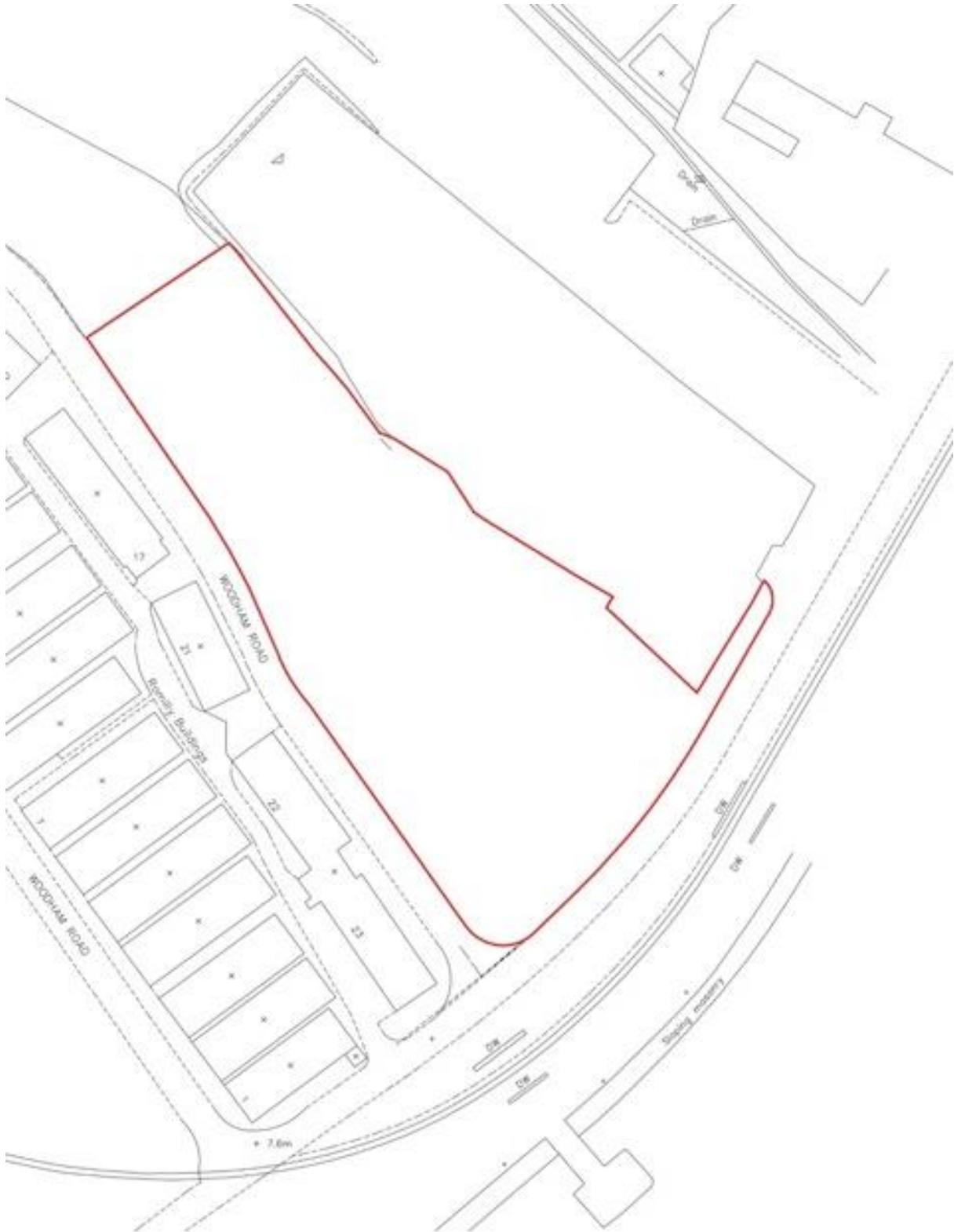


Figure 1.2: Site Planning Boundary

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## STATUTORY FRAMEWORK AND PURPOSE OF THE ENVIRONMENTAL STATEMENT

### Purpose of EIA

1.14 The Environmental Impact Assessment (EIA) process is a means of identifying and collating information to inform an assessment of the likely significant environmental effects of a project. The findings of the EIA process are reported in an Environmental Statement (ES) in order to inform the relevant planning authority and interested parties as part of the decision-making process.

### The EIA Directive

1.15 The legislative framework for EIA is set by European Directive 2011/92/EU, as amended by Directive 2014/52/EU (collectively referred to as the EIA Directive). Directive 2014/52/EU entered into force on 15 May 2014 (Ref 1.3).

### The EIA Regulations

1.16 In Wales, the requirements of the EIA Directive have been transposed into legislation through the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, as amended. These regulations are referred to in this ES as '*the EIA Regulations*'.

## CONTENT OF THE ES

1.17 This ES has been prepared in accordance with the requirements of the EIA Regulations as far as practically possible, however due to the retrospective nature of the ES and the fact that the plant is fully constructed and developed, a number of the aspects required by the EIA Regulations such as pre development public consultation, assessment of alternatives, screening and scoping etc, are not relevant.

1.18 The scope and content of the ES has been agreed following detailed consultation with Welsh Government and specifically aims to address the concerns raised by the Government and their advisors following the independent review of the previously submitted documentation.

1.19 Given the retrospective and voluntary nature of this ES and that the construction of the Barry Biomass Facility has been completed, the Owner has, as far as practically possible provided the information specified in Regulation 17 and Schedule 4 of the EIA Regulations. For the avoidance of doubt, a table providing the specified information within Regulation 18 and Schedule 4 is provided in **Appendix 1.7** of this ES.

1.20 This ES provides all available relevant information, where possible required under Regulation 17 and Schedule 4. The information supplied within this ES is considered to provide a clear understanding of the main and likely significant effects upon the environment of the 'As-Built' Development.

## STRUCTURE OF THE ES

1.21 The ES has been structured in order to allow relevant environmental information to be easily accessible. This volume of the ES (Volume 1) includes the main text of the ES. The description of the Consented and 'As-Built' Development, the Barry Biomass Facility is provided in Chapter 2.

1.22 Where relevant, the information relating to the alternative development scenarios considered during the evolution of the Barry Biomass Facility is found within Chapter 3. Chapter 4 outlines the approach and methodology adopted for the EIA. The remainder of Volume 1 contains topic by topic environmental information as shown in Table 1.2.

1.23 Figures and appendices to accompany the text of the ES are provided separately in Volumes 2 and 3. Volume 2 includes specialist reports providing relevant background and technical information. The Non-Technical Summary (NTS) forms Volume 3 of the ES.

**Table 1.2: Structure of ES**

Non-Technical Summary	Summary of the ES using non-technical terminology	
<b>Volume 1: Text</b>		
Chapter 1	Introduction	An overview of the project, the background to the Voluntary EIA
Chapter 2	Description of the Development	A detailed description of the 'As-Built' development as existing. The description is more detailed than previously provided in the 2015 applications and relies on the 'As-Built' construction plans, elevations and plant.
Chapter 3	Needs and Alternatives Considered	This section provides the layout alternatives considered during the detailed design process, prior to the finalization of the 'As-Built' construction.
Chapter 4	Environmental Assessment Methodology	Sets out the approach taken to EIA of the As-Built Development.

Chapter 5	Landscape and Visual	Assesses landscape and visual effects resulting from construction and operation of the Development.
Chapter 6	Noise and Vibration	Assesses noise and vibration related to the operation of the Development.
Chapter 7	Air Quality	Assesses air quality impacts relating to the point source and diffuse emissions arising from the operation of the development.
Chapter 8	Climate Change	Considers effect on climate change as a consequence of the impact of greenhouse gas (GHG) emissions resulting from Development
Chapter 9	Waste Management	Considers the impacts in relation to the on-site management and storage of hazardous and non-hazardous wastes from the development.

**Volume 2: Appendices**

Including all figures, drawings and specialist reports forming technical appendices to the main text.

**Volume 3: Appendices**

Non-Technical Summary

**THE OWNER AND OPERATOR**

1.24 The Owner and Operator of the Barry Biomass Facility is Biomass UK No.2 Limited.

**THE ASSESSMENT TEAM**

1.25 The EIA has been managed by Sol Environment Ltd, taking into account information provided by the Owner and design team. Sol Environment is a corporate member of the Institute of Environmental Management and Assessment (IEMA). All authors of this ES are senior members of Sol Environment and/or third-party technical practitioners.

1.26 A brief summary of the team's expertise and experience is provided in Table 1.3 with additional information provided in **Appendix 1.8**.

**Table 1.3: Environmental Impact Assessment Consultant Team**

Discipline	Consultancy
Landscape and Visual Impact	Leyton Place Ltd
Air Quality and Human Health Impacts	Entran Ltd
Noise and Vibration	Entran Ltd / Sol Acoustics Ltd
Climate Change	Sol Environment Ltd
Waste Management	Sol Environment Ltd

## FURTHER INFORMATION

1.27 This Environmental Statement has been submitted on a voluntary and retrospective basis to the Welsh Government. The Environmental Statement and Non-Technical Summary can be viewed at:

*Welsh Government*  
*Cathays Park,*  
*Cardiff, CF10 3NQ*

1.28 Copies of the ES can be viewed through the Welsh Government website and consultation portal:

[www.gov.wales/building-planning](http://www.gov.wales/building-planning)

1.29 Further copies of the ES can be obtained by request and through agreement from the following address:

*Sol Environment Ltd*  
*Building 5.3 Paint Works*  
*Arnos Vale, Bristol, BS4 3EH*

1.30 A paper copy of the full ES can be obtained for a cost of £450 plus VAT or an electronic copy (CD or Memory Stick/Drive) for a cost of £10.

1.31 All comments on the ES should be issued to Welsh Government (planning department) at the address stated in paragraph 1.49.

## REFERENCES

**Ref 1.1:** Wales Statutory Instruments 2017 No. 567 (W. 136)

**Ref 1.2:** UK Statutory Instruments 2013 No. 390

**Ref 1.3:** Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

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## 2 DESCRIPTION OF DEVELOPMENT

### INTRODUCTION

2.1 This chapter provides a description of the consented scheme and 'As-Built' development. The development is a renewable energy generation facility which has been designed to recover energy from pre-prepared mixed waste wood feedstocks using gasification. The gasification facility is an Advanced Thermal Treatment (ATT)<sup>1</sup> process that produces a combustible synthesis gas, which is then used to raise steam and generate electricity, through steam cycle turbine generation.

2.2 The gasification plant is designed to process shredded mixed waste wood feedstocks to create synthesis gas that is subsequently combusted to produce heat and to raise steam in a conventional tube boiler for the production of renewable electricity in a steam turbine. The annual average export capacity of the Barry Biomass Facility is 10MWe.

2.3 The Biomass Facility is permitted by Natural Resources Wales as a waste co-incineration activity and is to be operated in accordance with the Environmental Permitting (England and Wales) Regulations 2016 and Chapter IV of the Industrial Emissions Directive (IED).

2.4 The 'As-Built' Development forms the basis for the environmental assessment provided in this Environmental Statement (ES) and has been agreed between the owner and the Welsh Government.

2.5 The effects of the Biomass Facility have been assessed throughout the ES based upon what has been constructed and is currently existing. For example, pre-construction information and the associated impacts have been specifically excluded at the request of the Welsh Government on the basis that they have already occurred and there is no longer any potential to change, modify or make adjustments as a result of this assessment.

2.6 The measures that have been incorporated into the design which either reduce or avoid adverse environmental effects arising from the consented scheme and 'As-Built' development have been included as part of the project design. Details of these measures are provided in this chapter and are set out in each topic chapter.

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<sup>1</sup> Advanced Thermal Treatment technologies are primarily those that employ pyrolysis and/or gasification to process municipal solid waste (MSW). It excludes incineration of wastes which is already a mature and well established technology.

2.7 This chapter, together with the subsequent topic chapters, provide the data that is required to identify and assess the main and likely significant effects of the consented development and 'As-Built' scheme during operation in accordance with Regulation 18 and Schedule 4 of the EIA Regulations<sup>2</sup>. The ES chapters and associated technical assessments have also included where relevant the likely effects and impacts associated with decommissioning and routine maintenance.<sup>3</sup>

2.8 This chapter also provides a description of the site and the key components of the consented development and 'As-Built' scheme.

## THE SITE AND SURROUNDING AREA

### Site Location

2.9 The Barry Biomass Facility is located off Woodham Road, Barry, Vale of Glamorgan at NGR ST 12605 67691.

2.10 The Biomass Facility is located within the docks area of Barry on brownfield land immediately adjacent to industrial units on Woodham Road to the south west and Viaduct Road to the north east.

2.11 The site is roughly rectangular, averaging approximately 60m in width, by 170m in length. The site is oriented roughly north-west/south-east. The land is flat, and prior to development was surfaced with a mixture of hardcore and compacted earth, with some areas of concrete with little vegetation evident on the site. At the time of the development the site was not considered to have any significant ecological value.

2.12 The site is bound by David Davies Road to the south and Ffordd-y-Mileniwm to the north. The eastern extent of the Barry Waterfront development is located approximately 200m to the west of the Installation and Dow Corning Chemical Works complex is located approximately 1km to the north east. The Installation occupies an area of approximately 0.74 hectares.

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<sup>2</sup> It is noted that due to the fact that the ES is a retrospective document and specifically assesses the impact of the operational development, that not all of the items required by Regulation 18 and Schedule 4 can be provided. A detailed breakdown of each of these requirements is provided in Appendix 1.6.

<sup>3</sup> The maintenance and decommissioning aspects have been included within this ES as a response to recommendations made by PINS as a part of a pre-publishing consultation exercise by WAG.

2.13 The nearest residential development is located on Dock View Road to the north and northeast of the site.

2.14 Access to the site is via Woodham Road, off the Ffordd-y-Milleniwm roundabout adjacent to the Council's Dock Offices. The site is fully developed, with the construction of the Barry Biomass Facility being completed in January 2018.

2.15 The site lies within the north western area of the broader Barry Docks area, which consists of large areas of flat land occupied by various industrial and commercial businesses, centred around the docks themselves. The businesses are a mixture of manufacturing, storage, open storage, light industrial and commercial operations, along with aggregates and waste processing, energy generation and other activities.

2.16 Along the entirety of the south western boundary of the site, on the other side of Woodham Road, and oriented parallel to its longer dimension, lies a row of 'Nissen Hut' style buildings with a series of curved roofs, occupied by various commercial activities including vehicle repair, taxi firms and warehouses.

2.17 To the north east lies an open storage area, a haulage firm, timber products business and other commercial ventures. To the north west lies an area occupied by railway lines, Ffordd-y-Mileniwm Road, then rising ground with Dock View Road above, at some 220m distant. To the south east lies David Davies Road, beyond which is a single rail line, and then the open water of the docks.

2.18 The site is not located over a groundwater Source Protection Zone (SPZ).

2.19 There are no sites with sensitive flora or fauna having a statutory or local nature conservation designation within 500 metres of the site.

2.20 The nearest designated site is the SSSI named Hayes Point to Bendrick Rock at a distance of 616 metres from the site (SSSI 510 administered by the Countryside Council for Wales) which covers an area of 29 hectares.

2.21 The site has no clearly defined planning history prior to the current project, but historical maps indicate that the site has predominantly been utilised as part of the Barry docks area with the construction of railway sidings in the 1900's. These were removed by the 1990's and the site remained predominantly undeveloped until the construction of the Biomass Facility.

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2.22 In terms of the wider area, the site within the Docks lies to the south east of the centre of Barry. To the north and west lies the bulk of the residential areas of the town, with heavy industry to the east of the docks, and the broader area of Barry Docks to the south/south east, beyond which lies the sea.

2.23 Figure 2.1 provides an aerial view of the 'As-Built' development showing the site context and relationship to the wider surroundings.

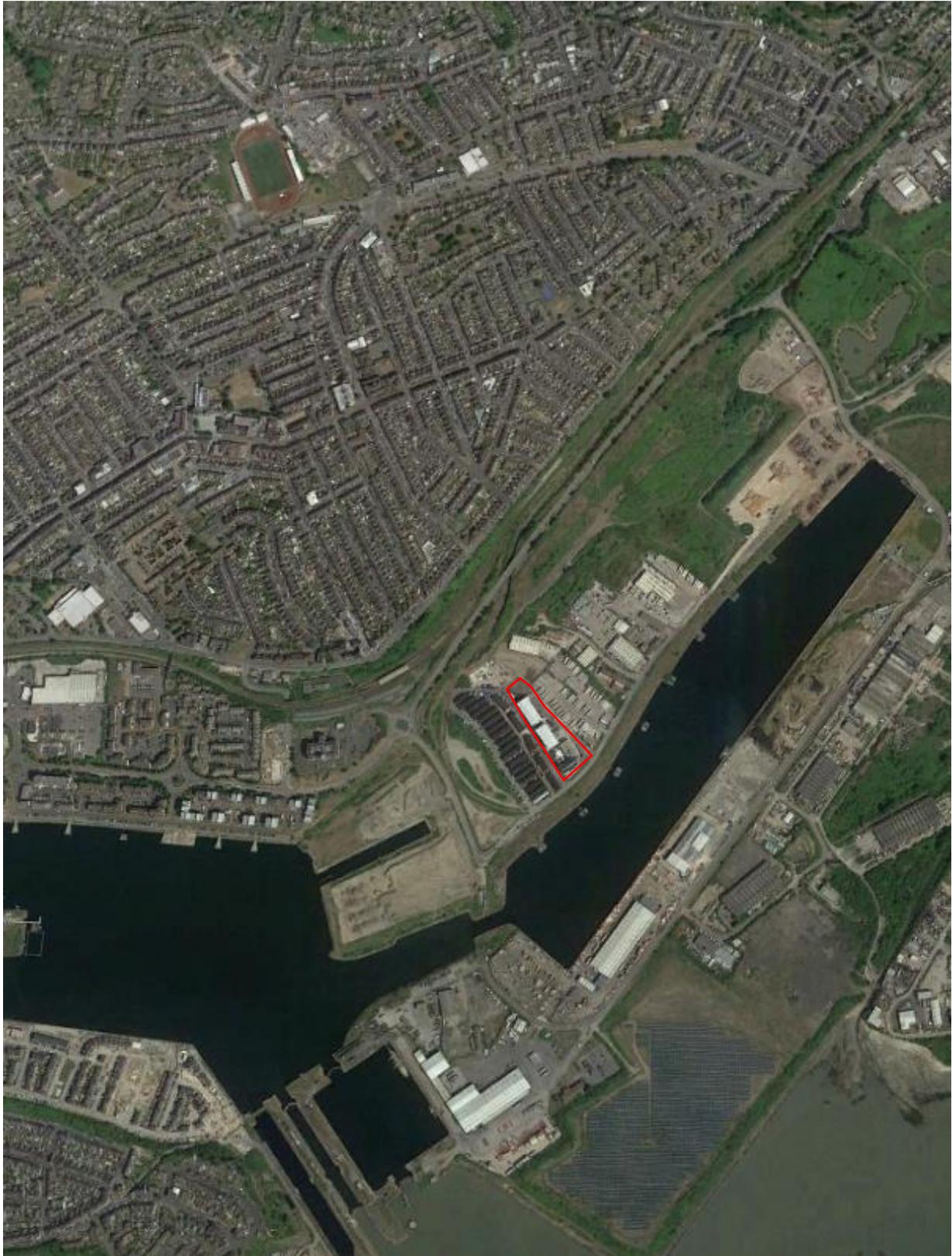


Figure 2.1: Barry Biomass Facility in context of the surroundings (Credit Google Earth)

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## CONSENTED SCHEME (authorised by 2015/00031/OUT)

2.24 The 2015 Permission authorises the construction and use of ‘...*wood fired renewable energy plant at David Davies Road, Woodham Road, Barry*’.

2.25 In summary, the 2015 Permission granted the following changes, relative to the scheme authorised by the 2010 Permission:

- *Technology*: a change in the manufacturer of the advanced conversion technology (ACT) from gasification based on pyrolysis to one based on a fluidised-bed. The proposed technology was chosen as it provided greater fuel efficiency and increased the average annual electrical output of 10 MWe as opposed to 9.0 MWe under the 2010 Permission<sup>4</sup>.
- *Layout*: the accommodation of the plant and equipment required a different configuration of the plant buildings as opposed to the single connected structure approved in the 2010 permission. The 2015 Permission revised the layout to include three separated, but functionally interconnected, buildings. The footprint of these buildings is 7.5% less than under the 2010 Permission.
- *Elevations*: the buildings forming the approved 2015 layout comprised three buildings, two of which were lower than the building height in the 2010 Permission and one that is higher. The average building height of the 2010 Permission is 14m, whilst the average building height of the revised 2015 layout is 16.3m. To align with Industrial Emissions Directive requirements, the stack height increased to 43m.
- *Footprint*: the previous consent granted permission for a single building with a footprint of approx. 2,700sqm. The 2015 Permission reduced the proposed buildings footprint to 2,497sqm, separated across three separate structures and an increased stack structure.

2.26 In order to mitigate against any potential impacts of the approved scheme, the 2015 Planning Permission included a number of specific conditions relating to waste types, tonnage limitations,

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<sup>4</sup> It is noted that this Planning Application pre-dates the Development of National Significance (“DNS”) process is provided by the Planning (Wales) Act 2015, which amends the Town and County Planning Act 1990 (“the Act”), and the Developments of National Significance (Wales) Regulations 2016 (as amended) and subsequent Regulations. As of 1 April 2019, the DNS thresholds related to generating stations have been extended; as a result, all energy generation projects of between 10MW and 350MW are now captured by the DNS system.

environmental management and drainage design for the sole purposes of ensuring that the operational environmental impacts of the scheme are acceptable and do not have an adversely impact the surrounding environment. In all cases the scheme has been implemented in compliance with the conditions and either have, or in the process of being discharged by the Planning Authority.

2.27 The 2015 Permission granted permission for the construction of the following infrastructure, which is considered to be the extent of the constructed Development comprising the following key elements of external construction:

- Fuel storage and feed building: The fuel storage and feed building (52.4 x 21.6 x 13.7m high).
- Main process building: This is the largest building and comprises the gasification equipment (41.4m x 20.4m x 23m high).
- Turbine, Welfare and Ancillary building: This building (29.1 x 17.9 x 11m high) contains the emergency generators, switchgear, the main control room and turbine room.
- ACC Unit: An external air-cooled condenser (32m x 14.5m and 20m high) mounted on steel stilts adjacent to the turbine, welfare and ancillaries building.
- External Equipment: Ash silos - two cylinder shaped structures (18.4m high x 6.7m diameter). Flue gas treatment, exhausting to the chimney stack will also be external.
- Chimney Stack: 43m high stack; located to the south of the site and is this height to meet emission requirements.
- Parking provision for 12 cars (including one disabled) and four cycle bays for employees and visitors.

2.28 The approved scheme layout is provided in Figure 2.1 overleaf.



Figure 2.1: Approved 2015 Planning Layout

## The 'As-Built' Scheme

2.29 The 2015 Permission granted permission for the development of the Barry Biomass Facility, however despite the plant being constructed substantially in accordance with the approved layout, there are a number of ancillary, non-material elements that by necessity have been incorporated in to the final construction.

2.30 The layout associated with the 'As-Built' scheme is provided in Figure 2.2.



Figure 2.2: As-Built Construction (referred to as the Structures Plan)

2.31 The following table takes each of the key elements of the 'As-Built' scheme and explains their operational function:

Table 2.1: The Consented and 'As-Built' Development	
Activity	Purpose
<p>Fuel Storage Building</p> <p><i>Structures 1 &amp; 2 on Approved Plans (Figure 2.1)</i></p>	<p>All waste wood is delivered directly into the fuel storage building via electrically operated roller shutter doors.</p> <p>When required, the fuel is discharged onto the feedstock feed conveyor system and delivered into the gasification building via an external enclosed inclined conveyor and screening unit.</p> <p>All fuel feedstock is supplied to the site via an approved third-party fuel provider who is contracted to provide material in accordance with the sites waste acceptance procedures and waste supply specifications.</p>
<p>Main Process Building</p> <p><i>Structure 4 on Approved Plans (Figure 2.1)</i></p>	<p>The main process building contains the fluidised bed gasification system, combustion, heat recovery boiler systems and associated water pumping systems.</p> <p>The gasification<sup>5</sup> plant partially combusts the fuel to produce a synthetic gas (syngas), which is subsequently combusted to produce a high temperature flue-gas.</p> <p>A steam boiler then recovers the heat from the combustion gases through the conversion into superheated steam.</p> <p>The building also contains the water treatment plant and associated dosing skids which feed directly into the feed line.</p> <p>Ancillary plant including the air compressors, emergency generator and associated fuel tank are located within a lean to annex to the main building.</p>
<p>Turbine, Welfare and Ancillary Buildings</p> <p><i>Structure 6 &amp; 7 on Approved Plans (Figure 2.1)</i></p>	<p>The superheated steam passes to a Steam Turbine and Generator, which generates electricity, which then exports an annual average of 10MWe of renewable electricity to the Local Distribution Network.</p>

<sup>5</sup> Gasification: This technology uses waste and biomass feedstocks to produce either a synthesis gas (syngas) or liquid fuels (bio-oils) which can be used to generate electricity. Gasification is an example of advanced conversion technologies (ACTs).

	<p>The building is sub-divided to include welfare, offices and the control rooms for the operation of the site.</p>
<p>ACC Unit <i>Structure 8 on Approved Plan (Figure 2.1)</i></p>	<p>The Air-Cooled Condenser (ACC) is a stand-alone structure containing 8 axial fans and radiator cells on a traditional A-Frame structure. ACCs immediately condense the steam turbine exhaust flow and return condensate to the boiler without water loss.</p>
<p>External Equipment and Flue Gas Cleaning Equipment <i>Structure 5 on Approved Plan (Figure 2.1)</i></p>	<p>The external plant includes:</p> <ul style="list-style-type: none"> <li>- Sealed ash silos for the containment of all fly ash and air pollution control residues.</li> <li>- Flue gas treatment plant, comprising external enclosed fan plant and pollution control consists of urea injection for the reduction of NO<sub>x</sub>, lime injection for acid gas neutralisation and activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOCs and other substances. The flue gas cleaning system also incorporates a baghouse system, which is designed to remove submicron dust particles within anticipated emission limit values (ELV's) listed in Annex VI which are referenced by Chapter IV of the Industrial Emissions Directive (IED).</li> <li>- Urea and Activated Carbon Storage Silos</li> <li>- Exhaust flue, comprising a single freestanding 43m flue, with external platforming and associated continuous emissions monitoring equipment and equipment cabinets</li> </ul>
<p>External Areas <i>Shown as areas 9 on Approved Plan (Figure 2.1)</i></p>	<p>External areas including car parking, vehicle weighbridge, security lodge, bike shed and small ancillary cabins.</p>
<p>Fire Water Tank <i>Shown as location 8 on Structure Plan (Figure 2.2)</i></p>	<p>An externally mounted above ground (10m dia) emergency fire water tank and associated pumphouse is located to adjacent to the southern boundary of the site.</p>
<p>Export Transformers <i>Shown as Structure 9 on the Structure Plan (Fig 2.2)</i></p>	<p>Export transformers installed by Western Power under their statutory powers. Transformers do not form part of the ownership or responsibility of the plant owner.</p>

2.32 Despite the 'As-Built' scheme being constructed substantially in accordance with the consented scheme, it is nonetheless acknowledged there are a small number of discrepancies between the finalised construction (as shown on the Figure 2.2 'Structures Plan' and the approved drawings referenced in Planning Condition 5 of the consent.

2.33 A table containing all identified structures that have been the subject of discussion between the owner and VoG Council. The full of discrepancies explored with the Council are provides in Figure 2.2 and summarised within Table 2.2 below, along with narrative providing additional information relating to the nature, appearance and materiality of each structure / plant feature. It is key to note that a number of the perceived discrepancies are in fact authorised by the 2015 permission or are not part of the development (i.e. the WPN Transformers).

**Table 2.2: Summary of Observed Deviations from the Approved Drawings**

No. <sup>6</sup>	Structure	Description and Commentary
1	Lean to FRB	7434 L x 2217 W x 4000 H (area 16.4 sqm)  A small (non-material) plant house providing environmental protection to hydraulic plant and rams for the walking floor feedstock system.  No significant planning or environmental effects are caused by the structure's presence.
2	Lean to Compressor House	12508 L x 7350 W x 4231 H or 9754 H if aux coolers included (area 27.5 sqm)  Lean-to (Non-Material) plant building that provides environmental protection to the compressor plant equipment. The compressors were relocated from within the main gasification building to an external location to aid maintenance access and cooling.  No significant planning or environmental effects are caused by the structure's presence.
3	Urea Silo	4544 L x 4544 W x 11131 H (area 20.3 sqm)  Small (non-material) silos containing Urea and APC reagents. Installed as a result of detailed design and the desire to reduce the deliveries of pre-mixed product by HGV tankers. It was considered that the use of the silo reduces amenity impacts and increases operational efficiency.

<sup>6</sup> Numbering system as per Figure 2.2 'As-Built' Construction (Structures Plan).

**Table 2.2: Summary of Observed Deviations from the Approved Drawings**

No. <sup>6</sup>	Structure	Description and Commentary
4	Inclined Conveyor	The incline conveyor is shown on the Approved Layout Plan and forms part of the Development authorised by the 2015 planning permission.
5	Screening Tower & Dust Extractor	2100 L x 487 W x 1370 H (102.3 sqm)  This structure screens oversize and metal products from the fuel stream and forms part of the fuel infeed system. As the plant is 'sandwiched' between two main buildings it is screened from view and has no material impacts.
6	Diesel Generator  Diesel Tank	The emergency generator is an approved piece of plant, that was re-located to an external location for ease of access and to create space. The presence of this plant is non-material. The plant requires an emergency generator for the safe operation and shut down of the facility in the event of a power failure or mains electricity black out.
7	Fire Kiosk	1000 L x 600 W x 400 H (area 6 sqm)  A small flat roofed building (non-material) that houses valve sets necessary to distribute fire water to the deluge system.
8	Fire Water Tank  Fire Pump House	Tank: 1000 L x 1000 W x 1020 H (area 100 sqm)  Pumphouse: 600 L x 220 W x 290 H (area 13.2 sqm)  Non-consented Structure which houses fire water as specified by the fire prevention plan that forms part of the environmental permit and pumping equipment.
9	WPD Transformer Unit	The structure was erected by WPN under its powers as a statutory undertaker. Does not form part of the development.

2.34 The Barry Biomass Facility has been designed and constructed to deliver a high efficiency energy generation plant that utilises advanced thermal technology, namely gasification, as a cost-effective means of processing fuel grade waste wood feedstock to generate energy.

2.35 The outward appearance of all aspects the Barry Biomass Facility is that of a modern industrial development comprising three main buildings and a single freestanding stack, within an area that is industrialised in character.

2.36 The biomass buildings have been constructed using a light grey profiled steel fabric material giving both a simple and utilitarian manner, within the industrial backdrop of the docks and Dow Corning Chemical works.

2.37 Conditions attached to the 2015 permission relating to the approved building materials, landscaping and external lighting (of site and building) ensure that the development minimises the impacts on the amenity of the area.

2.38 In addition to being granted planning permission for the Development, Biomass UK No.2 Ltd has been granted an Environmental Permit by Natural Resources Wales under the Environmental Permitting Regulations 2013 (Ref 1.2) to operate a Part A(1) Installation under Section 5.1A(1)(b) *'The incineration of non-hazardous waste in a waste co-incineration plant with a capacity of 3 tonnes per hour or more'* for the sole purpose of electricity generation.

2.39 The site's EPR permit (EPR/AB3790ZB) (**Appendix 2.2**) was granted in 7<sup>th</sup> February 2018 and enabled the plant to enter in to formal commissioning and operation.

2.40 Under the requirements of the Environmental Permit the facility is required to comply with the requirements of the Industrial Emissions Directive (IED) Best Available Techniques (BAT) conclusions and other requirements for the incineration and co-incineration sector.

2.41 A simplified process flow diagram is provided in Figure 2.2 overleaf.

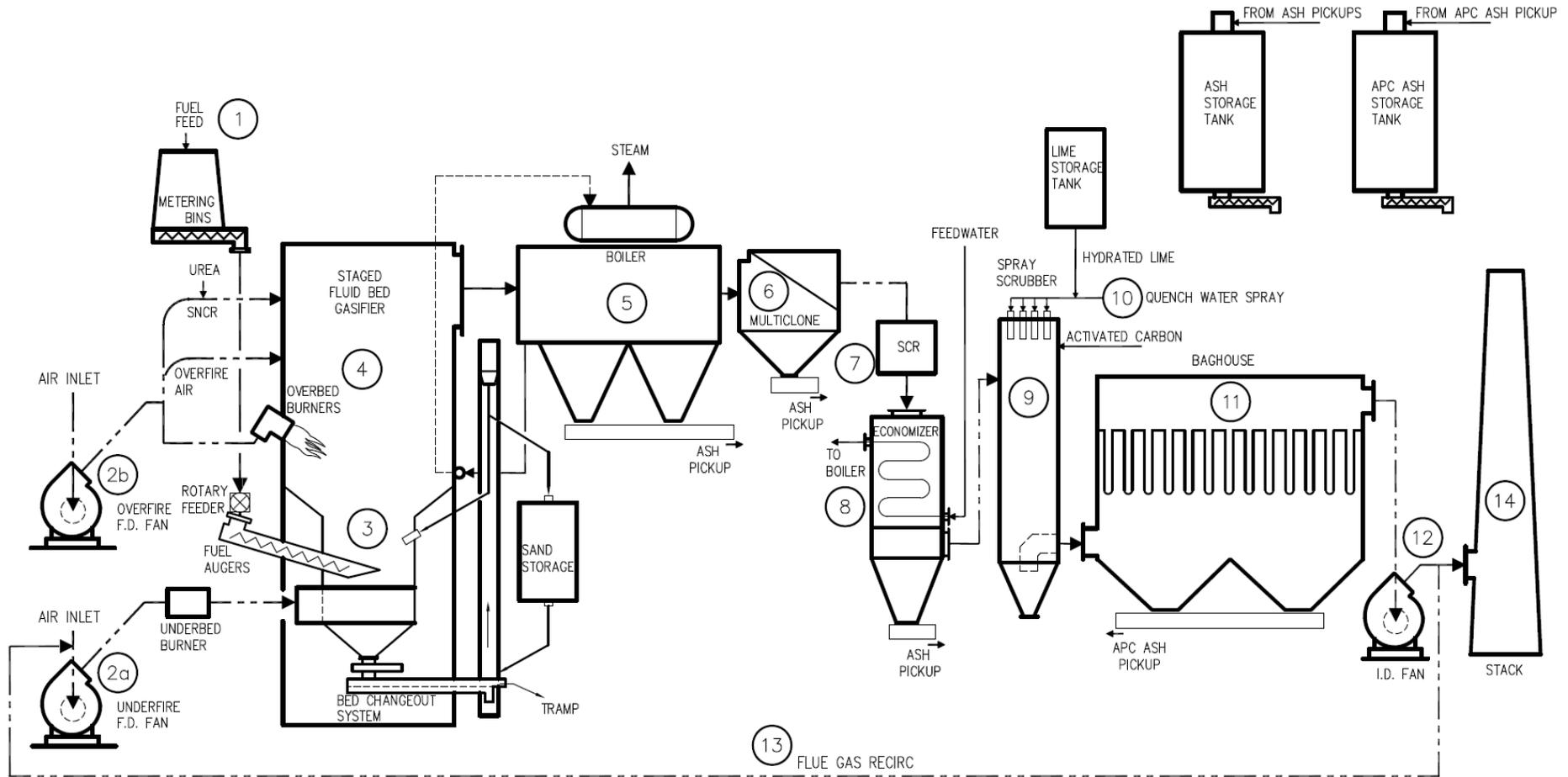


Figure 2.2: Process flow diagram showing the gasification and energy generation plant (noting that reception hall, feedstock screening etc and other ancillary processes are omitted)

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## SITE PROCESS DESCRIPTION

### Waste Acceptance and Reception

2.42 Waste wood fuel feedstock are delivered to site via walking floor HGV's. All vehicles report to the site weighbridge for acceptance checks in line with site waste acceptance procedures prior to being directed to the Fuel Storage Building for delivery. All fuel feedstocks are deposited directly into the internal fuel reception area.

2.43 Within the fuel storage building the site operators will use mechanical loading shovels to load the fuel into the storage bays and onto the fuel transfer system, whereby it is automatically fed into the gasification system when required.

2.44 The wood storage building is of sealed construction and equipped with fast acting roller shutter doors. Air from within the fuel storage building is extracted via the main combustion systems to ensure that the internal environment is maintained at acceptable occupational exposure levels. In addition to the extraction systems, the fuel storage building is equipped with a misting dust mitigation system.

2.45 The wood storage area has an approximate storage volume of 2,000m<sup>3</sup> and is designed in accordance with the approved NRW Fire Prevention and Management Plan requirements.

### Waste Processing

2.46 The fuel transfer system comprises a push floor with intermediate storage for conveyed transport to the gasifier.

2.47 The fuel transfer system includes a material screen and metal separator to remove any oversize materials and metals from the feedstock. Ferrous and non-ferrous metals are separated using an overband magnet and eddy current separator and segregated into a dedicated container for export offsite. Following this, a sizing screen segregates oversize material which is collected separately while smaller feedstock drops onto a chain conveyor which then transports the waste wood into the gasifier metering bins.

### Gasification Process

2.48 The gasification system is made up of the following major plant items:

- Advanced Fluidised Bed Staged Gasification Cell;

- Underbed Air Distribution System;
- Overfire Air; and
- Bed Material.

2.49 Within the fluidised bed, air and recirculated flue gas is passed uniformly through the bed material at such a velocity that the bed material become buoyant and behaves as a fluid. The introduction to heated air within the fluidised bed drives the thermal conversion process and produces synthetic gas. The synthesis gas (syngas) then passes from the gasification bed to the secondary chamber where the gas mixes with primary and secondary combustion air and is combusted. Within the secondary chamber the temperature is maintained above 900°C (i.e. greater than the 850°C minimum requirements) and has a residence time well in excess of the 2 seconds minimum required by Chapter IV IED Requirements.<sup>7</sup>

2.50 Overfire air delivered to the gasification cell above the active bed is used to optimise the thermal oxidation and temperature profile and is key to the control of primary NOx emissions from the plant.

2.51 The fluidised bed material is a fired refractory clay. The refractory material is selected for its resistance to thermal shock and abrasion. Bottom ash material that is collected within the gasifier is recycled through the bed and ultimately removed in the fly ash streams. The bed recycling system is designed to allow the continuous operation of the fluidised bed process while removing inert materials including metals.

2.52 The system is designed with both an underbed preheat burner system and overbed burner system, both oil fired, for start-up requirements and to maintain the required minimum temperature of 850°C during normal operation.

2.53 Syngas produced in the gasifier is then combusted and the heat recovered and converted to steam in the heat recovery boiler.

## Electricity Generation

2.54 The Biomass Facility is equipped with a single steam turbine and generator. The steam turbine has been designed to recover all available thermal energy from the steam and generate electricity.

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<sup>7</sup> 850°C / 2 Seconds is the required temperature and residence time to ensure thermal destruction of VOC's and to ensure complete combustion.

2.55 The steam turbine is fed with the superheated steam from the gasifier and used to generate electricity. With the exception of a small portion of the steam which is extracted at the high-pressure exit stage of the turbine and the boiler drum for the supply of heat to the 'deaerator' and the feedwater preheater respectively, all steam is used for the generation of power.

2.56 An air cooled condenser circuit is employed to cool the exhaust steam from the turbine exit back to liquid state (condensate) to be re-used by the boiler.

#### Air Cooled Condenser

2.57 An air-cooled condenser (ACC) condenses the steam exiting the turbine. The ACC comprises a large bank of fans and cooling radiators to convert the low-pressure steam from the turbine exhaust back to condensate that subsequently flows back into a condensate tank and ultimately reused in the turbine.

#### Electrical Generation

2.58 The electricity produced by the steam turbine generator is transferred onto the Local Distribution Network using a 33kV connection.

2.59 The Biomass Facility has been designed to export an annual average of 10MWe to the local DNO<sup>8</sup> generation network at full load.

#### Boiler Water Treatment System

2.60 The plant is equipped with a water treatment system which is designed to provide high quality feedwater to the boiler.

2.61 The water treatment plant provides a multi-stage de-mineralisation process, consisting of the following elements:

- Activated carbon filter for the removal of free chlorine and any other organic impurities;
- Water softeners for the conversion of calcium and magnesium salts within the feedwater;

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<sup>8</sup> The Distribution Network Operator is Western Power who own and operate a transformer compound located adjacent to the gatehouse on site and within the Planning 'Red Line' Envelope of the site.

- Reverse osmosis for removal of dissolved solids from the feedwater; and
- Electro-deionisation for the final polishing of the feedwater.

2.62 All necessary chemicals are dosed directly within the water treatment plant. No solid chemicals are added to the water, therefore solid deposit formations are avoided.

2.63 The pH of the feedwater is maintained at a level to minimise corrosion in the feed system. The pH of the feed water is controlled by dosing a blend of proprietary low volatile water treatment chemicals.

2.64 These water treatment chemicals not only control the water pH but also minimise corrosion through the removal of oxygen.

### Flue Gas Treatment

2.65 Flue gas cleaning and pollution control consists of Selective NO<sub>x</sub> Catalytic Reduction (SNCR) by urea injection, Selective Catalytic Reduction (SCR), anhydrous lime injection for acid gas neutralisation and activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOC and other harmful substances.

2.66 The gasification line is fitted with a dedicated baghouse filtration system with sufficient capacity to remove all submicron dust particles which include fly ash and absorbents leaving them behind as Air Pollution Control residues (APCR). In turn, this residue is recovered from the bottom of the filter and transported to the APC ash tank, where it is then transported from the site to an identified re-processor and is used as low carbon gypsum replacement in the cement / construction sector.

2.67 Emissions to atmosphere are then discharged through the 43 m high stack. All emissions from the stack are monitored using a fully compliant MCERTS accredited Continuous Emissions Monitoring System (CEMS). The CEMS is 'WID' compliant and monitors HF, HCl, NO, NO<sub>2</sub>, N<sub>2</sub>O, NO<sub>x</sub>, NH<sub>3</sub>, O<sub>2</sub>, SO<sub>2</sub>, VOC, particulates, H<sub>2</sub>O, temperature, pressure and flow. TOC is analysed by a Flame Ionisation Detector.

2.68 The plant has been designed to ensure compliance with the Industrial Emissions Directive (IED) Chapter IV Emission Limit Values (ELVs) in line with the conditions of the Environmental Permit (EPR/AB3709ZB).

2.69 An aerial photo of the completed as-built development is provided in Figure 2.3 below.

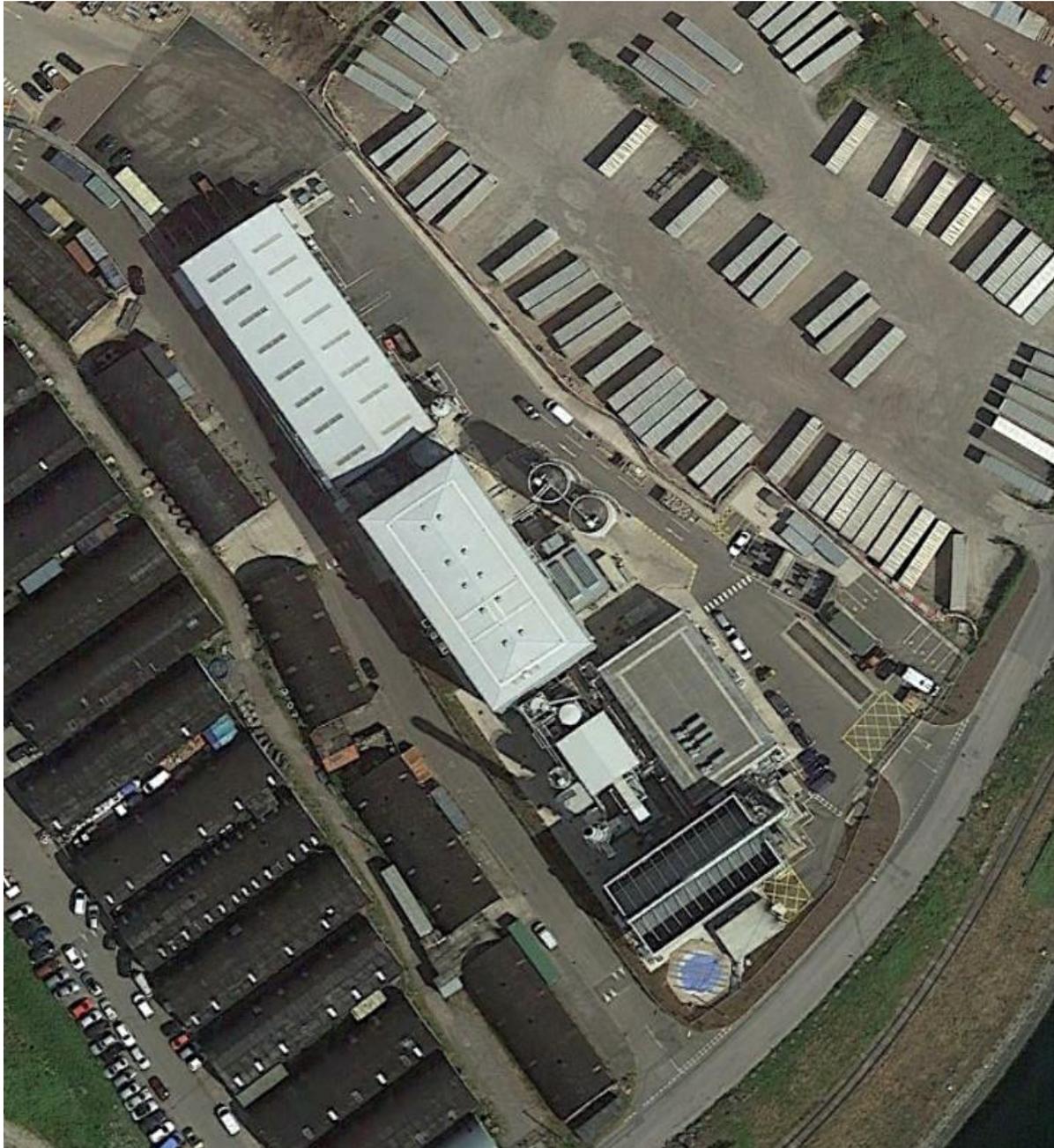


Figure 2.3: As-Built Building Configuration

## Raw Materials

### *Fuel Supply*

2.70 The Biomass Facility accepts up to 72,000 (dry) tonnes of mixed waste wood per annum. The incoming waste will consist of 'fuel grade' mixed waste wood as defined by BS PAS 111: Waste Wood Processing (Grade C or better) (Ref 2.1).

2.71 The waste wood is supplied directly to the Biomass Facility from locally derived appropriately certified companies and meets the EWC codes as defined in the Environmental Permit (EPR/AB3790ZB).

2.72 Waste deliveries take place typically between the hours of 08:00 – 17:30 Monday – Friday with additional deliveries outside these hours only in emergencies or in the event of unforeseen delays.

### *Operational Consumables*

2.73 In addition to waste wood, the Biomass Facility utilises raw materials in line with the existing Environmental Permit as follows:

- Urea, hydrated lime and activated carbon (reagents for FGT);
- Limestone (bed additive);
- Water treatment chemicals and general stores (e.g. lubrication, hydraulic and turbine oils); and
- Diesel (auxiliary and back-up fuel).

### Reagents

2.74 Hydrated lime, urea and activated carbon is used in the flue-gas treatment (FGT) process. The above reagents are utilised in the below approximate quantities onsite:

- Hydrated lime - approximately 540 tonnes per annum;
- Activated carbon – approximately 30 tonnes per annum; and
- 40 % Urea solution – approximately 2,400 tonnes per annum.

2.75 Reagents used in the FGT system are removed from site within the APCR composed of fly ash and FGT reaction products.

### Bed Additive

2.76 Solid limestone is introduced into the fluidised bed energy system for two reasons;

- Firstly, fuels containing high levels of alkaline elements typically contain ash with low softening temperatures. Lime helps reduce the effects of ash softening by coating the ash particles with the additive.

- Secondly, sulphur and other acid gas constituents are abated at source by introducing lime into the fluidised bed.

2.77 Approximately 140 tonnes of limestone is used by the process per annum.

Diesel

2.78 Diesel, used as an auxiliary fuel for the start-up burners and for mobile plant such as the mechanical loading shovel, is stored onsite in a 15m<sup>3</sup> bunded tank and used as required.

Other Consumables

2.79 Lubrication, hydraulic and turbine oils, in addition to water treatment chemicals are stored internally within the ancillary building in bunded 5m<sup>3</sup> tanks.

**Access and Logistics**

2.80 All deliveries of incoming waste wood, FGT reagents, and other consumables are undertaken via road. As are all collections of residues and wastes from the site.

2.81 The below table outlines typical HGV movements per day.

Table 2.3: Logistical movements			
Product	Tonnes per annum	Mode	Vehicles per day *
Biomass	72,000 (dry) <sup>9</sup>	HGV	15
Ash, lime, carbon	6726	HGV	1
Urea	3,352	HGV	0.33

\* Movements shown here include all logistics vehicle movements, both incoming and outgoing from the Barry Biomass Facility and assume 100% load in accordance with the design HEMB.

<sup>9</sup> Planning Condition 22 of 2015/00031/OUT states ‘The total tonnage of wood waste treated at the plant hereby approved shall not exceed 72,000 dry tonnes per annum, unless otherwise agreed in writing with the Local Planning Authority beforehand, and records of the amount of fuel processed shall be retained and made available to the Local Planning Authority on request.’

## Staffing and Shifts

2.82 The operational Biomass site has approximately 17 - 20 staff. The site is operational on a continuous 24/7 basis with deliveries, loading and unloading activities generally carried out between 07:00 – 19:00 Monday to Friday, and in accordance with the stipulations of Condition 24 of the 2015 Planning Permission<sup>10</sup>.

## Access and Parking

2.83 The Biomass Facility is situated on David Davies Road. The site has one entrance which is strictly controlled and managed to ensure no unauthorised access to site.

2.84 The site has been designed with dedicated parking and cycle storage facilities.

## Transport Management

2.85 The Biomass Facility is operated in accordance with a Green Travel Plan<sup>11</sup> which controls heavy goods access to the site, minimising and optimising private and commercial transport.

## Appearance and Design

2.86 The site has been built substantially in accordance with the conditions stipulated in the approved 2015 planning permission, however a number of ancillary structures have been included as part of the 'As-Built' development, which despite neither materially changing the nature nor purpose of the development, were not included as part of the consented scheme. All of these discrepancies have been listed in detail earlier within this Chapter.

2.87 Further assessment of the facility's appearance is outlined in Chapter 5: Landscape and Visual.

## Landscape and Biodiversity Enhancement Strategy

2.88 Landscaping at the site, including planting, seeding and turfing in accordance with the landscape plan approved under the 2015 Permission and the Reserved Matters approval has been undertaken.

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<sup>10</sup> Condition 24 States '*Deliveries to the site, and all other external operations, shall be restricted to the following hours: - Monday to Saturday : 07:00 - 19:00; and Sunday /Bank/Public holidays 08:00 - 16:00.*'

<sup>11</sup> The requirement of a Green Travel Plan is stipulated by Condition 29 of 2015/00031/OUT and is pending approval by the Vale of Glamorgan Planning team.

## Drainage and Flood Risk

2.89 The site is not located in an area where there is a risk of flooding from rivers and the sea. The southern boundary of the site lies immediately adjacent to land which has a low risk of flooding with a chance of between 1 in 1000 (0.1%) and 1 in 100 (1%).

2.90 The site drainage scheme has been constructed in accordance with the agreed scheme details and with the approval of NRW<sup>12</sup>.

## Lighting

2.91 Lighting at the site has been installed in accordance with the 2015 Permission, and subsequent conditions. Off-site light spillage and LUX plots for the site were detailed and anticipated not to have an impact offsite. All conditions relating to light spillage, as defined by Condition 12 of the 2015 Permission are pending approval by the Vale of Glamorgan planning team.

## Waste

2.92 The gasification process does not inherently produce significant quantities of waste.

2.93 There are two principal types of solid by-products produced from the operation of the gasification facility namely:

- Bottom Ash/Fly Ash; and
- APC Ash (Air Pollution Control (APC) residues).

2.94 Bottom Ash is initially recirculated as bed material before ultimately being rejected from the bed as particulate fly ash within the combustion gases and collected as part of the cyclone collection systems. The bed is eroded at a rate that requires replacement every 4 years.

2.95 All air pollution control residues from the FGT system are stored within dedicated hoppers and exported off site to a re-processor for use as a gypsum replacement, aggregate recycler or disposal. All ash collection and transfer are via dedicated covered vehicles ensuring no fugitive emissions from this process.

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<sup>12</sup> Conditions 13 and 14 of the 2015 Permission are pending discharge by Vale of Glamorgan.

2.96 The plant will produce approximately 2,000 tonnes of APCR per annum<sup>13</sup>, composed of ash and abatement products, is produced per annum. APCR is discharged into enclosed road tankers via a sealed connection and transported off-site by road for disposal.

2.97 Approximately 4,000 tonnes of bottom ash / fly ash are produced per annum<sup>12</sup>. All bottom ash / fly ash is transported off-site by road for recovery or disposal dependent on its composition and testing.

2.98 Further details relating the control, management and environmental impacts of the waste produced by the plant is provided in ES Volume 1 - Chapter 9 Waste Management.

### **Use of Natural Resources**

2.99 The principal natural resource used at the Barry Biomass Facility is mains water usage.

#### ***Water***

2.100 Supplies of mains water are provided to the site by the municipal supply (Welsh Water). The mains supply feeds two water systems:

- Town's water; and
- Potable water.

#### **Towns Water**

2.101 The towns water system supplies several operational processes before entering the towns water storage tanks. These tanks supply water for firefighting and support the boosted towns water system. The boosted towns water system supplies water to demineralisation plant and other operational utilities.

#### **Potable Water**

2.102 The potable water system supplies drinking water and water to showers and toilets.

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<sup>13</sup> Based on the 'As-Built' design Heat and Energy Mass Balance. Actual numbers in HEMB are 3,944 TPA and 2,072 TPA for Bottom Ash and APCR respectively.

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## Residues and emissions

2.103 Water related emissions are limited to uncontaminated rainwater runoff arising from the roof drainage to surface water and effluent emissions to sewer.

2.104 Uncontaminated run-off is collected and discharged to surface water drain via an attenuation tank. Rainwater which falls onto the roads and hardstanding is also discharged to surface water drain via attenuation tank.

2.105 Process effluent comprising water treatment system discharges and boiler blowdown is processed via the water treatment system and released directly to sewer. The plant releases approximately<sup>14</sup> 4m<sup>3</sup> per hour to sewer under consent from Welsh Water. All parameters as outlined within the discharge consent are adhered to, with online monitoring equipment and periodic third-party extractive sampling.

2.106 Details of residues and emissions in relation to discharges to; air and noise and vibration are set out in *Chapter 7: Air Quality* and *Chapter 6: Noise and Vibration*, respectively. Details of lighting are provided above, and any effects of light emissions are considered within *Chapter 5: Landscape and Visual Resources*, where relevant. As set out in Chapter 4 of this ES, the project is not likely to give rise to heat or radiation emissions.

## VULNERABILITY TO ACCIDENTS AND DISASTERS

2.107 The 2017 EIA regulations state that the EIA must identify, describe and assess in an appropriate manner the direct and indirect significant effects arising from the vulnerability of the Development to risks of major accidents or disasters. Vulnerability of the Development to major accidents introduced by the location should be considered as well as risks that are an inherent characteristic of the development.

2.108 The objective of such an assessment is to establish whether the proposed development [in this case the consented and 'As-Built' development] increases risks to existing receptors or increases the sensitivity of those receptors to the consequences of the hazard. For example, by introducing new links/pathways between a possible hazard and a receptor.

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<sup>14</sup> Actual HEMB figure 3,921 Litres per hour

2.109 The Barry Biomass Facility is intended to operate under an Environmental Permit (EPR/AB3790ZB) granted by NRW. It is not proposed that this EIA will duplicate those permitting controls.

2.110 Assessment of accidents and emergencies has been undertaken as part of the Environmental Permit application through an associated Environmental Risk Assessment (ERA). The ERA presents a high-level assessment of accident risks, that has then informed an Accident Management Plan (AMP) for the operational site. An AMP is a regulatory requirement for the Environmental Permit and will be updated throughout the lifetime of the development.

2.111 The storage and processing of mixed waste wood feedstock is a regulated activity which presents a risk of fire unless controlled and managed appropriately. Accordingly the owner will manage the site in accordance with an approved Fire Prevention and Management Plan (FPMP) which forms part of the operational requirements and specified Risk Management Controls within the Environmental Permit.

2.112 The existing Biomass UK No. 2 Ltd Environmental Management System (EMS) is certified to ISO 14001.

### MEASURES ADOPTED AS PART OF THE DEVELOPMENT

2.113 In order to avoid or reduce the likely significant environmental effects, a number of measures have been designed into the Barry Biomass Facility. A number of these requirements have formed part of permitted regulatory conditions and others have been stipulated through the associated planning conditions of 2015/00031/OUT. Details of these can be found within each topic chapter of the ES and have been summarised in Table 2.4 below.

Table 2.4 Schedule of Measures Adopted by the Project		
Topic	Operational Control Measures	Regulatory Control
General / Design	The Development is entirely contained within the existing Biomass facility. All major plant items are sited away from sensitive habitats and sensitive receptors.	Site layouts have been approved in planning and have been subject to consultation by all statutory consultees in both planning and permitting process.
Historic Environment	None	No specific requirements stipulated in planning.

Transport Impacts	Transport impacts are limited to fuel feedstock deliveries, ash collection, consumable deliveries and staff and maintenance vehicles only. Specific controls are placed on the facility that limit the quantity of incoming waste feedstock and delivery times, hence the major contributing highways impact is controlled.	Planning Conditions 22, 24 and 29 relate and provide specific controls.
Contaminated Land	The facility is required to store and manage all chemicals and potentially polluting materials in accordance with best practice requirements and ensure that adequate primary, secondary and tertiary containment is provided. All drainage systems are designed in accordance with NRW required and sealed to prevent any contamination migration.	Planning Conditions 8, 9 and 27 specifically relate to the identification and remediation of contaminated land. NRW have reviewed all contaminated land reports and confirmed that the land baseline condition has been adequately assessed and that the site infrastructure is adequate to prevent pollution occurring.
Landscape and Visual	The plant has been designed with building fabric that is both in-keeping and suitable for the dockside development. The Landscape and Visual Impact assessment concludes that the visual impacts of the site are acceptable.	All building materials, cladding colours and design details have been approved by planning condition. Planning Conditions 5, 7, 12, 15, 16 relate and provide specific controls
Ecology and Nature Conservation	<p>Habitat protection:</p> <ul style="list-style-type: none"> <li>All process plant controls able to ensure that the plant operates within its consented limits at all times (i.e. will not be subject to uncontrolled emissions releases); and</li> <li>Application of existing pollution incident prevention and control procedures apply to the developed site.</li> </ul>	All ecology and habitat impact have been assessed by the NRW as part of the permitting process and approved. Emission limit values have been stipulated in the EPR Permit.
Noise and Vibration	The site is subject to NRW Environmental Permit Regulations (EPR) and has demonstrated Best Available Techniques (BAT) in terms of	All noise sources and mitigation measures are a regulated through the

	<p>operational noise mitigation and control. The resultant noise control measures ensure that the overall noise impacts of the facility do not have a significant impact at the sites nearest sensitive residential receptors.</p>	<p>permit and the agreed Noise Management Plan.</p> <p>Planning Conditions 21, 25 and 30 relate and provide specific limits and controls.</p>
<p>Air Quality</p>	<p>The air emissions are fully mitigated to meet the IED BAT emissions requirements and ELVs stipulated in the Environmental Permit conditions. All assessed impacts relating to the operational air emissions have been assessed as part of this ES and determined not to have a significant impact.</p>	<p>All airborne emission from the plant are regulated as part of the EPR permit. In addition to the emission limits, Barry Biomass is required to operate in accordance with an approved Dust Management Plan and specific waste control requirements.</p> <p>Planning Conditions 11, 26, 30, 31 specifically relate to air quality and dust management.</p>
<p>Waste Management</p>	<p>All wastes received, processed and generated by the Biomass Facility are managed in accordance with the IED BAT requirements and controlled to prevent pollution.</p> <p>No wastes are stored externally and all outgoing waste materials are controlled in accordance with the regulatory requirements.</p>	<p>All wastes are managed in accordance with the conditions stipulated within the EPR Permit.</p> <p>Planning conditions 6 (fly ash management), 26 and 30 relate to control of wastes and waste storage related matters.</p>
<p>Climate Change</p>	<p>All direct Carbon Emissions meet the Ofgem definition of Renewable and therefore have a net 'neutral' impact.</p>	<p>Planning Conditions 22 and 23 specifically restrict the operation of the plant to waste wood biomass materials.</p>

## REFERENCES

**Ref 2.1:** The Publicly Available Specification 111 (BSI PAS 111:2012) for processing wood waste was commissioned by WRAP in collaboration with the British Standards Institution (BSI) and extensive consultation with the wood recycling industry.

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## 3 NEED AND ALTERNATIVES CONSIDERED

### INTRODUCTION

3.1 This chapter of the Environmental Statement (ES) provides a summary of the need for the Barry Facility and provides a context for the construction of the plant. As the site has been constructed, the discussion about viable alternative layouts and design options has been excluded. The chapter includes layout options that were considered at the time of the plant design. Principally however this chapter provides the background to the need for the development and provides the background to the technology choice and site configuration.

3.2 The construction and planning approval for the Biomass Facility was supported by the following key areas of policy:

- Energy security – through the provision of a facility capable of generating sustainable baseload electricity, displacing primary fossil fuels;
- Energy recovery – through the provision of a facility that generates power by combusting non-recyclable biomass waste; and
- Zero landfill – through the provision of a facility that creates market demand for non-recyclable waste materials, which would otherwise be destined for landfill or other forms of disposal.

3.3 Sustainability, including:

- Efficient use of land;
- Use of low carbon energy sources;
- Minimisation, re-use and recycling of waste;
- Minimising risk of and from flood, sea level rise and impact of climate change;
- Encouraging economic diversification; and
- Conserving, enhancing and linking green infrastructure, protecting and enhancing the built and natural environment.

3.4 In granting the 2015 planning permission the officers report stated that benefits from the Project remain essentially the same as for the 2010 Permission, namely:

*“Renewable electricity: Utilising established biomass energy technology in order to contribute to national targets for renewable energy provision. The facility will supply electricity via the electricity grid which is equivalent to the annual energy usage of approximately 23,600 households (increased from the previous level of 22,000) based on an average UK household consumption of 3,300kWh.*

*Climate change: Contributing to creating “A resilient and sustainable economy for Wales that is able to develop whilst reducing its use of natural resources and reducing its contribution to climate change.” (Planning Policy Wales Edition 7, Para 4.1.5).*

*Reduced landfilling: Reducing the need to dispose of wood to landfill, thereby conserving finite landfill capacity and facilitating a more sustainable end use for waste wood as a renewable energy resource in accordance with the waste hierarchy (Planning Policy Statement 10). There remains an over-supply of waste wood in the UK and consequently, large volumes of wood continue to be directed to landfill or other less sustainable uses.*

*Assisting wood recycling: Providing an additional outlet for recycled wood to enhance the commercial viability of wood recycling, both locally and nationally.*

*Achieving a reduction in the number of vehicle movements carrying waste wood to local and national landfill sites.*

*Economy/employment: Utilising a vacant industrial plot in order to provide skilled employment opportunities and investment in local goods and services. Up to 12 full-time equivalent jobs based at the site plus 2 office staff will be provided.”*

3.5 With the agreement of the Welsh Government, this Environmental Statement does not contain a section on planning policy, as this was provided as part of the extant 2015 Permission and associated application. As set out previously, the 2015 Permission has been lawfully implemented and is the subsisting operative planning permission benefitting the site. A further assessment of planning policy is therefore not relevant in the context of this retrospective ES.

3.6 Notwithstanding the above, there are a number of waste management policy documents that relate to sustainable waste management and renewable energy in Wales. A number of these document have been published since the extant planning permission and since agreement of the ES scoping with the Welsh Government.

3.7 Accordingly, the remains of this Chapter identifies how the Barry Biomass Facility complies with these requirements and meets the policy objectives.

3.8 In essence the Welsh Government are committed to a Zero Waste Future and have an established suite of policies that are described within the section below. The principal documents that define waste policy are outlined and detailed within the following documents:

- Planning Policy Wales *'Towards Zero Waste - One Wales: One Planet'*. The overarching waste strategy document for Wales (June 2010) (Ref 3.3);
- Technical Advice Note 21 – Waste 2014 (Ref 3.4);
- Beyond Recycling – A Strategy to make the circular economy in Wales a reality (Ref 3.5);  
and
- Strategic assessment for the future need for energy from waste capacity in the three economic regions of Wales (Ref 3.6)

3.9 Both the the Welsh Government's overarching waste strategy for Wales, *'Towards Zero Waste - One Wales: One Planet'*, and TAN 21 have previously been assessed and were material in the original consenting of the facility, however most recently, in March 2021 the Welsh Government issued two documents that related to the circular economy and the future need for energy from waste capacity in Wales.

3.10 The ‘Beyond Recycling’ document outlines a strategic vision for achieving a circular economy in Wales. The strategy sets out the Welsh Governments commitment to action to accelerate Wales’ transition to a circular, low carbon economy. This strategy includes many areas of waste management such as tackling single-use plastics, increasing recycling recovery rates and driving innovation in waste recycling and hydrogen. Ultimately the document prioritises the following:

- Phasing Out of Single Use Plastics;
- Eradication of avoidable food waste;
- Achieving the highest rate of recycling in the world;
- Taking full responsibility of Wales’ waste through effective management and infrastructure.

3.11 The conclusion of the Beyond Recycling contains an action for Welsh Ministers to put in place a moratorium on any future large scale energy from waste developments, as the increase in recycling and reduction in waste already seen means that we will not need any new large scale energy from waste infrastructure to deal with the residual waste generated in Wales.

3.12 The document ‘*A Strategic assessment for the future need for energy from waste capacity in the three economic regions of Wales*’ focuses residual municipal mixed waste capacity and concludes that there is sufficient consented EfW capacity within Wales to meet current and future needs.

3.13 The document effectively places into immediate effect the moratorium on additional EfW capacity in the form of a Ministerial Written Statement issued on 24 March 2021. This moratorium means the Welsh Government does not consider there to be a need for any new large scale energy from waste plants of 10MW or greater. Small scale energy from waste plants of less than 10MW will only be allowable if the applicant can demonstrate need for such a facility for the non-recyclable residual wastes produced in the region. Any new small scale facilities must also supply heat, and where feasible, be carbon capture and storage enabled or ready.

3.14 Although relevant to the development of future infrastructure capacity, the publishing of these two documents do not directly relate to the consented and ‘As-Built’ development on the basis that the plant is

a dedicated biomass facility, formed part of the consented capacity considered within the review, only processes segregated non-recyclable biomass wastes and does not processes mixed residual wastes arisings.

3.15 As such, the Barry Biomass Facility fully supports the objectives of the Beyond Recycling strategy of achieving a circular and zero carbon economy.

3.16 In addition to the above, a number of other key environmental and sustainability policy objectives and statements have been published, all of which are complied with by the Barry Biomass facility.

### Climate Change

3.17 There is a requirement to reduce the emission of greenhouse gases as a result of electricity generation as part of wider climate change obligations (including the Paris Agreement 2015 and government declaration of a 'climate emergency' and the setting of a target of 'net zero' greenhouse gas emissions by 2050 in 2019 by the UK Government).

3.18 The overriding advice of the Committee on Climate Change is that significant improvements in climate policy are necessary if the UK is to adhere to its net-zero target. 'Net zero' means that any emissions are balanced by absorbing an equivalent amount from the atmosphere. The Committee has suggested that most sectors across the UK need to be close to net zero greenhouse gas emission without the reliance on carbon offsetting and international carbon credits. With respect to the power sector, the overarching advice from the Committee is for the immediate rollout of low-carbon generation (with low-carbon, non-renewable sources having a role in the transitional period 2020 to 2050).

3.19 Baseload generation, such as that produced by the Barry Facility, supplements generation from intermittent renewable sources by providing a consistent supply to grid that is unaffected by prevailing weather or daylight conditions.

3.20 The waste wood biomass gasification used at Barry is comprised of biogenic<sup>15</sup>, devoid of 'fossil' carbon, thus ensuring that the carbon emissions related to the plant are 'net' zero.

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<sup>15</sup> Only fossil carbon is regarded as causing a net increase in atmospheric CO<sub>2</sub> concentration, having been released from long-term geological storage. Biogenic carbon was drawn down from the atmosphere in the form of CO<sub>2</sub> by parent plant material during growth prior to being released again during combustion. Over this short cycle, CO<sub>2</sub> released at point of use does not

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## Energy Security

3.21 The Biomass Facility contributes to UK energy security and the anticipated future increase in electricity demand to 2050 by meeting the continuing need for underlying baseload or ‘on demand’ generation. Given that there is no current technology solution for large scale electricity storage to smooth out differences in generation and demand, the need for reliable baseload electricity generation is growing. As such, the Barry facility has been designed to provide baseload electricity alongside increasing generation from intermittent renewable sources to ensure that increasing UK electricity demand can be met during this transition towards decarbonisation.

3.22 Planning Policy Wales anticipates up to 30% of Wales’ electricity demand to be met by non-renewable sources at 2030 (50% currently, according to Energy Generation in Wales 2018) while the Welsh Government has set a target of a 95% reduction in greenhouse gas emissions by 2050.

3.23 National Grid’s Future Energy Scenarios (National Grid, July 2019) anticipates demand for electricity to increase in the future beyond current levels. These increases are primarily due to the increase in electricity demand from the target to achieve net zero by 2050, which will involve the need to decarbonise direct energy generation as well as the electrification of heating and transportation systems. The figures above demonstrate that considerably more new generation is required between now and 2050.

## Sustainability

3.24 The Well-Being of Future Generations (WBFG) Act 2015 requires *“public bodies to do things in pursuit of the economic, social, environmental and cultural well-being of Wales in a way that accords with the sustainable development principle”*.

3.25 The first Well-Being Goal is *“A Prosperous Wales - an innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change); and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.”*

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change the net atmospheric CO<sub>2</sub> concentration, provided that the carbon content is released as CO<sub>2</sub> and not as methane (CH<sub>4</sub>, such as from a decomposition process).

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## ALTERNATIVES CONSIDERED

3.26 Prior to the construction of the site a number of alternative technology solutions were considered, however gasification combined with a heat recovery boiler and associated steam turbine generation was selected for the following reasons:

- Numerous environmental advantages over incineration and other technologies in terms of lower mass flow of air pollutants, lower water use and smaller footprint.
- Lower operating costs than conventional incineration due to lower air flows, smaller boilers and less fouling / maintenance.
- Reliable technology with numerous global reference sites.
- Gasification recognised by UK government as being a preferred technology as opposed to traditional 'Mass Burn' moving grate combustion processes.

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## REFERENCES

**Ref 3.1:** Directive 2010/75/EU of the European Parliament and the Council on industrial emissions (the Industrial Emissions Directive or IED)

**Ref 3.2:** Directive 2012/27/EU establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020.

**Ref 3.3:** Planning Policy Wales Edition 10, Welsh Government 2014 & Government of Wales Act 2006, s.79; Welsh Government (May 2009) One Wales: One Planet - The sustainable development scheme of the Welsh Assembly Government.

**Ref 3.4:** Welsh Government 2018 Technical Advice Note 21: Waste. published February 2014 ('TAN 21').

**Ref 3.5:** Beyond Recycling - A strategy to make the circular economy in Wales a reality. Published by Welsh Government, March 2021.

**Ref 3.6:** Strategic assessment for the future need for energy from waste capacity in the three economic regions of Wales. Published by Welsh Government, March 2021.

**Ref 3.7:** Well-being of Future Generations (Wales) Act 2015 Acts of the National Assembly for Wales 2015 Anaw 2

**Ref 3.8:** Directive 1999/31/EC on the landfill of waste, OJ [1999] L182/1 Directive 2008/98/EC on waste, OJ [2008] L312/3

**Ref 3.9:** Directive 2008/98/EC of the European Parliament

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## 4 ENVIRONMENTAL ASSESSMENT METHODOLOGY

### INTRODUCTION

4.1 This chapter of the Environmental Statement (ES) sets out the approach taken to the Environmental Impact Assessment (EIA) of the 'as constructed' Biomass Facility in its current location at Barry Docks. The chapter also includes details of the consultation undertaken to date and the overall approach to the assessment of the operational effects of the project. Further details of topic specific methodologies, such as survey methods, are provided in each topic chapter of the ES.

### SCOPING

4.2 Scoping is the process of identifying the issues to be addressed during the EIA process.

4.3 The Owner has agreed with a request from the Welsh Government to prepare this statement with a view to establishing whether the environmental impacts of the 'As-Built' development as approved by 2015/00031/OUT are acceptable and that the development does not have a significantly adverse impact to the environment.

4.4 In accordance with the requirements of Regulation 14 of the EIA Regulations, whereby an applicant can make a request for the relevant planning authority to set out its opinion as to the scope and level of detail of the information to be provided in the ES (referred to as the Scoping Opinion), the Owner has sought the advice of the Welsh Government.

4.5 Accordingly, and with agreement from the Welsh Government this Environmental Statement provides an impact assessment of the operational 'As-Built' Biomass Facility using the pre-development environmental background information assuming a 2015 assessment baseline and neither assesses construction nor pre-development aspects or impacts.

4.6 The scoping of this ES has also sought to address a number of specific technical questions that were identified as part of WSP's independent review<sup>16</sup> of the previously submitted environmental documentation that formed the applications for the 2010 and 2015 planning applications. The purpose of the independent

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<sup>16</sup> Welsh Government: Barry Biomass Facility Environmental Statement Adequacy Report (November 2019)

review was to inform Welsh Government of whether the information was sufficient for decision making in the light of the nature of the development and the environmental issues of concern and in accordance with the EIA Regulations. As such, the scope of this ES specifically responds to the identified recommendations and actions within the report.

4.7 A scoping request was submitted to Welsh Government following a meeting on the 4<sup>th</sup> December 2020 whereby the scope was discussed and agreed.

4.8 A formal response from the Welsh Government was received on the 2<sup>nd</sup> February 2021 which clarified the scope of Voluntary ES. The received scoping response is appended to this chapter (**Appendix 4.1**).

4.9 The scoping exercise highlighted a number of areas that the Welsh Government wished to see addressed within the ES. Taking into account the nature, size and location of the project and the information provided within the Scoping Opinion, the following topics have been identified as requiring consideration within this ES:

- Landscape (Chapter 5);
- Noise (Chapter 6);
- Air Quality (Chapter 7);
- Human Health (Incorporated into Chapter 7);
- Climate Change (Chapter 8); and
- Waste (Chapter 9).

4.10 Consideration has also been given in the ES where relevant to the potential impacts associated with routine maintenance activities and end of life plant decommissioning. Due to the nature of the plant, maintenance is carried out during planned outages and whilst the plant is not operational, and as such a majority of the operational impacts are reduced.

#### TOPICS SCOPED OUT OF THE EIA PROCESS

4.11 As the principal purpose of the Environmental Impact Assessment is to provide an assessment of the operational impacts, a number of the environmental topics typically associated with Environmental

Statements have been scoped out. Accordingly, The Welsh Government have agreed that the following topics are not included in the scope of the ES on the basis that ongoing impacts are not considered significant in the context of the 'As-Built' development;

- Planning Policy;
- Material Assets (Heritage and Archaeology);
- Accidents and Emergencies;
- Ground Conditions and Contaminated Land;
- Flood, Water Resources and Drainage;
- Transportation and Highways Impacts;
- Ecology; and
- Socio economics.

4.12 These topics are discussed in further detail below.

### **Planning Policy Context**

4.13 The ES provides an overview of relevant legislative and planning policy context within each topic chapter. The assessment has regard to national and local policy documents, where relevant. However, it was agreed with Welsh Government that a separate chapter on Planning Policy Context is not required to be provided in its full extent in the ES on the basis that the 2015 permission was granted in accordance with the adopted development plan and other material considerations as at 31<sup>st</sup> July 2015 and has previously been granted two former planning approvals.

4.14 Where new or revised Policy has been published in the interim period between the 2015 consent and the publication of this Environmental Statement, then a summary has been provided where applicable.

### **Material Assets**

4.15 The EIA Regulations refer to 'material assets', including architectural and archaeological heritage. The phrase 'material assets' has a broad scope, which may include assets of human or natural origin, valued for socio-economic or heritage reasons. Again, due to the fact that the site is subject to planning approval and has been constructed within an area of Barry Docks that has been allocated for both industrial and employment uses, it was agreed by Welsh Government that additional 'post-dated' assessment of heritage

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and socio-economic aspects of the development would not contribute to the any further understanding of the operational impacts of the facility. Therefore, no separate consideration of material assets is provided within this ES.

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## Accidents and Emergencies

4.16 The 2017 EIA Regulations state that the EIA must identify, describe and assess expected significant and insignificant effects arising from the vulnerability of the Biomass Facility to risks of major accidents and disasters. Vulnerability of the development to major accidents introduced by the location should be covered as well as risks that are an inherent characteristic of the development.

4.17 The objective of such an assessment is to establish whether the Biomass Energy Facility increases risks to existing receptors or increases the sensitivity of those receptors to the consequences of the hazard. For example, by introducing new links/pathways between a possible hazard and a receptor.

4.18 The Biomass Facility will operate under an Environmental Permit supplied by NRW. The Environmental Permit application that was prepared by the operator describes in detail the potential accident and emergency scenarios that could occur at the site and provides both a risk assessment and an accompanying Accident Management Plan for how such incidents will be controlled.

4.19 Given that in determining that the decision for granting the Biomass Facility an Environmental Permit by the NRW, the application and associated decision documents were subject to three rounds of public consultation and that all accident, emergency and fire management documents and risk assessments were deemed competent and sufficient by the relevant statutory authority, it is not proposed that the EIA duplicate this process.

4.20 No aspects of the approved planning conditions require additional measures to be implemented at the Barry Biomass Facility.

## Maintenance

4.21 All maintenance outages will be carried out in accordance to a planned schedule, during which time the plant will be non-operational and therefore will not be subject to any process emissions.

4.22 All maintenance activities are daytime only, during which time the major noise and emissions sources such as cooling, exhausts and boiler systems will be isolated and de-energised.

4.23 All maintenance activities are carried out in accordance to a detailed set of Risk Assessments and Method Statements (RAMS) and in line with sites ISO14001 EMS to ensure that all potential impacts are mitigated and controlled in accordance to the requirements of the sites Environmental Permit.

4.24 As a requirement of the Environmental Permit, it is stipulated that the fuel inventory is run down to a minimum and deliveries cease, thus both reducing the potential for dust releases and HGV transport impact.

4.25 Outages will require a number of maintenance vehicles and contracted personnel to be on site, but these will typically be less than 20 [light goods] vehicles per day and therefore minimal.

4.26 All maintenance activities will be carried out internally, under very controlled conditions and during daytime only. Once the maintenance activities are over, the plant will be returned to normal operation.

### **Decommissioning**

4.27 The decommissioning of the plant will take place at the end of the plants 25 year operational life.

4.28 Due to the modular design of the facility, in the event that the plant is decommissioned, it will be a controlled dismantling exercise with minimal impacts.

4.29 Under the requirements of the NRW Environmental Permit, the site is required to maintain a Site Closure Plan that details the measures that will be carried out to ensure that the site is closed and decommissioned in a controlled manner and without any adverse impact to the environment.

4.30 The Site Closure Plan needs to take into account all potentially polluting aspects and require full mitigation and prevention to be in place prior to its implementation. Given that no aspect of the Site Closure Plan can be implemented without formal sign off and approval from NRW, the impacts should be assumed to be well managed and without any adverse impact on the environment.

4.31 Post decommissioning, the facility will be a vacant plot with no potential environmental emissions.

### **Ground Conditions and Contaminated Land**

4.32 The Barry Biomass site is a brownfield site in that it has previously been utilized for dockside storage and has been allocated as an industrial employment site. The site was developed in accordance to the conditions of Planning Consent 2015/00031/OUT which stated in accordance with Condition 8:

*'...No development approved by this permission shall be commenced until a contaminated land assessment and associated remedial strategy have been submitted to and approved by the Local*

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*Planning Authority. The assessment shall contain the following elements and follow the guidance contained in 'Contaminated Land: A Guide for Developers' available from the Local Planning Authority:*

*a) A Phase I Preliminary Risk Assessment (Desk Study) to be submitted to the Local Planning Authority for approval. The desk study shall detail the history of the site uses and identify and evaluate all potential sources and impacts of land and/or groundwater contamination.*

*b) Where the preliminary risk assessment identifies potentially unacceptable risks at the site, a suitably qualified and accredited person shall carry out a site investigation, including relevant soil, soil-gas, surface and groundwater sampling in accordance with a quality assured sampling and analysis methodology. The requirements of the Local Planning Authority shall be fully established before any site surveys are commenced.*

*c) A site investigation report detailing all investigative works and sampling on site, together with the results of any analysis, risk assessment to any receptors and a proposed remediation strategy shall be submitted to the Local Planning Authority. The Local Planning Authority shall approve any such remedial works as required, prior to any remediation commencing on site. The works shall be of such a nature as to render harmless the identified contamination given the proposed end-use of the site and surrounding environment including any controlled waters...'*

4.33 All pre-commencement conditions relating to contaminated land have been fully discharged by the Vale of Glamorgan Planning team, with no outstanding issues identified.

4.34 The completed and constructed site has been designed with a fully capped concrete cover and benefits from a sealed drainage system, with all tanks served with secondary and tertiary containment, therefore the likelihood of discharges to land are low.

4.35 There are no releases to land or groundwater associated with the Installation. In addition, there are no point source releases of process effluents to controlled waters from site, as all process effluents are discharged to the Dŵr Cymru/ Welsh Water sewer system.

4.36 In addition, as part of the facility's Environmental Permit Application, it was required that the Operator provide a detailed site condition report and conceptual site model that meet the requirements of EPR Horizontal Guidance EPR H5: Site Condition Reports.

4.37 As such, the NRW have fully assessed the ground condition as part of the permit determination process and considered that both the geo-technical and environmental conditions meet with the requirements of the Guidance and that the ground conditions are considered acceptable in terms of environmental impact.

4.38 This assessment is set out by Natural Resources Wales in page 19 onwards of the Environmental Permit decision letter of 7<sup>th</sup> February 2018 (**Appendix 4.2**).

4.39 Given that the Biomass Facility has been granted an Environmental Permit and is regulated by the NRW and prior to the issuance of the permit the application was subject to three rounds of public consultation it is not proposed that the EIA duplicate this process.

4.40 As such, no significant effects in terms of ground condition and contaminated land are anticipated during the operational life of the Installation and as such the Welsh Government have confirmed that no further assessment is required within the EIA process.

### **Flood, Water Resources and Drainage**

4.41 Flood Risk, Water Resources and Drainage have been scoped out of the EIA assessment for the following reasons:

- The Barry Biomass Facility is not located in an area at risk of flooding shown on Natural Resources Wales's 'Flood Risk Assessment Wales map'.
- Drainage has similarly been scoped out because process effluent discharges to the sewer and is subsequently subject to treatment by Dwr Cymru Welsh Water. Boiler blowdown consists of demineralised water and chemicals to prevent corrosion. The water is non-hazardous, has a pH of 7 and is cooled prior to discharge.

- The site has been designed to ensure that all surfaces water discharge points are adequately protected and cannot adversely impact controlled surface or ground water. All discharges and drainage controls are regulated by NRW as part of the sites Environmental Permit.

4.42 Planning conditions 13 and 14 required the development of approved drainage details and Sustainable Urban Drainage systems and that all runoff is mitigated to green field run off rates. All drainage design has been implemented on site to the satisfaction of the Planning Authority and has been assessed by the NRW as part of the Environmental Permit. At the time of writing Condition 13 relating to the design of the surface water drainage scheme is pending discharge.

4.43 It is the consideration of both NRW<sup>17</sup> and the Welsh Government that flood risk and site discharges associated with the development are not considered to have a significant potential environmental impact and can be scoped out of the Environmental Impact Assessment.

#### **Transportation and Highways Impacts**

4.44 Transportation and highways impacts are considered to be minimal. The operational facility will require approximately 10 vehicle deliveries per day, which in the context of the operational dock area is negligible.

4.45 Vehicle deliveries are constrained to daytime only and do not take place on either Sunday or bank holiday periods.

4.46 The site Owner has submitted all necessary scheme details and associated Green Travel plans as stipulated by the approved planning consent and is awaiting formal discharge of conditions. No issues or concerns have been identified by the relevant highways and planning officers.

#### **Ecology**

4.47 The development site has been subject to numerous planning decisions including an appeal decision which involved scoping input from the Vale of Glamorgan Council's ecologist. It has been concluded by the

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<sup>17</sup> Please refer to Page 109 of Natural Resources Wales Permitting Decision Notice dated 7<sup>th</sup> February 2018.

councils ecologist that the potential presence of *Althaea hirsuta* was the only possible likely significant effect relating to onsite ecology.

4.48 All necessary ecological survey work was undertaken prior to the construction of the site to the satisfaction of the county ecologist and is considered by Welsh Government adequate to conclude there is no likely significant effect on the environment.

4.49 The ecological effects from emissions to air have been fully considered as part of the air quality assessment.

### **Socio-Economics**

4.50 The construction of the Barry Biomass Project created significant beneficial economic effects during construction in relation to employment opportunities and the purchasing of local services by construction workers.

4.51 The Barry Biomass project has a 25-year operational life, during which it will create considerable tax revenues in terms of corporation tax, business rates and income tax revenues. The Biomass Facility provides key renewable energy infrastructure that facilitates the migration to a green 'carbon-free' economy.

4.52 During operation, the plant will provide full time employment for about 20 site personnel, with an additional employment being provided for numerous site support services. Therefore, operational socio-economic effects are not significant beyond a local level. Therefore further assessment as part of this retrospective EIA is not required.

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## ENVIRONMENTAL ASSESSMENT METHODOLOGY

### Relevant EIA Guidance

4.53 The EIA process has taken into account relevant government or institute guidance, including:

- Welsh Office Circular 11/99: Environmental Impact Assessment;
- Department for Communities and Local Government (2014) Planning Practice Guidance at <http://planningguidance.planningportal.gov.uk>;
- Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;
- Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report;
- Institute of Environmental Management and Assessment (2015a) Environmental Impact Assessment: Guide to Shaping Quality Development;
- Institute of Environmental Management and Assessment (2015b) Climate Change Resilience and Adaptation;
- Institute of Environmental Management and Assessment (2016) Environmental Impact Assessment: Guide to Delivering Quality Development;
- Institute of Environmental Management and Assessment (2017) Environmental Impact Assessment: Assessing Greenhouse Gas Emissions and Evaluating their Significance; and
- Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach.

4.54 Other topic specific legislation and good practice guidance, including the Planning Policy Wales Edition 10 (December 2018) has been considered and details of these can be found in the topic chapters within this ES.

### KEY ELEMENTS OF THE GENERAL APPROACH

4.55 The assessment of each environmental topic forms a separate chapter of the ES. For each environmental topic, the following have been addressed:

- Methodology and assessment criteria;

- Description of the environmental baseline conditions;
- Measures adopted as part of the project, including mitigation and design measures that form part of the project;
- Identification of likely effects and evaluation and assessment of the significance of identified effects, taking into account any measures designed to reduce or avoid environmental effects which form part of the project;
- Identification of any further mitigation or monitoring measures envisaged to avoid, reduce and, if possible, remedy adverse effects (in addition to those measures that form part of the project); and
- Assessment of any cumulative effects with other developments planned in the area.

### **Methodology and Assessment Criteria**

4.56 Each topic chapter provides details of the methodology for baseline data collection and the approach to the assessment of effects. Each environmental topic has been considered by a specialist in that area.

4.57 Each topic chapter defines the scope of the assessment within the methodology section, together with details of the study area, desk study and survey work undertaken and the approach to the assessment of effects. The identification and evaluation of effects have been based on the information set out in Chapter 2 (Description of the Consented and 'As-Built' Development) of this ES, EIA good practice guidance documents and relevant topic-specific guidance where available.

### **Previous Welsh Government Independent Review Findings**

4.58 Each chapter of the ES seeks to not only address the identified and foreseeable emission impacts of the development, but also cross-references and addresses the findings made by the independent Environmental Statement Adequacy Report in their review of the previous Environmental Statement that have been produced in relation to this project.

### **Description of the Environmental Baseline Conditions**

4.59 The Welsh Government have agreed that in order to understand the operational impacts of the development, a baseline that more closely relates to the construction and commissioning timelines (or a close as possible) should be utilised.

4.60 The 2015/16 baseline considered appropriate in this context because as it coincides with the date of commencement of construction of the Barry Biomass Facility and therefore can be used for the purposes of a 'before and after' comparison of the impacts. Therefore 2016 is considered to be the 'baseline conditions' for the technical assessment associated with Noise, Air Quality and Human Health.

4.61 Other topics such as Greenhouse Gas Emissions and Operational Waste Management effects have used the proposed year of completion, namely 2018 as the baseline.

4.62 Each topic chapter includes a description of the both the baseline environmental conditions and post construction / operation conditions. The baseline conditions at the site and within the study area form the basis of the assessment, enabling the likely significant effects to be identified through a comparison with the baseline conditions.

4.63 The baseline for the assessment of environmental effects is primarily drawn from publicly available data and physical assessments and monitoring data carried out taken at the time of the construction in the period 2016 to 2018.

4.64 The baseline for the assessment should represent the conditions that will exist in the absence of the Biomass Facility being constructed and operated.

4.65 There have been no material changes between the time of baseline survey and completion of site construction and commencement of commissioning in 2018, that were not otherwise considered in the original assessment. The major physical changes to the local environment relate to the construction of the residential development to the west of Cory Way, which although were not present at the time of the original assessments were identified as being sensitive environmental receptors and fully assessed.

4.66 The consideration of future baseline conditions although relevant in terms of Greenhouse Gas emissions, are considered to mainly relate to Flood Risk and Water resource impacts. Given that impacts related to flood risk have been scoped out of the assessment, the use of projected changes in the UK climate projections (such as EA and Met Office data) and reference to published documents such as the UK Climate Change Risk Assessment 2017 (Committee on Climate Change, 2016) (Ref 4.1) are not considered relevant to the document.

4.67 Consideration is also given for the potential impacts of maintenance and decommissioning.

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## Limitations of the Assessment

4.68 Each topic chapter identifies any limitations identified in the available baseline data and whether there were any difficulties encountered in compiling the information required.

## Mitigation Measures Adopted as Part of the Project

4.69 This EIA is a retrospective document that has been compiled to provide the Welsh Government with information on the operational impacts of the Biomass Facility. Given that the project has been fully constructed the EIA provides information on all of the measures that have been incorporated into the design to reduce or prevent significant adverse effects arising. The assessment of effects has taken into account all 'as-installed' mitigation measures that form part of the 'As-Built' project.

4.70 The topic chapters set out the primary and secondary mitigation measures that form part of the Barry Biomass Project and that have been taken into account in the assessment of effects for that topic.

4.71 A detailed description of the facility and how it complies with the published EU Sector BREF '*Best Available Techniques – Reference*' document as defined by the European IPPC Bureau (Ref 4.2) has been provided within the Environmental Permit Application documentation and fully assessed and determined by NRW. This assessment has formed part of an extensive public consultation as part of the Environmental Permit determination process and considered to meet all legislative requirements.

## Assessment of Effects

4.72 Although the EIA Regulations require the identification of the likely significant environmental effects of the Barry Biomass development during the construction and operational phases, it has been agreed with the Welsh Government that the scope of this assessment relates to the operational phase only. The assessment is based on consideration of the likely magnitude of the impacts and the sensitivity of the affected receptor. The process by which effects have been identified and their significance evaluated is set out within each individual topic chapter. The overarching principles are set out below.

## *Sensitivity or Value of Receptors*

4.73 Receptors are defined as the physical/biological resource or user group that would be affected by a project. For each topic chapter, baseline studies have informed the identification of potential environmental receptors. Some receptors will be more sensitive to certain environmental effects than

others. The sensitivity or value of a receptor may depend, for example, on its frequency, extent of occurrence or conservation status at an international, national, regional or local level.

4.74 Sensitivity is defined within each ES topic chapter and takes into account factors including:

- Vulnerability of the receptor;
- Recoverability of the receptor; and
- Value/importance of the receptor.

4.75 Sensitivity is generally described using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

4.76 In some cases, a further category of very high can be used.

### ***Magnitude of Impact***

4.77 Impacts are defined as the physical changes to the environment attributable to the operation of the development. For each topic, the likely environmental impacts have been identified. For each topic the likely environmental change arising from the operation of the project has been identified and compared with the baseline (the situation without the project).

4.78 The categorisation of the magnitude of impact is topic-specific but generally takes into account factors such as:

- Extent;
- Duration;
- Frequency; and
- Reversibility.

4.79 With respect to the duration of impacts, the following has been used as a guide within this assessment, unless defined separately within the topic assessments:

- Short term: A period of months, up to one year;
- Medium term: A period of more than one year, up to five years; and
- Long term: A period of greater than five years.

4.80 The magnitude of an impact has generally been defined using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

4.81 In some cases, a further category of 'no change' has been used.

### ***Significance of Effects***

4.82 Effect is the term used to express the consequence of an impact (expressed as the 'significance of effect'). This is identified by considering the magnitude of the impact and the sensitivity or value of the receptor.

4.83 The magnitude of an impact does not directly translate into significance of effect. For example, a significant effect may arise as a result of a relatively modest impact on a resource of national value, or a large impact on a resource of local value. In broad terms, therefore, the significance of the effect can depend on both the impact magnitude and the sensitivity or importance of the receptor.

4.84 Significance levels are defined separately for each topic. Unless separately defined in topic chapters, assessments take into account relevant topic specific guidance, based on the following scale and guidance:

- Substantial: Only adverse effects are normally assigned this level of significance. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity;

- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process;
- Moderate: These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor;
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important considerations for the design of the project; and
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

4.85 The terms minor, moderate, major and substantial apply to either beneficial or adverse effects. Effects may also be categorised as: direct or indirect; secondary; short, medium or long term; and permanent or temporary, as appropriate.

4.86 Each topic defines the approach taken to the assessment of significance. Unless set out otherwise within the chapter, topic chapters use the general approach set out in Table 4.12. For some topics, a simplified or quantitative approach is considered appropriate.

Table 4.12 Assessment Matrix					
	Magnitude				
Sensitivity	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very High	No change	Minor	Moderate or Major	Major or Substantial	Substantial

4.87 Unless set out otherwise in each topic chapter, effects assessed as moderate or above are considered to be significant in terms of the EIA Regulations within this assessment.

### **Further Mitigation and Future Monitoring**

4.88 Should further mitigation measures than those already incorporated into the design of the 'As-Built' development to further prevent, reduce and, where possible, offset any adverse effects on the environment these have been identified within topic chapters<sup>18</sup>, noting however that that this ES has not identified any harm that has not already been fully assessed and quantified within the previous technical evaluations.

4.89 Where relevant and necessary, on-going monitoring measures have been set out within the topic chapters.

### **Assessment of Cumulative Effects**

4.90 The EIA Regulations require consideration of cumulative effects, which are effects on a receptor that may arise when the project is considered together with other proposed developments in the area.

4.91 The cumulative effects of the project in conjunction with other proposed schemes have been considered within each topic chapter of the ES. Other developments that have been considered within the cumulative assessment include those that are:

- Under construction; and
- Consented, but not yet implemented.

4.92 It is noted that developments that are built and operational at the time of the baseline assessment have been considered to be part of the existing baseline conditions.

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<sup>18</sup> No such further measures have been identified as a result of this ES.

## Inter-relationships

4.93 Where appropriate each topic chapter considers whether or not there are any inter-related effects with other topics included within the EIA that have not already been considered in order to identify any secondary, cumulative or synergistic effects.

## Summary Tables

4.94 Summary tables have been used to summarise the effects of the project for each environmental topic.

## CONSULTATION

4.95 The Barry Biomass Facility has been subject to very significant public consultation as part of the both the Planning and Environmental Permitting processes. As this is retrospective EIA, further public consultation which communicate the findings of this ES will be carried out by the Welsh Government as deemed necessary.

### Planning Pre-Application Consultation (2015)

4.96 A summary of the Planning Consultation and key concerns raised has been provided below:

- Pre-Application EIA Screening exercise carried out in 2015, where the development was screened as not being an EIA development. Noting that both Welsh Government and VoG Council did not object to<sup>19</sup>;
- Barry Town Council: Consulted on 16 February 2015. Made objections relating to the stack height, proximity to the residential properties and transport congestion impacts;
- Environmental Health (Pollution): Consulted on 16 February 2015. No objections made – but recommended conditions relating to quality control on the source material, requirements for Construction Environmental Management Plans, and on-site lighting,

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<sup>19</sup> Of note, at the time of the 2015 Application the Welsh Government refused to entertain a request from objectors to issue a Screening Direction to screen the development as requiring an EIA.

- Cardiff Airport (Safeguarding): Consulted on 16 February 2015. No objections made.
- Glamorgan Gwent Archaeological Trust: Consulted on 16 February 2015. No objections made.
- Policy Section (Planning): Consulted on 16 February 2015. No principle objection to the proposed development, subject to the proposal being considered acceptable under Policies ENV6, ENV27, ENV29, TRAN11, COMM8 and WAST 1 & 2.
- Local ward members: Consulted on 16 February 2015. No objections or formal comments submitted.
- Dwr Cymru Welsh Water: Consulted on 16 February 2015. No objections or comments made.
- Internal Council Consultation (Council's Ecology Officer, Waste Management team, Finance, ICT and Estates, Energy Manager): Consulted on 16 February 2015. No comments or comments made.
- Highways and Engineering: Consulted on 16 February 2015. No objection to the proposed development subject to conditions on visibility splays, parking provision and cycle provision within the site.
- Natural Resources Wales: Consulted on 16 February 2015 and 6th May 2015. Following the submission of the Air Quality Assessment (AQA). No objections made<sup>20</sup>.
- Public Health Wales: Consulted on 16 February 2015 and 6 May 2015. No objections made, however some initial concerns identified<sup>21</sup>.

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<sup>20</sup> NRW initially objected to the proposed development outlining that insufficient information had been submitted for the matter to be properly considered and that an updated AQA would be required. NRW outlined that the proposed development lies within close proximity to the Severn Estuary (designated as a Special Area of Conservation (SAC) Special Protection Area (SPA) and RAMSAR site and is also within proximity of Hayes Point to Bendrick Rock (SSSI) and Barry Island (SSSI) and as such advised that a further assessment of aerial emissions should be undertaken. This was to ensure the principle of development at this location could be acceptable.

<sup>21</sup> Public Health Wales stated that there is limited potential for risk to public health from the proposed process itself, but raised concerns relating to previous permissions for similar uses in the vicinity (i.e. wood pellet plant Dow corning and residual waste gasification plant approved in Atlantic way) and the impacts on the multi storey residential properties which have permission to the west of the site. However, at the time of consenting, gasification plant at Atlantic Way (2009/00021/FUL) had expired, and the application for a wood chip gasification plan in Dow Corning (2014/00610/FUL) had been withdrawn. Hence these concerns were unfounded.

- Health and Safety Executive: Consulted on 16 February 2015. No objections or comments received.
- Associated British Ports: Consulted on 16 February 2015. No comments.
- Local Representations: Consulted on 16<sup>th</sup> February 2015. Considerable representations (>104 letters / emails) objections made on grounds of potential environmental impacts, amenity, transport and health issues.
- Post Submission Consultation: A final post submission consultation was carried out by Vale of Glamorgan which considered all responses within its committee report.

#### **Additional Public Consultation Activities**

4.97 Natural Resources Wales carried out extensive consultation on the consented scheme as part of the Environmental Permitting application. The consultation process was entirely independent of the planning process and was completed in accordance with the Environmental Permitting Regulations 2016 ('EPR'), the Industrial Emissions Directive ('IED'), NRW's statutory Public Participation Statement ('PPS') and NRW Regulatory Guidance Note RGN 6 for Determinations involving Sites of High Public Interest.

4.98 In determining the Permitting Application, the NRW carried out a separate Environmental Impact Assessment of the operation effects of the Barry Biomass Facility in relation to the air, noise, dust, odour, greenhouse gas and waste management impacts of the scheme.

4.99 The NRW consultation exercise also considered their obligations under the Public Participation Directive ('PPD') (Ref 4.3) and publicly advertised the receipt of the Application providing all the information required by the EPR and IED, including notification of the times and locations where the Application could be viewed.

4.100 The first phase of NRW consultation ran for 4 weeks from 5<sup>th</sup> December 2016 to 2<sup>nd</sup> January 2017, with full electronic copies of the Application being placed on the Public Register.

4.101 In addition, NRW provided copies of the EPR Permit Application documents to the following bodies, all of which whose expertise, democratic accountability and/or local knowledge make it appropriate for the NRW to seek their views directly.

- 
- Vale of Glamorgan Council (Environmental Protection Department);
  - Vale of Glamorgan Council (Planning Department);
  - Cardiff and Vale University Health Board;
  - Food Standards Agency;
  - Public Health Wales;
  - South Wales Fire and Rescue Service;
  - Dŵr Cymru Welsh Water; and
  - Health and Safety Executive.

4.102 The NRW ran a second phase of consultation for 12 weeks from the 21<sup>st</sup> February 2017 to 8<sup>th</sup> May 2017. In addition to the measures put in place for the first phase consultation, the NRW also arranged for paper copies of the Application to be made available for public viewing at the following locations:

- Natural Resources Wales, Cambria House, 29 Newport Road, Cardiff, CF24 0TP;
- Natural Resources Wales, Rivers House, St. Mellons Business Park, St. Mellons, Cardiff, CF3 0EY;
- Barry Library, The County Library, King Square, Barry, Vale of Glamorgan, CF63 4RW; and
- Barry Town Council, 7 Gladstone Road, Barry, Vale of Glamorgan, CF62 8NA.

4.103 On 31<sup>st</sup> July 2017, the NRW opened a supplementary third phase consultation on further information that was provided as a result of Schedule 5 questions that were made in response to the previous consultation processes. All information relating to these responses was made available to the members of public as described above and was made available for download from the NRW website.

4.104 The third phase consultation ran for 6 weeks and closed on 10<sup>th</sup> September 2017.

4.105 Copies of the further information was also provided directly to the following bodies:

- Vale of Glamorgan Council (Environmental Protection Department);
- Public Health Wales; and
- South Wales Fire and Rescue Service.

4.106 On 27<sup>th</sup> November 2017, the NRW issued a '*mindful to grant*' decision accompanied by a draft permit for a fourth period of consultation. That fourth phase consultation ran for eight weeks and closed on 22<sup>nd</sup> January 2018.

4.107 In total, the NRW ran four phases of consultation over a period beginning on 5<sup>th</sup> December 2016 and ending on 22<sup>nd</sup> January 2018. The consultation phases provided a total of 29 weeks for interested parties to prepare and participate effectively in this decision process.

4.108 A summary of all consultation comments and the related responses to the representations has been provided by NRW in Annex 4 of the permitting decision notice. NRW have stated that they have taken all relevant representations into consideration in reaching their final determination.

4.109 The EPR Permit (EPR/AB3790ZB) was formally determined, granted and issued on 07/02/2018 on that basis that all impacts have been deemed acceptable and that the Operator has demonstrated that the Barry Biomass Facility meets the published definition of Best Available Techniques.

4.110 In summary, it can be clearly demonstrated that during all stages of the planning and permitting determination processes extensive and extended public and statutory consultation has been carried out and that in all cases considerable opportunity has been provided for both the public and statutory consultees evaluate the submission and make representations upon the environmental information provided in support of the development.

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## REFERENCES

**Ref 4.1:** [UK Climate Change Risk Assessment 2017 - GOV.UK \(www.gov.uk\)](http://www.gov.uk)

**Ref 4.2:** Commission Implementing Decision (EU) 2019/2010 of 12 November 2019 establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for waste incineration (notified under document C(2019) 7987)

**Ref 4.3:** Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC.

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## 5 LANDSCAPE AND VISUAL IMPACTS

### INTRODUCTION

5.1 This chapter forms the Landscape and Visual Impact Assessment (LVIA) of the Environmental Statement prepared at the request of the Welsh Government (WAG) in response to public concerns regarding the operational impacts of the Biomass Facility. Accordingly, this LVIA assessed the landscape and visual effects of the ‘as-constructed’<sup>22</sup> and consented Biomass Facility on David Davies Road, Barry (the ‘Site’).

5.2 The Biomass Facility is centred on National Grid Reference (NGR) ST 125677, (E) 312594, (N) 167714 and is in the administrative boundary of the Vale of Glamorgan Council (VGC). Chapter 2 of the ES provides a detailed description of the development and details the location and character of the Site.

### Scope of the Assessment and Consultation

5.3 The scope of the assessment includes all constructed elements of the entire operational facility in accordance with the ‘As-Built’ Site Layout Plan (**Appendix 5.1**), noting that a number of these elements are in addition to the extant permission or form part of the District Network Operator (Western Power Distribution) transmission assets.

5.4 A Scoping Request document, detailing the methodology and approach to be adopted in the preparation of the Landscape and Visual Impact Assessment was issued to the Welsh Government on 22<sup>nd</sup> January 2021, a copy of which is contained at **Appendix 5.2**. The methodology was formally agreed by Welsh Government during March 2021 a copy of which is also provided as part of **Appendix 4.1**.

5.5 The terminology used, and approach to the assessment of effects are set out in **Appendix 5.2**. **Appendix 5.3** contains the bibliography.

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<sup>22</sup> Construction completed 2016

### Identified Welsh Government Concerns

5.6 Table 5.1A below identifies the concerns that were raised regarding the previous ES's produced for the Site and provides information on how these issues have been considered within this ES chapter.

Table 5.1A: Previous ES Concerns	
Concern Identified	Consideration
<i>2010 ES</i>	
Description of baseline visibility of site appears to relate to the ground level only and as such dismisses some potential key views for later assessment.	This has been addressed through consideration in this LVIA of numerous potential key views
Landmap reference limited - more discussion on townscape character would be expected.	Considerable discussion has been included regarding townscape character in this LVIA
Zone of Visual Influence - no methodology given as to how this was constructed and what it was based upon. Not clear if it is based on the site, building height or stack height.	Methodologies have been clearly defined within this LVIA
Methodology - references views rather than visual receptors which may reflect older guidance and date of assessment.	This LVIA has been undertaken in line with the relevant and most recent guidance
Negligible visual impacts assessed could be argued to be too low, in accordance with their own methodology "minor adverse" would be more appropriate.	Impacts have been assessed for the 'As-Built' development in accordance with updated guidance and methodology
Making a combined judgement on landscape and visual impact is not appropriate and the 'major beneficial' judgement is at odds with their methodology.	Judgement has been made separately for landscape and visual receptors in accordance with the updated guidance and methodology
General comment: No mention of consultation with Regulators or how the study area was defined in the chapter.	Consultation with Welsh Government was undertaken via Scoping Request document in 2021 to formally agree the scope and methodology for the assessment
General comment: Limited detail in methodology and approach. No clear methodology defined in establishing landscape or visual receptor sensitivity, or magnitude of change - which were defined by GLVIA2. Confusion over viewpoints and visual receptors.	The methodology has been detailed and is in accordance with updated guidance GLVIA3.

**Table 5.1A: Previous ES Concerns**

Concern Identified	Consideration
<i>2019 ES</i>	
<p>The 2019 document does not constitute a LVIA - it is a reconfiguration to account for the 2015 assessment which did not include an updated LVIA and refers to the 2010 LVIA. This is deemed inadequate for the modified proposals and would not conform to current best practice LVIA guidance.</p>	<p>This assessment constitutes an LVIA which is based on the 'As-Built' development and conforms to the current best practice LVIA guidance – GLVIA3. The approach and scope has been formally agreed by the Welsh Government during scoping.</p>
<p>General comment: 'No direct comparison given to the change of the modified proposal from the consented scheme which is the most important aspect. Attention is wrongly diverted to the comparison with the BioGen consented (but lapsed) proposal which should have no bearing on an LVIA in 2019.'</p>	<p>This assessment has considered only the 'as-built' development and as such does not refer to previously consented schemes as a means of comparing them. Reference is made to these for specific reasons as stated in the chapter.</p>
<p>General comment: 'This document constantly refers to the proposed development changes as having an 'average building height' of 16.3m across three buildings instead of the actual building heights which for a LVIA is a critical part of the assessment. This has clearly been used to more closely relate to the 14m height of the original planning permission which inaccurately infers a minimal change.</p>	<p>This LVIA has considered the 'As-Built' development individual building components and heights rather than an average.</p>
<p>This states that the landscape and visual baseline conditions remain accurate at the time of the 2015 application. However, the 2015 application did not update the 2010 Proof of Evidence and LVIA, and a major change is that the BioGen development's planning consent has lapsed.</p>	<p>By the very nature of an 'As-Built' assessment the LVIA does not illustrate or describe the baseline situation prior to the implementation of the development.</p>
<p>'Use of the same 2015 VIA reference to the 2010 Inspector's notes that the site lies within an industrial area and mis-uses this statement <i>'looking down from Dock View Road the new building would be seen in the context of the development within the Docks and , in my view, would sit comfortably in its industrial surroundings.'</i> This relates to a much smaller development and not the modified proposals.</p>	<p>This comment is not relevant to the updated LVIA.</p>

**Table 5.1A: Previous ES Concerns**

Concern Identified	Consideration
<p>A comparison provided of this modified facility with the now lapsed BioGen Project. At no point is discussion given as to how this relates to the modified proposals and why it's presence or now lack of presence would affect the landscape and visual impacts of the modified facility</p>	<p>This LVIA does not provide a comparative analysis between the 'As-Built' scheme and previous iterations (consented or otherwise). The assessment relates to the effects of the 'As-Built' development on the landscape and visual context.</p>
<p>No evidence is provided to support the following statement and "negligible" is an underestimate of effect:  <i>'The 2015 Application shares the majority of it's characteristics with the approved 2010 permission, and the changes in dimensions to the plant did not fundamentally alter the way in which the development would interact with the landscape and the views to which the plant would be subject during the construction stage. The conclusions about the landscape therefore remained valid, and as such the impacts of the construction phase on Visual Amenity and Landscape Character remained Negligible.'</i></p>	<p>This LVIA does not provide a comparative analysis between the 'As-Built' scheme and previous iterations (consented or otherwise). The assessment relates to the effects of the 'As-Built' development on the landscape and visual context.</p> <p>Conclusions drawn from this assessment are independent of the previous ES's.</p>
<p><i>The 2015 Application proposed changes to the elevations, layout, stack position and height. It remained the case that the principal views were available from Dock View Road and Dyfrig Road and that these views would be available in the context of the industrial setting.'</i> No evidence provided in the 2015 Application to justify that these were the only key views with the modified proposals</p>	<p>This LVIA has considered a number of additional key views in the assessment, all of which relate to the 'As-Built' development.</p>
<p><i>'The rearranged structures in terms of elevation and layout continued to have a comparable impact upon the landscape and available views and from Dock View Road would barely break the skyline, if at all.'</i> No evidence provided in the 2015 Application to justify this statement.</p>	<p>This LVIA has assessed key views and significance of impact independently from previous ES's and justification of conclusions has been provided.</p>
<p>Reference is made to the principal changes being the stack, but no mention of the two +20m high buildings. The stack or change in mass/height was not explicitly considered in the 2015 VIA and no justification given to the findings presented.</p>	<p>This LVIA does not provide a comparative analysis between the 'As-Built' scheme and previous iterations (consented or otherwise). The assessment relates to the</p>

**Table 5.1A: Previous ES Concerns**

Concern Identified	Consideration
<p>Comparison provided with the now lapsed BioGen Project to state that both projects were directly comparable and would have a similar visual impact and 'de facto, viewed as acceptable by VoGC in the context of the available views. No evidence provided in the 2015 Application or this chapter to justify this reasoning.</p>	<p>effects of the 'As-Built' development on the landscape and visual context.</p>
<p><i>'It is considered therefore that these conclusions remained valid notwithstanding the change in elevations, stack and layout associated with the 2015 Application and that as such the impact of the operational phase on Visual Amenity and Landscape Character would be Negligible'.</i></p> <p>No evidence to support this is provided to consider 'negligible' is justified. .</p>	<p>Conclusions drawn from this assessment are independent of the previous ES's and justification has been provided.</p>
<p>General comment: 'There were no accompanying photomontages or wirelines of the modified proposals presented or referred to within the LVIA (only a reprint of BioGen Proposal montages and comparison section).</p>	<p>Professional photography has been included within this LVIA and accordance with the published guidance.</p>

## Methodology

5.7 This chapter has been written on the basis that the primary audience will be the Welsh Government and Vale of Glamorgan and the statutory and non-statutory consultees where appropriate. It is therefore assumed that the publicly available and published documents referred to within this LVIA, such as the landscape character assessments, will be familiar and available to the reader. Footnotes have been provided where required to assist.

5.8 A site visit was conducted by the assessor in December 2020 and a photographer visited the viewpoints on the 10<sup>th</sup> February 2021 (including overnight) to take the daytime and night-time images which are included within this assessment.

5.9 The extent of the Study Area is described in the Scoping Request (**Appendix 5.2**). The extent of the Study Area is appropriate and proportional to the scale of the project, the area which falls within its influence (character and visual) and nature of effects.

5.10 This LVIA considers the inter-related but distinct issues of the effects on the landscape, its character and resources and the visual amenity of people and provides a subjective and impartial assessment on the impacts and appropriateness of the development in its location and setting.

### ***Baseline Analysis***

5.11 The starting point of the process is to understand the ‘Established Context’ in respect of the landscape and visual environment against which any changes are assessed. The consideration of the established context is made in the absence of pre-construction baseline analysis by the assessor. The contextual analysis considers the physical and perceptual aspect of the landscape and the value attached to it, and the views from where the changes are visible, and the people affected.

5.12 The description of the established context has been derived from:

- A review of published material, particularly in respect of Landscape Character Assessments (See **Appendix 5.3: Bibliography**);
- Consideration of the planning policy context;
- Zone of Theoretical Visibility Mapping;
- Review of historic maps and images available online in respect of Barry and Barry Docks;
- Consideration of maps (plan and digital) and aerial photography; and
- Observations made in the field.

5.13 The viewpoints which form the basis of the visual analysis in this assessment have been determined by reference to the mapping shown on the Zone of Theoretical Visibility (**Appendix 5.2**) and subsequently verified in the field. Sample images were taken during the site visit to assist the Scoping Request consultation. The professional photography contained in this chapter is in accordance with the published guidance.

### ***Sensitivity of Resources and Receptor***

5.14 Having determined the established context, against which the effects of the Biomass Facility is measured, the sensitivity of the landscape and visual resources to the change is considered and classified. This considers the value of the resource and the susceptibility to accommodate the proposed changes.

Consideration of the Development

5.15 The assessment process then considers the **Development Inherent Mitigation Measures** so that the magnitude of the change can be described and assigned.

5.16 Throughout the assessment a subjective judgement, underpinned by an informed professional judgement and experience, is made on where the sensitivity of receptors or magnitude of changes lies on a spectrum from low to high. This is set out in the Scoping Request provided to the Welsh Government (**Appendix 5.2**).

5.17 The narrative which supports the conclusion drawn is provided to explain the rationale of the assessor.

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## ***Assessment of Effects***

5.18 The **Assessment of Effects** is a function of the sensitivity of each receptor and the magnitude change which has occurred. It is important to acknowledge that GLVIA, paragraph 3.33, (Ref 5.1) recognises that it is not essential to establish a series of thresholds of different levels of significance. The simple point is to make clear judgements as to whether the effects are significant or not significant. Notably the word ‘harm’ is not contained in the GLVIA, any judgements on ‘harm’ are planning judgements and would be addressed in the appropriate forum.

## **Context to this Assessment**

### ***Planning Context***

5.19 The GLVIA 3 (Ref 5.1) does not require that an assessment of planning policies be a component of the LVIA process. The assessment of landscape and visual effects is prepared independent of the planning considerations which are made on the basis of merit, compliance and balance by the determining authority. However, it is recognised that designations and policies may provide an indication of ‘value’ of landscape and visual assets.

5.20 In this context a review of the local landscape and townscape designations has not identified any ‘valued’ or protected sites within the Study Area.

5.21 The site is located within an area designed as Existing Employment Site (Policy MD 16), there is no landscape or visual component to this location specific policy.

5.22 Policy SP10 applies to the plan area and relates to the Built and Natural Environment. In this policy:

*“Development proposals must preserve and where appropriate enhance the rich and diverse built and natural environment and heritage of the Vale of Glamorgan including:*

- 1. The architectural and / or historic qualities of buildings or conservation areas, including locally listed buildings;*
- 2. Historic landscapes, parks and gardens;*
- 3. Special landscape areas;*

4. *The Glamorgan Heritage Coast;*
5. *Sites designated for their local, national and European nature conservation importance; and*
6. *Important archaeological and geological features.”*

5.23 The site is not part of, or intrinsically linked to any of the listed landscapes.

### ***Planning History***

5.24 The Biomass Facility has been the subject of a complex planning and assessment history. Previous scheme proposals have been the subject of a number of planning applications and a planning inquiry. Landscape and Visual Impact Assessments were prepared in respect of the various scheme iterations, these being:

- December 2009, Landscape and Visual Impact Assessment prepared by The Appleton Group as a component of the appellant’s landscape evidence to the planning inquiry [APP/Z6950/A/09/2114605<sup>23</sup>];
- January 2015<sup>24</sup>, Visual Impact Analysis prepared by UK Power Partners, which relied on the 2009 LVIA; and
- August 2019, Landscape and Visual Impact Assessment (Chapter 5 of the Environmental Statement) which formed part of a voluntary EIA prepared for the Welsh Government in association with a now withdrawn 2017 S73 application<sup>25</sup>, drew on the previously prepared Appleton Group LVIA and contained comparative analysis with the Atlantic Way Power Plant, for which the planning consent has expired.

5.25 In relation to the 2019 voluntary EIA, the Welsh Government commissioned WSP to prepare an Environmental Statement Adequacy Report in November 2019. In respect of the 2009 LVIA, the overall conclusion was that the assessment fell in the category of *“Potential for significant data gaps or inadequate mitigation, control measures can be corrected without full re-assessment.”* In respect of the 2019 LVIA the conclusions reached were classified as *“A full EIA is needed, significant gaps identified in the assessment.”*

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<sup>23</sup> Planning Application 2008/01203/FUL established the principle of development.

<sup>24</sup> Amendments to the original consent, Planning Application 2015/00031/OUT consent granted.

<sup>25</sup> The s73 Application was made by UK Power Development Partners in 2017 in an attempt to regularise the planning consent to incorporate the water tanks and ancillary buildings on site.

5.26 As a result of the WSP conclusions and discussions between the Owner and the Welsh Government it was agreed that the scope of the new EIA would be limited the technical issues listed above. Leyton Place Limited was instructed to provide a full Landscape and Visual Impact Assessment to address the criticisms made by WSP, and to provide a robust evidential basis for the determination of the 'as built' scheme of development.

5.27 This LVIA does not provide a comparative analysis between the 'as built' scheme and previous iterations (consented or otherwise). The assessment relates to the effects of the 'as built' development on the landscape and visual context.

5.28 Cumulative landscape and visual effects do not form a component of this chapter on the following basis:

- There are no other schemes with planning consent within the Study Area;
- There are no other projects, the subject of a valid planning application, yet to be determined; and
- The Biomass Facility has already been constructed, so therefore any 'new' projects will need to assess their own cumulative effects with other projects. As such, the Barry Biomass Facility will form part of the baseline analysis for those new projects.

#### **Credentials of assessor <sup>26</sup>**

5.29 This LVIA has been prepared by a Fellow of the Landscape Institute (FLI) with more than 30 years professional experience in the field of landscape planning. The assessor has a BSc (Hons) degree in Landscape Management from the University of Reading, a Post Graduate diploma in Landscape Architecture and achieved chartered status with the LI in 1991.

5.30 The assessor has prepared more than 100 LVIA's both as standalone reports and Chapters in Environmental Statements (ES) in her career and has appeared at more than 70 planning inquiries as an expert witness on Landscape and Visual matters. Her approach to assessing landscape and visual effects has been subject to scrutiny by her peers and the planning inspectorate.

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<sup>26</sup> As required under the EIA Regs 2017

5.31 A final draft of the LVIA was the subject of a peer review, in line with LI Technical Guidance Note 1/20<sup>27</sup>, by a Chartered Member of the Landscape Institute (CMLI). The Peer Review is contained in **Appendix 5.4**. Following the peer review all identified matters have been addressed as required.

### Deficiencies/Omissions

- By the very nature of an ‘as built’ assessment the LVIA does not illustrate or describe the baseline situation prior to the implementation of the development, there are no ‘before’ photographs;
- The LVIA does not consider those elements set out in Chapter 4 of the GLVIA 3 relating to the assessment of the baseline situation and the iterative design development process. If any further mitigation measures, capable of being accommodated within the ‘as built’ envelope, are recommended these are set out in Section 4 of this LVIA;
- We agreed with the Welsh Government, this chapter does not assess the Construction phase, as the development has been implemented and is operation; and
- Apart from the site itself, no access to private land or property was obtained during the assessment.
- This LVIA does not consider the implications of Decommissioning, noting that the project is a minimum of 25 years and will take a period of 2-3 years.

5.32 This Landscape and Visual Impact Assessment is structured as follows:

- Section 1: Introduction and Scope;
- Section 2: Established Context;
- Section 3: Evaluation of Resources and Receptors;
- Section 4: Design Evolution and Mitigation Measures;
- Section 5: Assessment of Effects;
- Section 6: Policy Considerations; and
- Section 7: Summary.

5.33 Within Section 6 consideration is given to the relevant landscape planning policies and the degree to which the proposals comply with the policy objectives.

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<sup>27</sup> Reviewing Landscape and Visual Impact Assessments (LVIAs) and Landscape and Visual Appraisal (LVAs), 10 Jan 2020

## ESTABLISHED CONTEXT

5.34 The UK has signed and ratified the European Landscape Convention (ELA) since 2002<sup>28</sup>. This convention provides several definitions which assist with understanding 'landscape'.

*'Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.'*

5.35 This definition applies to urban and peri urban landscape, towns, villages, and rural area. It applies to ordinary or degraded landscape as well as those which are protected. This interpretation is embedded in the GVIA 3 (paragraph 2.3). This chapter uses landscape as the overarching term, although 'townscape' is used where it assists the reader in appreciating the context.

5.36 This assessment recognises that landscape and visual effects need to be considered separately, however the character of the landscape has aesthetic aspects which are experienced visually. Where relevant these are set out in this section.

## Landscape Character

5.37 Landscape Characterisation is the process whereby areas are identified and classified into distinct, recognisable and consistent patterns of elements and features. This is a value-free process and does not provide for comparison of areas being 'better' than others. The determination of 'value' primarily comes through the process of determining and applying designations, policies, or local expressions of value.

5.38 In respect of the Site and the Study Area the built environment dominates. To the south and south east the marine environment of the River Severn Estuary dominates the character. The Site is distinctly part of, and associated with, the built environment. Whilst the Site is set back and perceived as being separate from the River Severn the historic and functional relationship of the land and water are important in appreciating the establishment, growth, and evolution of Barry.

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<sup>28</sup> Although the UK has left the EU the definitions are still valid and relevant to the LVIA process.

### ***Published Character Assessments***

5.39 LANDMAP is the formally adopted methodology for landscape assessment and is advocated by PPW10 and is promoted by Natural Resources Wales (NRW). It is a “whole” landscape approach that covers all landscapes, designated and non-designated in Wales.

5.40 LANDMAP separates each character area into nationally consistent data sets into the following five categories (Aspects):

- Geological Landscape;
- Landscape Habitats;
- Visual and Sensory Landscape;
- Historic Landscape; and
- Cultural Landscape.

5.41 Each category is provided with an evaluation level as follows:

<b>Outstanding</b>	Of international or national importance
<b>High</b>	Of regional or county importance to the aspect
<b>Moderate</b>	Of local importance to the aspect
<b>Low</b>	Of little or no importance to the aspect
<b>Unknown</b>	Insufficient information exists to evaluate the area

5.42 Within the National Landscape Characterisation, the Site falls within the area classified as Cardiff, Barry, and Newport (NLAC35)<sup>29</sup>. This area is acknowledged to be one of the most urbanised and busy landscape character areas in Wales.

5.43 Within the Study Area, validated by the fieldwork, the LANDMAP aspect areas of relevance to this project are Barry Area and Barry Docks Area.

<sup>29</sup> This is located in the South-Central Wales landscape

5.44 The summary description of the area is recorded as:

*“The area of Barry is urban Set on an undulating to hilly landform with a large flat coastal plain and Barry Island, it is the largest town in the Vale. The highest point in Barry is approximately 90m AOD near the north west section of the town. The lowest point is approximately 5m AOD next to the Bristol Channel. Barry has a Victorian core of 4 to 5 storey brick buildings with stone detailing around walls and doors. Whilst the buildings at the core have remained mostly intact these have been modified over the years with signage etc. A new shopping village has been built near to the existing shopping centre. Designed as buildings surrounded by parking, rather than as perimeter blocks, this shopping village has altered the structure and grain of the town.*

*The inner core is also made up of Victorian terrace houses many of which have been inappropriately renovated. The outer suburbs of Barry are made up of a mixture of building styles from 1920's to 1970's housing. Some close to the coast such as round the Knap are attractive. Many outer areas have a discordant appearance.*

*Part of Barry's edge to the east has been developed with hypermarkets, McDonald's outlets and cinemas as well as major industrial complexes. This presents a poor-quality entry to the town and lacks any distinctive character of place. The A4231 acts as a boundary to the east and the A4226 does to an extent to the north although this has been bridged by housing and commercial development. The Docks area from a natural visual focus for the main part of the town.*

*The Docks still functions to an extent while other parts are being redeveloped but the area appears open at present. Barry Island, once a major tourist destination, is now lower key with a promenade and housing on the sensitive peninsula replacing the Butlins Camp.*

*Overall, the town is very difficult to find one's way around due to the confusing road pattern and lack of coherent urban structure. Change detection 2014: considerable on-going redevelopment of Docks area.”*

5.45 In terms of the evaluation of the landscape the following table summaries the conclusions reached in LANDMAP:

**Table 5.2 Summary of Overall Evaluation of Aspect Areas**

Aspect Area	Classification	Value	Condition	Overall Evaluation
<b>Visual and Sensory</b>				
Barry	Level 1: Development, Level 2: Built Land, Level 3: Urban	Low	Fair	Low
Barry Docks	Level 1: Water, Level 2: Inland Water, Level 3: Lake	Moderate	Poor	Moderate
<b>Geological Landscape</b>				
Barry Docks- Cog Moors	Levels 1 & 2 Man- Made, Level 3 Engineered features and reclaimed/infilled land	Low	Poor	Low
<b>Landscape Habitats</b>				
Vale of Glamorgan	Level 1: Dry (relatively) terrestrial habitats, Level 2: Built Up Areas, Level 3: Residential/Green Space	Low	Unassessed	Low

5.46 In respect of the Cultural Landscape Services layer the notable conclusions are that Barry Docks have a moderate scenic quality; high character with a strong sense of place evaluation; whereas Barry has a moderate sense of place, low scenic quality and is of moderate character.

5.47 The relevant data sets are included in **Appendix 5.5**, with full data and records on the website (see Bibliography).

Field Observations and Local Scale Analysis

5.48 Barry has two distinct components supported by the LANDMAP analysis, one being the residential and retail ‘seaside’ townscape and the other being the Docks. The Docks comprise the land, development,

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and inland water which collectively (extending to the east and west of the port entrance) have been key to the growth of Barry since its original function as a coal port.

5.49 Figure 5.1 of **Appendix 5.5** and repeated below illustrates the locally identified character areas within the Study Area which form the context to the Site. The following is a summary of the key qualities of each area, drawing on LANDMAP and observations made in the field.

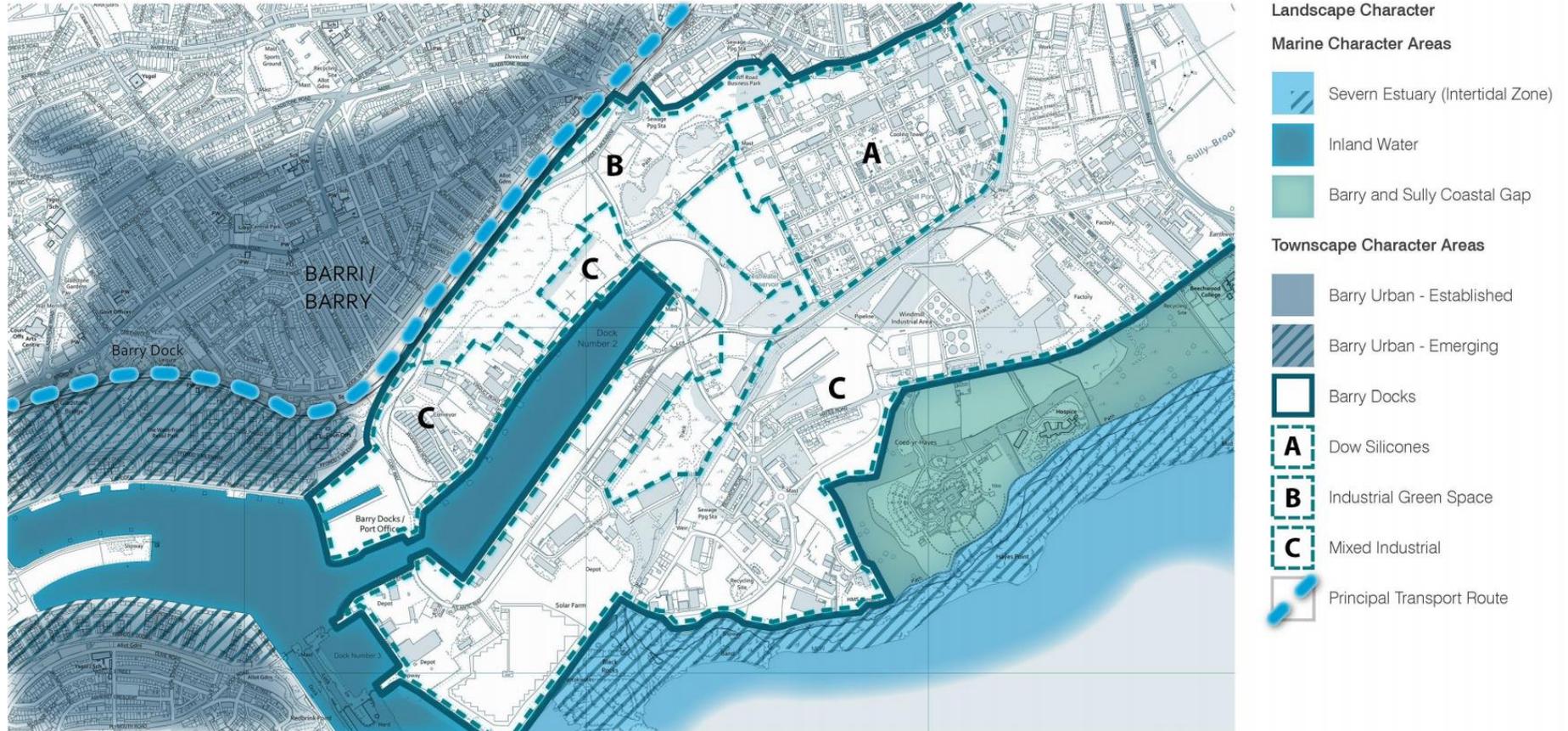


Figure 5.1: Locally Identified Landscape Character

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## Marine Character Areas

### Severn Estuary

5.50 An open seascape with strong intervisibility with the Somerset Coastline, extensive rocky inter tidal area. A historic and long-standing strategic role in trade and maritime navigation, functional relationship with Barry Docks. Barry is a long-established pilot station for the estuary and Bristol Channel. Barry remains a focus for shipping movements and the harbour provides temporary refuge in adverse weather conditions.

5.51 The water is a component of the visual composition for much of the outlook from Barry, this is considered in more detail in the next section.

### Inland Water

5.52 An engineered and man-made feature first opened in 1889, The Docks, formed around the created inland water, are an important feature to the identity and heritage of Barry. The form and qualities of the inland water are hard edged, simple in grain and texture and open, contrasting with the enclosing features which house the associated activities. The water has reflective qualities which add to the visual dynamic of the environment.

### Barry and Sully Coastal Gap

5.53 An area of land which marks the transition between the Docks, the estuary and Sully. In contrast to the urbanised landscape this area is primarily pastoral in character with notable vegetation. A sense of relative tranquillity resulting from the relatively undeveloped character, with limited intervisibility with the settlement.

## Townscape Character Areas

### Barry Urban – Established

5.54 The urban environment originates on the undulating high ground surrounding the Docks. The pattern of the settlement is regular and predominantly rectilinear, with a semi-grid arrangement of terraced properties facing onto the streets, except where the landform necessitate a modified form. The townscape is enclosed with a predominance of 4-5 storey red brick Victorian buildings. The Docks form the natural

visual focus from this townscape, these historic, functional, visual, and perceptual links are important in the identity of the interrelated character areas. The terraced housing overlooking the Docks is recognised as giving rise to a set of topographic and built form elements which are quite strong. Night-time lighting is substantial.

### Barry Urban – Emerging

5.55 Areas of the Docks, focussed on Dock 1 have, and are continuing, undergone significant redevelopment, primarily providing residential development in the form of houses and apartments arranged around the inland water. The emerging townscape provides new publicly accessible spaces and pedestrian areas alongside the water, contributing a degree of openness to the townscape missing from the established settlement.

### Docks

5.56 As noted above the Docks are strongly associated with the original settlement as they provided the focus to the function and growth of the area, there is a strong sense of the industrial history in respect of this landscape. LANDMAP recognises the Docks as being a positive asset in connecting the current settlement to its original function as a coal port. Until recently the Docks extended to include the land now within the Barry Urban – Emerging landscape character area.

5.57 This area has a distinctly industrial character arising from the use, buildings, and activities, albeit having moved on from its original function as a coal port. The Dock's location, function and history are reinforced by the proximity to the primary transport corridors and connection with the River Severn. Within the Docks character area there are three components which cumulatively give rise to the character of this landscape. Throughout the area there are vertical lighting column/features which interrupt the skyline. Night-time lighting is substantial and extends across the landscape, including a variety of forms of illumination, colour and brightness<sup>30</sup>. The road network has been modernized and engineered to serve the Docks.

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<sup>30</sup> This chapter does not assess lighting impacts (lux, spill, glare etc.). The descriptions relate to the visual experience only. There has been no request by Welsh Government for a lighting assessment to form a chapter in this ES

5.58 There are some barriers to views, however, there is a strong sense of intervisibility and visual connectivity across and within the Docks landscape.

5.59 Access is restricted within the Docks either by a lack of physical connection or due to security measures associated with specific uses.

#### *A – Dow Silicones*

5.60 A heavily industrialised area with vertical features, including towers, which dominate the skyline and skyline, exerting a strong influence over the wider Docks. This area has a mechanical appearance, arising from the nature of the construction and skeletal form of the built elements. Whilst these elements are unified by use and the collective appearance, there is a strong sense of diversity resulting from the form and silhouette of individual elements.

#### *B - Industrial Green Space*

5.61 Due to the adjacent land uses, disturbance and activity, the areas of undeveloped space within the Docks have a rough and ‘wild’ appearance. There is evidence that some of these areas are used by the local community for informal access. These areas incorporate redundant features such as rail lines, roads, and drainage ditches. The degree to which vegetation is regenerating varies as depending on when the industrial use became inactive and if new development is occurring.

#### *C - Mixed Industrial*

5.62 An area in a state of flux where long-established uses and structures are interspersed with now disused land, awaiting development, alongside new development, and new industries/technologies. Some activities are primarily contained within buildings, others occur without any physical containment, such as metal recycling and recovery, or lorry parking. The built form is varied and includes simple ‘sheds’ and more complex building forms, such as those to the south west of the Site. Vehicles, including lorries, pass through the landscape continuously. This is a dynamic and disturbed landscape.

5.63 Having analysed the published material and observations made during the fieldwork the local Landscape Character Areas which have an immediate influence on the character and appearance of the Site are:

- Inland Water;
- Barry Island – Established; and
- Docks.

5.64 This assessment has not identified individual landscape features associated with the Site that which are the subject of separate analysis. It is the combine elements and qualities which give rise to the distinctive character of the Site and its local context.

### Visual Character and Views

5.65 As noted in respect of the landscape character of Barry, the landscape has both open and enclosed qualities resulting from landform, vegetation, and land use (including built form).

5.66 In combination these elements result in the area from which the Site is visible being relatively contained as shown on Figure 5.2 overleaf. The visual mapping has been informed by the ZTV analysis (contained within **Appendix 5.2**) and fieldwork. Having the benefit of the construed development, the analysis has determined that the visual effects of the development are localised in terms of geographic extent.

5.67 Viewpoints have been selected to represent the views of the receptor groups within the Visual Envelope. The photography included in this assessment has been taken in accordance with the LIs published guidance and is presented in a format to assist the reader. Panoramic views (90°-degree field of view) are included as the context of the visual experience is important, as most views are associated with linear routes. The views are presented at the correct size (820x250), subject to compliance with the printing instructions.

5.68 It should be noted that for the purposes of presenting the worst-case scenario the photography included from Dock View Road (Viewpoints 1, 2, 3, 4 and 9) has deliberately sought to present the view ‘beyond’ the railings and scrubby vegetation which occupy the foreground of the views. The actual visual experience from the footpath is more filtered and less ‘direct’. To better represent the views Viewpoints 2A, 9A and 9B are included which demonstrate the immediate foreground to the visual composition from the footpaths, roads, and residential properties.

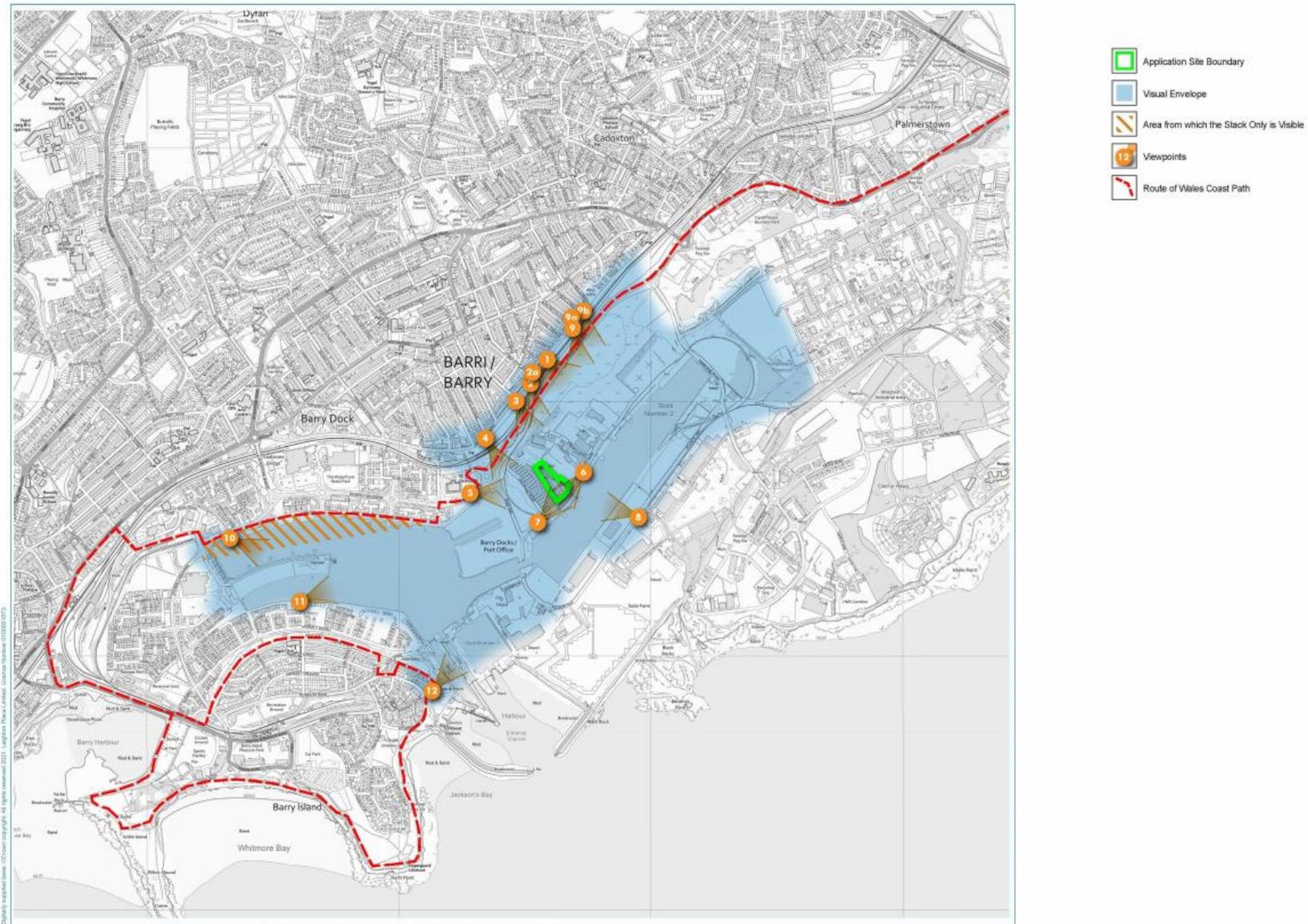


Figure 5.2: Field Verified Visual Envelope

5.69 The groups of people who experience visual change resulting from the development are:

- Residents on Dock View Road (Viewpoints 1-4 and 9);
- Residents on Dyfrig Street (between Dock Road and Redbrink Point) (Viewpoint 12);
- Residents off Charles Darwin Way (including the newly constructed properties) which are orientated towards the north east;
- Pedestrians on the footpath alongside Dock View Road (Viewpoints 1-4 and 9);
- Pedestrians using the new public space and walkway associated with the new development to the south of 'Dock 1' (Viewpoint 11);
- Pedestrians on Ffordd-y-Mileniwm (Viewpoint 10);
- Drivers and road users on Dock View Road;
- Those working in the Council Offices – travelling and working (Viewpoint 5); and
- Those occupied in the Dock activities of Dock 2– travelling and working (Viewpoints 6-8).

5.70 The visual character of the area associated with the site is focussed on, and strongly influenced by the presence of the Docks. The naming of the road to the immediate north west of the Site 'Dock View Road' appears to celebrate this visual relationship, between the area that stimulated the economic growth of the town and provided the homes and ancillary infrastructure for those involved in the Docks. This visual connectivity is important.

5.71 To the west the visual character is increasingly dominated by residential apartments, as the redevelopment of Dock 1 continues. Even from this area the visual character has associations with the more industrial context which once occurred within the townscape and remains in the landscape to the north east.

5.72 Elements within this landscape area are both prominent in, and discordant with, the settlement character. The composition of the views from the representative viewpoints<sup>31</sup> is provided within the main LVBIA (**Appendix 5.6**) and below. In each case, for the purpose of the contextual analysis the description focusses on the general composition and features, rather than visual analysis of the development.

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<sup>31</sup> Representative views represent the experience of different types of receptor, where large numbers of viewpoint cannot all be included individually and where the significant effects are unlikely to differ – for example, certain points may be chosen to represent the view of users of public footpaths and bridleways.

5.73 Notably viewpoints 1-4 and 9 are locations which pedestrians, and road users, will see as a sequence of views. This sequential nature of the visual experience encapsulates more than the Site, the visual experience is anchored in its context and the elements which directly and perceptually reinforce the appearance of the landscape and the visual composition that results from those physical attributes. Generally, the composition of each viewpoint is similar, but the angle of view and immediate foreground and backdrop varies to a small degree.

5.74 Night-time photography has also been included to illustrate the extent to which lighting characterises the visual experience and character.

5.75 **Viewpoint 1** – Taken from the south eastern footpath on Dock View Road, at the junction with Cyril Street looking south. The views from the footpath have a mixed composition, including a variety of elements. With ‘domestic’ features such as railings in the foreground, transitioning to linear elements comprising the highway and rail infrastructure. The dockside development adds mass and volume to the visual components in the view, which in terms leads the eye to the open and flat estuarine backdrop of the River Severn. Generally, views of the Docks, and coastal character beyond, are interrupted by the elements in the immediate foreground of the view, but open views when available are expansive and broad. The skyline is relative flat and uniform where the river and sky meet, However, occasional buildings and structures, including lighting columns on the Dockside, punctate the skyline. Glare resulting from sunlight reflecting from the Inland Water is part of the visual experience during the daytime.

5.76 At night, the foreground and immediate context of people walking through the townscape is fully illuminated. Lights can be seen extending across the horizon, with the lighting on the principal highway creating a visual and lit ‘band’ across the view. Security and street lighting create bright points in the view.



**Figure 5.3:** Viewpoints 1 and 2 (High Resolution images and GPS Coordingates provided in LVIA Appendix 5)

5.77 **Viewpoint 2** – Taken from the south eastern footpath on Dock View Road, at the junction with Lower Pyke Street looking south. The views from the footpath have a mixed composition, including the railings in the foreground, highways, and rail infrastructure close to the viewpoint, Dockside buildings complete the mid-ground and the estuarine backdrop of the River Severn provide the backdrop. The railway line sits in a substantial and engineered cutting with the Ffordd-y-Mileniwm running at grade with the Docks. Glare resulting from sunlight reflecting from the Inland Water is part of the visual experience. Generally, the views are interrupted and occasionally obscured by the elements in the immediate foreground, but open views, when available, are expansive and broad. The skyline is relative flat and uniform where the river and sky meet. Buildings and structures, including lighting columns on the Dockside occasionally punctuate the skyline.

5.78 At night, the foreground and immediate context of people walking through the townscape is fully illuminated. Lights can be seen extending across the horizon, with the lighting on the principal highway creating a visual and lit ‘band’ across the view. Security and street lighting create bright points in the view.

5.79 **Viewpoint 2A** – Taken from the northern footpath on Dock View Road, at the junction with Lower Pyke Street looking south, this vantage point demonstrates the degree to which features alongside the road limit and filter views to the landscape beyond.

5.80 At night, from viewpoint 2A, the illuminated foreground of the view and lighting from the individual properties is evident.

5.81 **Viewpoint 3** – Taken from the south eastern footpath on Dock View Road, at the junction with George Street (close to Seaview Labour Club) looking south. From this location people are relatively close to the Site. The road and rail line are set within distinctly ‘wooded’ embankments. The Docks are the most notable component of the view. Buildings tend to be simple in form, broad and low but areas of colour, particularly blues and yellows, add a vibrancy to the visual composition contrasting with the pale grey development and reflective water tones. Glare resulting from sunlight reflecting from the Inland Water is part of the visual experience.

5.82 At night, the foreground and immediate context of people walking through the townscape is fully illuminated. Lights can be seen extending across the horizon, with the lighting on the principal highway creating a visual and lit ‘band’ across the view. Security and street lighting create bright points in the view.

5.83 **Viewpoint 4** – Taken from the south eastern footpath on Dock View Road, at the junction with St Marys Road looking southeast. Like viewpoints 1-3 the visual composition is mixed, with the foreground railings and scrubby vegetation in the foreground. Moving through the landscape from the south west the backdrop to views changes from coastal to industrial with glimpses of the rolling rural landscape beyond. Glare resulting from sunlight reflecting from the Inland Water is part of the visual experience.

5.84 At night, the foreground and immediate context of people walking through the townscape is fully illuminated. Lights can be seen extending across the horizon, with the lighting on the principal highway creating a visual and lit ‘band’ across the view. Security and street lighting create bright points in the view. The direction of view means the visual experience includes the Dow Silicone plant.



Figure 5.4: Viewpoints 3 and 4 (High Resolution images and GPS Coordingates provided in LVIA Appendix 5)

5.85 **Viewpoint 5** –Taken from the Car Parking serving the VGC Council Offices looking East. The photography has sought to show the open view from the car park, avoiding the trees and shrubs which provide visual and physical containment. The visual composition is entirely urban. The form of the roads, structures and buildings within the Docks obscuring views toward and of the coastal and rural backdrops evident elsewhere from the settlement. The urban components are mixed but cumulatively generate a Dockside appearance.

5.86 At night, the visual experience is characterised by the illuminated highways and car parking in the foreground with the lighting along the horizon and within the Dow Silicone plant forming the backdrop.

5.87 **Viewpoint 6** – Taken from David Davies Road looking south west. The foreground is dominated by the road, wasteland and trailer storage, these features not only define the industrial character of the visual composition but foreshorten views, reducing the depth of the field of view. Long distant views are limited to views out towards the south west, with the housing on Barry Island forming the skyline on the rising landform. At night, the street lighting and light emitted from the residential properties on the skyline creates an illuminated visual composition.

5.88 **Viewpoint 7** – Taken from David Davies Road looking north east. From close views within the Docks the visual composition is varied and changes within a relatively small area. From this vantage point there is a line of barrel-roofed storage buildings (former Nissan Huts), each slightly different in appearance but unified in form. Derelict land, including soil mounds and invasive weeds lie in the foreground and the road draws the eye long and through the Docks. The residential properties on Dock View Road create the urbanised skyline from this location. Street lighting along David Davies Road draws the eye towards the Dow Silicone plant, which is a ‘bright’ element in the view. Street lighting illuminates the facades of the properties on Dock View Road.

5.89 **Viewpoint 8** – View from Atlantic Road, at the junction with Atlantic Crescent looking north west. Security fencing and the presence of large footprint ‘sheds’ limits views across the Docks. This creates a distinctly industrial character to the composition of the view and reduced the depth of the field of view. The properties on Dock View Road can be glimpsed through the fencing located on the elevated landform across the skyline. It is an urbanised visual experience.



Figure 5.5: Viewpoint 5 (High Resolution images and GPS Cooridingates provided in LVIA Appendix 5)





**Figure 5.6:** Viewpoints 6, 7 and 8 (High Resolution images and GPS Coordingates provided in LVIA Appendix 5)

5.90 **Viewpoint 9** – Taken from the south eastern footpath on Dock View Road, at the junction with Burlington Street looking south. The views from the footpath have a mixed composition, including the more domestic features such as railings, highways and rail infrastructure, Dockside buildings and the estuarine backdrop of the River Severn. Generally, the views are interrupted by the elements in the immediate foreground, but open views are expansive and broad. The skyline is relative flat and uniform where the river and sky meet. Buildings and structures, including lighting columns, on the Dockside interrupt the skyline. Glare resulting from sunlight reflecting from the Inland Water is part of the visual experience.

5.91 At night, the foreground and immediate context of people walking through the townscape is fully illuminated. Lights can be seen extending across the horizon, with the lighting on the principal highway creating a visual and lit ‘band’ across the view. Security and street lighting create bright points in the view.

5.92 **Viewpoints 9A and 9B** – Taken from the northern footpath on Dock View Road, at the junction with Burlington Street looking south. These images illustrate the degree to which elements in the foreground interrupt and filter views of the docks beyond the fence line.

5.93 At night, the foreground and immediate context of people walking through the townscape is fully illuminated. Lights can be seen extending across the horizon, with the lighting on the principal highway creating a visual and lit ‘band’ across the view. Security and street lighting create bright points in the view.



**Figure 5.7:** Viewpoints 9 and 10 (High Resolution images and GPS Coordinates provided in LVIA Appendix 5)

5.94 **Viewpoint 10** – View from Ffordd-y-Mileniwm looking east (located on the Wales Coast Path). From this location there are uninterrupted and open views across the inland water and to the hills rising in the east. This open visual experience is atypical of views within the Visual Envelope of the Site, with the visual experience dominated by the inland water and strongly influenced by the residential and retail components of the townscape. The historic references are still evident in the view but do not determine the character of the view or the visual experience. The skyline is mixed and varied with landform, buildings and vegetation all contributing to the character of the skyline.

5.95 At night, this view is fully illuminated from the foreground into the distance, and across the horizon. The density of lighting diminishes as the view moves to the south east. As the new properties are occupied lighting from the residential windows and street lighting is likely to increase.

5.96 **Viewpoint 11** – Taken from the open space within the new development off Charles Darwin Way looking east, this recently created public walkway and incidental open spaces provides opportunities for people to enjoy the views alongside the inland water (formerly Dock 1). The developed northern banks create visual containment and create an immediate and strongly urbanised skyline. To the east and south the views become increasingly open, with buildings and the natural landform beyond creating a broad and simple skyline, which is punctuated by the various vertical structures within the Docks, including lighting columns and stacks present within the Dow Silicone operations. This visual composition has a transitional character from the settlement to Docks and rural landscape.

5.97 At night there is lighting across the full extent of the horizon. The lighting reflects on the surface of the inland water.

5.98 **Viewpoint 12** – Taken from Dyfrig Street looking east (located on the Wales Coast Path), an elevated vantage point from which the totality of the industrial character of the Docks and inland water can be appreciated. The elements are varied in form, colour and pattern, but collectively they create a unified and distinctly industrial composition. The skyline is predominantly formed by the rolling landscape in the background, with vertical structures punctuating the skyline. The views are open and expansive and capture the diversity of the landscape and townscape qualities of Barry.

5.99 At night, the view is dominated by the density of lighting in the foreground, middle distance and across the horizon. The Dow Silicone plant appears to have a high density and intensity of illumination.



**Figure 5.8:** Viewpoints 11 and 12 (High Resolution images and GPS Coordingates provided in LVIA Appendix 5)

## EVALUATION OF THE SENSITIVITY OF RESOURCES AND RECEPTORS

5.100 The sensitivity of the landscape (resource) and people experiencing the views (receptors) is established by considering both the value of the resource/view and the susceptibility of each to accommodate the Barry Biomass Facility without undue<sup>32</sup> negative consequences.

5.101 In respect of LANDMAP Guidance Note 2 (2010) has been used to inform an understanding of how the consented and 'As-Built' development may affect the various LANDMAP aspects. Paragraph 6.2.3 states:

*"is advised that the Visual & Sensory overall evaluation is mapped, (Collector survey question 50) as well as the scenic quality and character evaluation criteria (Collector survey questions 46 and 48) to help identify aspect areas which may experience "likely significant effect". Attention should be focused on the outstanding,*

<sup>32</sup> Undue being defined as - unwarranted or inappropriate because excessive or disproportionate.

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high, and moderate aspect areas for further assessment. Aspect areas with an outstanding or high overall evaluation-score, or aspect areas with a moderate overall evaluation score but an outstanding or high evaluation in either scenic quality or character evaluation criteria, could be starting points for the assessment of significant effect." (Emphasis added)

5.102 In this context and in respect of the LANDMAP evaluation and Barry and Barry Docks aspect areas, the following are recorded as either outstanding, high or moderate.

### **Barry Docks**

- Historic landscape evaluation – Outstanding;
- Geological landscape Evaluation – Mosaic of outstanding, low, moderate; and
- Visual and Sensory – Overall Moderate evaluation.

### **Barry**

- Historic landscape evaluation – Outstanding;
- Geological landscape evaluation – Mosaic of outstanding, low, moderate; and
- Visual and Sensory: Character and rarity (port related) – Moderate.

5.103 Notably the Barry Biomass Facility development has occurred within an area of previously developed land, geological issues have not been highlighted by either VGC or the Welsh Government.

### ***Landscape Value***

5.104 This aspect is “the relative value that is attached to different landscapes by society” (GLVIA, 3, Glossary).

5.105 As noted above the landscape characterisation process is judgement-free and does not indicate ‘value’. Information which may contribute to the understanding of value may include:

- Areas recognised by statute;
- Local Plans (extent of policies for local landscape designations);
- Information regarding individual elements such as Conservation Areas, TPOs etc;

- Art and literature; and
- Material on landscape or local of community interests, such as local green spaces, village greens or allotments.

5.106 Landscape Value is rated, for the purposes of this assessment on the following scale:

- National/International – Designated landscapes which are nationally or internationally designated for their landscape value – including National Parks, Areas of Outstanding Natural Beauty, World Heritage sites; Heritage Coast and National Scenic Areas;
- Regional – Locally or regionally designated landscapes (e.g., Area of High Landscape Value, Regional Scenic Areas); also, areas which local evidence (such as tourism guides, landscape character assessments or other documentary information) indicates as being more valued than the surrounding area; and
- Local – ‘everyday’ landscape which is appreciated by the local community but has little or no wider recognition of its value.

5.107 Neither the Site or its immediate townscape are subject to an ‘value’ designation at a national, regional, or local scale.

### ***Landscape Susceptibility***

5.108 Susceptibility indicates the ability of a defined landscape or visual receptor to accommodate the development *“without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.”* (GLVIA 3, paragraph 5.40).

- At the highest end of the ‘susceptibility spectrum’ is a landscape wherein changes in terms of the development would be entirely at odds with the character of the local area, related to matters including pattern, grain, use, scale, and mass.
- Mid-way on the spectrum is a landscape wherein the development has a degree of consistency with the existing scale, pattern, grain, land use of the prevailing character, although mitigation may be appropriate to enhance assimilation.
- At the lower end of the spectrum the development is entirely consistent with the character of the local area, related to matters including pattern, grain, use, scale, and mass.

5.109 In respect of the susceptibility of the Site and its landscape context to accommodate the type of development which forms the basis of this assessment it should be noted that not only has the Biomass Facility has been granted consent on two occasions, (2008/01203/FUL granted on appeal and 2015/00031/OUT), but a technically very similar development has been granted full planning permission on Atlantic Way (2009/00021/FUL: Land accessed off Atlantic Way)<sup>33</sup>, on the east side of Barry docks. On each occasion the issue of landscape and visual impact was deemed acceptable by the planning authorities. It can therefore be concluded that following scrutiny by the Council this landscape is not highly susceptible to development of this nature and is appropriately located.

### *Landscape Sensitivity*

**Table 5.3 Landscape Sensitivity Evaluation**

Landscape Resource	Value	Susceptibility	Sensitivity
Inland Water	This marine character area has an historic and distinctive sense of place and is important in providing a focus to the development and growth of the area. It also has a functional relationship with the Docks. The reflect qualities of the water are attractive and extend beyond the site. Some detractors exist; however, these are consistent with the industrial character of the landscape. The value of this character area lies at the <b>mid to mid-low range</b> of value.	The inland water was designed to facility the development of the Docks. It is therefore capable of accommodating development of an industrial character without undue negative consequences. The inland water has remained an unchanged feature of the landscape despite the changes to its use and the modernisation of the land uses which abut it. This character area is not susceptible to the changes proposed and is at the <b>lower end of the spectrum.</b>	The sensitivity of the landscape is at the <b>mid to lower end</b> of the spectrum

<sup>33</sup> Change of use from B2 - General Industrial Use to Sui Generis - Waste Use which would include operational development in the form of the construction of a gasification waste to energy plant for non-hazardous waste - Approved 23 December 2009 – Not implemented.

<p>Barry Island – Established</p>	<p>The townscape has some distinctive qualities. The greatest sense of place and value found in those locations which are associated with the Docks, reinforcing the historic and functional inter-relationship between the townscape components. These qualities diminish where the physical and visual associations are weaker or lost. Overall, the value is at the <b>lower end of the range</b>.</p>	<p>The established townscape has and will continue to accommodate changes which occur within the Docks. There is an in-built relationship of functionality and form of the settlement that indicates that this character area, subject to some appropriate mitigation in respect of form, texture and colour can accommodate the Barry Biomass Facility. The susceptibility lies <b>mid-way on the spectrum</b>.</p>	<p>The sensitivity of the landscape is at the <b>lower end</b> of the spectrum</p>
<p>Docks</p>	<p>Whilst the inland water has remained a constant the Dockside areas have changed and evolved. The historic time depth is diminished, and the quality and character of the area remains in a state of flux whereby the character is a distinctly Dockside and industrial landscape, but the derelict or unused components can detract from this sense of place. The value is at the <b>lower end of the range</b>.</p>	<p>Development of the Biomass facility is in keeping with the character and appearance of the Docks and will be consistent with its context. This is demonstrated by the permissions which have been granted (irrespective of the planning matters) The susceptibility of the Docks character area to accommodate this type of change, is at the <b>lowest end of the spectrum</b>.</p>	<p>The sensitivity of the landscape is at the <b>lower end</b> of the spectrum</p>

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***Value attached to the views***

5.110 The value of views should take account of:

- Recognition of value attached to a particular view, possibly associated to a heritage asset, or planning designation; and/or
- Indicators of the value through guidebooks, tourist maps, or historic references.

5.111 None of the viewpoints are from within or associated with key locations in the Special Landscape Area or either of the Conservation Areas (**Figure 5.9**).

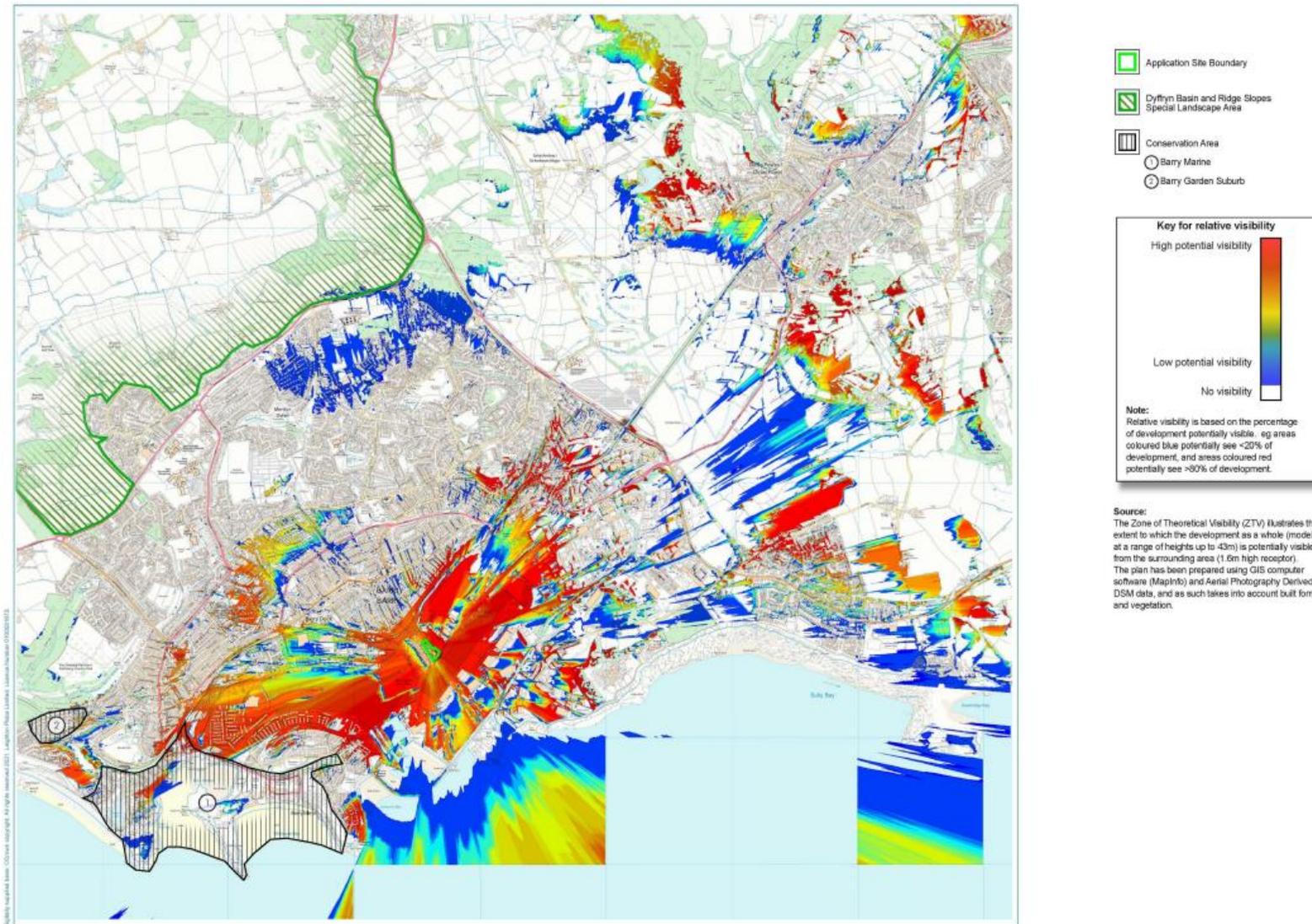


Figure 5.9: ZTV Mapping with SLA and Conservation Area designations

### ***Susceptibility to visual change***

5.112 For the purposes of this assessment the susceptibility of people to changes in their views and visual experience is a function of the occupation of the people and the extent to which their attention or interest is focused on the views and the visual amenity they experience at a particular location.

5.113 It is noted that none of the vantage points identified by this assessment are either acknowledged or protected in policy as an important or key view, nor are any views recorded in published material on maps as being of local value or associated with an important landmark.

5.114 In respect of the susceptibility of people to visual change consent has been granted for similar development within the Visual envelope of the Site, which indicates a degree of conformity and acceptability with the visual context.

### ***Visual Sensitivity***

<b>Table 5.4 Visual Sensitivity Evaluation</b>			
<b>Visual Receptor</b>	<b>Value</b>	<b>Susceptibility</b>	<b>Sensitivity</b>
Residents on Dock View Road	The naming of the road does indicate a local value and recognition of the intervisibility and relationship between the town and Docks. This value is in the <b>mid to low range</b> of value.	Residents experience their environment daily, particularly they will be susceptible to change viewed from those rooms occupied in daylight hours. These people will be at the	The sensitivity of these people to visual change is within the <b>mid to high range</b> of the spectrum.
Residents on Dyfrig Street (between Dock Road and Redbrink Point)	Properties benefit from an elevated position in the landscape, but this location does not facilitate a 'vantage point' of more than <b>low local</b> value.	<b>higher end</b> of the Susceptibility spectrum.	The sensitivity of these people to visual change is within the <b>mid to high range</b> of the spectrum.
Residents off Charles Darwin Way (including the newly constructed	Properties benefit from an open water aspect, but this location does not facilitate a		The sensitivity of these people to visual change

properties) which are orientated towards the north east.	‘vantage point’ of more than <b>low local</b> value.		is within the <b>mid to high</b> range of the spectrum.
Pedestrians on the footpath alongside Dock View Road	The naming of the road does indicate a local value and recognition of the intervisibility and relationship between the town and Docks. This value is in the <b>mid to low range</b> of value.	Those people passing through the landscape will have be engaged with their visual environment. The visual experience encompasses the context along and	The sensitivity of these people to visual change is within the <b>mid-range</b> of the spectrum.
Pedestrians using the new public space and walkway associated with the new development to the south of ‘Dock 1’	Benefitting from an open water aspect, but this location does not facilitate a ‘vantage point’ of more than <b>low local</b> value. Given the residential context this public walkway is not a destination for tourists or visitors to the area.	associated with the entire route. The susceptibility of these people lies between the <b>high and mid-range</b> of the spectrum.	The sensitivity of these people to visual change is within the <b>mid-range</b> of the spectrum.
Pedestrians on Ffordd-y-Mileniwm	Benefitting from an open water aspect, but this location does not facilitate a ‘vantage point’ of more than <b>low local</b> value.		The sensitivity of these people to visual change is within the <b>mid-range</b> of the spectrum.
Drivers and road users on Dock View Road.	The naming of the road does indicate a local value and recognition of the intervisibility and relationship between the town and Docks. This value is in the <b>mid to low range</b> of value.	Those using the road network will have a transitory visual experience and have a lower level of engagement with the visual environment beyond the road corridor. The susceptibility to change	The sensitivity of these people to visual change is at the <b>lowest</b> end of the spectrum.

		will be on the <b>mid to low range</b> of the spectrum	
Those working in the Council Offices – travelling and working	The council offices occupy the former Barry Dock Offices in a prominent location, positioned to overlook the Docks. There is a recognition that views from this building are linked with the Docks, as such this locally valued viewpoint would be <b>mid to low range</b> of value.	Whilst views will be experienced daily the visual context is the background to the work and travel activities which are the prime focus of those people. These people have the lowest level of susceptibility to change.	The sensitivity of these people to visual change is at the <b>lowest</b> end of the spectrum.
Those occupied in the Dock activities of Dock 2– travelling and working	There is no value associated with views from and within the Docks.		The sensitivity of these people to visual change is at the <b>lowest</b> end of the spectrum.

5.115 Overall, the landscape character of the Site and its context is of low sensitivity to the ‘As-Built’ and consented Barry Biomass development. This conclusion is consistent with the findings of LANDMAP and the previous planning consents.

5.116 Those most sensitive to visual change are residents in their properties, which pedestrians on the local streets being relatively sensitive to visual change.

## DESIGN EVOLUTION AND MITIGATION MEASURES

5.117 For the purposes of this assessment the following ‘as built’ elements represent the components of the Operational Phase of the project which are likely to have an effect on the landscape and visual environment (Reference to **Appendix 5.1: Site Layout Plan**).

### Primary Elements

- *Wood storage and feed building:* The wood storage and feed building (52.4 x 21.6 x 13.7m high)
- *Turbine, Welfare and Ancillary buildings:* This building is 29.1 x 17.9 x 11m high. This building incorporates the switchgear, the main control room and turbine room
- *Main process building:* Incorporates the gasification equipment (41.4m x 20.4m x 23m high). Containment of the process
- *ACC Unit:* An external air cooled condenser (32m x 14.5m and 20m High) mounted on steel stilts adjacent to the turbine, welfare and ancillaries building
- *External Equipment:* Ash silos - two cylinder shaped structures (18.4m high x 6.7m diameter). Flue gas treatment, exhausting to the chimney stack will also external
- *Chimney Stack:* 43m high stack; located to meet emissions. The diameter being 1.6m.
- *Car Parking:* Up to 12 car spaces.

### Non-Material and Ancillary Structures

- *Lean to FRB:* Small structure which houses ancillary plant (hydraulic rams) (7.4m x 2.2m x 4m high);
- *Lean to Compressor house:* Housing air compressors;
- *Urea Silo:* Provides necessary prilled urea to minimise the need for regular delivery by road;
- *Incline Conveyor:* The discharge conveyor is located on the south west facing façade of the Feedstock Reception building. This external fixing is necessary due to the arrangement of the internal processing elements. The incline conveyor has the following dimensions (4800 L x 220 W x 1370 H). The conveyor has been constructed using similar materials and the same colour palette as the principal buildings;
- *Screening Tower and Dust Extractor:* The structure facilitates the screening of oversized metal products from the fuel stream;
- *Diesel Generator:* incorporates system for back up energy supplies;
- *Fire Kiosk:* Houses valves sets necessary to distribute fire water;
- *Fire Water Tank:* Houses water as part of fire presentation plan;
- *Reactor:* Structure erected by WPN.

5.118 The construction phase of the project commenced in 2016 and was completed in Qtr 2 2018. Since that time the plant has been undergoing commissioning and completion in readiness for continuous operation.

5.119 As noted in the Introduction of this chapter, the LVIA assessor was not involved in the design evolution of the project. However, the following observations have been made in the approach to the design of the scheme:

### ***Location***

5.120 The Barry Biomass Facility has been located within an industrialised landscape which is an appropriate receiving landscape for development of this nature.

5.121 The location benefits from access to the highway's infrastructure, and seaport (alternative route for supply of fuel feedstock) and in proximity to waste wood processing facilities to reduce vehicular movements and journey times/distance. These matters have been considered elsewhere in the Owner's submissions.

### ***Layout***

5.122 The layout has undergone several iterations in the planning phases of the project. The evolution of the layout being driven by changes in the technology to be employed in the facilities and to improve the efficiency of the process output, and movement within and around the development.

5.123 In accordance to accepted best practice, as defined by the IED sector BREF guidance (Ref 5.2), the scheme provides for physical containment of the operational plant including all fuel storage, gasification and boiler processes. The enclosure of these major components allows for a simplification of the appearance of the various structures.

### ***External Appearance***

5.124 The built form is based on simple geometric forms complementing the built components in the wider Dock landscape.

5.125 The buildings which house the biomass processes have been constructed using the same materials and treated with the similar grey/blue grey tones (Albatros Grey RAL 240 80 05). This integrated and cohesive approach to the external appearance has minimised visual issues associated with the reflection of sunlight, and incidents of ‘glare’.



**Figure 5.10:** Illustration of materials and colour used in the construction of the facility.

5.126 Furthermore, the neutral colour is appropriate as most views are from elevated ground where the development is seen against the muted tones of the Severn estuary and the lower portions of the sky.

5.127 The primary access and haul route has been directed to the Dockside of the Site so that the built form screens the activity from the wider area. Lorry movements occur within the ‘front’ portion of the Site and deliveries are made inside the buildings to further limit visibility.

5.128 Ancillary structures are located in immediate or close proximity to the primary structures so that they are primarily concealed from public vantage points or are seen against or in the context of the larger and more substantive elements of the development.

5.129 Except for the chimney stack the other buildings range from 6.7m to 23m high.

5.130 Similarly, the water tank and pump house have been constructed using materials possessing similar finish and colour to the principal development, ensuring visual integration.

5.131 External lighting is the subject of Planning Condition 12 (2015/0003/OUT) which states:

*'...Prior to their construction / installation / use on site, details of all external lighting of the building and site, to include specification, means of operation (whether permanent or sensor/security lights, and hours of operation), and lux plots to prevent / minimise light spillage outside of the site (including atmospheric light pollution) shall be submitted to and approved in writing by the Local Planning Authority. All lighting shall be implemented in accordance with such approved scheme and thereafter retained as approved, unless otherwise approved in writing by the Local Planning Authority...'*

5.132 The above condition has been met by the Operator with the Planning Officer providing confirmation that sufficient information has been received in order that the condition can be discharged<sup>34</sup>.

5.133 Along the perimeter of the site adjacent to Woodham Road a scheme of tree and shrub planting has been agreed with the planning authority. This landscape mitigation has been implemented and will be the subject of on-going maintenance and management by the site owners.

### ***Decommissioning Phase***

5.134 The facilities have a design life of 25 years. Subsequent uses of the site have not yet been determined and will be the subject of analysis and planning submissions at the appropriate time. However, the lease agreement provides that the site be returned to its pre-development (circa 2015) condition, unless otherwise agreed. This is basis of the decommissioning analysis in the following sections.

5.135 The pre-development condition is illustrated in the LVIA technical Appendix 5.

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<sup>34</sup> Notification received by the Local Authority Planning Team on 6<sup>th</sup> October 2020 that the information provided and the corresponding responses by the Shared Regulatory Services of the Vale of Glamorgan would be sufficient to discharge condition.

5.136 In addition, under the obligations of the Environmental Permitting Regulations, prior to the end of the operational life the operator is required to submit a decommissioning plan that provides a detailed description of the decommissioning phases of the facility.

### **ASSESSMENT OF EFFECTS**

5.137 The GLVIA3 recognises the importance of professional judgement in undertaking the assessment of effects in determining the likely significance of effects. To overcome the potential problems associated with the over-reliance on matrices and tabular summaries of effects, that have typically been used in the past. In the latest guidance there is a greater emphasis on the need for narrative text describing the landscape and visual effect and the judgements made on their significance.

5.138 As recorded in the introduction of this assessment, this is not an EIA project. This section therefore does not distinguish between different levels of significance but uses judgement to determine if the effect is or is not significant.

5.139 The significance of the effect is a function of the sensitivity of the resource or receptor and the magnitude of the change.

### ***Magnitude of Landscape Change***

5.140 At the lower end of the spectrum the degree of change may be small, and the loss/addition of landscape features only a small proportion of the total extent which the resource represents and contributes to the character, the changes are entirely consistent with the context, the geographic extent over which the effects occur may be localised. At the higher end of the spectrum the change may be over an extensive area with a high proportion of landscape elements which contribute the character of the area being lost, the change may be at odds and incongruent with the context within which it occurs.

**Table 5.5 Magnitude of Landscape Change – As Built**

Landscape Resource	Sensitivity – set out in Section 3 above	Description of change	Magnitude of effect on landscape resource
Inland Water	<b>Mid to lower end</b> of the spectrum	<p>There is no direct change to the Inland Water. The development of an industrial facility is consistent with the contemporary character and the perceptual and historic associations with energy supplies in this location.</p> <p>The scenic qualities relating to the reflective character and nature of the water will be unchanged. The inland water will retain its strong sense of place and character. The quality of the water and engineered walls will be unaffected by the development.</p> <p>The presence of the principal buildings and stack on the dock side complements the existing context. The scale of the development is appropriate for the scale and extent of the inland water.</p> <p>There is potential to maintain the functional links of the water to the docks using the water as a route to supply source materials should it be required.</p> <p>In respect of the ancillary structures, the scale of these features is too small to have any effect on the character of this landscape character area.</p> <p>The features are consistent with other site elements/components of development within the Docks and wider landscape and industrial components.</p>	At the <b>lowest end</b> of the spectrum
Barry Island – Established	<b>Lower end</b> of the spectrum	<p>There is no direct change to the townscape character because of the development. The development is sufficiently distant and distinct from the finer grain, Victorian townscape to have no impact on the character and sense of place of the established settlement character.</p> <p>The development reinforced the industrial character of the docks so that there is no</p>	At the <b>lowest end</b> of the spectrum

		<p>diminution of the contrasting, scale, pattern, and grain of the two townscapes.</p> <p>The ancillary features are too small to have any effect on the character of this landscape character area. The features are consistent with other site elements/components of development within the Docks</p>	
Docks	<b>Lower end</b> of the spectrum	<p>The development is in a relatively small parcel of land within the Docks. The impact is localised in geographic extent and scale.</p> <p>The new built form is larger than its immediate neighbours, but consistent with the footprint and massing of other buildings within the Docks. The simple outline/silhouette of the building complements other structures within the Docks and the cladding is a colour and tone which reflects and complements other development within the Docks.</p> <p>The stack is a single vertical feature which is compatible with the presence of other narrow and tall components in the townscape. The height is greater than any immediate feature, but similar in scale (albeit smaller) with the stacks within the Dow Silicone plant. The stack is often appreciated and perceived in the context of other similar features (see the relative appearance in viewpoints 2A, 5, 8 and 9B) which ensures it blends with its context.</p> <p>The development occupies previously developed land and is in a location which has been the subject of consent for development of a similar (exact) scale of the 'as built' scheme.</p> <p>In respect of the ancillary structures, the scale of these features is too small to have any effect on the character of this landscape character area.</p> <p>The features are consistent with other site elements/components of development within the Docks and wider landscape and industrial components.</p>	At the <b>Mid-low end</b> of the spectrum

### ***Magnitude of Visual Change***

5.141 At the lower end of the spectrum the visual change will be small scale with no notable loss or addition to the view, the change is consistent with the baseline context and will not give rise a contrast in elements, form, colour and line, views are likely to be fleeting, glimpsed, or viewed infrequently. At the higher end of the spectrum the changes will be large scale, with losses of key elements in the view and/or additional features which may be incongruent in the composition. There is likely to be contrast in scale, form, line and colour and the changes will affect a large proportion of the view, be fully visible and the duration of the view will be prolonged and frequent.

5.142 In respect of night-time views, none of the additional elements (Water Tank and Pump House and External Conveyor Belt) are the subject of any additional lighting.

**Table 5.7 Magnitude of Visual Change – As Built**

Visual Receptor	Sensitivity – set out in Section 3 above	Description of change	Magnitude of effect
Residents on Dock View Road	<b>Mid to high range</b> of the spectrum.	<p>Views from these locations are experienced from within buildings and set back from the road, they look down on the development so that it is always viewed with the Docks as a backdrop and context to the views. The colour and non-reflected nature of the cladding ensures that the development is well assimilated into the visual composition.</p> <p>The building rarely breaches the skyline, the roofline sits below the crest of the distant hills (Viewpoints 1, 2A, 9, 9A and 9B). Where the building does rise above the landform the change to the skyline is marginal and only a small part of the overall view (Viewpoints 2, 3 and 4). The subtlety of this change will not be evident from within the properties set back from the road and with the intervening foreground elements (viewpoints 2A and 9A).</p> <p>The stack is the most notable component, however, from these elevated locations the colour and narrow nature of the structure is viewed alongside other vertical feature, which are seen in the foreground or as part of the wider visual context (viewpoints 2 and 2A). The stack does not detract from the view or alter the balance of components, albeit is the most visible component of the development.</p> <p>No views are lost as a result of the development, the depth of the field of view is unchanged. The elements in the composition are consistent with the context and the views of the distance hills, estuary and inland water continue to form an important aspect of the visual experience.</p> <p>Of the ancillary structures, the water tank, screening tower/dust extractor, reactor, and incline conveyor are not visible to those people represented by Viewpoints 1 to 3, 9, 9A and 10. The other smaller elements, including the lean to structures, urea silo and fire kiosk are not distinguishable in the view as</p>	<p>The degree of visual change is at the <b>mid-range</b> of the spectrum.</p> <p>The ancillary structures have no discernible effect on the to the view and visual experience.</p>

		<p>they are seen in the context of the larger structures which provide the backdrop to these features.</p> <p>From the western end of the road the conveyor is visible (Viewpoint 4) but is seen in the context of the development. It has no effect on the overall composition, balance of elements or skyline.</p> <p>The overall appearance is of an industrial building, in an industrial landscape.</p>	
<b>Night-time effects</b>		<p>The 'white' light reflecting on the pale grey façade results in the development being strongly apparent in the view, altering the balance of the composition. However, this is viewed in the context and appreciation of other elements which are 'bright' in the view. The presence of illuminated elements is not incongruent, albeit there is a change in the visual composition relating to the focus of night-time views. The remainder of the view and the immediate foreground of the residential properties is lit. There is no issue with 'dark skies'.</p>	<p>The degree of visual change is at the <b>mid to higher</b> end of the spectrum.</p>
Residents on Dyfrig Street	<b>Mid to high range</b> of the spectrum.	<p>Views from this location (Viewpoint 12) look down on the development so that it is always viewed with the Docks as a backdrop providing the context to the views. The colour and non-reflected nature of the cladding ensures that the development is well assimilated into the visual composition, complementing other buildings within the view.</p> <p>The building does not breach the skyline.</p> <p>The stack is seen in the context of the multiple stacks at the Dow Silicone Plant and is smaller than many of these existing features. Where it punctuates the skyline, this is a minor incursion and does not change the overall composition or balance of features in the view.</p> <p>Of the ancillary structures, the screening tower/dust extractor, reactor, and other smaller elements, including the lean to structures, reactor and urea silo are not visible as they are located to the rear of the principal development when seen from this vantage point, represented by viewpoint 12.</p>	<p>The magnitude of change is at the lowest end of the spectrum.</p> <p>The ancillary structures have no discernible effect on the to the view and visual experience</p>

		<p>The fire kiosk is barely discernible in the view.</p> <p>The incline conveyor and water tank are visible but seen in the context of the larger structures. The conveyor has a similar 'skeletal' appearance that is consistent with the structure prevalent on the Dow site. These ancillary structures have no effect on the overall composition, balance of elements or skyline character.</p> <p>The overall appearance is of an industrial building, in an industrial landscape.</p>	
<b>Night-time</b>		<p>The west facing façade has limited lighting, as a result the development appears more recessive in the view than experienced from the north. The Dow Silicone Plant remains the more intensely lit feature in the night-time view. There is no issue with 'dark skies'.</p>	<p>The magnitude of change is at the <b>lower</b> end of the spectrum.</p>
Residents off Charles Darwin Way	<b>Mid to high</b> range of the spectrum.	<p>There is a strongly horizontal 'banding' to the views, with the built components occupying a narrow band between the expansive skies and open water. This overall composition does not change. The 'block' form of the development is consistent with the form and silhouette of the new apartment buildings on the northern edge of the water.</p> <p>The skyline has a clear and consistent character, and the balance of the composition is unchanged by the development.</p> <p>The stack is visible but is seen in the context of the stacks and vertical elements at the Dow Silicone plant and within the docks. There is no change in the visual emphasis.</p> <p>Those Ancillary structures which are visible to these receptors include the incline conveyor and water tank. However, these are not readily apparent in the context of the principal buildings and context provided by the wider industrial development.</p> <p>The other ancillary structures are not visible due to their positioning to the rear of the main buildings and the other off-site buildings.</p>	<p>The magnitude of change is at the <b>lower</b> end of the spectrum.</p> <p>The ancillary structures have no discernible effect on the view and visual experience.</p>

<p><b>Night-time</b></p>		<p>The west facing façade has limited lighting, as a result the development appears more recessive in the view than experienced from the north.</p> <p>There are other ‘bright spots’ in the view with ensure that where lighting associated with the development is visible it is consistent with the general visual composition. There is no issue with ‘dark skies’.</p>	
<p>Pedestrians on the footpath alongside Dock View Road</p>	<p><b>Mid-range of the spectrum.</b></p>	<p>Views from this location look down on the development so that it is always viewed with the Docks as a backdrop and context to the views. The colour and non-reflected nature of the cladding ensures that the development is well assimilated into the visual composition.</p> <p>The building rarely breaches the skyline, the roofline sits below the crest of the distant hills (Viewpoints 1, 2A, 9, 9A and 9B). Where the building does rise above the landform the change to the skyline is marginal and only a small part of the overall view (Viewpoints 2, 3 and 4).</p> <p>The stack is the most notable component, however, from these elevated locations the colour and narrow structure is viewed with other vertical feature in the foreground or as part of the visual context (viewpoints 2 and 2A). The stack does not detract from the view or alter the balance of components, albeit is the most visible component of the development.</p> <p>Of the ancillary structures, the water tank, screening tower/dust extractor, reactor, and incline conveyor are not visible to those people represented by Viewpoints 1 to 3 and 9. The other smaller elements, including the lean to structures, urea silo and fire kiosk are not distinguishable in the view as they are seen in the context of the larger structures which provide the backdrop to these features.</p> <p>From the western end of the road the conveyor is visible (Viewpoint 4) but is seen in the context of the development. It has no effect on the overall composition, balance of elements or skyline.</p>	<p>The degree of visual change is at the <b>mid-range</b> of the spectrum.</p> <p>The ancillary structures have no discernible effect on the to the view and visual experience</p>

		The overall appearance is of an industrial building, in an industrial landscape.	
<b>Night-time</b>		The 'white' light reflecting on the pale grey façade results in the development being strongly apparent in the view, altering the balance of the composition. However, this is viewed in the context and appreciation of other elements which are 'bright' in the view when moving around the townscape. The presence of illuminated elements is not incongruent, albeit there is a change in the visual composition relating to the focus of night-time views passing the development. The remainder of the view and the immediate foreground of the residential properties is lit. There is no issue with 'dark skies'.	The degree of visual change is at the <b>mid to higher</b> end of the spectrum.
Pedestrians using the walkway associated with the development to the south of 'Dock 1'	<b>Mid-range</b> of the spectrum.	<p>There is a strongly horizontal 'banding' to the views, with the built components occupying a narrow band between the expansive skies and open water. This overall composition does not change. The 'block' form of the development is consistent with the form and silhouette of the new apartment buildings on the northern edge of the water.</p> <p>The skyline has a clear and consistent character, and the balance of the composition is unchanged by the development.</p> <p>Those Ancillary structures which are visible to these receptors (represented by viewpoint 11) include the incline conveyor and water tank. However, these are not readily apparent in the context of the principal buildings and context provided by the wider industrial development.</p> <p>The other ancillary structures are not visible due to their positioning to the rear of the main buildings and the other off-site buildings.</p> <p>The stack is visible but is seen in the context of the stacks and vertical elements at the Dow Silicone plant and within the docks. There is no change in the visual emphasis.</p>	<p>The magnitude of change is at the <b>lower</b> end of the spectrum.</p> <p>The ancillary structures have no discernible effect on the to the view and visual experience</p>
<b>Night-time</b>		The west facing façade has limited lighting, as a result the development appears more recessive in the view than experienced from the north.	

		<p>There are other 'bright spots' in the view with ensure that where lighting associated with the development is visible it is consistent with the general visual composition. There is no issue with 'dark skies'.</p>	
<p>Pedestrians on Ffordd-y-Mileniwm</p>	<p><b>Mid-range</b> of the spectrum.</p>	<p>Neither the principal building buildings or ancillary structures are visible from this location. Careful examination of the view shows that the top of the stack is visible, but this is recessive in the view when seen alongside the various lighting columns which are located between the footpath and the site. The tower on the Council buildings is and remains as the more notable element on the immediate skyline due its form and size.</p>	<p>There is no discernible change to the view.</p> <p>The ancillary structures have no effect on the to the view and visual experience</p>
<p><b>Night-time</b></p>		<p>The immediate foreground is strongly illuminated and street lighting and lighting emanating from the residential dwelling in the middle distance prevent any appreciation of the illumination associated with the development beyond.</p>	<p>There is no discernible change to the view.</p>
<p>Drivers and road users on Dock View Road.</p>	<p><b>Lowest</b> end of the spectrum.</p>	<p>Drivers will experience the view in a fleeting manner as they pass through the townscape, whilst there will be a degree of change to the view this will not be clearly apparent. The parked cars, fencing and scrub vegetation which is present between the road and the development will minimise the overall degree of change experienced.</p> <p>Of the ancillary structures, the water tank, screening tower/dust extractor, reactor, and incline conveyor are not visible to those people represented by Viewpoints 1 to 3 and 9. The other smaller elements, including the lean to structures, urea silo and fire kiosk are not distinguishable in the view as they are seen in the context of the larger structures which provide the backdrop to these features.</p> <p>From the western end of the road the conveyor is visible (Viewpoint 4) but is seen in the context of the development. It has no effect on the overall composition, balance of elements or skyline particularly when experienced by those moving through the landscape.</p>	<p>The magnitude of change is at the <b>lower</b> end of the spectrum.</p> <p>The ancillary structures have no discernible effect on the to the view and visual experience</p>

<p><b>Night-time</b></p>	<p>Drivers will experience the view in a fleeting manner as they pass through the townscape, whilst there will be a degree of change to the view this will not be clearly apparent. The parked cars, fencing and scrub vegetation which is present between the road and the development will minimise the overall degree of change experienced.</p> <p>The water tank, pump house and conveyor are not apparent to those travelling on the road. Views are experienced at speed and glimpsed through the foreground paraphernalia.</p> <p>The foreground and focus of the view is highly illuminated for road safety reasons, any peripheral changes in the presence of lighting will not detract from or alter the view and the overall appearance.</p>	<p>The magnitude of change is at the <b>lower end</b> of the spectrum.</p>
<p>Those working in the Council Offices – travelling and working</p> <p><b>Lowest</b> end of the spectrum.</p>	<p>Much of the approach road and car park benefits from tree and shrub planting. As a result the view shown (viewpoint 5) represents the greatest degree of change to the view. The building is apparent but seen in the context of the Docks. The stack is one of numerous vertical features in the view, including lighting columns and the stacks at the Dow Silicone plant.</p> <p>Those ancillary structures which are visible to these receptors (represented by viewpoint 5) include the incline conveyor and water tank. However, these are not readily apparent in the context of the principal buildings and context provided by the wider industrial development and other buildings in the foreground. These features have no effect on the overall composition, balance of elements or skyline.</p> <p>The other ancillary structures are not visible due to their positioning to the rear of the main buildings and the other off-site buildings.</p> <p>The skyline is already characterised by large buildings and the immediate roofscape of the Docks. Overall, the character and balance of the visual composition is unchanged.</p> <p>The visual character remains utilitarian and industrial.</p>	<p>The magnitude of change is at the <b>lower</b> end of the spectrum.</p> <p>The ancillary structures have no discernible effect on the to the view and visual experience</p>

<b>Night-time</b>		The immediate foreground is strongly illuminated with street lighting. The limited lighting on the west facing façade reduces the degree to which the change to night-time views is appreciated.	The magnitude of change is at the <b>lower</b> end of the spectrum.
Those occupied in the Dock activities of Dock 2– travelling and working	<b>Lowest</b> end of the spectrum.	<p>The character of the view remains distinctly developed and industrialised. This is completely consistent with the context and character of the visual experience moving through the Docks. The introduction of the Barry Biomass Facility does not detract from the visual qualities of the Docks.</p> <p>As illustrated by viewpoints 6 and 7 only the water tank is visible to be sufficiently evident in the view from those travelling on David Davies Road. Other ancillary structures may be glimpsed when passing the immediate site boundary. The water tank has been designed and constructed in a material which reflects the principal buildings and complements the other silo structures within the development.</p> <p>This has no effect on the character or the view, prominence, composition of skyline character of the visual experience.</p> <p>The visual composition is similar for those on Atlantic Way (viewpoint 8), albeit views are less frequent and intermittent in character as a result of the multiplicity of structures and features in the foreground.</p> <p>Views from Atlantic Way (viewpoint 8) still enable intervisibility with the residential townscape of Dock View Road, maintaining these perceptual and visual links.</p>	<p>The magnitude of change is at the <b>lower</b> end of the spectrum.</p> <p>The ancillary structures have no discernible effect on the to the view and visual experience</p>
<b>Night-time</b>		From the west (viewpoint 7) the extent of the new security lighting is less evident that when viewed from the east (viewpoint 6). However, for those limited groups of people moving around the Docks at night-time the character and emphasis of lit and unlit areas is consistent with the general visual experience.	The magnitude of change is at the <b>lower</b> end of the spectrum.

### ***Significance of Landscape Effect***

5.143 In determining the significance of effect, the following has informed the assessment. At the lower end of the spectrum the resource affected may be of limited value and sensitivity and the degree of change may be small and the loss/addition of landscape features only a limited proportion of the total extent that the landscape/asset represents and contributes to the character; the changes are entirely consistent with the baseline situation, the geographic extent over which the effects occur is possibly localised. At the higher end of the spectrum the change may affect the landscape resources of the highest level of value and sensitivity and be experienced over an extensive area with a high proportion of landscape elements which contribute the character of the area lost/altered, the change maybe at odds and incongruent within the context in which it occurs.

5.144 In the case of the as built development none of the receptors are identified as being at the mid to highest range on the spectrum of sensitivity, nor do they experience a of change greater than the mid to low range of magnitude.

5.145 The development is a small component of a historic and established industrial character area. The built form and associated infrastructure are consistent with its context and has been constructed to reflect the simple form present in the landscape, with the stack mirroring features found within the docks.

5.146 The additional elements, comprising the water tank, pump house and other minor additional structures, which are part of the project and would not occur in isolation, are too small and localised to have any effect on the character of the landscape.

5.147 Overall, the effects will be at the lower end of the spectrum. **These effects are not significant.**

5.148 As a means of 'cross-checking' this conclusion, it is noted that in respect of the very similar scheme to that as built (2015/00031/OUT), which was scrutinized by the Vale of Glamorgan planning department, the conclusions reached in the report to committee (18th June 2015) were that:

*"It is considered that, while some 23 metres tall, the buildings would still nevertheless relate to the character of nearby use and buildings and are not considered to have a detrimental impact upon the surrounding area. The height of the new buildings and the proposed stack will of course have a marked impact upon the immediate landscape and would be visible from prominent locations*

*around the site, but they will appear as modern designed industrial buildings relating to the existing use and character than surrounds them.”*

*“...the area is indisputably industrialised in character and the addition of a new industrial building would, within this context, not appear out of place. It could also be considered that the retail sector of the waterfront, in particular, the Asda waterfront store, as well as the those adjoining Morrisons, have taken account of its historical siting within the docks and has been designed in a very similar and utilitarian manner, resulting in a simple grey cubed building. As such, while it could be said to be at odds with the appearance of some of the near by residential buildings, the utilitarian box design is not too dissimilar to the existing industrial buildings and the newly constructed retail developments.”*

*“Indeed, the main element of the proposal which distinguishes it from any other large industrial building is the proposed 40m high stack. While the stack height does appear large, this height is to mitigate environmental impacts of the process and it must also be considered that the stack is not a building and will only measure 2m<sup>35</sup> in diameter. Furthermore, within the industrial backdrop of the docks and Dow Corning Chemical works there are several large tower and stacks that can be viewed in this landscape, some taller, some shorter than proposal in this instance. Within its industrial context, therefore, this would similarly have no adverse impact.”*

*“For those reasons discussed in greater detail above, it is thus considered that the physical impact of the use and building would neither appear out of character or unacceptably overbearing to the extent that it would cause demonstrable harm to the amenities of those residential properties living near the area...”*

5.149 The landscape character of the area has not substantially changed since the Council reached its own independent<sup>36</sup> conclusions on the project, nor has the form or character of the development.

### **Significance of Visual Effects**

5.150 At the lower end of the spectrum the visual change may affect the lower order of visually sensitive receptors, the changes experienced will be small scale with no notable loss of addition to the view, the change is consistent with the baseline and will not give rise to contrast in elements, form, colour and line,

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<sup>35</sup> This quoted diameter is incorrect and should have stated 1.6m

<sup>36</sup> The Council has no vested interest in the project.

views are likely to be fleeting, glimpsed, or viewed infrequently. At the higher end of the spectrum the changes will affect the higher order of visual receptors and the change will be large scale, with losses of key elements in the view and/or additional features which may be incongruent in the composition. There is likely to be contrast in scale, form, line and colour and the changes will be distinctive and prominent.

5.151 In making judgement on the significance of visual effects it should be noted that GLVIA 3 (paragraph 6.45) recognises that effects on those people particularly sensitive to change are more likely to be 'significant', or where the change is large-scale and introduces non-characteristics or discordant or intrusive elements are more likely to be 'significant' than small changes or changes involving features in the view.

5.152 In the case of the as built proposals the most sensitive visual receptors are the residents on:

- Residents on Dock View Road;
- Residents on Dyfrig Street (between Dock Road and Redbrink Point); and
- Residents off Charles Darwin Way (including the newly constructed properties).

5.153 Of these groups of people, the greatest degree of change will occur in respect of the residents on Dock View Road, who are also closer to the development. Overall, the visual change is consistent with the context, in terms of appearance and design, and occupies a small portion of the visual composition experienced from these properties daily. The street furniture, parked cars and scrubby vegetation in the foreground of views filter the views beyond. The development is characteristic of the overall visual experience, is seen against the backdrop of the wider Docks and is not intrusive, the changes include features which are already present in the wider view. The built form primarily sits below the skyline formed by the rolling hills in the distance or Dock development in the middle distance. The significance of the visual effect (daytime) is in the mid-range and **not significant**.

5.154 From these same views, the night-time views are consistent with the context, the established situation is well-illuminated across the field of view. 'White lights' are already part of the visual composition, and in the case of the development the focus of the night-time features may have changed but that is a change in emphasis rather than an alteration of the character and appearance of the landscape at night. The night-time effects are at the mid to lower end of the spectrum and **not significant**.

5.155 All other visual receptors are of equal or lesser sensitivity than the people living on Dock View Road or experience a lower magnitude of change. As a result, the visual effects on these groups of people will **not be significant**.

5.156 Similarly, as a means of 'cross-checking' these conclusions reference has been made to the 2015 Committee Report, which recorded:

*"In this respect it is notable that the ridge height to the proposed Welfare & Ancillaries building is 23m, compared to 29.2m to the ridge of the Council's Dock Office, as well as being lower than the approved buildings along Atlantic way. This is considered to demonstrate that the building will undoubtedly become a visible structure within the immediate vicinity as it would exceed all but the Dock Office in the immediate area, while its 40m stack would clearly exceed all but the stacks on the chemical works to the east. This in itself, however, does not make the development unacceptable."*

*"While it is appreciated that the Docks are overlooked by houses from an elevated height in and around Dock View Road – with the visual impact of the proposal on residential amenity having been raised in local representations, including matters relating to the impact on or loss of view, value of properties, regeneration of the docks for retail - the area is indisputably industrialised in character and the addition of a new industrial building would, within this context, not appear out of place. It could also be considered that the retail sector of the waterfront, in particular, the Asda waterfront store, as well as the those adjoining Morrisons, have taken account of its historical siting within the docks and has been designed in a very similar and utilitarian manner, resulting in a simple grey cubed building. As such, while it could be said to be at odds with the appearance of some of the near by residential buildings, the utilitarian box design is not too dissimilar to the existing industrial buildings and the newly constructed retail developments."*

*"Indeed, the main element of the proposal which distinguishes it from any other large industrial building is the proposed 40m high stack. While the stack height does appear large, this height is to mitigate environmental impacts of the process and it must also be considered that the stack is not a building and will only measure 2m in diameter. Furthermore, within the industrial backdrop of the docks and Dow Corning Chemical works there are several large tower and stacks that can be viewed in this landscape, some taller, some shorter than proposal in this instance. Within its industrial context, therefore, this would similarly have no adverse impact."*

*“Accordingly, it is concluded that the proposal would not have any unacceptable visual impact.”*

5.157 The height of the structures within the site are no different from those proposed in 2015 and the receptors have not become anymore sensitive to change in the intervening 5 years.

## SUMMARY

5.158 In the introduction it was noted that in respect of the 2019 voluntary ES WSP undertook a review and provided a commentary on the individual chapters of the ES. The Landscape and Visual Impact Assessment was considered to be deficient in a number of respects.

5.159 This summary sets out the areas where WSP recorded either a red or amber rating and the steps which have been taken in the preparation of this ES chapter.

5.160 The Study Area is shown in plan form and the rationale to its limits explained in the text.

5.161 There is a full description of the baseline visibility of the site and the methodology used in the preparation of the ZTV is set out in within **Appendix 5.5**.

5.162 The assessment references the people (or groups of people) which will experience the visual change.

5.163 There is no ‘combined judgement’ on landscape and visual effects.

5.164 The methodology employed in the assessment is set out in **Appendix 5.5** and has been provided to the Welsh Government in advance of preparing this chapter.

5.165 This LVIA is a new piece of work which has been prepared without reliance on the previous assessment and does not undertake a comparative study with the now expired planning consent off Atlantic Way.

5.166 This assessment does not seek to average the building heights ‘across the site’, it assesses the heights as specified in the planning application and are now apparent on the ground.

5.167 This chapter has properly examined LANDMAP and considers the current context to the development.

5.168 Wirelines/photomontages are not necessary as the development has been built, however, photography for day and night-time views has been taken in accordance with the published guidance and provided within the LVIA and associated appendices.

5.169 The Barry Biomass Facility lies within the distinctive and industrialised landscape of Barry Docks. It occupies land which has historically be developed for a specific use associated with the coal industry. As such the development complements the context and the land use which makes the landscape distinctive.

5.170 The development consists of large-scale buildings, a single stack and infrastructure elements. However, the Biomass Facility is located within the context of an extensive industrial area. Due to its relatively modest scale, the development can be accommodated in this townscape without significant effects on the character and sense of place or altering the relationship of the development in the wider townscape. The development occupies previously developed land, originating from the coal and port industry for which this area was formed.

5.171 The development does not alter the evaluation of the five area aspects of the landscape and visual environment recorded in LANDMAP.

5.172 The assessment concluded that development (principal buildings and ancillary structures) would not have a significant effect on visual receptors within the study area. Whilst there is a new building onsite, it is located within a visual context that enables appropriate assimilation. The intervisibility from residential properties to and of the developed Docks is an intrinsic and historical relationship. This is not affected by the development. The development is seen as part of the industrial context and measures have been taken, through the choice of the treatments for the facades, to minimise the likely prominence of the development in the view.

5.173 The stack is not a new feature in this landscape context. Its narrow form, singular nature and colour treatment ensure that it does not detract from the visual experience, block values views or vista and its form complements the local context avoiding visual incongruence.

5.174 None of the additional ancillary structures (Water Tank etc) that are subject to discussions with the Vale of Glamorgan Council are considered have any additional impacts on the character of appearance of the townscape, nor will they affect the visual environment.

Table 5.9 – Effects Summary

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Visual Nuisance	Direct, Permanent	Negligible	The development is in-keeping with the industrial nature of the area and operational plant where possible has been enclosed within the main buildings	Negligible
	Long-Term			
	Local			

## REFERENCES

**Ref 5.1:** The third edition of Guidelines for Landscape and Visual Impact Assessment (GLVIA3) was published in collaboration with IEMA and came into force on 17 April 2013.

**Ref 5.2:** Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC.

## 6 NOISE AND VIBRATION

### INTRODUCTION

6.1 This chapter of the environmental statement assesses the likely environmental significant effects, with respect to noise, arising from the 'As-Built' and Consented development. The operational activities onsite are assessed in order to allow consideration of potential effects at existing noise sensitive receptors in the surrounding area.

6.2 In the context of this assessment, noise is defined as unwanted or undesirable sound derived from sources such as site activity that interfere with normal activities, including conversation, sleep or recreation.

6.3 This chapter addresses the potential noise impacts at identified sensitive receptors due to the operational activities at the Application Site.

6.4 A glossary of common noise terminology is provided in **Appendix 6.1**. The assessment has considered the noise effects from the 'As-Built' and Consented Development as shown on the Site Layout Plan in **Appendix 6.2**.

6.5 The calculations and assessment were undertaken by Sol Acoustics Ltd. This noise chapter has been prepared by Stuart Berry MSc BSc (Hons) who is a member of the Institute of Acoustics with 8 years' experience in conducting environmental noise and vibration impact assessments for a range of project types. Entran have over 15 years' experience carrying out noise assessments for a range of projects, including large schemes falling under the EIA Regulations.

### Scope of the Assessment and Consultation

6.6 The scope of the assessment includes all operational noise emissions arising from the constructed facility as identified by both the NRW EPR Permit (**Appendix 1.3**) and the 'As-Built' Site Structures Layout Plan (**Appendix 2.1**), noting that the scope of the permitted installation includes all internal vehicle movement, but excludes local highway and external road noise impacts associated with delivery of waste feedstock to the facility via the public highway.

6.7 A Scoping Request document, detailing the methodology and approach to be adopted in the preparation of the Noise Assessment was issued to the Welsh Government on 22<sup>nd</sup> January 2021. The methodology was formally agreed by Welsh Government during March 2021 a copy of which is also provided as part of **Appendix 4.1**.

6.8 The terminology used, and approach to the assessment of effects are set out in **Appendix 6.1**.

**Identified Welsh Government Concerns**

6.9 Table 6.1A below identifies the concerns that were raised regarding the previous ES’s produced for the Site and provides information on how these issues have been considered within this ES chapter.

Table 6.1A: Previous ES Concerns	
Concern Identified	Consideration
<i>2010 ES</i>	
The operational noise prediction and subsequent assessment are based on the assumption that all noisy equipment will be contained within a building, and that the internal noise level would not exceed 90dB(A). This assessment is insufficient, and it should be revised in accordance with BS4142.	A full noise assessment in accordance with BS4142 including all operational noise emissions arising from the constructed facility has been undertaken.
The 2010 ES chapter does not make any reference to: external plant shown in the layouts in the ES such as the noise emissions from the stack, louvres/doors on the building envelope, HGV movements within and outside the red line boundary. This assessment is insufficient, and it should be revised in accordance with BS4142.	
<i>2019 ES</i>	
This section described the revised baseline noise survey undertaken in 2015 by Hunter Acoustics. There are no references to guidance of standards. There is no reference to equipment used in the noise survey. Noise measurements were undertaken during extremely short periods for two days only. Statistical analyses suggested in BS4142 were not undertaken and there would have been insufficient data to do so in any event. No noise measurements were carried out during the weekend. The survey duration was inadequate.	The noise assessment has been undertaken in accordance with BS4142. Baseline conditions have been determined by environmental noise measurements undertaken at the Site both pre (2017) and post commissioning (2020). Background noise measurements were taken

Table 6.1A: Previous ES Concerns

Concern Identified	Consideration
<p>Measurements were undertaken during the daytime with wind speeds slightly higher than 5m/s. This exceeds the recommendation in BS4142, there is no commentary to justify the adequacy of the measurements.</p> <p>Wide discrepancies in levels measured by Hunter Acoustics and by AB (in the Voluntary ES 2010) are identified but only subject to a cursory discussion with no reason for the differences suggested.</p>	<p>both during the week and on weekends and for durations as outlined within the guidance.</p>
<p>This section, titled ‘Methodology’ does not set out the assessment methodology. It simply makes selective references to standards and guidance.</p> <p>The commentary on BS 4142 selectively reports elements of the assessment methodologies and appears to confuse elements of the respective versions of the Standard. This is significant as there some aspects of the two versions are very different.</p> <p>Where the initial impact estimation guidance is set out there is a typographical error in c) where it is stated that 'a difference of around +5dB or more is likely to be an indication of a significant adverse effect - depending on context'.</p> <p>It should read adverse impact instead.</p> <p>The summary of selected World Health Organisation Guidelines is selective and inappropriate.</p>	<p>Methodology has been appropriately outlined within this chapter and has been peer reviewed to ensure no significant typographical errors such as this occur.</p>
<p>The summary of mitigation provided is extremely superficial with no details of the noise sources or the acoustic performance required of the containing structure.</p> <p>There is no description of the methodology/standard followed to predict the operational noise levels. We would expect reference to ISO 9613- Part 2.</p>	<p>This assessment has utilised measured operational data for the site.</p>
<p>The operational noise prediction and subsequent assessment are based on the assumption that all noisy equipment will be contained within a building, and that the internal noise level would not exceed 90dB(A). The assumptions used in the assessment originates from the 2008 noise assessment prepared by AB Acoustics.</p> <p>There is no reference to any differences in the assumptions or reference to any differences in the design/technology.</p>	<p>The entire ‘As-Built’ development, including internal vehicle movements and external plant has been included in the assessment.</p>

**Table 6.1A: Previous ES Concerns**

Concern Identified	Consideration
<p>The 2019 ES chapter does not make any reference to: external plant shown in the layouts in Appendix 1 such as the ACC; noise emissions from the stack, louvres/doors on the building envelope, HGV movements within and outside the red line boundary.</p>	
<p>The chapter refers to the operational noise levels predicted in 2008. It is noted in the chapter that the rating levels have a +5dB correction factor in accordance with BS4142:1997.</p> <p>The chapter refers to differences in rating methodology described in BS4142:2014 but it fails to apply the new corrections appropriately. A +2dB correction due to tonal component is added to the rating level rather than the specific level.</p> <p>As the external sources have not been considered, specific levels and potential feature corrections for these sources have not been identified.</p>	<p>This noise assessment has been undertaken in line with updated best practice guidance – BS4142:2014.</p>
<p>The chapter describes the assessment for operational noise at Location 3 as 'Low impact depending on context'. Based on the values stated, this should correspond to an initial impact estimation of 'adverse impact' instead.</p> <p>No explicit consideration of the context is provided despite this being a key element of an assessment based on the Standard.</p>	
<p>There is no discussion/agreement of methodology with the Environmental Health Officer (EHO).</p>	<p>The scope and methodology of the assessment was formally agreed with the Welsh Government in March 2021.</p>
<p>There is no Policy / Guidance section. Technical Advice Note (TAN) 119 is not mentioned in the chapter.</p>	<p>This chapter includes a Policy Section.</p>

## ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

### Sound from Proposed Onsite Activities

6.10 Limits relating to the introduction of any commercial sources are derived based on the guidance presented by BS 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound' (Ref 9.1).

## ASSESSMENT CRITERIA

6.11 The measurement, prediction and assessment of noise levels associated with the operational development and the significance of their potential impacts have been assessed in accordance with national guidance and recognised codes of practice. The sensitivity of the noise receptors and assessment of the magnitude of impacts are used to identify the likely significance of impacts. These are discussed below and have been specifically applied to the following conceptual significance impact matrix as appropriate.

### Sensitivity

6.12 The criteria set out in Table 6.1 below have been applied to identify noise sensitive receptors either on or adjacent to the Application Site. The receptors are termed ‘local’ (within 600m of the Site).

Table 6.1: Noise and Vibration Receptor		
Sensitivity	Description	Receptor
High	Receptors that are especially susceptible to noise/vibration	Residential dwellings, Schools, Hospitals, Care Homes
Moderate	Receptors where a reasonable degree of noise disturbance is acceptable	Offices
Low	Receptors where noise is tolerable	Retail shops, restaurants
Negligible	Receptors where noise is not likely to be a factor	Sports Grounds, commercial and industrial environments

### Significance Matrix

6.13 The significance matrix has been adopted to guide the quantitative identification of significant effects. The sensitivity of the receptor is used in conjunction with the calculated magnitude of impact to identify a likely significant effect. The matrix presented in Table 6.2 does not allow for consideration of additional context and is therefore used as a guide. Professional judgement will be applied where deemed necessary due to additional factors.

Table 6.2: Quantitative Derivation of Effect Significance				
Sensitivity	Magnitude of Impact			
	Negligible	Minor	Moderate	Major
High	Negligible	Minor	Moderate	Major
Moderate	Negligible	Negligible	Minor	Moderate
Low	Negligible	Negligible	Negligible	Minor
Negligible	Negligible	Negligible	Negligible	Negligible

## Commercial Activity

6.14 British Standard BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound is intended to be used for the assessment of whether sound of industrial and/or commercial nature is likely to give rise to complaints from people residing in nearby dwellings. The Standard, which was updated in 2014, states that such sound can include:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

6.15 The procedure contained in BS 4142 for assessing the likelihood of complaints is to compare the measured or predicted sound level from the source in question, the 'specific sound level', at the assessment position with the background sound level. Where sound contains acoustic features, such as tonality, impulsivity or other noticeable characteristics then a correction is added to the specific sound to obtain the 'rating level' that reflects the contextual setting of the Site.

6.16 To assess the likelihood of complaints, the measured background sound level is subtracted from the rating level. BS 4142 states:

*'Typically, the greater this difference, the greater the magnitude of the impact;*

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and,*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.'*

6.17 BS 4142 also states that “where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.”

6.18 The BS 4142 methodology has been used to adopt values for quantitative assessment of impacts. Accordingly, for the introduction of a commercial source, threshold values for the onset on impacts are based on the excess over the existing background sound levels. These values are assigned with consideration to the impact descriptions provided within BS 4142 and are presented in Table 6.3.

Table 6.3: Threshold Values*, dB For Commercial Activity Rating Levels		
Minor	Moderate	Major
Background + 5	Background + 10	Background + 15

\* Values adopted where commercial sources are newly introduced

## LEGISLATION, PLANNING POLICY AND GUIDANCE

### National Policy: Planning Policy Wales (PPW)

6.19 The Department of the Environment, Food and Rural Affairs (DEFRA), the Department for Communities and Local Government (DCLG) and the Welsh Government (WG) are responsible for all aspects of noise policy in Wales.

6.20 The aim of noise policy within Wales has been to protect individuals from excessive noise levels both in the workplace and within their homes. It has been recognised that severe annoyance to individuals due to noise can lead to sleep disturbance and adverse health effects.

6.21 Under the heading *Air Quality and Soundscape*, paragraph 6.7.3 of Planning policy Wales (Ref 6.2) states.

*“Certain sounds, such as those created by trees, birds or water features, can contribute to a sense of tranquillity whilst others can be reassuring as a consequence of their association with the normality of everyday activities. Problematic forms of sound are generally experienced as noise pollution and can affect amenity and be prejudicial to health or a nuisance. Noise action plans drawn*

*up by public bodies aim to prevent and reduce noise levels where necessary and preserve soundscape quality where it is good.”*

6.22 Under the heading *Framework for Addressing Air Quality and Soundscape*, paragraphs 6.7.4 to 6.7.6 state:

*“6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure<sup>148</sup> to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.*

*6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.*

*6.7.6 In proposing new development, planning authorities and developers must therefore:*

- address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors.*
- not create areas of poor air quality or inappropriate soundscape; and*
- seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.”*

## Local Policy

6.23 The Vale of Glamorgan Local Development Plan (2017) (Ref 6.3) Policy MD2 states that development proposals should safeguard existing residential amenity with regards to noise. Further, Policy MD7 (Environmental Protection), states that development proposals are required to demonstrate that they will not result in unacceptable impacts from noise.

## Regional Policy

6.24 The Welsh Government has published a series of Technical Advice Notes (TANs), including the October 1997 TAN 11 *Noise* (Ref 6.4). TAN 11 sets out the Welsh Government's policies on noise related planning issues, giving guidance to local authorities in Wales on the use of their planning powers to minimise the adverse impacts of noise. Specifically, it:

- outlines the considerations to be taken into account when determining planning applications for both noise-sensitive developments and for those activities which will generate noise;
- sets out noise exposure categories for residential development, encourages their use and recommends appropriate levels for exposure to different sources of noise; and
- advises on the use of planning conditions to minimise the impact of noise.

6.25 Although there is no specific advice in TAN 11 relating to the proposed installation, paragraph A6 in Annex A provides advice on non-residential developments, which would equally apply to prisons. It states:

*“Other noise-sensitive development*

*A6. Although developments such as offices, hospitals and schools will contain buildings and activities that are noise-sensitive, such developments are likely to occupy sizeable sites and contain a proportion of buildings and activities which are less noise-sensitive. The NEC principle cannot therefore be applied sensibly to such developments and it will be more appropriate to refer to specific guidance on internal noise standards in respect of each activity. General information can be found in BS 8233: 1987.”*

6.26 TAN11 refers to a number of other guidelines and standards that relate to specific types of noise, including construction noise and vibration and noise from industrial or commercial developments.

6.27 Under the heading *Noise from construction sites*, paragraph B20 in Annex B states:

*“B20. Detailed guidance on assessing noise from construction sites can be found in BS 5228, parts 1-4. In particular, Part 1: 1984, "Code of practice for basic information and procedures for noise control" describes a method for predicting noise from construction sites as well as giving general advice.”*

6.28 The 1984 version of BS5228 has been superseded twice; the first time in 1997 and most recently in 2009 (see above).

6.29 TAN 11 considers noise from industrial and commercial developments, which is relevant to the ‘As-Built’ Development. It states in paragraph B17:

*“B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance'. Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987.”*

6.30 The 1987 version of BS8233 was superseded in 1999 and the 1997 version of BS4142 was superseded in 2014 (see above).

## BASELINE CONDITIONS

6.31 The baseline conditions near the Barry Biomass site have been determined by environmental noise measurements undertaken at the Site both pre and post commissioning. The survey of existing noise conditions at the Barry Biomass Site commenced on 25<sup>th</sup> May and were completed 5<sup>th</sup> June 2020.

6.32 The primary purpose of the noise survey was to gather acoustic information on the baseline noise levels at the Barry Biomass Site during proposed operational periods. This data has been used to assess the likely impact of the operational facility at nearby residential receptors.

6.33 The noise measurements were undertaken at three positions representative of background sound levels at nearby identified residential receptors.

6.34 The noise monitoring at position 1 was undertaken approximately 225m to the north west of the site boundary, and approximately 20m to the south of the existing residential premises on Dock View Road, at a height of approximately 2m above local ground level. The background noise levels measured at this position are considered to be representative of those expected at the boundary of the residential premises on Dock View Road.

6.35 Noise Monitoring Position 2 was approximately 190m to the west of the site boundary, at a height of approximately 3m above local ground level. The background noise levels measured at this position are considered to be representative of those expected at the boundary of the proposed future residential premises on Cory Way.

6.36 Position 3 was approximately 350m to the west of the site boundary, and approximately 30m to the east of the existing residential premises on Cei-Daffd, at a height of approximately 3m above local ground level. The background noise levels measured at this position are considered to be representative of those expected at the residential premises on Cei-Dafdd.

6.37 A summary of the noise measurement is presented in Table 6.4. The noise measurement locations are shown in **Appendix 6.2**. The full set of graphical results is shown in **Appendix 6.3 to 6.5**.

**Table 6.4: Summary of Measured Noise Levels**

Measurement Position	Date	Daytime (07:00 - 23:00)		Night Time (23:00 – 07:00)	
		dB LAeq,16hr	dB LA90,15min (Typical)	dB LAeq,8hr	dB LA90,15min (Typical)
1	25/05/2017	60	50	58	44
	26/05/2017	62	56	57	45
	27/05/2017	62	55	53	36
	28/05/2017	61	55	56	42
	29/05/2017	60	51	55	38
	30/05/2017	61	50	55	36
	31/05/2017	61	52	55	35
	01/06/2017	61	52	55	36
	02/06/2017	61	50	55	38
	03/06/2017	61	48	57	40
	04/06/2017	62	50	55	42
05/06/2017	66	54	63	49	
2	26/05/2017	53	42	55	40
	27/05/2017	56	47	47	37
	28/05/2017	54	40	49	37
	29/05/2017	52	45	50	36
	30/05/2017	56	45	50	34
	31/05/2017	55	43	50	34
	01/06/2017	54	46	49	34
	02/06/2017	54	46	52	39
	03/06/2017	54	48	50	39
	04/06/2017	53	45	51	37
05/06/2017	60	49	56	46	
3	25/05/2017	52	47	50	39
	26/05/2017	52	47	51	41
	27/05/2017	52	44	44	32
	28/05/2017	50	43	48	38
	29/05/2017	49	41	44	32
	30/05/2017	51	43	43	30
	31/05/2017	49	41	42	30
	01/06/2017	50	44	45	30
	02/06/2017	50	44	50	34
	03/06/2017	51	46	50	36
	04/06/2017	50	44	45	36
05/06/2017	54	46	50	42	

6.38 Background sound levels have been identified based on typically occurring values at each measurement position. The identified background sound levels are presented in Table 6.5.

**Table 6.5: Adopted Background Sound Levels**

Measurement Position	Associated Residential Premises	Assessment Period	Typical Measured Background Noise Level, dB $L_{A90,15min}$
1	Dock View Road	Daytime	50
		Night time	38
2	Cory Way	Daytime	45
		Night time	37
3	Cei Dafdd	Daytime	44
		Night time	32

6.39 The microphones were fitted with protective windshields. All measurement equipment used during the noise surveys conformed to relevant Type 1 specifications.

6.40 All noise measurements were undertaken by consultants competent in environmental noise monitoring, and, in accordance with the principles of BS 7445: 2003 (Ref 6.5). The broadband noise parameters of  $L_{Aeq,T}$ ,  $L_{A10,T}$ ,  $L_{A90,T}$ , and  $L_{Amax,F}$  were recorded at each location.

6.41 Consideration of weather conditions and stability of the unattended data indicates that the weather conditions during the survey did not affect the survey.

## IDENTIFICATION AND EVALUATION OF POTENTIALLY SIGNIFICANT EFFECTS

6.42 This section considers the potentially significant effects associated with the noise egress during the operation of the 'As-Built' and consented scheme.

### Proposed Fixed Plant & Commercial Activity

6.43 The potential impact of the 'As-Built' scheme has been determined by calculation of likely noise levels during operation of the Biomass Facility. The results of the environmental noise survey have been used to identify assessment criteria, in accordance with BS 4142.

6.44 Noise emission levels from the Operational Development have been calculated using predictive computer noise modelling. The noise modelling software (Cadna-A) uses algorithms based on ISO 9613 'Attenuation of sound during outdoor propagation' to predict noise levels generated at receiver locations by noise sources.

6.45 Noise levels have been predicted at nearby noise sensitive receptors. The proposed site activities have been modelled based on the source data representative of typical site activity, as presented in **Appendix 6.6**. Adopted octave band sound reduction data for the roof and façade construction is presented in **Appendix 6.7**.

6.46 The proposed activities will be assessed to ensure compliance with the relevant design standards contained within BS 4142.

6.47 The Barry Biomass Facility will comprise of the operation of an Advanced Thermal Treatment (ATT) gasification line which will typically process 72,000 dry tonnes of shredded mixed waste wood feedstocks per annum.

6.48 The main features of the consented development and 'As-Built' Scheme have been described fully within Chapter 2 of this Environmental statement but are summarised as follows:

- Fuel Reception Building: For the delivery and reception of mixed waste wood feedstocks;
- Waste Processing: For the screening and sampling of the fuel feedstocks before being delivered to the gasification unit;

- Fluidised Bed Gasification System: Comprising a gasification line for the thermal conversion and combustion of syngas from the fuel feedstocks;
- Steam Turbine Generator: Comprising a steam turbine and generator for the conversion of steam into electricity within a steam turbine; and
- Gas Cleaning and Pollution Abatement Plant: Consisting of selective non-catalytic reduction (SNCR) and selective catalytic reduction (SCR) for the reduction of Nitrogen Oxides (NO<sub>x</sub>), sorbent injection for acid gas neutralisation and activated carbon powder injection for absorption and removal of heavy metals, dioxins, VOC and other harmful substances.

6.49 The Owner has confirmed the external HGV and mobile plant operations that will be applicable to the proposed operation of the plant are in alignment with the Planning Conditions and that these vehicle movements form the basis of all acoustic calculations, modelling and assessment.

6.50 Deliveries of fuel feedstock and urea prills can occur between 07:00 to 19:00 hours Monday to Saturday inclusive, and between 08:00 and 16:00 hours on Sunday. Up to 15 deliveries per day of biomass fuel could be expected and up to two deliveries of urea prills per week could be expected.

6.51 Waste collections can occur between 07:00 and 19:00 hours Monday to Saturday inclusive, and between 08:00 and 16:00 hours on Sunday. Waste ash collections will occur once every ten days. Other waste collections such as removal of waste, and collections of rejected fuel also are expected at a frequency of approximately once per day. These movements are all in alignment with the consented planning conditions.

6.52 Limestone, hydrated lime and bed material shall be moved into the Main Processing building via a single forklift. It is understood that these operations are relatively infrequent and would be conducted during the daytime only: the limestone tank will require filling once per month, the bed material will be replenished up to 4 to 5 times per year and the hydrated lime will be stocked approximately twice a month.

6.53 Light personnel vehicles are expected to be used by staff changing their shifts and visitors which could occur at any time. However, these minor movements are not considered as part of this noise impact assessment.

6.54 Annual maintenance activities are undertaken to ensure continued reliability, efficiency and safety of the plant. Maintenance is planned and executed to ensure minimum impact on operations. During

maintenance activities the plant is switched off, therefore during this time there will be no sound emanating from the plant. During planned maintenance activities deliveries of wood fuel are ceased. There will be a small number of additional maintenance vehicles which would be less than 20 LGVs per day. An assessment of specific levels during maintenance activities has therefore been scoped out of this assessment.

6.55 Additionally, in the event that the plant is decommissioned, it will be a controlled dismantling exercise rather than a demolition exercise. All of the aspects of the plant are modular, dismantling can therefore be carried out with minimal impacts. Under the requirements of the NRW Environmental Permit, the Site is required to maintain a Site Closure Plan that details the measures that will be carried out to ensure that the Site is closed and decommissioned without any adverse impacts to the environment. The Site Closure Plan will consider all potentially polluting aspects and require full mitigation and prevention to be in place prior to its implementation. No aspect of the Site Closure Plan can be implemented without formal approval from NRW. Therefore, specific sound levels during decommissioning are not considered further within this ES chapter.

6.56 The plant assumptions and sound power levels have been used to calculate a specific source sound pressure level at the closest residential receptor locations.

6.57 BS 4142 requires that an acoustic feature correction is applied to the specific sound level in order to obtain a rating level L<sub>Ar,Tr</sub> at the identified receptor. Where applicable, the correction is applied in order to consider the effect of additional acoustic characteristics present in the source of interest. A feature correction of +3 dB has been applied to account for any features that may be perceptible at receptor locations.

6.58 The calculated Rating levels and the assessment of excess over background are presented in Table 6.6. Calculated day and night-time noise contours are presented in **Appendix 6.8 and 6.9**, respectively.

Table 6.6: Calculated Rating Levels and BS 4142 Assessment

Noise Sensitive Receptors	Period	Calculated Rating Level, dB L <sub>Ar,Tr</sub>	Background Sound Level, dB LA90	Excess of Rating Level Over Background, dB
Dock View Road	Daytime	46	50	-4
	Night time	41	38	3
Cory Way	Daytime	44	45	-1
	Night time	41	37	4
Cei Dafdd	Daytime	36	44	-7

	Night time	34	32	2
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6.59 The excess of the Rating levels over adopted background sound levels has been used to identify impact magnitudes at the identified receptor locations. The receptor locations are identified as high sensitivity. The effect significance has been assigned with consideration to the matrix as presented in Table 6.2. The calculated impacts and resultant effects are presented in Table 6.7.

**Table 6.7: Identification of Effect Significance**

Noise Sensitive Receptors	Period	Excess of Rating Level Over Background, dB	Identified Impact	Resultant Effect Significance
Dock View Road	Daytime	-4	Negligible	Negligible
	Night time	3	Negligible	Negligible
Cory Way	Daytime	-1	Negligible	Negligible
	Night time	4	Negligible	Negligible
Cei Dafdd	Daytime	-7	Negligible	Negligible
	Night time	2	Negligible	Negligible

6.60 The calculated rating levels are identified as Negligible at all receptor locations and during all periods. Significant effects are therefore identified as unlikely due to the introduction of the operational Biomass Facility.

### Uncertainty

6.61 The calculation of the specific level is based on available information and source data obtained from various sources as detailed in **Appendix 6.6**. The sound emissions and quantities are based on information provided by the Owner. Based on the information provided, it is understood that this assessment is representative of proposed activities.

6.62 Mitigation measures have been applied to modelled sources. Attenuation will be implemented into systems in a satisfactory manner to achieve the specified reductions.

6.63 Adopted background sound levels were obtained in 2017 and therefore may be less representative of the current background environment. However, any variation in extant noise sources would likely constitute an increase to noise levels observed during the unattended survey. Any change in background

sound levels would likely result in a decrease to the excess of Rating over background and would therefore not affect the outcome of this assessment.

## MITIGATION AND RESIDUAL EFFECTS

### Mitigation

6.64 The Biomass Facility has been designed taking full consideration of the sensitivity of the local environment and identified residential receptors. Accordingly, substantial noise control engineering and mitigation has been incorporated into the basic design of the plant to ensure that the plant meets with both the requirements of the planning conditions and the NRW EPR permitting guidance.

6.65 In accordance with the requirements of the Environmental Permitting Regulations, any Installation that has the potential for significant noise impacts is required provide a detailed noise management plan (NMP) that details the specific noise mitigation and control measures that will be adopted on site in order to ensure that all impacts are adequately managed and controlled.

6.66 The noise management plan was submitted to the NRW as part of the original Environmental Permit application in July 2017 that was subsequently verified and validated as part of the permit determination process and subsequent public consultation processes.

6.67 As part of the determination and consultation process NRW carried out a process of verification modelling and have been satisfied that the measures proposed within the noise management plan both meet the requirements of the regulations, demonstrate BAT and are sufficient to ensure that the noise and vibration are not likely to cause an adverse effect at occupied sensitive receptors.

6.68 Details of the noise mitigation measures and associated noise management plan incorporated into the 'As-Built' Scheme are provided within **Appendix 6.6**. All acoustic model information and assessment assumes and requires the full and satisfactory implementation of all the noise control measures.

6.69 Various building envelope fabric acoustic enhancements have been incorporated into the noise agreed mitigation strategy, specifically to include acoustically uprated roller shutter doors (which furthermore must be actuated and kept closed at all times except for brief daytime only ingress/egress use) and specific acoustic louvre types and specifications.

6.70 All pneumatic blow-offs and solenoids et al, including Baghouse, Silos blow-downs, have all been fitted with Silvent pneumatic silencers or similar. Roller shutter doors are required to be kept closed at all times when not in used.

### Residual Effects

6.71 Calculated significant effects due to fixed plant and onsite activities indicate that the effects at identified receptors will be **Negligible**.

### CUMULATIVE EFFECTS

6.72 There are no identified likely significant effects arising from the operation of the 'As-Built' scheme and therefore it is unlikely that nearby developments would give rise to cumulative effects.

6.73 Any potential cumulative effects from the operation of the 'As-Built' Scheme and nearby developments are therefore likely to be **Negligible**.

### SUMMARY

6.74 This chapter has considered the likely effects of the operation of the 'As-Built' Scheme with respect to noise. These include the effects at residential receptors from the operation of the 'As-Built' scheme on surrounding properties.

6.75 The assessment has been based on a computer noise model, informed and validated using environmental noise measurements and data provided for proposed plant items.

6.76 An assessment has been carried out in accordance with the adopted criteria to determine the impacts of the 'As-Built' Scheme at nearby residential receptors. The assessment, based on the information provided in conjunction with measurements undertaken at existing sites, indicates nearby receptors will experience Negligible significant effects during typical onsite activities.

6.77 A summary of the noise significance and residual effects for the operation on the 'As-Built' Scheme are presented in Table 6.8.

6.78 The full acoustic assessment report is available in Appendix 6.10.

Table 6.8 – Effects Summary

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Noise: Commercial Activities	Direct, Permanent	Negligible	Scheme of mitigation as detailed within <b>Appendix 6.6</b> , incorporated into calculations	Negligible
	Long-Term			
	Local			

## REFERENCES

**Ref 6.1:** Planning Policy Guidance PPG24 'Planning and Noise'. 1994 The Stationary Office, 1994

**Ref 6.2:** The National Planning Policy Framework, February 2019, The Stationary Office, 2012

**Ref 6.3:** BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

**Ref 6.4:** Noise Policy Statement for England, 2010 (NPSE)

**Ref 6.5:** British Standard 7445: 2003: Description and measurement of environmental noise. BSI, 2003

## 7 AIR QUALITY AND HUMAN HEALTH

### INTRODUCTION

7.1 This chapter presents the findings of an assessment of local air quality associated with the operation of the 'As-Built' and Consented Development. As the Barry Biomass Facility is currently built but not yet operational, no account of the air quality effects associated with the construction of the site have been included in this chapter. The assessment presented herein includes only the operational impacts. The EIA is submitted as a retrospective EIA as per the year 2016. For completeness the legislation, policy and guidance have been updated, however the background concentrations are presented as per the year 2016.

7.2 In addition, the assessment presented uses the permitted IED Emission Limits stipulated within the EPR Permit at the time of permit issue. This is consistent with the assessment completed for the EPR Permit Application and provides a worst-case assessment as the revised emission limits are lower than the IED Emission Limits.

### Scope of the Assessment and Consultation

7.3 The scope of the assessment includes all operational air emissions arising from the constructed facility as identified by both the NRW EPR Permit (**Appendix 1.3**) and the 'As-Built' Site Layout Plan (**Appendix 5.1**), noting transport emissions relating to the local delivery of waste feedstock has been scoped out the ES under agreement by Welsh Government.

7.4 A Scoping Request document, detailing the methodology and approach to be adopted in the preparation of the Air Quality and Human Health Impact Assessment was issued to the Welsh Government on 22<sup>nd</sup> January 2021, a copy of which is contained at **Appendix 5.2**. The methodology was formally agreed by Welsh Government during March 2021 a copy of which is also provided as part of **Appendix 4.1**.

7.5 The terminology used, and approach to the assessment of effects are set out in **Appendix 7.1**.

### *Identified Welsh Government Concerns*

7.6 Table 7.1A below identifies the concerns that were raised regarding the previous ES's produced for the Site and provides information on how these issues have been considered within this ES chapter.

Table 7.1A: Previous ES Concerns

Concern Identified	Consideration
Dispersion modelling should have been based on the Waste Incinerator Directive (WID) emission limits not a combination of WID emission limits and emission rates for a different plant permitted locally (Barry Energy Recovery Facility, Biogen)	Dispersion Modelling was based on emission limits from the Industrial Emission Directive (IED) which superseded the WID
No information provided to scope out operational effects of traffic	Likely operational traffic flows provided in scoping section
No information provided on how operational dust is assessed, and no mitigation measures provided	An Assessment of Operational Dust is scoped out of the assessment. A justification for this is provided, mitigation measures are provided in a Dust and Emissions Management Plan
Clarity required on methodology for nitrogen and acid deposition assessment and information on background deposition rates and critical loads not provided	Methodology for nitrogen and acid deposition assessment is provided. Details on the background deposition rates and critical loads provided in Appendix 7.3
Insufficient information on significance criteria and significance criteria provided by the Environment Agency for undertaking risk assessments for the permitting process had been used. Suggestion that EPUK & IAQM significance criteria should have been used.	<p>Details of the significance criteria used are provided. The EPUK &amp; IAQM guidance states <i>‘the guidance has no formal legal status and is not intended to replace other guidance. Industrial development regulated by the Environment Agency, and requiring an Environmental Permit is subject to the EA’s risk assessment methodology’</i>. Therefore, the criteria provided in the NRW’s risk assessment has been used.</p> <p>If the EPUK &amp; IAQM guidance significance criteria had been used instead of the NRW’s risk assessment criteria, the determined significance for each pollutant at the human health receptors would remain the same.</p>
Concern that the dispersion modelling had not been updated to consider a revised stack diameter	The dispersion modelling considered emissions from a stack of diameter 1.6m, which is the proposed stack diameter
Local monitoring data for the years 2009 to 2012 had been used for the assessment. This was out of date for an assessment completed in June 2015.	This ES is provided retrospectively for the year 2016. The baseline considers monitoring upto the year 2015,

**Table 7.1A: Previous ES Concerns**

Concern Identified	Consideration
	which would have been the most recent monitoring at that time.
Results tables did not show the total predicted concentrations	Results tables show the maximum PEC
No comparison had been made between the baseline acid and nitrogen deposition rates between the 2019 and 2015 ES's and how changes in these might affect the assessment.	This ES is provided retrospectively for the year 2016. Baseline acid and nitrogen deposition rates obtained for 2016 were therefore used.

## POLICY AND LEGISLATION

### Planning Policy

#### *Planning Policy Wales (Ref. 7.1)*

7.7 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars and policy clarification letters. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.

7.8 In dealing specifically with air quality PPW (paragraph 6.76) states '*In proposing new development, planning authorities and developers must:*

- *Address any implication arising as a result of its association with, or location within, air quality management areas or areas where there are sensitive receptors;*
- *Not create areas of poor air quality or inappropriate soundscape;*
- *Seek to incorporate measures which reduce overall exposure to air pollution.'*

7.9 Paragraph 6.715 states '*Potentially polluting development should be located in areas where there is low potential for public exposure, or where its impact can be minimised.'*

### ***Technical Advice Note (Wales) 21 Waste (Feb 2014) (Ref. 7.2)***

7.10 Annex C of TAN 21 sets out a number of planning considerations relevant to waste management facilities. These include the overarching objective of minimising adverse effects on air quality.

### ***Vale of Glamorgan Local Development Plan***

7.11 The Vale of Glamorgan Local Development Plan (Ref. 7.3) was adopted in June 2017 and sets out the spatial strategy and long-term vision for the area between 2011 and 2026. The Local Development Plan includes the following policy relevant to air quality:

7.12 Policy MD7 Environmental Protection, which states

*‘Development proposals will be required to demonstrate they will not result in an unacceptable impact on people, residential amenity, property and / or the natural environment from either:*

- 1. Pollution of land, surface water, ground water and the air.*

*Where impacts are identified the Council will require applicants to demonstrate that appropriate measures can be taken to minimise the impact identified to an acceptable level. Planning conditions may be imposed or legal obligation entered into, to secure any necessary mitigation and monitoring processes.’*

### **Relevant Air Quality Guidance, Legislation and Policy**

#### ***The European Directive on Ambient Air and Cleaner Air for Europe***

7.13 European Directive 2008/50/EC (Ref. 7.4) of the European Parliament and of the Council of 21st May 2008, sets legally-binding Europe-wide limit values for the protection of public health and sensitive habitats. The Directive streamlines the European Union’s air quality legislation by replacing four of the five existing Air Quality Directives within a single, integrated instrument.

7.14 The pollutants included are sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), particulate matter of less than 10 micrometres (µm) in aerodynamic diameter (PM<sub>10</sub>), particulate matter of less than 2.5 µm in aerodynamic diameter (PM<sub>2.5</sub>), lead (Pb), carbon monoxide (CO), benzene (C<sub>6</sub>H<sub>6</sub>), ozone (O<sub>3</sub>), polycyclic aromatic hydrocarbons (PAHs), cadmium (Cd), arsenic (As), nickel (Ni) and mercury (Hg).

### ***Air Quality Strategy for England, Scotland, Wales & Northern Ireland***

7.15 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007 (Ref. 7.5), pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

7.16 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems.

7.17 The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

7.18 The air quality objectives (AQO) are medium-term policy-based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

7.19 For some pollutants there is both a long-term (annual mean) standard and a short-term standard. In the case of NO<sub>2</sub>, the short-term standard is for a 1-hour averaging period, whereas for PM<sub>10</sub> it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

### ***Air Quality (Wales) Regulations***

7.20 Many of the objectives in the AQS were made statutory in Wales with the Air Quality (Wales) Regulations 2000 (Ref. 7.6) and the Air Quality (Wales) (Amendment) Regulations 2002 (the Regulations) (Ref. 7.7) for the purpose of Local Air Quality Management (LAQM).

7.21 The Air Quality Standards (Wales) Regulations 2010 (Ref. 7.8) have adopted into UK law the limit values required by EU Directive 2008/50/EC and came into force on the 10th June 2010. These regulations

prescribe the ‘relevant period’ (referred to in Part I2V of the Environment Act 1995) that local authorities must consider in their review of the future quality of air within their area. The regulations also set out the air quality objectives to be achieved by the end of the ‘relevant period’.

7.22 Ozone is not included in the Regulations as, due to its trans boundary nature, mitigation measures must be implemented at a national level rather than at a local authority level.

7.23 The air quality standards and objectives for the pollutants considered in the assessment are presented in **Appendix 7.1**.

### ***Local Air Quality Management (LAQM)***

7.24 Part IV of the Environment Act 1995 also requires local authorities to periodically Review and Assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

7.25 Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate that part an Air Quality Management Area (AQMA).

7.26 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

7.27 The Department of Environment, Food and Rural Affairs (DEFRA) has published technical guidance for use by local authorities in their Review and Assessment work (Ref, 7.9). This guidance, referred to in this chapter as LAQM.TG(16), has been used where appropriate in the assessment.

### ***Industrial Emission Directive***

7.28 The Industrial Emissions Directive (IED) (2010/75/EU) (Ref. 7.10) came into force on the 6<sup>th</sup> January 2011, replacing the seven existing Directives, including the Waste Incineration Directive (WID) and Large Combustion Plant Directive (LCPD), implemented through the Environmental Permitting Regulations (EPR). The aim of the IED was to simplify the existing legislation and reduce administrative costs, whilst maintaining a high level of protection for the environment and human health. Existing and new sites will be required to

comply with the requirements of the IED, which places greater emphasis on new plant best available technology (BAT).

7.29 The IED has been transposed into UK law via the Environmental Permitting (England and Wales) (Amendment) Regulations 2013 (SI 2013 No, 390) (Ref. 7.11), which came into force on 27 February 2013.

7.30 The design and operation of all new waste incinerations facilities must ensure compliance with emission limit values (ELVs) set out in the IED; these ELVs are summarised in Table 7.1.

Table 7.1: IED Emission Limits	
Pollutant	ELV (referenced to 11% O <sub>2</sub> )
<b>Daily Average</b>	
Total dust	10
Total organic carbon (TOC)	10
Hydrogen chloride (HCl)	10
Hydrogen fluoride (HF)	1
Sulphur dioxide (SO <sub>2</sub> )	50
Oxides of nitrogen (NO <sub>x</sub> )	200
Carbon monoxide (CO)	50
<b>Hourly Average</b>	
Total dust	30
Total organic carbon (TOC)	20
Hydrogen chloride (HCl)	60
Hydrogen fluoride (HF)	4
Sulphur dioxide (SO <sub>2</sub> )	200
Oxides of nitrogen (NO <sub>x</sub> )	400
Carbon monoxide (CO)	100
<b>Average over a sample period between 30 minutes and 8-hours</b>	
Group 1 metals (a)	0.05
Group 2 metals (b)	0.05
Group 3 metals (c)	0.5
<b>Average over a sample period between 6-hours and 8-hours</b>	
Dioxins and furans (d)	1 x 10 <sup>-7</sup>
Cadmium (Cd) and Thallium (Tl)	

**Table 7.1: IED Emission Limits**

Pollutant	ELV (referenced to 11% O <sub>2</sub> )
Mercury (Hg)	
Antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni) and vanadium (V)	
I-TEQ	

***Best Available Techniques ('BAT') Reference Document for Waste Incineration ('BREF') (Ref. 7.12)***

7.31 Published by the European Commission in December 2019, this document provides an update to the BAT reference documents. It provides information on the process and general techniques used in the Waste Incineration sector, including information on the techniques used to minimise emissions. It provides a range of pollutant emissions that are considered achievable using Best Available Techniques.

***Land Use Planning and Development Control***

7.32 Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) published the Land Use Planning and Development Control Air Quality guidance in June 2017 (Ref. 7.13) to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

7.33 The main focus of the guidance is to ensure all developments apply good practice principles to ensure emissions and exposure are kept to a minimum. It also sets out criteria for identifying when a more detailed assessment of operational impacts is required, guidance on undertaking detailed assessments and criteria for assigning the significance of any identified impacts.

7.34 This guidance has been used within this assessment.

## ASSESSMENT METHODOLOGY

### Scope of Assessment

7.35 The scope of the assessment has been determined in the following way:

- Review of air quality data for the area surrounding the Site, including data from the Defra Air Quality Information Resource (UK-AIR) and background pollutant maps;
- Desk study to determine the location of nearby areas that may be sensitive to changes in local air quality;
- Review of process operations; and
- Review of emission parameters for the Operational Development and dispersion modelling to predict ground-level concentrations at sensitive human and habitat receptor locations.

7.36 There is the potential for impacts on local air quality to arise as a result of emissions from the operation of the Barry Biomass Facility. The site would consist of a gas boiler utilising synthetic gas (Syngas) generated from the gasification of waste wood. The high-pressure steam generated by the boiler would be directed to a steam turbine and used to generate electricity for supply to the National Grid. The facility is designed to operate 24 hours a day, 365 days per year. Emissions to air would be via a single 43m stack.

7.37 Emissions to air from the facility will be governed by the BAT BREF Note for Waste Incineration which require adherence to emission limits for the following pollutants:

- Nitrogen oxides;
- Carbon monoxide;
- Total dust (as PM<sub>10</sub> and PM<sub>2.5</sub>)
- Gaseous and vaporous organic substance, expressed as total organic carbon;
- Sulphur dioxide;
- Hydrogen Chloride;
- Hydrogen Fluoride;
- Twelve trace metals;
- Dioxins and Furans; and
- Ammonia (NH<sub>3</sub>).

7.38 An assessment of impacts arising from the emissions from the plant has been undertaken using detailed dispersion modelling, details of which are provided below. In addition to the above pollutants, the assessment also considers emissions of Polycyclic aromatic hydrocarbons (PAH, as Benzo[a]pyrene) and polychlorinated biphenyls (PCBs).

7.39 In addition to emissions from the main stack, there is also a diesel powered start up generator. This generator will only be used when there is absolutely no power available on site such as a total grid failure or transformer failure to bring the plant into a safe shutdown scenario. The generator is sized to enable the safe operation of the boiler feed water pumps and combustion fans to allow the plant to ‘fail safe’. There is no routine use of the standby generator, and its use is considered to be an extremely unlikely event. Assessment of emissions from this generator has therefore been excluded from the assessment.

7.40 Also operating within the installation boundary is a single mobile loading shovel which will be operating within the fuel hall and reception shed. Emissions from a single mobile plant are considered to be insignificant and are not considered further within this assessment.

7.41 There is also the potential for impacts on local air quality to arise as a result of emissions from road vehicles associated with the operation of the Biomass Facility. Guidance provided by the EPUK and IAQM provides threshold criteria for establishing when significant impacts on local air quality may occur and when a detailed assessment of potential impacts is required. At locations outside an Air Quality Management Area (AQMA), a change in light duty vehicles (LDV) of more than 500 per day and / or a change in heavy duty vehicles (HDV) of more than 100 per day is considered to result in potentially significant impacts on air quality. At locations within or adjacent to an AQMA, a change in LDVs of more than 100 per day or a change in HDVs of more than 25 per day is considered potentially significant.

7.42 The Site itself is not within an AQMA. Data provided by the project team indicates that the operation of the Barry Biomass Facility will result in an increase in traffic flows of approximately 10 vehicles per day. An assessment of the impacts arising from exhaust emissions from vehicles using the local roads has therefore been excluded from the assessment.

7.43 Annual maintenance activities are undertaken to ensure continued reliability, efficiency and safety of the plant. Maintenance is planned and executed to ensure minimum impact on operations. During maintenance activities the plant is switched off, therefore during this time there will be no emissions to air from the plant. During planned maintenance activities deliveries of wood fuel re ceased. There will be a

number of additional maintenance vehicles which would be less than 20 LGVs per day. An assessment of emissions to air during maintenance activities has therefore been scoped out of this assessment.

7.44 There is also the potential for impacts to air arising as a result of dust and particulate matter arising from on-site operations. The Site lies within a predominantly industrial setting, the closest residential properties are located off Dock View Road which is approximately 250m to the northwest of the Site. The site operations that may potentially result in emissions of dust and particulate matter are the delivery and unloading of waste wood (fuel) into the facility, the processing of the waste wood and the transfer of material from the storage bays to the plant via mechanical loading shovels.

7.45 The waste wood would be delivered in covered vehicles which would be sealed to prevent escape of material and no inherently dusty material will be accepted. Unloading will be undertaken within the Fuel Storage Building and will be undertaken at a low speed and low tipping height to reduce the potential for dust release. Due to the measures in place, it is considered that the emissions of dust from the operation of the facility will be minimal. A Dust and Particulate Management Plan (Ref. 7.14) has been produced for the Site, which provides details of the dust control measures that will be implemented. The DMP concluded that there is a very low risk of nuisance or exposure of the local receptors to dust and particulate matter arising from the Site. An assessment of the impacts of dust and particulate matter arising from on-site operations has therefore been scoped out of this assessment.

7.46 In the event that the plant is decommissioned, it will be a controlled dismantling exercise, rather than a demolition exercise. All of the aspects of the plant are modular, dismantling can therefore be carried out with minimal impacts. Under the requirements of the NRW Environmental Permit, the Site is required to maintain a Site Closure Plan that details the measures that will be carried out to ensure that the Site is closed and decommissioned without any adverse impacts to the environment. The Site Closure Plan will consider all potentially polluting aspects and require full mitigation and prevention to be in place prior to its implementation. No aspect of the Site Closure Plan can be implemented without formal approval from NRW. Therefore, emissions to air from decommissioning are not considered further within this ES chapter.

## ***Dispersion Modelling Methodology***

### *Normal Operational Emission Scenario*

7.47 IED emission limits have been assumed for the purposes of the modelling assessment and the plant is assumed to be operating at full load, continually throughout the year. Stack emission parameters (flow rate, temperature etc.) have been provided by the technology supplier (Outotec). In the absence of actual emissions data 'worst-case' IED emission limits have been assumed.

7.48 For the Group III trace metal predictions, it has been assumed in accordance with the Environment Agency's (EA) metals guidance (Ref. 7.15), that each of the metals is emitted at the maximum IED ELV (0.5 mg/Nm<sup>3</sup>) as a worst case. The same approach has also been adopted for the Group I and II metals.

7.49 Where the screening criteria set out in the guidance are not met, an emission concentration equal to half of the ELV for Group I metals and 1/9th of the ELV for Group III metals has been assumed. If the screening criteria are still not met, typical emission concentrations for energy from waste plants have been used, as specified in the guidance.

7.50 It is anticipated that the process will not result in significant emissions of polychlorinated biphenyls (PCBs) or polycyclic aromatic hydrocarbons (PAHs), however emission limits of 0.005 mg/Nm<sup>3</sup> and 0.001 mg/Nm<sup>3</sup> respectively, have been assumed based on measurements at European waste incineration facilities as specified in the IPPC Reference Document on BAT for Waste Incineration (Ref. 7.16).

7.51 The input parameters for the exhaust stack are identified in **Appendix 7.2**.

7.52 The proposed stack height of 43m is based on the stack height screening assessment that has been undertaken for the proposed facility (Ref. 7.17).

### *Abnormal Emission Scenarios*

7.53 Consideration has been given to the potential impacts in the event of failure of a number of processes associated with the abatement of emissions at the facility as follows:

- Failure of Urea Injection Operation;

- Failure of Lime Dosing Operation;
- Failure of Activated Carbon Dosing; and
- Failure of Bag Filter.

7.54 A summary of the emission parameters for each abnormal emission scenario is presented in **Appendix 7.2**.

7.55 The maximum allowable period for any one episode of abatement or monitoring equipment failure (separately or together) is 4 hours. In addition, the total allowable period in a year must not exceed 60 hours. On this basis, impacts due to abnormal emissions have been assessed against short-term EALs for the protection of human health only.

#### *Modelling Risk Assessment*

7.56 In order to determine a higher level of confidence in the modelled results, the modelling was repeated using an alternative model (ADMS 5.2). This model is widely used for assessments of emissions from stacks and is an EA approved model. It is therefore considered to be an appropriate choice of model.

#### *Assessment of Coastline Effects*

7.57 In order to determine the impact of the presence of the nearby coastline, additional modelling was completed using the coastal module of the ADMS 5.2. The coastal module enables the effect of the coastline to be modelled by taking into account the temperature of the sea in the vicinity of the Site. A limitation of the coastline module of ADMS 5.2 is that the model cannot be run considering the effects of the coastline and buildings and terrain simultaneously. Therefore, to assess the impact of the coastline, the model was run twice, once with the coastline module activated and once without. For both model runs, the effect of buildings and terrain were excluded and the results were compared to provide a quantitative assessment of the impact of the coastline.

#### *Local Meteorological Data*

7.58 The dispersion modelling has been carried out using five years of hourly sequential meteorological data in order to take account of inter-annual variability and reduce the effect of any atypical conditions. Data from the meteorological station at Cardiff Airport (approximately 6 km west of the proposed facility) have been used for the assessment, which is the most representative data currently available for the area.

### *Topography*

7.59 The presence of elevated terrain can significantly affect the dispersion of pollutants by increasing turbulence and reducing the distance between the plume centre line and the ground level.

7.60 Information relating to the topography of the area surrounding the proposed facility has been used in the dispersion modelling to assess the impact of terrain features on the dispersion of emissions.

### *Building Downwash / Entrainment*

7.61 The presence of buildings close to emission sources can significantly affect the dispersion of pollutants by leading to a phenomenon called downwash. This occurs when a building distorts the wind flow, creating zones of increased turbulence. Increased turbulence causes the plume to come to ground earlier than otherwise would be the case and result in higher ground level concentrations closer to the stack.

7.62 Downwash effects are only significant where building heights are greater than 30 to 40% of the emission release height. The downwash structures also need to be sufficiently close for their influence to be significant.

7.63 All potential downwash structures have been included in the model.

### *Nitric Oxide to NO<sub>2</sub> Conversion*

7.64 Oxides of nitrogen (NO<sub>x</sub>) emitted to atmosphere as a result of combustion will consist largely of nitric oxide (NO), a relatively innocuous substance. Once released into the atmosphere, NO is oxidised to NO<sub>2</sub>. The proportion of NO converted to NO<sub>2</sub> depends on a number of factors including wind speed, distance from the source, solar irradiation and the availability of oxidants, such as ozone (O<sub>3</sub>).

7.65 A conversion ratio of 70% NO<sub>x</sub>:NO<sub>2</sub> has been assumed for comparison of predicted concentrations with the long-term objectives for NO<sub>2</sub>. A conversion ratio of 35% has been utilised for the assessment of short-term impacts, as recommended by Environment Agency guidance (Ref. 7.18).

### ***Sensitive Human Health Receptors***

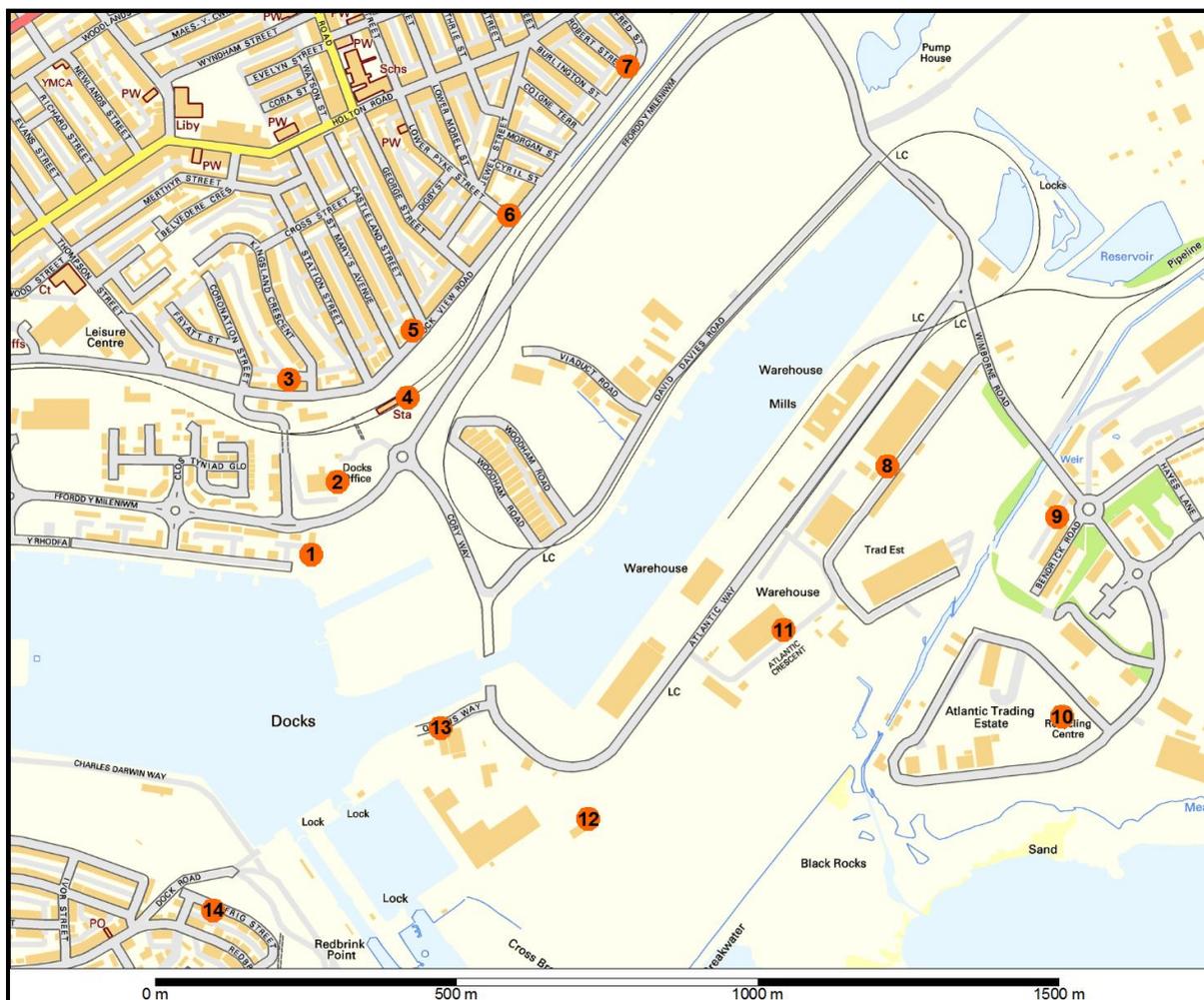
7.66 LAQM.TG(16) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations '*where members of the public are regularly present*' should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

7.67 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standard (i.e. 15-minute mean or 1-hour mean) may be relevant. In a school, or adjacent to a private dwelling, however; where exposure may be for longer periods, comparison with long-term (such as 24-hour mean or annual mean) standards may be most appropriate. In general terms, concentrations associated with long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

7.68 The locations of the discrete sensitive receptors selected for the assessment are presented in Table 7.2 and Figure 7.1.

ID	Receptor	Type	Easting	Northing
1	Vistamar House	Residential	312199	167543
2	Docks Office	Industrial	312243	167664
3	Phillipa Freeth Court	Residential	312162	167836
4	Barry Dock Station	Station	312359	167806
5	54 Dock View Road	Residential	312368	167918
6	89 Dock View Road	Residential	312528	168111
7	131 Dock View Road	Residential	312724	168359
8	Wimbourne Buildings	Industrial	313155	167691
9	Bendrick Road	Residential	313437	167606
10	Public Recycling Facility	Recycling Facility	313445	167271
11	Atlantic Crescent	Industrial	312983	167416
12	Port Office	Industrial	312659	167100
13	Queens Way	Industrial	312414	167253
14	Dyfrig Street	Residential	312037	166947

Figure 7.1: Sensitive Receptor Locations



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7.69 Pollutant concentrations have been predicted at both discrete receptor locations and over a Cartesian grid of 65 m resolution (1.5 times the stack height).

7.70 The maximum predicted ground level concentrations are compared with the relevant air quality standards and guidelines for the protection of health.

### Habitat Assessment

7.71 The Environment Agency’s risk assessment guidance (Ref. 7.19) states that the impact of emissions to air on vegetation and ecosystems should be assessed for the following habitat sites within 10 km of the source:

- Special Areas of Conservation (SACs) and candidate SACs (cSACs) designated under the EC Habitats Directive (Ref. 7.20);
- Special Protection Areas (SPAs) and potential SPAs designated under the EC Birds Directive (Ref. 7.21); and
- Ramsar Sites designated under the Convention on Wetlands of International Importance (Ref. 7.22)

7.72 Within 2 km of the source:

- Sites of Special Scientific Interest (SSSI) established by the 1981 Wildlife and Countryside Act;
- National Nature Reserves (NNR);
- Local Nature Reserves (LNR);
- local wildlife sites (LWS), county wildlife sites (CWS) and potential wildlife sites (PWS);
- Sites of Importance for Nature Conservation (SINC); and
- Ancient woodland.

7.73 Habitat receptor designations and locations relevant to the assessment are presented in Table 7.3. There are two SSSI's within 2 km of the proposed facility (Hayes Point to Bendrick Rock SSSI and Barry Island SSSI) however these sites have been designated for geological interest only and have therefore not been included in the assessment.

**Table 7.3: Location of Sensitive Habitat Receptors**

ID	Receptor	Approximate Location of Nearest Boundary to Boiler Stack
H1	Cadoxton River SINC	690 m east
H2	Cadoxton Wetlands SINC	780 m northeast
H3	Fields at Merthyr Dyfan SINC	1.9 km northwest
H4	Friars Point SINC	1.98 km southwest
H5	Gladstone Road Pond SINC	1.2 km west-northwest
H6	Nells Point East SINC	1.1 km south-southwest
H7	North of North Road SINC	1.98 km northeast
H8	Cadoxton Ponds Wildlife Trust Reserve	780 m northeast
H9	Severn Estuary Ramsar	3.9 km east
H10	Severn Estuary SPA	3.9 km east

**Table 7.3: Location of Sensitive Habitat Receptors**

ID	Receptor	Approximate Location of Nearest Boundary to Boiler Stack
H11	Ancient Woodland (Hayes Lane)	1.1 km east
H12	Severn Estuary SAC	6.0 km east

7.74 The habitat sites have been represented in the model by a discrete receptor at the nearest boundary of the designated area.

7.75 The modelled ground level pollutant concentrations are used to predict deposition rates, using typical deposition velocities. A summary of typical NO<sub>2</sub>, SO<sub>2</sub>, NH<sub>3</sub> and HCl dry deposition velocities is presented in Table 7.4.

**Table 7.4: Dry Deposition Velocity (m/s)**

Pollutant	Grassland	Woodland
Nitrogen Dioxide (NO <sub>2</sub> )	0.0015	0.0030
Sulphur Dioxide (SO <sub>2</sub> )	0.012	0.024
Hydrogen Chloride (HCl)	0.025	0.06
Ammonia (NH <sub>3</sub> )	0.02	0.03

7.76 The predicted nitrogen deposition rates assume a 100% NO<sub>x</sub>: NO<sub>2</sub> conversion. This represents a worst-case for the assessment since nitric oxide (NO) has a lower deposition velocity than NO<sub>2</sub> and consequently results in lower deposition rates.

7.77 A wet deposition rate for HCl has been calculated using a dry to wet deposition ratio, as follows:

$$HCl \text{ wet deposition rate} = HCl \text{ dry deposition rate} \times \text{wet-to-dry deposition ratio}$$

7.78 Within a few kilometres of the source, the wet deposition rate is comparable to the dry deposition rate and with increasing distance, the wet deposition fraction becomes a smaller fraction of the total HCl deposition. As a worst-case, the wet-to-dry deposition ratio is assumed to be 1 at all the identified habitat sites.

7.79 Predicted ground level concentrations and acidification/ deposition rates were calculated following the methodology provided in the AQTAG guidance (Ref. 7.23) are compared with relevant air quality

standards, critical levels and critical loads for the protection of sensitive ecosystems and vegetation (see **Appendix 7.3**).

### *Deposition to Ground*

7.80 A screening assessment of deposition rates to soil has been undertaken in accordance with the Environment Agency’s Risk Assessment Guidance.

### **Significance Criteria**

7.81 The significance of the predicted impacts has been determined using the significance criteria provided by the Natural Resources Wales. The NRW criteria assess the significance of an impact compared with the relevant environmental assessment level (EAL) and background air quality. The criteria are summarised in Table 7.5 below:

Table 7.5: EA Significance Criteria		
	Long Term	Short-Term
<b>Human Health Receptors</b>		
Stage One	If the long-term PC is less than 1% of the long-term environmental standard, the impact is considered to be insignificant	If the short-term PC is less than 10% of the short-term environmental standard, the impact is considered to be insignificant
Stage Two	If the long-term PEC is less than 70% of the environmental standard, the impact is considered to be insignificant	If the short-term PC is less than 20% of the short-term environmental standard minus twice the long-term background, the impact is considered to be insignificant
<b>Ecological Receptors</b>		
<b>At SPAs, SACs, Ramsar Sites and SSSIs</b>		
Stage One	If the long-term PC is less than 1% of the long-term environmental	If the short-term PC is less than 10% of the short-term environmental standard, the

**Table 7.5: EA Significance Criteria**

	Long Term	Short-Term
	standard, the impact is considered to be insignificant	impact is considered to be insignificant
Stage Two	If the long-term PEC is less than 70% of the long-term environmental standard, the impact is considered to be insignificant	
<b>At Local Nature Sites (NNR, LNR, LWS, CWS, SINC sites and ancient woodlands)</b>		
Stage One	If the long-term PC is less than 100% of the long-term standard, the impact is considered to be insignificant	If the short-term PC is less than 100% of the short-term standard, the impact is considered to be insignificant.

## BASELINE ENVIRONMENT

### Local Air Quality Management

7.82 Vale of Glamorgan Council (VGC) carries out frequent review and assessments of air quality within the area and produces Reports in accordance with the requirements of DEFRA.

7.83 A number of locations have been identified where concentrations of NO<sub>2</sub> are close to the annual mean air quality objective, however, to date no AQMAs have been declared in the vicinity of the Site.

### Nitrogen Dioxide

7.84 There are no automatic air quality monitoring stations measuring NO<sub>2</sub> in the vicinity of the Site, however routine monitoring of NO<sub>2</sub> concentrations is undertaken by passive diffusion tube at a number of locations in Barry. A summary of bias adjusted annual mean NO<sub>2</sub> concentrations measured between 2011 and 2015 is presented in Table 7.6. The locations of the monitoring sites are presented in Figure 7.2.

**Table 7.6: NO<sub>2</sub> Diffusion Tube Monitoring Data**

ID	Site Name	Type <sup>(a)</sup>	OS Grid Reference	2011 <sup>(a)</sup>	2012 <sup>(a)</sup>	2013 <sup>(c)</sup>	2014 <sup>(c)</sup>	2015 <sup>(c)</sup>
1	110 Dock View Road	R	312663, 168289	19	20	20.3	17.4	17.1
2	Port Road East	R	310813, 169693	26	27	24.2	25.8	23.1
3	24 Cardiff Road	R	313597, 168829	28	32	28.8	26.9	27.8
4	Bendrick Road	UB	313407, 167477	15	15	22.5	14.0	14.9
5	Thalasa, Dyfrig Street	UB	311980, 166965	14	17	16.7	13.5	14.2
6	Holton Road	R	311768, 168101	31	37	24.9	-	-

(a) R = Roadside B = Background, UB = Urban Background

(b) Data from 2013 LAQM progress Report, bias adjusted

(c) Raw data from Welsh Air Quality Forum, not bias adjusted.

Figure 7.2: Diffusion Tube Monitoring Locations



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7.85 The diffusion tube monitoring data indicate that urban background concentrations of  $\text{NO}_2$  in Barry are less than 50% of the air quality objective of  $40 \mu\text{g}/\text{m}^3$ .

7.86 The nearest monitoring site to the proposed facility is at 110 Dock View Road, where the maximum concentration measured between 2011 and 2015 was  $20 \mu\text{g}/\text{m}^3$ . This concentration is assumed to provide a reasonable estimate of the baseline concentration at the Site and the sensitive receptors on Dock View Road and a worst-case baseline for receptors to the south of the proposed facility (where the urban background monitoring sites indicate that the annual mean concentrations are somewhat lower).

## Carbon Monoxide, Particulate Matter, Sulphur Dioxide and Total Organic Carbon (as Benzene)

7.87 Continuous monitoring of PM<sub>10</sub> concentrations has been undertaken at a roadside site on Cardiff Road in Barry since 2010. Unfortunately, data capture at this location has been relatively poor; therefore the data has not been used to inform the baseline for the assessment.

7.88 In the absence of local monitoring data background concentrations of CO, PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and benzene have been obtained from the DEFRA UK Background Air Pollution maps (Ref. 7.24) for use in the assessment. These 1 km grid resolution maps are derived from a complex modelling exercise that takes into account emissions inventories and measurements of ambient air pollution from both automated and non-automated sites.

7.89 The background maps for PM<sub>10</sub> and PM<sub>2.5</sub> in 2016 were issued in June 2016 and are based on 2013 monitoring data.

7.90 The CO, SO<sub>2</sub> and benzene mapped concentrations are based on 2001 monitoring data. For CO, factors are available to project the concentrations to future years (Ref. 7.25). The 2013 SO<sub>2</sub> concentrations are assumed to be 75% of the 2001 estimates, in accordance with the 2003 Local Air Quality Management Technical Guidance (Ref. 7.26). The 2001 mapping includes projected benzene concentrations for 2010 and these are assumed to be representative of the existing concentrations for the purposes of the assessment.

7.91 A summary of the mapped annual mean background concentrations assumed for the assessment is presented in Table 7.7. The concentrations were derived from contour plots of the mapped data to determine the maximum at sensitive receptor locations. These concentrations are assumed to provide a reasonable representation of the existing and future air quality in the vicinity of the proposed facility.

**Table 7.7: Mapped Annual Mean Background Concentrations for PM<sub>10</sub>, PM<sub>2.5</sub>, CO, SO<sub>2</sub> and Benzene (µg/m<sup>3</sup>)**

Pollutant	Annual Mean	AQO/EAL
Particles (PM <sub>10</sub> )	13.5	40
Particles (PM <sub>2.5</sub> )	9.4	25
Sulphur Dioxide (SO <sub>2</sub> )	2.2	n/a
Carbon Monoxide (CO)	140	n/a
Benzene (C <sub>6</sub> H <sub>6</sub> )	0.35	5

## Hydrogen Chloride

7.92 Ambient monitoring of Hydrogen Chloride is carried out as part of the Defra Acid Gases and Aerosols Network (AGANET) at a number of locations around the UK.

7.93 The closest monitoring sites to the proposed facility are at Narbeth in Pembrokeshire and Rosemaund in Herefordshire. Over the period 2010 to 2012, the average annual mean HCl concentration at these sites was the same as the UK average at  $0.24 \mu\text{g}/\text{m}^3$ . This concentration is assumed to provide a reasonable estimate of the background concentration of HCl at the Site.

## Hydrogen Fluoride

7.94 Monitoring of ambient levels of hydrogen fluoride is not currently carried out in the UK, however the Expert Panel on Air Quality Standards (EPAQS) report on halogen and hydrogen halides in ambient air (Ref.7.27) cites a modelling study which suggests that the typical natural background HF concentration is  $0.5 \mu\text{g}/\text{m}^3$ , with an elevated background of  $3 \mu\text{g}/\text{m}^3$  where there are local anthropogenic emission sources.

7.95 The natural background HF concentration of  $0.5 \mu\text{g}/\text{m}^3$  is assumed to be applicable at sensitive human health and habitat receptors in the vicinity of the Site.

## Trace Metals

7.96 DEFRA has undertaken monitoring of trace elements at a number of locations in the UK since 1976 as part of the UK Urban and Rural Heavy Metals Monitoring Networks.

7.97 To provide an indication of the range of trace metal concentrations that occur in the UK the average concentrations measured at rural and urban sites between 2008 and 2011 are summarised in Table 7.8.

7.98 With the exception of Cr(VI), all the measured concentrations are well below their respective EAL's. Guidance issued by the Environment Agency for the assessment of Group 3 metals, states that for screening purposes it should be assumed that Cr(VI) comprises 20% of the total background chromium. On this basis the urban average Cr(VI) concentration substantially exceeds the EAL.

7.99 For the purposes of the assessment, the UK average urban concentrations are assumed to be reasonably representative of the baseline trace metal concentrations at the Site.

**Table 7.8: Average UK Trace Metal Concentrations ( $\mu\text{g}/\text{m}^3$ )**

Metals	Rural	Urban	EAL
Antimony (Sb)	Not measured	Not measured	5,000
Arsenic (As)	0.47	0.68	3
Cadmium (Cd)	0.10	0.30	5
Chromium (Cr)	0.76	4.2	n/a
Trivalent Chromium (Cr(III))	0.61 (a)	3.4 (a)	5,000
Hexavalent Chromium (Cr(VI))	0.15 (b)	0.85 (b)	0.2
Cobalt (Co)	0.047	0.21	1,000
Copper (Cu)	2.8	16.8	10,000
Lead (Pb)	4.4	13.9	250 – 500
Manganese (Mn)	2.2	13.2	150
Mercury (Hg) (c)	1.2	2.0	250
Nickel (Ni)	0.83	3.8	20
Thallium (Tl)	Not measured	Not measured	1,000
Vanadium (V)	1.1	1.7	5,000

(a) 80% of total chromium

(b) 20% of total chromium

(c) Total particulate and vapour

## Dioxins and Furans

7.100 Monitoring of PCDD/Fs is currently carried out by Defra at six locations in the UK (Hazelrigg, High Muffles, London, Manchester, Auchencorth Moss and Weybourne) as part of the Toxic Organic Micropollutants (TOMPs) Network.

7.101 To provide an indication of the range of PCDD/F concentrations that occur in the UK, a summary of the annual mean concentrations measured between 2008 and 2010 is presented in Table 7.9.

**Table 7.9: UK PCDD/Fs Concentration (fg TEQ/m<sup>3</sup>)**

Monitoring Site	Type	2008	2009	2010
London	Urban background	10.9	41.4	38.6
Manchester	Urban background	19.0	14.2	48.7
Auchencorth Moss	Rural background	6.4	0.56	5.0
High Muffles	Rural background	1.7	9.38	2.8
Hazelrigg	Rural background	3.7	13.5	8.0
Weybourne	Rural background	-	22.82	2.5

7.102 In general, the concentration of dioxins and furans at rural locations is considerably lower than at urban locations.

7.103 The average concentration measured at the two urban background monitoring sites from 2008 to 2010 is 28.8 fg/m<sup>3</sup> and is assumed to be reasonably representative of the baseline dioxin and furan concentration at the proposed facility and nearby sensitive receptors.

### Polycyclic Aromatic Hydrocarbons (as benzo[a]pyrene)

7.104 Monitoring of benzo(a)pyrene (B[a]P) is currently carried out by DEFRA at a number of locations in the UK as part of the TOMPS and PAH monitoring and analysis network. A summary of concentrations measured in the UK is issued by the National Physical Laboratory (NPL) on behalf of Defra on an annual basis. The most recent report was published in January 2014 and provides annual mean B[a]P concentrations measured by the network in 2012 (Ref. 7.28).

7.105 The average urban and rural background concentrations measured in the UK between 2010 and 2012 were 0.33 ng/m<sup>3</sup> and 0.062 ng/m<sup>3</sup> respectively.

7.106 The average urban background concentration is assumed to provide a reasonable estimate of the background concentration in the vicinity of the Site.

## Polychlorinated Biphenyls

7.107 Monitoring of PCBs is currently carried out by DEFRA at six locations in the UK as part of the TOMPs Network. The average PCB concentration measured at the urban background monitoring sites (London and Manchester) from 2008 to 2010 is 0.00044  $\mu\text{g}/\text{m}^3$  and is assumed to be reasonably representative of the baseline PCB concentration at the Site and nearby sensitive receptors.

## Ammonia

7.108 Ambient monitoring of ammonia ( $\text{NH}_3$ ) concentrations is carried out as part of the National Ammonia Monitoring Network (NAMN) at 95 locations around the UK. The Air Pollution Information Service, APIS (Ref. 7.29) uses the measured concentration to calibrate the FRAME dispersion model, which estimates concentrations at a 5km grid resolution. The three-year average (2012– 2014)  $\text{NH}_3$  concentration for the grid square containing the Site is 0.99  $\mu\text{g}/\text{m}^3$ .

## Summary of Background Concentrations

7.109 A summary of the annual mean and short-term background concentrations assumed for the assessment is presented in Table 7.10.

Table 7.10: Summary of Assessment Background Concentrations		
Pollutant	Annual Mean	Short Term
Particles ( $\text{PM}_{10}$ )	13.5 $\mu\text{g}/\text{m}^3$	15.9 $\mu\text{g}/\text{m}^3$ (d)(e)
Particles ( $\text{PM}_{2.5}$ )	9.4 $\mu\text{g}/\text{m}^3$	n/a
Nitrogen Dioxide ( $\text{NO}_2$ )	20.0 $\mu\text{g}/\text{m}^3$	40.0 $\mu\text{g}/\text{m}^3$ (d)
Sulphur Dioxide ( $\text{SO}_2$ )	2.2 $\mu\text{g}/\text{m}^3$	2.6 $\mu\text{g}/\text{m}^3$ (d)(e)
		4.4 $\mu\text{g}/\text{m}^3$ (d)
		5.9 $\mu\text{g}/\text{m}^3$ (d)(g)
Carbon Monoxide (CO)	140 $\mu\text{g}/\text{m}^3$	196 $\mu\text{g}/\text{m}^3$ (d)(f) 280 $\mu\text{g}/\text{m}^3$ (d)
Hydrogen Fluoride (HF)	0.50 $\mu\text{g}/\text{m}^3$	1.0 $\mu\text{g}/\text{m}^3$ (d)
Hydrogen Chloride (HCl)	0.24 $\mu\text{g}/\text{m}^3$	0.48 $\mu\text{g}/\text{m}^3$ (d)
Benzene ( $\text{C}_6\text{H}_6$ )	0.35 $\mu\text{g}/\text{m}^3$	0.70 $\mu\text{g}/\text{m}^3$ (d)
Dioxins and Furans (PCDD/Fs)	28.8 fg/ $\text{m}^3$ (b)	n/a

**Table 7.10: Summary of Assessment Background Concentrations**

Pollutant	Annual Mean	Short Term
Antimony (Sb)	No data available	n/a
Arsenic (As)	0.68 ng/m <sup>3</sup>	n/a
Cadmium (Cd)	0.30 ng/m <sup>3</sup>	n/a
Total Cr	4.2 ng/m <sup>3</sup>	8.4 ng/m <sup>3</sup> (d)
Cobalt (Co)	0.21 ng/m <sup>3</sup>	0.42 ng/m <sup>3</sup> (d)
Copper (Cu)	16.8 ng/m <sup>3</sup>	33.6 ng/m <sup>3</sup>
Lead (Pb)	13.9 ng/m <sup>3</sup>	n/a
Manganese (Mn)	13.2 ng/m <sup>3</sup>	26.4 ng/m <sup>3</sup> (d)
Mercury (Hg)	2.0 ng/m <sup>3</sup>	4.0 ng/m <sup>3</sup>
Nickel (Ni)	3.8 ng/m <sup>3</sup>	n/a
Thallium (Tl)	No data available	n/a
Vanadium (V)	1.7 ng/m <sup>3</sup>	3.4 ng/m <sup>3</sup> (d)(e)
Polycyclic Aromatic Hydrocarbons (PAH, as BaP)	0.33 ng/m <sup>3</sup>	n/a
Polychlorinated biphenyls (PCBs)	0.00044 µg/m <sup>3</sup>	0.00088 µg/m <sup>3</sup> (d)
Ammonia (NH <sub>3</sub> )	0.99 µg/m <sup>3</sup>	2.0 µg/m <sup>3</sup> (d)

- (a) Where background concentrations are expressed as range (e.g. trace metals) the average concentration has been used.
- (b) Units are fg/m<sup>3</sup> (femtogram per cubic metre) equivalent to 1 x 10<sup>-15</sup> grams per cubic metre
- (c) Units are ng/m<sup>3</sup> (nanogram per cubic metre) equivalent to 1 x 10<sup>-9</sup> grams per cubic metre
- (d) 1-hour mean background concentration estimated by multiplying the annual mean by a factor of 2 in accordance with the EA Guidance.
- (e) 24-hour mean background concentration estimated by multiplying the 1-hour mean by a factor of 0.59 in accordance with the EA Guidance.

## ASSESSMENT OF OPERATIONAL EFFECTS

### Normal Operations / Emissions

#### *Effects at Human Health Receptors*

7.110 Predicted process concentrations (PC) for the five years of meteorological data are presented as the maximum arising off-site and at each of the discrete receptors identified in Table 7.2.

7.111 The maximum PC is compared with the relevant air quality standard to determine the significance of the impact, in accordance with the EA significance criteria. Where a potentially significant impact is identified, the total; predicted environmental concentration (process + background) is compared with the air quality standard to assess the likelihood of an exceedance.

#### *Nitrogen Dioxide*

7.112 The predicted annual mean and 99.8<sup>th</sup> percentile of 1-hour mean ground level NO<sub>2</sub> process concentrations are presented in Table 7.11.

Table 7.11: Predicted NO <sub>2</sub> Concentrations (µg/m <sup>3</sup> )				
Receptor	Annual Mean		99.8 <sup>th</sup> Percentile of 1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Maximum Off-Site	1.8	4.5%	10.6	5.3%
Vistamar House	0.95	2.4%	10.3	5.1%
Docks Office	0.66	1.6%	10.0	5.0%
Phillipa Freeth Court	0.51	1.3%	9.3	4.6%
Barry Dock Station	0.51	1.3%	9.4	4.7%
54 Dock View Road	0.49	1.2%	10.0	5.0%
89 Dock View Road	0.44	1.1%	9.5	4.8%
131 Dock View Road	0.29	0.73%	7.8	3.9%
Wimbourne Buildings	1.6	3.9%	9.7	4.9%
Bendrick Road	1.0	2.5%	7.4	3.7%
Public Recycling Facility	0.68	1.7%	6.9	3.5%
Atlantic Crescent	0.88	2.2%	8.9	4.4%
Port Office	0.27	0.67%	6.5	3.3%

**Table 7.11: Predicted NO<sub>2</sub> Concentrations (µg/m<sup>3</sup>)**

Receptor	Annual Mean		99.8 <sup>th</sup> Percentile of 1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Queens Way	0.65	1.6%	10.0	5.0%
Dyfrig Street	0.45	1.1%	6.8	3.4%
Standard	40		200	
Background	20		40	
Max PEC	21.8		50.6	
Max PEC as % Standard	54.5		25.3	

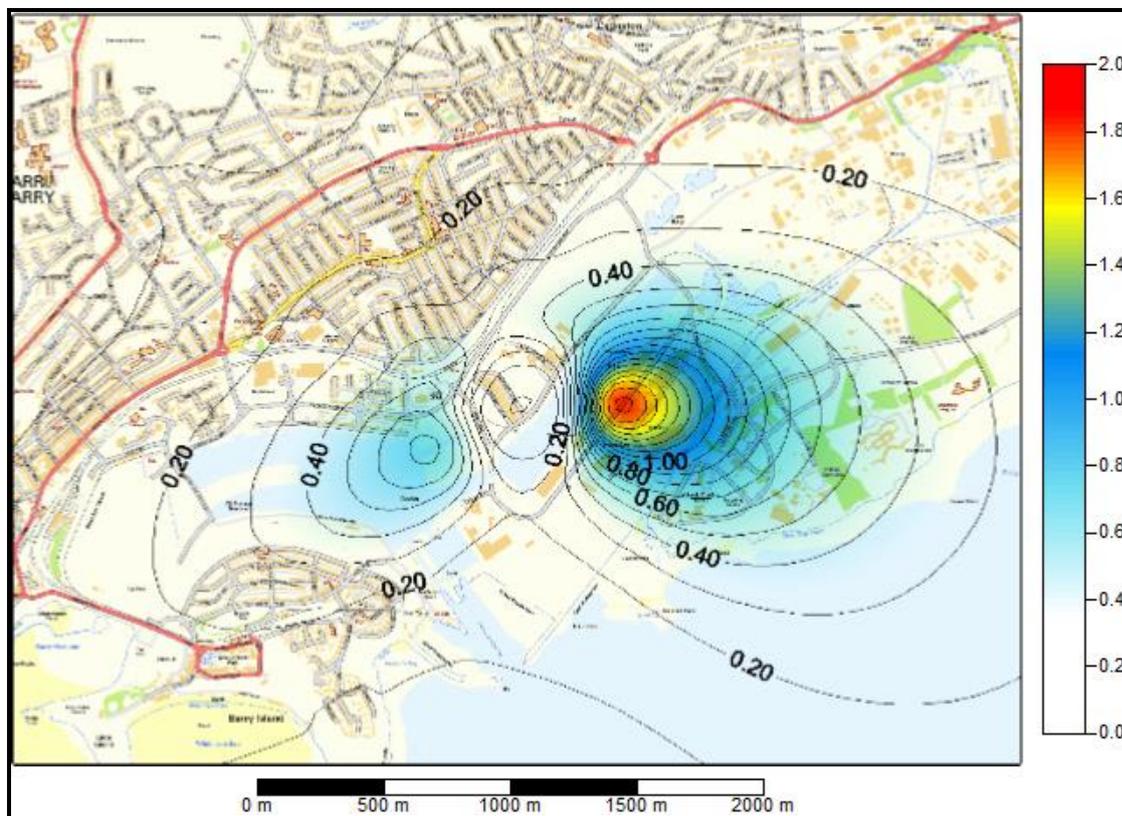
7.113 The maximum off-site annual mean process concentration is 1.8 µg/m<sup>3</sup>, which is potentially significant at 4.5% of the relevant standard which is the Air Quality Strategy Objective (AQO) of 40µg/m<sup>3</sup>. However, the total predicted concentration, PEC (process concentration plus background) is just 54.5% of the AQO, therefore the risk of an exceedance of the annual mean air quality objective is considered to be negligible at any off-site location.

7.114 The predicted short-term impacts are of negligible significance (<10% of the AQO) at all off-site locations.

7.115 Predicted annual and 99.8th percentile of 1-hour mean NO<sub>2</sub> concentrations for 2012 (the year in which the highest off-site annual mean concentrations are predicted) are presented as contour plots in Figures 7.3 and 7.4 respectively.

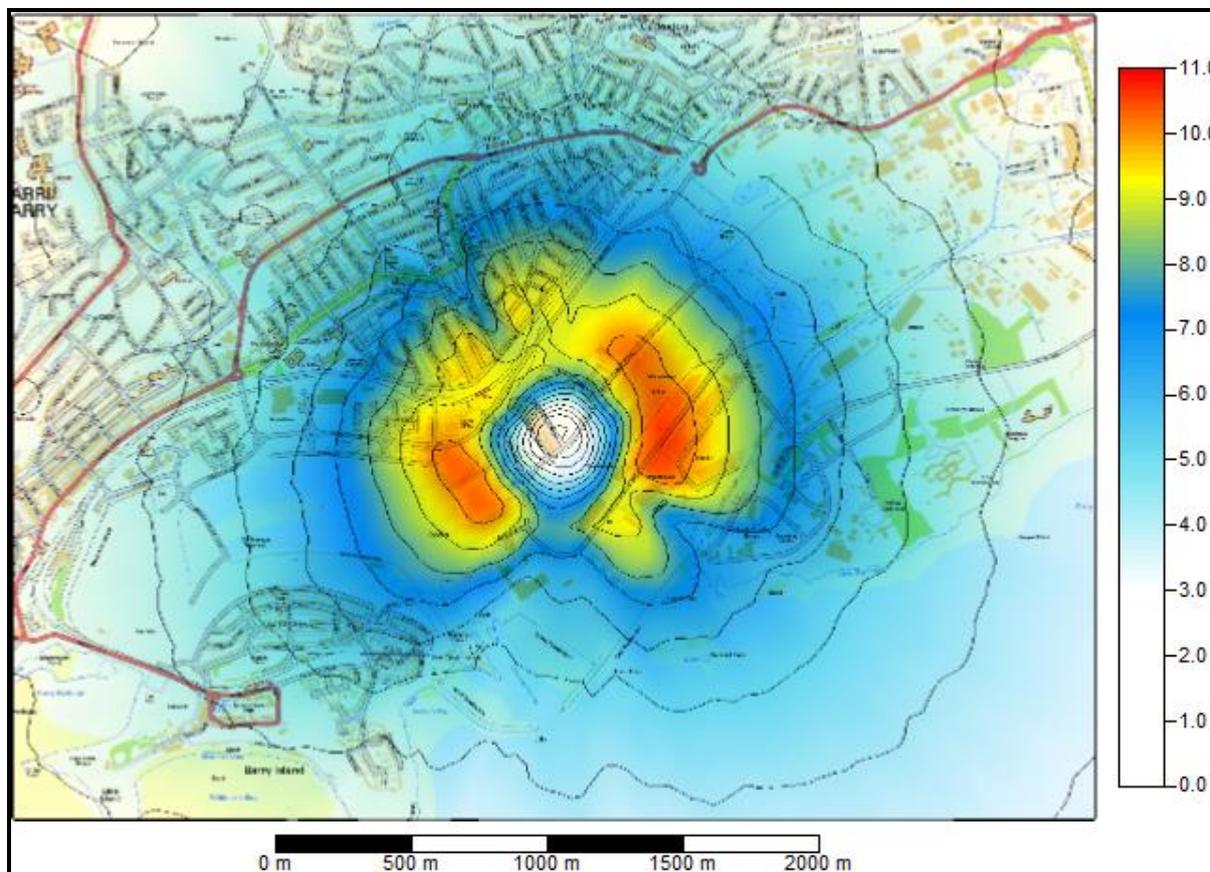
7.116 The influence of locally elevated terrain is clearly seen in the short-term concentrations, with the maximum impact occurring approximately 1.5 km northwest of the proposed facility.

Figure 7.3: Predicted Annual Mean NO<sub>2</sub> Process Concentration ( $\mu\text{g}/\text{m}^3$ )



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**Figure 7.4:** Predicted 99.8<sup>th</sup> Percentile of 1-Hour Mean NO<sub>2</sub> Process Concentrations (µg/m<sup>3</sup>)



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### Carbon Monoxide (CO)

7.117 The predicted maximum 1-hour and 8-hour mean ground level CO process concentrations are presented in Table 7.12.

**Table 7.12: Predicted CO Concentrations (µg/m<sup>3</sup>)**

Receptor	Maximum 8-Hour Mean		Maximum 1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Maximum Off-Site	7.5	0.075%	25.1	0.084%
Vistamar House	6.8	0.068%	8.0	0.027%
Docks Office	6.4	0.064%	7.6	0.025%
Phillipa Freeth Court	6.0	0.060%	7.4	0.025%
Barry Dock Station	5.6	0.056%	7.4	0.025%
54 Dock View Road	6.1	0.061%	7.7	0.026%

**Table 7.12: Predicted CO Concentrations ( $\mu\text{g}/\text{m}^3$ )**

Receptor	Maximum 8-Hour Mean		Maximum 1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
89 Dock View Road	5.7	0.057%	7.3	0.024%
131 Dock View Road	3.8	0.038%	6.0	0.020%
Wimbourne Buildings	6.1	0.061%	7.3	0.024%
Bendrick Road	4.6	0.046%	5.5	0.018%
Public Recycling Facility	3.6	0.036%	5.1	0.017%
Atlantic Crescent	5.7	0.057%	6.9	0.023%
Port Office	4.0	0.040%	5.2	0.017%
Queens Way	6.3	0.063%	7.6	0.025%
Dyfrig Street	4.0	0.040%	5.1	0.017%
Standard	10,000		30,000	
Background	196		280	
Max PEC	203.5		305.1	
Max PEC as % of Standard	2.04%		1.02%	

7.118 The maximum predicted 8-hour and 1-hour PCs are less than 10% of the relevant air quality standards which are the AQO of  $10,000\mu\text{g}/\text{m}^3$  and the EAL of  $30,000\mu\text{g}/\text{m}^3$  respectively, therefore according to the Environment Agency's criteria the significance of the impact is negligible.

### *Sulphur Dioxide ( $\text{SO}_2$ )*

7.119 Predicted  $\text{SO}_2$  process concentrations are presented in Table 7.13.

**Table 7.13: Predicted  $\text{SO}_2$  Concentrations ( $\mu\text{g}/\text{m}^3$ )**

Receptor	99.2 <sup>nd</sup> Percentile of 24-Hour Mean		99.7 <sup>th</sup> Percentile of 1-Hour Mean		99.9 <sup>th</sup> Percentile of 15-Minute Mean	
	PC	PC (% of Standard)	PC	PC (% of Standard)	PC	PC (% of Standard)
Maximum Off-Site	2.9	2.3%	15.1	4.3%	20.5	7.7%
Vistamar House	2.4	1.9%	14.6	4.2%	20.0	7.5%
Docks Office	1.9	1.5%	14.0	4.0%	19.5	7.3%
Phillipa Freeth Court	2.1	1.6%	13.1	3.7%	18.2	6.8%

Barry Dock Station	1.3	1.0%	13.1	3.7%	18.5	7.0%
54 Dock View Road	1.3	1.1%	13.5	3.9%	19.6	7.4%
89 Dock View Road	1.4	1.1%	13.1	3.7%	18.8	7.1%
131 Dock View Road	0.90	0.7%	10.6	3.0%	15.5	5.8%
Wimbourne Buildings	2.6	2.1%	13.7	3.9%	18.8	7.1%
Bendrick Road	1.5	1.2%	10.5	3.0%	14.4	5.4%
Public Recycling Facility	1.2	1.0%	9.8	2.8%	13.5	5.1%
Atlantic Crescent	1.7	1.4%	12.3	3.5%	17.6	6.6%
Port Office	0.90	0.72%	9.1	2.6%	12.8	4.8%
Queens Way	2.2	1.7%	14.2	4.1%	19.5	7.3%
Dyfrig Street	1.3	1.0%	9.6	2.7%	13.2	4.9%
Standard	125		350		266	
Background	2.6		4.4		5.9	
PEC	5.5		19.5		26.4	
PEC as % of Standard	4.4%		5.6%		9.9%	

7.120 The maximum predicted ground level SO<sub>2</sub> process concentrations are less than 10% of the relevant AQOs and are therefore of **negligible significance**.

#### *Particulate Matter (as PM<sub>10</sub>)*

7.121 Predicted annual mean and 90.4th percentile of 24-hour mean ground level PM<sub>10</sub> process concentrations are presented in Table 7.14. The predictions assume that 100% of the particulate matter is emitted from the stack is PM<sub>10</sub>.

Table 7.14: Predicted PM<sub>10</sub> Concentrations (µg/m<sup>3</sup>)

Receptor	Annual Mean		90.4 <sup>th</sup> Percentile 24-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Maximum Off-Site	0.13	0.33%	0.36	0.71%
Vistamar House	0.068	0.17%	0.28	0.55%
Docks Office	0.047	0.12%	0.14	0.28%
Phillipa Freeth Court	0.037	0.091%	0.13	0.25%
Barry Dock Station	0.037	0.091%	0.13	0.26%
54 Dock View Road	0.035	0.087%	0.11	0.22%

89 Dock View Road	0.032	0.079%	0.093	0.19%
131 Dock View Road	0.021	0.052%	0.064	0.13%
Wimbourne Buildings	0.11	0.28%	0.29	0.58%
Bendrick Road	0.072	0.18%	0.18	0.36%
Public Recycling Facility	0.049	0.12%	0.13	0.26%
Atlantic Crescent	0.063	0.16%	0.17	0.34%
Port Office	0.019	0.048%	0.056	0.11%
Queens Way	0.046	0.12%	0.15	0.31%
Dyfrig Street	0.032	0.080%	0.12	0.24%
Standard	40		50	
Background	13.5		15.9	
Max PEC	0.34		16.26	
Max PEC as % of Standard	34.1%		32.5%	

7.122 The predicted maximum ground level PM<sub>10</sub> concentrations are less than 1% and 10% of the long and short-term AQOs respectively and are therefore of **negligible significance**.

#### *Particulate Matter (as PM<sub>2.5</sub>)*

7.123 Predicted annual mean ground-level PM<sub>2.5</sub> process concentrations are presented in Table 7.15. The predictions assume that 100% of the particulate matter emitted from the stack is PM<sub>2.5</sub>.

Table 7.15: Predicted PM<sub>2.5</sub> Concentrations (µg/m<sup>3</sup>)

Receptor	Annual Mean	
	PC	PC (% Standard)
Maximum Off-Site	0.13	0.53%
Vistamar House	0.068	0.27%
Docks Office	0.047	0.19%
Phillipa Freeth Court	0.037	0.15%
Barry Dock Station	0.037	0.15%
54 Dock View Road	0.035	0.14%
89 Dock View Road	0.032	0.13%
131 Dock View Road	0.021	0.083%
Wimbourne Buildings	0.11	0.44%

Bendrick Road	0.072	0.29%
Public Recycling Facility	0.049	0.20%
Atlantic Crescent	0.063	0.25%
Port Office	0.019	0.08%
Queens Way	0.046	0.18%
Dyfrig Street	0.032	0.13%
Standard		25
Background		9.5
Max PEC		9.6
Max PEC as % of Standard		38.5%

7.124 Maximum predicted annual mean PM<sub>2.5</sub> concentrations are less than 1% of the EU limit value are therefore of **negligible significance**.

*Total Organic Carbon (as Benzene)*

7.125 Predicted annual mean ground-level C<sub>6</sub>H<sub>6</sub> concentrations are presented in Table 7.16.

Receptor	Annual Mean		1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Maximum Off-Site	0.13	2.7%	4.9	2.5%
Vistamar House	0.068	1.4%	1.6	0.21%
Docks Office	0.047	0.94%	1.5	0.20%
Phillipa Freeth Court	0.037	0.73%	1.5	0.20%
Barry Dock Station	0.037	0.73%	1.5	0.20%
54 Dock View Road	0.035	0.69%	1.5	0.21%
89 Dock View Road	0.032	0.63%	1.5	0.20%
131 Dock View Road	0.021	0.42%	1.2	0.16%
Wimbourne Buildings	0.11	2.2%	1.5	0.19%
Bendrick Road	0.072	1.4%	1.1	0.15%
Public Recycling Facility	0.049	0.98%	1.0	0.14%
Atlantic Crescent	0.063	1.3%	1.4	0.18%
Port Office	0.019	0.38%	1.0	0.14%

Table 7.16 Predicted C<sub>6</sub>H<sub>6</sub> Concentrations (µg/m<sup>3</sup>)

Receptor	Annual Mean		1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Queens Way	0.046	0.92%	1.5	0.20%
Dyfrig Street	0.032	0.64%	1.0	0.14%
Standard	5		195	
Background	0.35		0.7	
Max PEC	0.48		5.6	
Max PEC as % of Standard	9.6%		2.9%	

7.126 The predicted maximum ground level C<sub>6</sub>H<sub>6</sub> PC is potentially significant at 2.7% of the air quality objective, however the predicted PEC is just 9.6% of the objective and the impact is therefore of **negligible significance**.

7.127 The short-term PCs are less than 10% of the EAL and are therefore also of **negligible significance**.

#### Hydrogen Chloride (HCl)

7.128 The maximum predicted 1-hour mean ground-level HCl process concentrations are presented in Table 7.17.

Table 7.17: Predicted HCl Concentrations (µg/m<sup>3</sup>)

Receptor	1-Hour Mean	
	PC	PC (% Standard)
Maximum Off-Site	14.8	2.0%
Vistamar House	4.8	0.64%
Docks Office	4.6	0.61%
Phillipa Freeth Court	4.4	0.59%
Barry Dock Station	4.5	0.59%
54 Dock View Road	4.6	0.62%
89 Dock View Road	4.4	0.59%
131 Dock View Road	3.6	0.48%
Wimbourne Buildings	4.4	0.58%
Bendrick Road	3.3	0.44%

Public Recycling Facility	3.1	0.41%
Atlantic Crescent	4.1	0.55%
Port Office	3.1	0.42%
Queens Way	4.6	0.61%
Dyfrig Street	3.1	0.41%
Standard	750	
Background	0.24	
Max PEC	15.04	
Max PEC as % of Standard	2.0%	

7.129 Predicted maximum 1-hour mean off-site ground level HCl concentrations are less than 10% of the EPAQS guideline value for protection from irritant and respiratory effects at all of the identified receptor locations, therefore the significance of the impact is **negligible**.

#### *Hydrogen Fluoride (HF)*

7.130 The predicted monthly mean and 1-hour mean ground-level HF process concentrations are presented in Table 7.18.

Receptor	Annual Mean		1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Maximum Off-Site	0.024	0.15%	0.98	0.61%
Vistamar House	0.022	0.14%	0.32	0.20%
Docks Office	0.013	0.081%	0.31	0.19%
Phillipa Freeth Court	0.0087	0.054%	0.30	0.18%
Barry Dock Station	0.0079	0.049%	0.30	0.19%
54 Dock View Road	0.0074	0.046%	0.31	0.19%
89 Dock View Road	0.0076	0.048%	0.29	0.18%
131 Dock View Road	0.0043	0.027%	0.24	0.15%
Wimbourne Buildings	0.021	0.13%	0.29	0.18%
Bendrick Road	0.013	0.080%	0.22	0.14%
Public Recycling Facility	0.010	0.065%	0.20	0.13%
Atlantic Crescent	0.013	0.081%	0.27	0.17%

Port Office	0.0031	0.019%	0.21	0.13%
Queens Way	0.0072	0.045%	0.30	0.19%
Dyfrig Street	0.0052	0.033%	0.20	0.13%
Standard	16		160	
Background	0.5		1.0	
Max PEC	0.502		1.98	
Max PEC as % of Standard	3.1%		1.2%	

7.131 The maximum predicted ground level monthly mean and 1-hour mean HF concentrations are less than 1% and 10% of the long and short-term EPAQS guideline values, therefore the significance of the impact is **negligible**.

#### *Dioxins and Furans*

7.132 The predicted annual mean ground-level dioxin and furan process concentrations at identified sensitive receptor locations are presented in Table 7.19. The results are presented in femtograms (fg) per cubic metre (10-15 g/m<sup>3</sup>).

Table 7.19: Predicted Dioxin and Furan Concentrations (fg/m<sup>3</sup>)

Receptor	Annual Mean
	PC
Maximum Off-Site	1.3
Vistamar House	0.68
Docks Office	0.47
Phillipa Freeth Court	0.37
Barry Dock Station	0.37
54 Dock View Road	0.35
89 Dock View Road	0.32
131 Dock View Road	0.21
Wimbourne Buildings	1.1
Bendrick Road	0.72
Public Recycling Facility	0.49
Atlantic Crescent	0.63
Port Office	0.19

**Table 7.19: Predicted Dioxin and Furan Concentrations (fg/m<sup>3</sup>)**

Receptor	Annual Mean
	PC
Queens Way	0.46
Dyfrig Street	0.32
Background	28.8

7.133 There are no assessment criteria for dioxins and furans. The predicted maximum contribution from the Operational Development is 4.6% of the average background concentration measured at urban monitoring sites in the UK.

7.134 Health effects from dioxins and furans can occur through exposure routes other than purely inhalation (for example ingestion), therefore a human health risk assessment was completed to determine the overall risk of exposure to the substances emitted to air from the proposed plant. A Human Health Risk Assessment Report is included as **Appendix 7.4**, this report demonstrates that for the maximally exposed individual considered, the exposure to dioxins, furans and dioxin-like PECs is **not significant**.

*PAH (as Benzo[a]pyrene)*

7.135 The maximum predicted annual mean ground-level B[a]P process concentrations are presented in Table 7.20. The results are presented in nanograms (ng) per cubic metre (10<sup>-9</sup> g/m<sup>3</sup>).

**Table 7.20 Predicted B[a]P Concentrations (ng/m<sup>3</sup>)**

Receptor	Annual Mean	
	PC	PC (% Standard)
Maximum Off-Site	0.13	13.3%
Vistamar House	0.068	6.8%
Docks Office	0.047	4.7%
Phillipa Freeth Court	0.037	3.7%
Barry Dock Station	0.037	3.7%
54 Dock View Road	0.035	3.5%
89 Dock View Road	0.032	3.2%
131 Dock View Road	0.021	2.1%
Wimbourne Buildings	0.11	11.1%

Bendrick Road	0.072	7.2%
Public Recycling Facility	0.049	4.9%
Atlantic Crescent	0.063	6.3%
Port Office	0.019	1.9%
Queens Way	0.046	4.6%
Dyfrig Street	0.032	3.2%
Standard	1.0	
Background	0.33	
Max PEC	0.46	
Max PEC as % of Standard	46%	

7.136 The maximum predicted off-site annual mean ground level B[a]P concentration is 13.3% of the EU limit value, however the PEC is less than 70% of the limit value and the impact of the proposed facility is therefore of **negligible significance**.

#### *Polychlorinated Biphenyls (PCBs)*

7.137 The predicted annual and maximum 1-hour mean ground-level PCB process concentrations are presented in Table 7.21. The results are presented in nanograms (ng) per cubic metre (10<sup>-9</sup> g/m<sup>3</sup>).

Table 7.21 Predicted PCB Concentrations ng/m<sup>3</sup>)

Receptor	Annual Mean		1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Maximum Off-Site	0.066	0.033%	1.2	0.021%
Vistamar House	0.034	0.017%	0.40	0.0066%
Docks Office	0.023	0.012%	0.38	0.0064%
Phillipa Freeth Court	0.018	0.0091%	0.37	0.0062%
Barry Dock Station	0.018	0.0091%	0.37	0.0062%
54 Dock View Road	0.017	0.0087%	0.39	0.0064%
89 Dock View Road	0.016	0.0079%	0.37	0.0061%
131 Dock View Road	0.010	0.0052%	0.30	0.0050%
Wimbourne Buildings	0.056	0.028%	0.36	0.0061%
Bendrick Road	0.036	0.018%	0.28	0.0046%
Public Recycling Facility	0.024	0.012%	0.26	0.0043%

Atlantic Crescent	0.031	0.016%	0.34	0.0057%
Port Office	0.0096	0.0048%	0.26	0.0043%
Queens Way	0.023	0.012%	0.38	0.0063%
Dyfrig Street	0.016	0.0080%	0.25	0.0042%
Standard	200		6000	
Background	0.44		0.88	
Max PEC	0.506		2.08	
Max PEC as % of Standard	0.25		0.03%	

7.138 Maximum predicted ground level annual mean and 1-hour mean PCB concentrations are less than 1% and 10% of the long and short-term EALs, therefore the significance of the impact is **negligible**.

#### *Ammonia (NH<sub>3</sub>)*

7.139 The predicted annual and maximum 1-hour mean ground-level NH<sub>3</sub> process concentrations are presented in Table 7.22.

Table 7.22: Predicted NH<sub>3</sub> Concentrations (ng/m<sup>3</sup>)

Receptor	Annual Mean		1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Maximum Off-Site	0.066	0.037%	1.26	0.050%
Vistamar House	0.034	0.019%	0.40	0.016%
Docks Office	0.023	0.013%	0.38	0.015%
Phillipa Freeth Court	0.018	0.010%	0.37	0.015%
Barry Dock Station	0.018	0.010%	0.37	0.015%
54 Dock View Road	0.017	0.0096%	0.39	0.015%
89 Dock View Road	0.016	0.0088%	0.37	0.015%
131 Dock View Road	0.010	0.0058%	0.30	0.012%
Wimbourne Buildings	0.056	0.031%	0.36	0.015%
Bendrick Road	0.036	0.020%	0.28	0.011%
Public Recycling Facility	0.024	0.014%	0.26	0.010%
Atlantic Crescent	0.031	0.017%	0.34	0.014%
Port Office	0.010	0.0053%	0.26	0.010%
Queens Way	0.023	0.013%	0.38	0.015%

**Table 7.22: Predicted NH<sub>3</sub> Concentrations (ng/m<sup>3</sup>)**

Receptor	Annual Mean		1-Hour Mean	
	PC	PC (% Standard)	PC	PC (% Standard)
Dyfrig Street	0.016	0.0089%	0.25	0.010%
Standard		180		2500
Background		0.99		2.0
Max PEC		0.966		3.26
Max PEC as % Standard		0.54%		0.13%

7.140 Maximum predicted ground level annual mean and 1-hour mean NH<sub>3</sub> concentrations are less than 1% and 10% of the long and short-term EALs, therefore the significance of the impact is **negligible**.

### Trace Metals

#### Step One: Screening

7.141 The predicted maximum long and short-term trace metal impacts at sensitive receptors for emissions at maximum IED limits are presented in Tables 7.23 and 7.24 respectively.

7.142 For the group 3 metals (Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V), if both the long and short term PCs are within the relevant EALs, then the impact is considered insignificant, in accordance with the Environment Agency’s metals guidance.

7.143 The Step One screening has assumed that the background concentration is equal to the average measured at urban sites for each pollutant. The predicted and background concentrations are apportioned 80% Cr (III): 20% Cr(VI).

**Table 7.23: Long Term Trace Metal Predictions – Step One (µg/m<sup>3</sup>)**

Pollutant	EAL (µg/m <sup>3</sup> )	Max PC (µg/m <sup>3</sup> )	Background (µg/m <sup>3</sup> )	PC (% of EAL)	PEC (% of EAL)	Further Assessment Required
Cd	0.005	0.00056	0.00030	11.1%	17.1%	No

**Table 7.23: Long Term Trace Metal Predictions – Step One ( $\mu\text{g}/\text{m}^3$ )**

Pollutant	EAL ( $\mu\text{g}/\text{m}^3$ )	Max PC ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	PC (% of EAL)	PEC (% of EAL)	Further Assessment Required
Tl	1	0.00056	n/a	0.056%	0.056%	No
Hg	0.25	0.00056	0.0020	0.22%	1.0%	No
Sb	5	0.0056	n/a	0.11%	0.11%	No
<b>As</b>	<b>0.003</b>	<b>0.0056</b>	<b>0.00068</b>	<b>185%</b>	<b>208%</b>	<b>Yes</b>
Cr (III)	5	0.0044	0.0034	0.089%	0.16%	No
<b>Cr (VI)</b>	<b>0.0002</b>	<b>0.0011</b>	<b>0.00085</b>	<b>556%</b>	<b>981%</b>	<b>Yes</b>
Co	1	0.0056	0.00021	0.56%	0.58%	No
Cu	10	0.0056	0.017	0.056%	0.22%	No
Pb	0.25	0.0056	0.014	2.2%	7.8%	No
Mn	0.15	0.0056	0.013	3.7%	12.5%	No
Ni	0.02	0.0056	0.0038	27.8%	46.8%	No
V	5	0.0056	0.0017	0.11%	0.15%	No

**Table 7.24: Short Term Trace Metal Predictions – Step One ( $\mu\text{g}/\text{m}^3$ )**

Pollutant	EAL ( $\mu\text{g}/\text{m}^3$ )	Max PC ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	PC (% of EAL)	PEC (% of EAL)	Further Assessment Required
Tl	30	0.0040	n/a	0.013%	No	Tl
Hg	7.5	0.0040	0.0040	0.053%	No	Hg
Sb	150	0.040	n/a	0.027%	No	Sb
Cr (III)	150	0.032	0.0068	0.021%	No	Cr (III)
Cr (VI)	3	0.0080	0.0017	0.27%	No	Cr (VI)
Co	30	0.040	0.00042	0.13%	No	Co
Cu	200	0.040	0.034	0.020%	No	Cu
Mn	150	0.040	0.026	0.027%	No	Mn
V	1	0.029	0.0034	2.9%	No	V

7.144 On the basis of the Step One screening, further assessment is required for long-term arsenic and chromium (VI) only. The maximum predicted short-term impacts are negligible for all trace metals.

### Step Two: Emissions at 11% of IED Limits

7.145 Maximum predicted concentrations of arsenic and chromium (VI) are presented in Table 7.25 for emissions at 11% of the maximum IED limits (1/9th of ELV). No Cr(III):Cr(VI) apportionment has been applied to either the emissions or background concentration. The results show that the EAL for Cr(VI) continues to be substantially exceeded and further assessment is required.

**Table 7.25: Long Term Trace Metal Predictions – Step Two ( $\mu\text{g}/\text{m}^3$ )**

Pollutant	EAL ( $\mu\text{g}/\text{m}^3$ )	Max PC ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	PC (% of EAL)	PEC (% of EAL)	Further Assessment Required
As	0.003	0.00062	0.00068	20.6%	No	As
<b>Cr (VI)</b>	<b>0.0002</b>	<b>0.00062</b>	<b>0.0042</b>	<b>126%</b>	<b>Yes</b>	<b>Cr (VI)</b>

### Step Three: Typical Operational Emissions

7.146 The EA metals guidance provides a range of emission concentrations measured at 18 municipal waste incineration (MWI) facilities in the UK. A maximum chromium Cr(VI) emission concentration of 1.3 x 10<sup>-4</sup> mg/Nm<sup>3</sup> is provided.

7.147 Predicted annual mean Cr(VI) concentrations at this maximum operational emission rate are presented as a percentage of the EAL in Table 7.26.

**Table 7.26: Predicted Annual Mean Chromium (VI) Concentrations ( $\text{ng}/\text{m}^3$ )**

Receptor	Annual Mean	
	PC	PC (% Standard)
Maximum Off-Site	0.0017	0.85%
Vistamar House	0.00088	0.44%
Docks Office	0.00061	0.30%
Phillipa Freeth Court	0.00048	0.24%
Barry Dock Station	0.00047	0.24%
54 Dock View Road	0.00045	0.23%
89 Dock View Road	0.00041	0.21%
131 Dock View Road	0.00027	0.14%

Wimbourne Buildings	0.0014	0.72%
Bendrick Road	0.00093	0.47%
Public Recycling Facility	0.00063	0.32%
Atlantic Crescent	0.00082	0.41%
Port Office	0.00025	0.12%
Queens Way	0.00060	0.30%
Dyfrig Street	0.00042	0.21%
Standard		0.2
Background		4.2

7.148 For maximum typical operational emissions, the maximum predicted annual mean Cr(VI) concentrations off-site and at the identified receptors are **negligible** (<1%) compared with the EAL.

#### *Summary of Stack Emissions Impact*

7.149 A summary of the significance of the predicted significance of the impact on pollutant concentrations at receptor locations is presented in Table 7.27.

Table 7.27: Summary of Impact Significance for Maximum Off-Site Concentrations

Pollutant	Significance
	PC
Particles (PM <sub>10</sub> )	Negligible
Particles (PM <sub>2.5</sub> )	Negligible
Nitrogen Dioxide (NO <sub>2</sub> )	Negligible
Sulphur Dioxide (SO <sub>2</sub> )	Negligible
Carbon Monoxide (CO)	Negligible
Hydrogen Fluoride (HF)	Negligible
Hydrogen Chloride (HCl)	Negligible
Benzene (C <sub>6</sub> H <sub>6</sub> )	Negligible
Dioxins and Furans (PCDD/Fs)	Negligible
Cadmium (Cd)	Negligible
Thallium (Tl)	Negligible
Mercury (Hg)	Negligible
Arsenic (As)	Negligible

**Table 7.27: Summary of Impact Significance for Maximum Off-Site Concentrations**

Pollutant	Significance
	PC
Chromium (CrIII)	Negligible
Chromium (CrIV)	Negligible
Cobalt (Co)	Negligible
Copper (Cu)	Negligible
Lead (Pb)	Negligible
Manganese (Mn)	Negligible
Nickel (Ni)	Negligible
Antimony (Sb)	Negligible
Vanadium (V)	Negligible
Polycyclic Aromatic Hydrocarbons, PAH (as B[a]P)	Negligible
Polychlorinated Biphenyls (PCBs)	Negligible
Ammonia (NH <sub>3</sub> )	Negligible

### Effects on Ecological Habitats

#### *Airborne Concentrations of NO<sub>x</sub>, SO<sub>2</sub> and HF*

7.150 Predicted maximum ground level concentrations of NO<sub>x</sub>, SO<sub>2</sub>, HF and NH<sub>3</sub> at the sensitive habitat sites are compared with the relevant critical level (CL) and background concentrations obtained from APIS in Tables 7.28 to 7.31.

**Table 7.28: Predicted Airborne NO<sub>x</sub> Concentrations as a % of Critical Level**

Habitat Site	Annual Mean		Daily Mean	
	PC (as % of CL)	PEC (as % of CL) (a)	PC (as % of CL)	PEC (as % of CL) (b)
Cadoxton River SINC	5.6%	48.2%	9.7%	32.3%
Cadoxton Wetlands SINC	1.8%	48.0%	8.5%	31.1%
Fields at Merthyr Dyfan SINC	0.42%	48.0%	1.7%	24.3%
Friars Point SINC	0.89%	48.0%	3.0%	25.6%
Gladstone Road Pond SINC	1.0%	48.0%	6.1%	28.8%
Nells Point East SINC	1.5%	48.0%	6.7%	29.3%

**Table 7.28: Predicted Airborne NOx Concentrations as a % of Critical Level**

Habitat Site	Annual Mean		Daily Mean	
	PC (as % of CL)	PEC (as % of CL) (a)	PC (as % of CL)	PEC (as % of CL) (b)
North of North Road SINC	0.64%	48.0%	2.4%	25.1%
Cadoxton Ponds Wildlife Trust Reserve	1.8%	48.0%	8.5%	31.1%
Severn Estuary Ramsar	0.51%	48.7%	1.2%	24.1%
Severn Estuary SPA	0.22%	48.7%	0.60%	23.6%
Ancient Woodland (Hayes Lane)	3.2%	48.1%	6.1%	28.7%
Severn Estuary SAC	0.22%	48.7%	0.60%	23.6%
Critical Level	30		75	

(a) Includes annual mean NOx backgrounds obtained from APIS

(b) Includes 24-hour mean NOx background concentration (annual mean x 2 x 0.59, in accordance with EA guidance)

**Table 7.29: Predicted Annual mean SO<sub>2</sub> Concentrations as a % of Critical Level**

Habitat Site	PC (as % of CL)	PEC (as % of CL)
Cadoxton River SINC	2.1%	13.2%
Cadoxton Wetlands SINC	0.68%	11.7%
Fields at Merthyr Dyfan SINC	0.16%	11.2%
Friars Point SINC	0.33%	11.4%
Gladstone Road Pond SINC	0.39%	11.4%
Nells Point East SINC	0.55%	11.6%
North of North Road SINC	0.24%	11.3%
Cadoxton Ponds Wildlife Trust Reserve	0.68%	11.7%
Severn Estuary Ramsar	0.19%	8.7%
Severn Estuary SPA	0.081%	8.6%
Ancient Woodland (Hayes Lane)	1.2%	12.2%
Severn Estuary SAC	0.081%	8.6%
Critical Level	20	

**Table 7.30: Predicted HF Concentrations as a % of Critical Level**

Habitat Site	Daily Mean		Weekly Mean	
	PC (as % of CL)	PEC (as % of CL) (a)	PC (as % of CL) (b)	PEC (as % of CL) (c)
Cadoxton River SINC	0.85%	12.7%	3.0%	n/a
Cadoxton Wetlands SINC	0.64%	12.4%	1.3%	n/a
Fields at Merthyr Dyfan SINC	0.23%	12.0%	0.25%	n/a
Friars Point SINC	0.28%	12.1%	0.69%	n/a
Gladstone Road Pond SINC	0.47%	12.3%	0.73%	n/a
Nells Point East SINC	0.50%	12.3%	0.74%	n/a
North of North Road SINC	0.20%	12.0%	0.39%	n/a
Cadoxton Ponds Wildlife Trust Reserve	0.64%	12.4%	1.3%	n/a
Severn Estuary Ramsar	0.092%	11.9%	0.30%	n/a
Severn Estuary SPA	0.047%	11.8%	0.10%	n/a
Ancient Woodland (Hayes Lane)	0.48%	12.3%	1.7%	n/a
Severn Estuary SAC	0.047%	11.8%	0.10%	n/a
<b>Critical Level</b>	<b>5</b>		<b>0.5</b>	

- (a) Includes 24-hour mean NO<sub>x</sub> background concentration (annual mean x 2 x 0.59, in accordance with EA guidance)
- (b) It is not possible to predict weekly concentrations using the AERMOD dispersion model, therefore the monthly mean concentrations have been compared with the CL
- (c) There is not current guidance available with regard to calculating a monthly mean background concentration from the annual mean

**Table 7.31: Predicted Annual mean NH<sub>3</sub> Concentrations as a % of Critical Level**

Habitat Site	PC (as % of CL)	PEC (as % of CL)
Cadoxton River SINC	1.4%	33.0%
Cadoxton Wetlands SINC	0.45%	33.0%
Fields at Merthyr Dyfan SINC	0.11%	33.0%
Friars Point SINC	0.22%	33.0%
Gladstone Road Pond SINC	0.26%	33.0%
Nells Point East SINC	0.36%	33.0%
North of North Road SINC	0.16%	33.0%
Cadoxton Ponds Wildlife Trust Reserve	0.45%	33.0%
Severn Estuary Ramsar	0.13%	22.0%

Severn Estuary SPA	0.054%	22.0%
Ancient Woodland (Hayes Lane)	0.79%	33.0%
Severn Estuary SAC	0.054%	22.0%
Critical Level	3	

7.151 There are no predicted exceedances of the critical levels for NO<sub>x</sub>, SO<sub>2</sub> or HF at any of the identified sensitive habitat sites. At the statutory habitat sites, the long-term process impacts are less than 1% of the relevant critical level and therefore of **negligible significance**.

7.152 The short-term NO<sub>x</sub> process concentrations are of **negligible significance** at all of the identified habitat sites.

### *Eutrophication*

7.153 Predicted maximum nutrient nitrogen deposition rates are compared with the critical load for eutrophication in Table 7.32.

**Table 7.32: Predicted Eutrophication Rates (kg N/ha/yr)**

Habitat Site	Critical Load (CL)	PC (as % of CL)	PEC (as % of CL)
Cadoxton River SINC	15	3.1%	83.4%
Cadoxton Wetlands SINC	15	0.99%	81.3%
Fields at Merthyr Dyfan SINC	20	0.17%	60.4%
Friars Point SINC	20	0.36%	60.6%
Gladstone Road Pond SINC	n/a	n/a	n/a
Nells Point East SINC	20	0.60%	60.8%
North of North Road SINC	15	0.35%	80.6%
Cadoxton Ponds Wildlife Trust Reserve	15	0.99%	81.3%
Severn Estuary Ramsar	20	0.21%	50.7%
Severn Estuary SPA	20	0.089%	50.6%
Ancient Woodland (Hayes Lane)	10	4.6%	219%
Severn Estuary SAC	20	0.089%	50.6%

7.154 The predicted PC's are less than 1% and 100% of the relevant critical loads at the statutory and locally designated sites respectively. On this basis the significance of the impact of the Operation of the 'As-Built' Scheme is **negligible**.

#### *Acidification*

7.155 Predicted nitrogen and sulphur acidification rates are compared with the relevant critical loads and background acidification rates in Table 7.33.

Table 7.33: Predicted Acidification Rates (keq/ha/yr)		
Habitat Site	PC (as % of CLF)	PEC (as % of CLF)
Fields at Merthyr Dyfan SINC	0.16%	22.3%
Friars Point SINC	0.34%	22.6%
Nells Point East SINC	0.56%	22.9%
Ancient Woodland (Hayes Lane)	3.6%	60.5%

7.156 The maximum predicted acidification rates (PC) are less than 100% of the CLFs and are therefore of **negligible significance**.

#### *Deposition to Ground*

7.157 A summary of the screening assessment for deposition of pollutants to ground is presented in Table 7.34. It has been assumed that each of the Group I and Group III metals are emitted at ½ and 1/9th of the maximum IED ELVs of 0.05 and 0.5 mg/Nm<sup>3</sup>, respectively.

7.158 The maximum off-site deposition rates are negligible compared with the Limit Values specified by the Environment Agency.

Table 7.34: Predicted Deposition Rates to Ground (µg/m <sup>2</sup> /day)			
Pollutant	Limit	PC	PC (% of Limit)
As	0.02	2.5 x 10 <sup>-7</sup>	<0.001%
Cd	0.009	1.1 x 10 <sup>-9</sup>	<0.001%
Cr	1.5	2.5 x 10 <sup>-7</sup>	<0.001%

**Table 7.34: Predicted Deposition Rates to Ground ( $\mu\text{g}/\text{m}^2/\text{day}$ )**

Pollutant	Limit	PC	PC (% of Limit)
Cu	0.25	$2.5 \times 10^{-7}$	<0.001%
F	2.1	$1.8 \times 10^{-5}$	<0.001%
Pb	1.1	$2.5 \times 10^{-7}$	<0.001%
Hg	0.004	$2.2 \times 10^{-9}$	<0.001%
Ni	0.11	$2.5 \times 10^{-7}$	<0.001%

## Abnormal Operations / Emissions

### *Failure of Urea Injection and Lime Dosing Operation*

7.159 The plant control systems continuously monitor the urea and lime injection systems and the values stored within the bulk storage containers. The control systems will not allow the plant to continue operating without there being adequate supplies of urea or lime reagent available. Once the critical 'low level' reagent alarm is activated, the plant will automatically shut down without any loss of performance. It is therefore considered that emissions would not occur in the event of failure of the Urea Injection System or Lime Dosing Operation.

7.160 The reagent injection systems operate across many zones of the combustion plant, all of which have been designed with duty and standby pumps. Similarly, all reagent and abatement systems are fitted with duty and standby systems which have been subject to HAZOP assessment to ensure that the plant fails safe in all instances.

### *Failure of Activated Carbon Dosing*

#### *Trace Metals*

##### Step One: Screening

7.161 The predicted maximum short-term Group III trace metal impacts at sensitive receptors for emissions at  $5 \text{ mg}/\text{Nm}^3$  are presented in Table 7.35.

7.162 The Step One screening has assumed that the background concentration is equal to the average measured at urban sites for each pollutant. The predicted and background concentrations are apportioned 80% Cr (III): 20% Cr(VI).

Table 7.35 Short Term Group III Trace Metal Predictions – Step One ( $\mu\text{g}/\text{m}^3$ )					
Pollutant	EAL ( $\mu\text{g}/\text{m}^3$ )	Max PC ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	Max PC (% of EAL)	Further Assessment Required
Sb	150	0.40	n/a	0.27%	No
Cr (III)	150	0.32	0.0068	0.21%	No
Cr (VI)	3	0.080	0.0017	2.7%	No
Co	30	0.40	0.00042	1.3%	No
Cu	200	0.40	0.034	0.20%	No
Mn	150	0.40	0.026	0.27%	No
<b>V</b>	<b>1</b>	<b>0.29</b>	<b>0.0034</b>	<b>28.9%</b>	<b>Yes</b>

7.163 On the basis of the Step One screening, further assessment is required for vanadium only.

#### Step Two: Emissions at 11% of Group III Limit

7.164 Maximum predicted 24-hour mean concentrations of vanadium are presented in Table 7.36 for emissions at 11% of the ‘abnormal emissions’ Group III limit of  $5 \text{ mg}/\text{Nm}^3$ .

Table 7.36: Maximum Off Site 24-Hour Mean Vanadium Concentration – Step Two ( $\mu\text{g}/\text{m}^3$ )					
Pollutant	EAL ( $\mu\text{g}/\text{m}^3$ )	Max PC ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	Max PC (% of EAL)	Further Assessment Required
V	1	0.032	0.0034	3.2%	No

7.165 The maximum predicted short-term vanadium concentration is less than 10% of the EAL, therefore the significance of the impact is considered to be **negligible**.

## Failure of Bag Filter

### Particulate Matter (as PM<sub>10</sub>)

7.166 Predicted 90.4th percentile of 24-hour mean ground level PM<sub>10</sub> process concentrations are presented in Table 7.37. The predictions assume that 100% of the particulate matter is emitted from the stack is PM<sub>10</sub>.

Receptor	90.4 <sup>th</sup> Percentile of 24-Hour Means	
	PC	PC (% Standard)
Maximum Off-Site	5.2	10.5%
Vistamar House	4.1	8.3%
Docks Office	2.1	4.3%
Phillipa Freeth Court	1.9	3.8%
Barry Dock Station	2.0	3.9%
54 Dock View Road	1.7	3.3%
89 Dock View Road	1.4	2.8%
131 Dock View Road	0.96	1.9%
Wimbourne Buildings	4.4	8.7%
Bendrick Road	2.7	5.4%
Public Recycling Facility	2.0	3.9%
Atlantic Crescent	2.6	5.2%
Port Office	0.84	1.7%
Queens Way	2.3	4.6%
Dyfrig Street	1.8	3.7%
Standard		50
Background		15.9
Maximum PEC		21.1
Maximum PEC (% Standard)		42.2%

7.167 The predicted maximum off-site 90.4th percentile of 24-hour mean PC is less than 20% of the objective minus the short-term background concentration therefore the risk of any exceedance is considered to be **negligible**.

7.168 The predicted concentrations at sensitive receptor locations are less than 10% of the AQS and therefore of negligible significance.

### Modelling Risk Assessment

7.169 A summary of the maximum PC's at a sensitive receptor from both models are presented in Table 7.38 below along with the significance for each pollutant determined from both sets of modelling.

Table 7.38 Comparison of Model Results							
Pollutant	Averaging Period	AERMOD Results			ADMS Results		
		PC	PC (as % Standard)	Significance	PC	PC (as % Standard)	Significance
NO <sub>2</sub>	Annual Mean	1.6	3.9	Negligible	1.6	4.0	Negligible
	Hourly Mean	10.3	5.1	Negligible	16.2	8.1	Negligible
CO	8 Hour Mean	6.8	0.068	Negligible	10.1	0.10	Negligible
	Hourly Mean	8.0	0.027	Negligible	13.2	0.04	Negligible
SO <sub>2</sub>	24 Hour Mean	2.6	2.1	Negligible	3.1	2.5	Negligible
	Hourly Mean	14.6	4.2	Negligible	22.3	6.4	Negligible
	15 Minute Mean	20.0	7.5	Negligible	25.1	9.5	Negligible
PM <sub>10</sub>	Annual Mean	0.11	0.28	Negligible	0.12	0.29	Negligible
	24 Hour Mean	0.29	0.58	Negligible	0.34	0.7	Negligible
PM <sub>2.5</sub>	Annual Mean	0.11	0.44	Negligible	0.12	0.5	Negligible
TOC	Annual Mean	0.11	2.2	Negligible	0.12	2.3	Negligible
	Hourly Mean	1.6	0.21	Negligible	2.6	1.3	Negligible
HCl	Hourly Mean	4.8	0.64	Negligible	7.8	1.0	Negligible
HF	Hourly Mean	0.32	0.2	Negligible	0.52	0.3	Negligible
Dioxins	Annual Mean	1.1	4.5 <sup>(b)</sup>	Negligible	1.2	4.0	Negligible
PAH	Annual Mean	0.11	11.1	Negligible	0.12	11.6	Negligible
PCB	Annual Mean	0.056	0.028	Negligible	0.058	0.03	Negligible
NH <sub>3</sub>	Hourly Mean	0.40	0.0066	Negligible	0.66	0.01	Negligible

(a) Presented as fg/m<sup>3</sup>  
 (b) As % of UK background concentration  
 (c) Presented as ng/m<sup>3</sup>

7.170 As illustrated in Table 7.38 above, the maximum concentration predicted at a sensitive human receptor for each of the pollutants is very similar using either model. Further analysis of the results, has

indicated that for the long term (annual mean) predicted concentrations the results predicted by AERMOD 7 model are generally marginally higher than the concentrations predicted by the alternative model ADMS 5.2. For short term predicted concentrations the results predicted by AERMOD 7 are generally marginally lower than the concentrations predicted by the alternative model ADMS 5.2.

7.171 The results of the modelling of trace metals within the stack emissions also show the same similarity between the two models. The key metal of concern was determined to be Cr VI in the assessment above. The results of the Step Three assessment using the result from both models are provided in Table 7.39 below.

Pollutant	Averaging Period	AERMOD Results			ADMS Results		
		PC	PC (as % Standard)	Significance	PC	PC (as % Standard)	Significance
Cr VI	Annual Mean	0.014	0.72	Negligible	0.0015	0.74	Negligible

7.172 For all of the pollutants and scenarios modelled, the significance of the impact is not changed by using a different model. Therefore, it is concluded that the choice of model **does not have a significant impact** on the predicted results or the conclusions drawn from the modelling.

### Assessment of Coastline Effects

7.173 A summary of the maximum annual mean and hourly mean NO<sub>2</sub> PC's at each of the human sensitive receptor from both the model runs to determine the effect of the coastline are presented in Tables 7.40 and 7.41 below along with the significance determined from each set of modelling.

Receptor	With Coastal Effect			Without Coastal Effect		
	PC	PC (as % Standard)	Significance	PC	PC (as % Standard)	Significance
Vistamar House	0.63	1.6	Negligible	0.63	1.6	Negligible
Docks Office	0.37	0.9	Negligible	0.42	1.1	Negligible
Phillipa Freeth Court	0.40	1.0	Negligible	0.44	1.1	Negligible
Barry Dock Station	0.28	0.7	Negligible	0.38	1.0	Negligible

**Table 7.40: Predicted Annual Mean NO<sub>2</sub> Concentrations (µg/m<sup>3</sup>)**

Receptor	With Coastal Effect			Without Coastal Effect		
	PC	PC (as % Standard)	Significance	PC	PC (as % Standard)	Significance
54 Dock View Road	0.29	0.7	Negligible	0.37	0.9	Negligible
89 Dock View Road	0.34	0.8	Negligible	0.37	0.9	Negligible
131 Dock View Road	0.24	0.6	Negligible	0.25	0.6	Negligible
Wimbourne Buildings	1.42	3.6	Negligible	1.42	3.6	Negligible
FoBendrick Road	1.01	2.5	Negligible	1.01	2.5	Negligible
Public Recycling Facility	0.53	1.3	Negligible	0.53	1.3	Negligible
Atlantic Crescent	0.52	1.3	Negligible	0.52	1.3	Negligible
Port Office	0.15	0.4	Negligible	0.15	0.4	Negligible
Queens Way	0.42	1.1	Negligible	0.42	1.1	Negligible
Dyfrig Street	0.43	1.1	Negligible	0.44	1.1	Negligible
Standard				40		
Background				20		

**Table 7.41: Predicted Hourly Mean NO<sub>2</sub> Concentrations (as 99.8<sup>th</sup> percentile) (µg/m<sup>3</sup>)**

Receptor	With Coastal Effect			Without Coastal Effect		
	PC	PC (as % Standard)	Significance	PC	PC (as % Standard)	Significance
Vistamar House	12.4	6.2	Negligible	12.0	6.0	Negligible
Docks Office	12.6	6.3	Negligible	13.5	6.7	Negligible
Phillipa Freeth Court	12.1	6.1	Negligible	11.5	5.7	Negligible
Barry Dock Station	13.4	6.7	Negligible	15.2	7.6	Negligible
54 Dock View Road	12.5	6.3	Negligible	14.2	7.1	Negligible
89 Dock View Road	12.0	6.0	Negligible	11.3	5.6	Negligible
131 Dock View Road	9.1	4.6	Negligible	7.8	3.9	Negligible
Wimbourne Buildings	10.6	5.3	Negligible	10.6	5.3	Negligible
FoBendrick Road	7.2	3.6	Negligible	7.2	3.6	Negligible
Public Recycling Facility	6.6	3.3	Negligible	6.6	3.3	Negligible
Atlantic Crescent	11.6	5.8	Negligible	11.6	5.8	Negligible

**Table 7.41: Predicted Hourly Mean NO<sub>2</sub> Concentrations (as 99.8<sup>th</sup> percentile) (µg/m<sup>3</sup>)**

Receptor	With Coastal Effect			Without Coastal Effect		
	PC	PC (as % Standard)	Significance	PC	PC (as % Standard)	Significance
Port Office	9.8	4.9	Negligible	9.8	4.9	Negligible
Queens Way	10.5	5.3	Negligible	10.5	5.3	Negligible
Dyfrig Street	6.5	3.2	Negligible	6.5	3.2	Negligible
Standard	40					
Background	20					

7.174 As illustrated in Table 7.40 and 7.41, the difference between the PC's for both annual mean and hourly mean NO<sub>2</sub> concentrations with and without considering the effects of the coastline are minimal and both sets of results indicate there will be negligible impacts on each receptor.

7.175 Furthermore, the annual mean results show that for all receptors the effect of the coastline will be to reduce the likely concentrations experienced at the sensitive receptors. The hourly mean results show a similar pattern with the exception of three receptors which show a slight increase. For all receptors the results are lower than the results presented in the main results section which take into account the effects of buildings and terrain.

7.176 It is considered that the presence of the coastline has a **negligible** impact on the pollutant concentrations likely to be experienced at the sensitive receptors.

### Mitigation

7.177 The results of the assessment demonstrate that the likely impact of the operation of the Biomass Facility on local air quality would be negligible. Therefore, no mitigation measures above and over what has already been designed, incorporated into the scheme and permitted by NRW are required.

### INTER-RELATIONSHIPS

7.178 No inter-relationships are identified between air quality and any other technical areas.

### SUMMARY OF EFFECTS

7.179 An air quality impact assessment has been undertaken to assess the operational effects associated with the Biomass Facility on local air quality.

7.180 Dispersion modelling has been carried out to assess the impact associated with emissions from the proposed plant. As a worst-case, emissions from the Biomass Facility have been assumed to occur at the IED limits. Actual emissions from the Site are anticipated to be significantly lower.

7.181 The assessment has shown that the pollutant concentrations are predicted to be below the relevant air quality assessment levels at the sensitive human receptors in the vicinity of the Site. The significance of the impacts has been assessed as **negligible** in accordance with the Environment Agency’s criteria.

7.182 A habitats assessment was also undertaken to ascertain the impact of the operation of the Biomass Facility on nearby sensitive ecological habitats. with regards to airborne pollutants and deposition of nitrogen and acid. The assessment determined that there will be a **negligible** impact on the nearby sensitive ecological habitats.

7.183 Maximum impacts both off-site and at sensitive receptors have also been determined for a number of potential abnormal emissions scenarios for the facility, including failure of the Urea injection operation. Predicted short-term concentrations of all affected pollutants are of **negligible significance** compared with the relevant air quality standards.

7.184 The completed air quality assessment report is provided in Appendix 7.5.

Table 7.43 – Effects Summary

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Air Quality Impact at Human Receptors	Direct, Permanent	Negligible	Operational plant is fitted with abatement plant prior to atmospheric emission	Negligible
	Short and Long-Term			
	Local			
Air Quality Impact at Habitat Receptors	Direct, Permanent	Negligible		Negligible
	Short and Long-Term			
	Local			

## REFERENCES

- Ref. 7.1:** Welsh Government. Planning Policy Wales 11<sup>th</sup> Edition (February 2021)
- Ref. 7.2:** Welsh Government. Technical Advice Note 21: Waste (February 2014)
- Ref. 7.3:** Vale of Glamorgan Local Development Plan 2011 - 2026 (adopted 2017)
- Ref. 7.4:** Air Quality Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
- Ref. 7.5:** Defra, Scottish Executive, Welsh Assembly Government and DOE. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)
- Ref. 7.6:** The Air Quality (Wales) Regulations 2000 – Welsh Statutory Instrument 2000. No. 1940 (W.138)
- Ref. 7.7:** The Air Quality (Wales) (Amendment) Regulations 2002 – Welsh Statutory Instrument 2002. No 3182 (W. 298)
- Ref. 7.8:** The Air Quality Standards (Wales) Regulations 2010 – Welsh Statutory Instrument 2010. No. 1433 (W.126)
- Ref. 7.9:** Department for Environment, Food and Rural Affairs (Defra) (2016). Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(16)
- Ref. 7.10:** Directive 2010/75/EU of the European Parliament and of the Council of 24<sup>th</sup> November 2010 on Industrial Emissions (Integrated Pollution Prevention and Control) (IED)
- Ref. 7.11:** The Environmental Permitting (England and Wales) (Amendment) Regulations 2013 (SI 2013 No, 390)
- Ref. 7.12:** EC (Dec 2019). Best Available Techniques (BAT) Reference Document for Waste Incineration.
- Ref. 7.13:** Environmental Planning UK and Institute of Air Quality Management (2017). Land Use Planning and Development Control. Planning for Air Quality.
- Ref. 7.14:** Dust and Particulate Emission Management Plan (2018)
- Ref. 7.15:** Guidance to Applicants on Impact Assessment for Group 3 Metals Stack Releases – V.4 June 2016
- Ref. 7.16:** European Commission, Integrated Pollution prevention and Control Reference Document on the Best Available Techniques for Waste Incineration, August 2006.

**Ref. 7.17:** Stack Height Assessment for a 10 MWe Wood Gasification Facility at Barry Docks, Barry Island, Stopford Energy and Environment Document Number: R6270-PM-0001, M. Kett and M. Wilkinson, September 2014.

**Ref. 7.18:** Environment Agency AQMAU, Conversion Rates for NO<sub>x</sub> and NO<sub>2</sub>

**Ref. 7.19:** <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>

**Ref. 7.20:** Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

**Ref. 7.21:** Council Directive 79/409/EEC on the conservation of wild birds

**Ref. 7.22:** Ramsar (1971), The Convention of Wetlands of International Importance especially as Waterfowl Habitat

**Ref. 7.23:** AQTAG06 – Technical guidance on detailed modelling approach for an Appropriate Assessment for emissions to air

**Ref. 7.24:** <http://uk-air.defra.gov.uk/data/laqm-background-home>

**Ref. 7.25:** <http://laqm.defra.gov.uk/tools-monitoring-data/year-adjustment.html>

**Ref. 7.26:** Department for Environment, Food and Rural Affairs (2003): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance, LAQM.TG(03).

**Ref. 7.27:** EPAQS (February 2006), Guidelines for Halogen and Hydrogen Halides in Ambient Air for Protecting Human Health Against Acute Irritancy Effects.

**Ref. 7.28:** Annual Report for 2012 on the UK PAH Monitoring and Analysis Network, NPL Report AS 84, January 2014.

**Ref. 7.29:** <http://www.apis.ac.uk/>

## 8 CLIMATE CHANGE

### INTRODUCTION

8.1 This chapter assesses the likely significant effect on climate change resulting from the Biomass Facility as a consequence of the impact of greenhouse gas (GHG) emissions. It is supported by Appendix 8.1 containing details of the GHG emissions calculations.

8.2 Climate change in the context of EIA can be considered broadly in two domains: the impact of GHGs caused directly or indirectly by the Barry Biomass Facility, which contribute to climate change; and the potential impact of changes in climate to the Barry Biomass Facility, which could affect it directly or could modify its other environmental impacts.

8.3 This chapter focuses on the production and impact of GHG emissions. GHG emissions are normally expressed as carbon dioxide equivalents, explained in the methodology section below, and are therefore often referred to as ‘carbon’ as a shorthand (e.g. when speaking of ‘low-carbon power’ or ‘carbon reduction targets’).

8.4 Assessment of the Barry Biomass Facility risk from and resilience to climate change has been scoped out of this chapter<sup>37</sup>. As such potential inter-relationships between climate change and other environmental topic areas is considered to be minimal.

### Scope of the Assessment and Consultation

8.5 The scope of the assessment includes the lifecycle impacts of greenhouse gas emissions and all Scope 1 (direct) greenhouse gas emissions emitted by the operational ‘As-Built’ facility.

8.6 A Scoping Request document, detailing the methodology and approach to be adopted in the preparation of the Noise Assessment was issued to the Welsh Government on 22<sup>nd</sup> January 2021. The

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<sup>37</sup> It has been agreed with Welsh Government that the climate change impacts and risks associated with increased rainfall intensity and coastal flooding have been fully assessed to the satisfaction of both the Vale of Glamorgan and NRW's flood risk and water resources teams. Impacts associated with Flood Risk have therefore been scoped out of the ES by agreement with the Welsh Government.

methodology was formally agreed by Welsh Government during March 2021 a copy of which is also provided as part of **Appendix 4.1**.

8.7 The terminology used, and approach to the assessment of effects are set out in **Appendix 8.1**.

### ***Identified Welsh Government Concerns***

8.8 Table 8.1 below identifies the concerns that were raised regarding the previous ES’s produced for the Site and provides information on how these issues have been considered within this ES chapter.

<b>Table 8.1: Previous ES Concerns</b>	
<b>Concern Identified</b>	<b>Consideration</b>
<p>An assessment covering Climate Resilience has not been undertaken and there is no rationale for its omission from the assessment. The assessment has been undertaken in accordance with the Town and Country Planning (EIA) Regulations 1999 (as amended) which identifies 'climatic factors' as an aspect of the environment likely to be significantly affected by the proposed development.</p> <p>It is best practice that the assessment be undertaken in line with the updated EIA regulations (2017). The EIA Regulations 2017 Schedule 4 Part 5(f) identify 'the vulnerability of the project to climate change' to be addressed within Environmental Statements therefore this ES presents a significant omission in relation to climate vulnerability. Given the close proximity of the Scheme to the docks, particular consideration should be given to projections of sea level rise</p>	<p>This chapter provides a 'Climate Change;' and therefore meets the requirements of the 2017 EIA regulations. As agreed with the Welsh Government, the scope of the assessment omits the consideration of sea level rise and flood risk as these have been previously assessed to the satisfaction of both VoG and NRW as part of the planning process.</p>
<p>A GHG assessment has not been undertaken, and there is no rationale for its omission. Since the planning application was completed (2015) the EIA regulations have been updated. The EIA Regulations 2017 Schedule 4 Part 5(f) identify the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions), as requiring assessment if the emissions due to the project have the potential to be significant. The assessment has been undertaken in accordance with the Town and Country Planning (EIA) Regulations 1999 (as amended) which identifies 'climatic factors' as an aspect of the environment likely to be significantly affected by the proposed development. Given that the Project is a thermal</p>	<p>A GHG assessment has been undertaken and is outlined within this chapter.</p>

**Table 8.1: Previous ES Concerns**

Concern Identified	Consideration
power plant (biomass), there is the potential for significant GHG emissions. As such the lack of a GHG assessment is considered to be a gap.	

## ASSESSMENT METHODOLOGY

### GHG Emissions Calculation Overview

8.9 In overview, GHG emissions have been estimated by utilizing the WRATE methodology and applying published emissions factors to activities in the baseline and those required for the Barry Biomass project, as applicable. The emissions factors relate a given level of activity, a physical or chemical process, or amount of fuel, energy or materials used to the mass of GHGs released as a consequence.

8.10 The assessment reported in this chapter is for operation of the Barry Biomass Facility combusting 72,000 dry tonnes of waste wood per annum. Further detail of the approach, data inputs, assumptions and boundaries of the calculations are given in Appendix 8.1.

8.11 The Owner has stated that these fuel consumption and energy content values represent the expected ‘worst case’ 100% operational load scenario and therefore present the commercially realistic worst case operation of the facility on an annual average basis. These values are therefore considered appropriate for the assessment of climate change impacts, which arise from the long term operation of the facility.

8.12 The GHGs considered in this assessment are those in the ‘Kyoto basket’ of global warming gases expressed as their CO<sub>2</sub>-equivalent global warming potential (GWP). This is denoted by CO<sub>2</sub>e units in emissions factors and calculation results. GWPs used are typically the 100-year factors in the Intergovernmental Panel on Climate Change Fifth Assessment Report (Myhre et al, 2013) (Ref 8.1) or as otherwise defined for national reporting under the United Nations Framework Convention on Climate Change (UNFCCC).

8.13 The main emissions sources assessed comprise:

- direct combustion emissions;

- nitrous oxide emissions<sup>38</sup> from the air pollution control system;
- management of process outputs (bottom ash and fly ash);
- transport of inputs and outputs; and

8.14 Fuel utilised within the process is biomass and is therefore assumed to have a 100% biogenic content.

### Legislation and Planning Policy Context

8.15 A summary only is given here; policy detail and full references are provided in Appendix 8. There is much legislation and policy concerning climate change, energy and waste management in general, which is not exhaustively listed: this summary focuses on aspects of legislation or policy concerning energy production and climate change.

8.16 Planning Policy Wales Edition 10 (Welsh Government, 2018) (Ref. 8.2) indicates that significant weight will be given to the facilitation of renewable and low carbon energy developments, as they will be of paramount importance in meeting the commitment to tackling climate change (paragraph 5.7.8). The Welsh government recognise an energy hierarchy which obligates new developments to reduce energy demand and increases energy efficiency, be suitably located and designed and assist in meeting energy with renewable and low carbon sources (paragraph 5.7.14). The report also obligates new developments to include mitigation measures against the causes of climate change in their design (paragraph 5.9.19).

8.17 The Climate Change Act 2008 (Ref 8.3) commits the UK government to reducing greenhouse gas emissions by 100% of 1990 levels by 2050. National carbon budgets of 2.54 GtCO<sub>2</sub>e for 2018- 2022, 1.95 GtCO<sub>2</sub>e for 2023-2037 and 1.73 GtCO<sub>2</sub>e for 2028-2032 have been set. A statutory Committee on Climate Change to advise the government was created and its advice, while not adopted policy, is relevant to consider.

8.18 The Welsh Government has been provided with powers to put in place statutory emissions reduction targets, including at least an 80% reduction in emissions by 2050, through the Environment (Wales) Act (2016). The Welsh Government has accepted the Committee on Climate Change's suggestion,

in its 2019 Net Zero report, that it should amend this target to a 95% reduction (compared with 1990 baseline) and has gone further by stating an ambition to reach net-zero.

8.19 The Climate Change (Carbon Budgets) (Wales) Regulations 2018 (Ref 8.4) set two carbon budgetary periods: the period of 2016-2020 limits GHG emissions to an average of 23% lower than the baseline year of 1990, and the period of 2021 to 2025 limits GHG emissions to an average of 33% lower than the baseline. The 2021-2025 budget is equivalent to 37.4 MtCO<sub>2</sub>e/annum (67% of the Wales 1990 baseline of 55.8 MtCO<sub>2</sub>e/annum (National Assembly for Wales, 2014).

8.20 The overriding advice of the Committee on Climate Change is that significant improvements in climate policy are necessary if the UK is to adhere to its net-zero target. The Committee has suggested that most sectors across the UK need to be close to net zero without the reliance on carbon offsetting and international carbon credits. With respect to the power sector, the overarching advice from the Committee is for the immediate rollout of low-carbon generation (with low-carbon, non-renewable sources having a role in the transitional period). The Committee also places strong emphasis on the requirement for the rapid and widespread rollout of carbon capture and storage (CCS) technology.

8.21 The Wales 2019 Low Carbon Plan sets out plans to significantly increase the level of renewable generation in Wales' energy mix.

### Relevant Guidance

8.22 The main guidance used for the assessment of GHG emissions in EIA is the IEMA guide '*Assessing Greenhouse Gas Emissions and Evaluating their Significance*' (IEMA, 2017) (Ref 8.5).

8.23 The main guidance used for the quantification of GHG emissions are the principles for GHG accounting in the Greenhouse Gas Protocol suite of documents (World Resources Institute and World Business Council for Sustainable Development, 2004) (Ref 8.6) and the information in BEIS, Defra and Treasury guidance for carbon reporting in the UK (BEIS, 2019a and 2019b) (Ref 8.7). The principles of PAS2080 Section 7 (BSI, 2016) are also relevant, but as this is an assessment of GHG emissions for EIA, the other elements of whole-life carbon management for infrastructure in the standard are not addressed here.

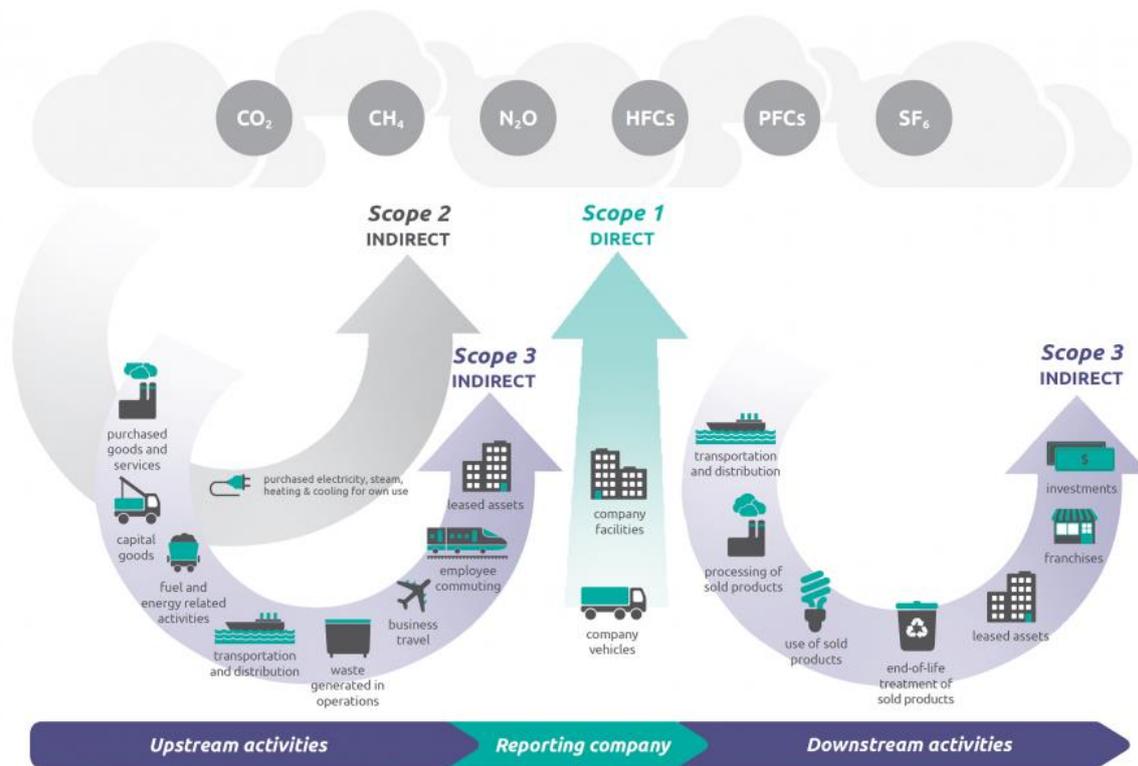


Figure 8.1: GHG Protocol

### Study Area

8.24 The direct<sup>39</sup> (Scope 1) greenhouse gas emissions associated both with the ‘As-Built’ operational site as well as the lifecycle emissions of the scheme including all import and exports of wastes and by products have been included in this assessment.

### Baseline Methodology

8.25 The approach to establishing the baseline is to consider what would have occurred in the absence (i.e. counterfactual position) of the Biomass Facility. This includes comparing generated emissions to current baseline standards for electricity generation.

8.26 Electricity generation from other sources and manufacture of cement or concrete products without use of recycled ash would occur in the absence of the Biomass Facility, however these have not been factored into this assessment as these end uses are not 100% certain and hence should not be relied on. As such, these estimates are considered conservative.

<sup>39</sup> Scope 1 Direct and Indirect emissions Direct Emissions

## Assessment Criteria and Assignment of Significance

8.27 The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact of that magnitude. This section describes the criteria applied in this chapter to characterise the magnitude of potential impacts and sensitivity of receptors.

### *Receptor Sensitivity*

8.28 GHG emissions have a global effect rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The global atmospheric mass of the relevant GHGs and consequent warming potential, expressed in CO<sub>2</sub> equivalents (CO<sub>2</sub>e), has therefore been treated as a single receptor of high sensitivity given the severe consequences of global climate change.

### *Magnitude of Impact*

8.29 GHG emissions can be quantified directly and expressed based on their global warming potential (GWP) as tonnes of CO<sub>2</sub>-equivalent emitted, so the magnitude of impact is reported numerically rather than requiring descriptive terms.

### *Significance of Effects*

8.30 Assessment guidance for GHG emissions (IEMA, 2017) indicates that in principle, any GHG emissions may be considered to be significant, and advocates as good practice that GHG emissions should always be reported at an appropriate, proportionate level of detail in an ES.

8.31 There are however no clear, generally-agreed thresholds or methods for evaluating the significance of GHG effects in EIA.

8.32 To aid in considering whether effects are significant, the IEMA guidance referenced above recommends contextualising the magnitude of a development's GHG impacts in several possible ways. Taking the guidance into account, the following factors are considered relevant for contextualising the Biomass Facility's GHG emissions:

- The magnitude of GHG emissions as a percentage of the UK and Wales national carbon budgets;
- The GHG emissions intensity of the Barry Biomass Project compared with baseline emissions intensity for electricity generation; and

- Whether the Barry Biomass Project contributes to and is in line with carbon policy goals for GHG emissions reduction, where these are consistent with science-based commitments to limit global climate change to an internationally agreed level.

8.33 Effects from GHG emissions are described in this chapter as being adverse, neutral/negligible or beneficial based on the following definitions:

- **Adverse:** the development's GHG impacts would be greater than the current or future baseline and/or would not meet existing policy goals for GHG reduction.
- **Neutral or negligible:** the development's GHG impacts would be consistent with existing policy goals for GHG reduction, or the impact is little or no net environmental change.
- **Beneficial:** the development's GHG impacts would be reduced compared to the baseline and/or would include measures that go beyond existing policy goals.

8.34 Adverse or beneficial effects are considered to be significant, taking into account the IEMA guidance and the high sensitivity of the receptor. Neutral or negligible effects are not considered to be significant.

### Limitations of the Assessment

8.35 The main potential areas of uncertainty in the assessment are:

- The applicable carbon intensity of marginal baseline electricity generation that is displaced during the Biomass Facility's operating lifetime;
- Any potential for variability in the composition, calorific value and ratio of fossil to biogenic carbon in the incoming fuel feedstocks used by the Barry Facility.

8.36 These uncertainties have been addressed as follows.

- Several different published projections of future baseline electricity generation carbon intensity have been considered. These show an expected decarbonisation of electricity generation from both grid-average and marginal sources over time.
- The lifecycle (WRATE) assessment has considered use of recycled ash as both aggregate and cement replacement (with low and high carbon intensity of baseline GHG emissions avoided, respectively) to show the sensitivity of the net total GHG emissions to this element of the assessment.

## BASELINE ENVIRONMENT

8.37 The UK national baseline carbon intensity of electricity at the time of commissioning and completion of construction (2019) on an as-generated basis (excluding transmission and distribution losses and scope 3<sup>22</sup> supply chain emissions) is 0.2566 tCO<sub>2</sub>e/MWh (BEIS, 2019a).

8.38 Therefore, the baseline indirect grid based CO<sub>2</sub> emissions arising from the generation of 81,522.87 MWh<sup>40</sup> of electricity to the grid equates to 20,918.76 tCO<sub>2</sub>e per annum.

8.39 However, due to the mix of grid electricity generation sources changing over time as a result of the UK decarbonization policy, the likely evolution of the future baseline has been considered to determine the counterfactual baseline that should be used over the lifetime of the development as projected in displaced electricity generation emission factors published by BEIS (2019b).

8.40 Table 8.2 shows the projections over the project's 25 year operational life time from 2022 onwards. The reductions in carbon intensity of baseline electricity generation that are projected by BEIS are in line with national climate policy and are expected to occur as result of changes such as increased use of renewable electricity generation, new nuclear capacity and future introduction of CCS for remaining fossil-fuelled generation.

Year	Marginal Carbon Intensity	Grid Average Carbon	Counterfactual Emissions
2022	0.246	0.098	20,054.62
2026	0.189	0.09	15407.82
2031	0.105	0.067	8559.90
2036	0.059	0.037	4809.84
2041	0.064	0.036	5217.46

## POTENTIAL MITIGATION MEASURES

8.41 Recycling the fly ash and bottom ash waste from the Barry Biomass Project to displace the production of carbon-intensive construction materials such as cement has the potential to provide

<sup>40</sup> Assuming 100% rated grid export of 10,230KWe for warranted 7969 hours per annum.

significant GHG emission reductions through substitution of the production of those materials. The current uses of the fly ash and APCR from the site transfer and reprocessing in South Wales (Swansea).

### Magnitude of Impact

8.42 The calculated emissions from the Barry Biomass Facility are estimated to be 5,479.798 tonnes CO<sub>2</sub>e /annum using BEIS UK Government GHG Conversion Methodology. This figure accounts for the direct emissions for the generation of electricity only (i.e. combustion of waste wood and associated auxiliary fuels) and not the overall lifecycle emissions (WRATE) as outlined later within this chapter.

8.43 Table 8.3 below details the direct combustion emissions for the Barry Biomass Facility and associated figures and conversion factors.

TABLE 8.3: Direct Combustion Emissions		
Parameter	Source	Figure
Total Waste Wood (tonnes / annum)	Owner / Operator	72,000 (Dry)
Conversion Factor (kg CO <sub>2</sub> e / Tonne)	BEIS	58.35272
<i>Waste Wood Emissions (Kg CO<sub>2</sub>e / annum)</i>	<i>Calculated</i>	<i>5,041,675</i>
Total Diesel (litres / annum) <sup>41</sup>	Owner / Operator	163,000
Conversion Factor (Kg CO <sub>2</sub> e / litre)	BEIS	2.68787
<i>Diesel Emissions (Kg CO<sub>2</sub>e / annum)</i>	<i>Calculated</i>	<i>438,123</i>
<b><i>Total Direct Combustion Emissions (Kg CO<sub>2</sub>e / annum)</i></b>		<b><i>5,479,798 (5,479 Tonnes)</i></b>

8.44 The figures above equate to the average electrical annual output of 10MWe on a continuous basis (assuming warranted annual operational hours).

8.45 In comparison with the 2018/19 baseline counterfactual position, the operation of the plant will equate to direct combustion emissions savings of approximately 73.8% moving towards parity as the grid fully decarbonizes.

<sup>41</sup> Owner / Operator provided figure of 163m<sup>3</sup>

8.46 Details of the GHG emission calculations and data used in the assessment are provided in Appendix 8.

8.47 The over project benefits relating to the Barry Biomass Facility that relate to a combination of the carbon emissions from the plant, combined with the displaced emissions arising from the generation of 10MWe from the grid are estimated to be -53,892.09 tCO<sub>2</sub>e/annum.

8.48 GHG emissions from transport of the fuel by road are estimated to be 604.48 tCO<sub>2</sub>e/annum, with the assumed distances and payloads described in Appendix 8

8.49 Net total GHG emissions from the Barry Biomass Project Project and its outputs compared to the future baseline are predicted to be -51,570.26 tCO<sub>2</sub>e/annum meaning that the Barry Biomass Project has a 'net-negative' overall carbon impact. The net emissions and a breakdown of the contributions are illustrated in Figure 8.1 of Appendix 8.

### ***Climate policy***

8.50 Government policy, legislation and guidance from the Committee on Climate Change all emphasise the need to rapidly decarbonise the energy sector through renewable and low carbon sources. Renewable energy developments are fundamental in the delivery of the underlying policies relating to decarbonisation and the transition to a circular low carbon economy.

8.51 The Barry Biomass Energy Project utilises 100% waste wood fuels that are considered to meet the definition of renewable as defined by Ofgem.

8.52 On an absolute emissions basis, the proposed Barry Biomass Project will provide a substantial reduction in GHG emissions compared to projected generation scenarios for the site.

8.53 The operational phase of Barry Biomass Project would be consistent with national climate change policy facilitating the diversion of biodegradable of wood waste from landfill (with net neutral emissions when combusted) and to recover energy from waste.

### ***Effect***

8.54 The long-term impact of GHG emissions from the operational phase of Barry Biomass Project, which is the balance of direct and indirect impacts of combustion, energy export and re-use of its outputs

compared to the baseline, is considered to cause a **significant beneficial effect**, using the definition in paragraphs 8.31 to 8.32.

### **Further Mitigation**

8.55 Given that the construction and operation of the Barry Biomass Facility has a significant net carbon benefit, no further mitigation is required in order to achieve the Welsh Governments Zero Carbon Policy Requirements.

### **Future Monitoring**

8.56 No operational-stage monitoring is required.

### **Accidents/Disasters**

8.57 No significant effect on climate change due to GHGs released by accidents or disasters is considered likely.

### **Potential Changes to the Assessment as a Result of Climate Change**

8.58 Climate changes would not affect the assessment of GHG emissions reported in this chapter. All other possible effects of climate change on the Barry Biomass Project (i.e. flood risk impacts) have been scoped out of this report under agreement with Welsh Government.

8.59 Assessment of the Barry Biomass Project risks and resilience to climate change has been scoped out of this chapter on the basis that no significant risks have been predicted.

8.60 There are no other potential inter-relationships between climate change and greenhouse gas emissions that apply to this aspect.

### **ASSESSMENT OF CUMULATIVE EFFECTS**

8.61 As set out in the IEMA guidance, any project has the potential in principle to result in adverse or beneficial effects on climate change that could be significant, and this may include other consented or planned developments in the area of the Barry Biomass Project. This is because climate change is a global effect, not an effect that is localised in the area around any one individual development or group of developments, so all projects have the potential to contribute cumulatively to the effect.

8.62 For this reason, the sensitivity of the receptor (atmospheric greenhouse gas concentrations) has been defined as 'low' for the assessment in this chapter, taking into account the cumulative contribution to climate change of other projects and anthropogenic activities. The significance of cumulative effects has therefore already been considered in the assessment in this chapter.

8.63 The type of impacts and suitable measures to mitigate these from other developments would need to be dealt with for each application as it comes forward, to ensure that the effects on climate change are reduced as far as possible.

### **SUMMARY OF EFFECTS**

8.64 The potential impact of the Barry Biomass Project on GHG emissions, resulting in an effect on atmospheric GHG concentration that contributes to climate change, has been assessed and reported in this chapter.

8.65 The potential for impacts of climate change to cause effects on the Barry Biomass Project has been scoped out of the assessment, as no significant effects were considered likely.

8.66 The potential for impacts of climate change to cause inter-related effects with other environmental impacts has been scoped out of this assessment with agreement from Welsh Government.

8.67 Operational phase GHG impacts from combustion of waste wood biomass by the Barry Facility, transport and recycling of ash have been assessed and it is predicted to cause a significant beneficial effect due to the overall reduction in GHG emissions in total and per unit of electricity generated.

**TABLE 8.2: SUMMARY OF LIKELY ENVIRONMENTAL EFFECTS ON CLIMATE CHANGE**

Receptor	Sensitivity of Receptor	Description of Impact	Short / Medium / Long Term	Magnitude of Impact	Significance of Effect	Significant / Not Significant	Notes
<b><i>Operational Phase</i></b>							
Atmospheric CO <sub>2</sub> e concentration	High	Greenhouse gas emissions	Long term	-51,570.26 tCO <sub>2</sub> e/annum	Beneficial	Significant	In initial year of operation

## REFERENCES

**Reference 8.1:** Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang (2013) Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

**Reference 8.2:** Welsh Government (2018). Planning Policy Wales. Edition 10. Welsh Government. (2019). Prosperity for All: A Low Carbon Wales. [Online] [https://gov.wales/sites/default/files/publications/2019-06/low-carbon-delivery-plan\\_1.pdf](https://gov.wales/sites/default/files/publications/2019-06/low-carbon-delivery-plan_1.pdf) . [accessed 18/12/19].

**Reference 8.3:** Climate Change Act 2008, UK public General Acts 2008 c27.

**Reference 8.4:** HM Government (2016) The Environment (Wales) Act. Acts of the National Assembly for Wales.

**Reference 8.5:** Institute of Environmental Management and Assessment (IEMA) (2017) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance. [Online] <https://www.iema.net/assets/newbuild/documents/IEMA%20GHG%20in%20EIA%20Guidance%20Document%20V4.pdf> [accessed 29/03/19].

**Reference 8.6:** World Resources Institute and World Business Council for Sustainable Development (2004) The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. Revised edition.

**Reference 8.7:** BEIS (2019a) UK Government GHG Conversion Factors for Company Reporting v1.01. [Online] <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018> [accessed 20/12/19]

## 9 WASTE MANAGEMENT / SOLID WASTE EMISSIONS

### INTRODUCTION

9.1 This chapter provides a detailed description of the solid and liquid waste management aspects of the Barry Biomass Facility. As the development is currently fully constructed, no account of the wastes generated as a result of the construction programme are included in this chapter. The assessment presented herein includes only the operational impacts pursuant to the 2015 Planning Permission and NRW regulated Facility. During construction the management of wastes was controlled through the deployment of a construction site waste management plan (SWMP) which had been approved by the Vale of Glamorgan planning authority.

### Scope of the Assessment and Consultation

9.2 The scope of the assessment includes all waste materials that are handled, processed and produced by the Biomass Facility. The scope includes the upstream and downstream management and handling of all incoming fuel feedstocks, in addition to the process waste products and their onward uses.

9.3 A Scoping Request document, detailing the methodology and approach all assessments included within the ES was issued to the Welsh Government on 22<sup>nd</sup> January 2021. The methodology was formally agreed by Welsh Government during March 2021 a copy of which is also provided as part of **Appendix 4.1**.

### *Identified Welsh Government Concerns*

9.4 Table 9.1A below identifies the concerns that were raised regarding the previous ES's produced for the Site and provides information on how these issues have been considered within this ES chapter.

**Table 9.1A: Previous ES Concerns**

Concern Identified	Consideration
The 2010 Environmental Statement was completed in line with the Town and Country Planning (EIA) Regulations 1999 (as amended) which required a description of materials and waste and to be included 'as is reasonably required to assess the environmental effects of the development'.	This ES has included a Waste Management Chapter, as the development has been constructed this considers

**Table 9.1A: Previous ES Concerns**

Concern Identified	Consideration
<p><i>"A description of the likely significant effects of the development on the environment resulting from, inter alia, the use of natural resources, in particular land, soil ... considering as far as possible the sustainable availability of these resources; and the ... disposal and recovery of waste."</i></p> <p>Given the absence of a 'Materials and waste' chapter, there is no information relating to scope (construction, operation, decommissioning) or baseline assessment made. Waste policy has been included throughout the 2010 and 2019 ES and supporting documentation.</p>	<p>operational waste controls and management only.</p>
<p>The 2010 Environmental Statement stated <i>'The wood feedstock will be produced to specification at the site by appropriate chipping, shredding and screening plant equipped with magnetic separators to remove nails etc.'</i></p> <p>The 2019 Environmental Statement provided an update and stated that 'Wood-waste feedstock is chipped off-site and delivered to the plant prior to being gasified.' There is no information provided as to how contaminants would be removed before the feedstock is chipped and therefore minimise the chance of hazardous waste materials being delivered to the site.</p>	<p>This chapter describes in detail the incoming waste acceptance procedures and controls which ensure that waste feedstocks processed onsite are in accordance with a strict specification.</p>
<p>The 2010 Environmental Statement's 'Predicated Impacts' section does not consider operational waste such as char/bottom ash and fly ash. Table 2.1 (Process input requirements and outputs), stated that the process could generate 45.36 tonnes of char/ash per week and that this was 3% of the input fuel.</p> <p>The 2019 Environmental Statement included the same table (Figure 9 Process Outputs, page 31). Section 3.4 of the Waste Planning Assessment (Type and Quantities of Waste to be Managed) stated that 'The Outotec gasifier will process up to 72,000 dry tonnes of waste wood per year...' and 'The process results in residual ash (8% of the input fuel), which is collected automatically from the various stages of the process.' There is no clarification as to whether the 8% is 'by weight' or 'by volume', however, by weight, this would equate to the Outotec gasifier process generating up to 5,760 tonnes of ash per year (72,000*0.08), or up to 120</p>	<p>This chapter outlines in detail the estimated volumes of ash output from the plant as based on the detailed design and operational models.</p>

**Table 9.1A: Previous ES Concerns**

Concern Identified	Consideration
<p>tonnes per week, based on 48 weeks' operation. This is almost three times the total weight of ash previously estimated.</p>	
<p>The Transport Statement states '3.4 Ash is a by-product of the gasification process and the majority of it can be used for building products such as block manufacture. It will be removed from site in separate contained loads by the feedstock supplier for recycling. Backloading is not possible due to the need to avoid contamination of incoming feedstock. However, there is a substantial reduction (over 94%) between the weight of wood fuel processed and the weight of ash requiring removal from the site. Therefore, the total amount of ash removed from the site per annum will not exceed 2200 tonnes.' There is no mention of this expected tonnage limit seen anywhere else in the Environmental Statements during the review, nor how it was calculated.</p> <p>The filter/abatement process designed to control emissions also produces a low volume of waste residues (flyash) which will be transported to specialist landfill in sealed containers by the feedstock supplier. The exact tonnage will depend on the abatement technology which the Environment Agency requires, but is unlikely to exceed 1500 tonnes per annum.' There is no mention of this expected tonnage limit seen anywhere else within the Environmental Statements during the review, nor how this was calculated.</p>	<p>This chapter outlines in detail the expected tonnages of ash produced by the plant, taking into account the abatement which has been installed. These tonnages have been based on the mass balance for the plant based on the actual constructed facility.</p>
<p>There is no information concerning the management arrangements for waste generated by employees on-site (e.g. from welfare facilities), or from the maintenance of on-site plant and equipment - the latter would be expected to generate a range of hazardous waste materials (such as oil and tyres) which will require specialist storage, handling and disposal.</p>	<p>All potential waste streams from the plant, including domestic and specialist wastes have been considered in this chapter.</p>

9.5 Within this chapter we have sought to clarify and conclude any identified concerns relating to the operational storage, processing and management of wastes at the Biomass Facility.

9.6 The purpose of this chapter is to clarify any issues raised by the Welsh Government internal review in the following specific areas:

- The nature of and specification of the incoming wood feedstocks and what controls are in place both internally and externally to ensure that these contaminants are removed and that the material is produced to specification<sup>42</sup>;
- Clarification on the quantity of waste ash and byproducts that will be produced by the operational facility<sup>43</sup>;
- Clarification of the waste transport and offsite processing arrangements with confirmation of the tonnages produced and exported<sup>44</sup>.
- Clarification of the onsite storage of welfare, vehicle maintenance wastes etc.

9.7 All wastes generated and assessed by the plant have been based on the design throughput and warranted energy mass balance. Where possible all data relating to both incoming and outgoing waste products are based on operational sampling and analysis.

9.8 Where possible we have also provided the chemical analysis and assessment of the waste processed and produced by the site.

9.9 For completeness the sections of this chapter relating to legislation, policy and guidance have been updated to reflect current environmental legislation and waste policy.

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<sup>42</sup> This issue was raised following the WSP review of the 2019 ES which stated The 2010 Environmental Statement stated 'The wood feedstock will be produced to specification at the site by appropriate chipping, shredding and screening plant equipped with magnetic separators to remove nails etc.' The 2019 Environmental Statement provided an update and stated that 'Wood-waste feedstock is chipped off-site and delivered to the plant prior to being gasified.' There is no information provided as to how contaminants would be removed before the feedstock is chipped and therefore minimise the chance of hazardous waste materials being delivered to the site.

<sup>43</sup> The WSP review states that the 2010 Environmental Statement's 'Predicated Impacts' section does not consider operational waste such as char/bottom ash and fly ash. The 2010 document stated that the process could generate 45.36 tonnes of char/ash per week (i.e. 3% of the input fuel). The 2019 Environmental Statement included the same table (Figure 9 Process Outputs, page 31) indicated that that the Outotec gasifier process generating up to 5,760 tonnes of ash per year. In addition, the 2019 ES does not provide details of this expected tonnage limit seen anywhere else within the Environmental Statements during the review, nor how this was calculated.

<sup>44</sup> The WSP review states that the Transport Statement states '3.4 Ash is a by-product of the gasification process and the majority of it can be used for building products such as block manufacture. It will be removed from site in separate contained loads by the feedstock supplier for recycling. Backloading is not possible due to the need to avoid contamination of incoming feedstock. However, there is a substantial reduction (over 94%) between the weight of wood fuel processed and the weight of ash requiring removal from the site. Therefore, the total amount of ash removed from the site per annum will not exceed 2200 tonnes.' There is no mention of this expected tonnage limit seen anywhere else in the Environmental Statements during the review, nor how it was calculated.

## ASSESSMENT METHODOLOGY

### Planning and Regulatory Policy Context

9.10 The key planning and policy documents that relate to waste management in Wales and how the Barry Biomass Facility conforms with these requirements are described in Chapter 3 of this ES and as such planning context is not replicated below. The principle documents that define policy are:

- Planning Policy Wales ‘Towards Zero Waste - One Wales: One Planet’. The overarching waste strategy document for Wales (June 2010) (Ref 9.1); and
- Technical Advice Note 21 – Waste 2014<sup>45</sup>.

### Relevant Guidance and Legislation

9.11 The Landfill Directive (Ref 9.2) and Waste Framework Directive (Ref 9.3) are outlined in Chapter 3 and as such are not replicated in this section.

#### *Environmental Permitting Regulations (England and Wales) Regulations 2016 (as amended)*<sup>46</sup>

9.12 The Environmental Permitting Regulations (England and Wales) 2016 (EPR) (Ref 9.4) and associated regulatory regime and associated is the key means by which the State seeks to secure the protection of the environment from industrial pollution.

9.13 For the most part, the Environmental Permitting Regulations 2016 (s.i. 2016/1154) are concerned with the use, treatment, storage and disposal of waste and with emissions from industrial processes. They are also concerned with the risk of pollution of groundwater and with activities which may contribute to non-coastal flooding (land drainage).

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<sup>45</sup> Welsh Assembly Government Technical Advice Note 21: Waste

<sup>46</sup> Environmental Permitting (England and Wales) Regulations 2016.

9.14 The Environmental Permitting Regulations 2016 provided a consolidated system of environmental permitting in England & Wales. They replaced the 2010 Regulations (which in turn replaced the 2007 Regulations).

9.15 The 2016 Regulations transposed the provisions of 15 EU Directives. As from 31 December 2020 a series of statutory instruments will have given effect to the consequences and requirements of s.8 of the European Union (Withdrawal) Act 2018 as a result of the UK's withdrawal from the EU ("dealing with deficiencies arising from withdrawal"). The EPR establishes the nature and scale of regulated industrial activities and stipulates the types of regulatory controls.

9.16 The Barry Biomass Facility falls under the definition of an Installation as defined by the Environmental Permitting Regulations (England and Wales) 2016 ('EPR') and is subject to the requirements of the Industrial Emissions Directive ('IED').

9.17 Regulation 8 EPR defines the categories of 'regulated facility' and for the purposes of Regulation 8 EPR, NRW has concluded that the regulated facility is an 'Installation' within which a 'waste operation' is conducted.

9.18 The Installation is subject to the EPR because it carries out an activity listed in Part 1 of Schedule 1 to the EPR:

- Section 5.1 Part A(1)(b) – incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 3 tonnes per hour. The EPR definition of "waste incineration plants" and "waste co-incineration plants" say;

*"waste co-incineration plant" means a stationary or mobile technical unit whose main purpose is the generation of energy or production of material products and which uses waste as a regular or additional fuel or in which waste is thermally treated for the purpose of disposal through the incineration by oxidation of waste as well as other thermal treatment processes, such as pyrolysis, gasification or plasma process, if the substances resulting from the treatment are subsequently incinerated;"*

9.19 NRW have defined the plant as being a waste co-incineration plant because the main purpose of the plant is the generation of energy and not, by definition, the disposal of waste.

9.20 Schedule 1 of the EPR also includes the definition of ‘directly associated activities’ (‘DAA’), which for the Barry Biomass Facility, includes the generation of electricity using a steam turbine, fuel reception & storage, an air-cooled condenser for the recovery of water, residue handling & storage, water treatment of make-up water and air pollution control system.

9.21 As some of these Directly Associated Activities are defined as ‘Waste Operations’ by Regulation 8 of the EPR, they are also included as part of the regulated activities within the Installation and form part of the permitted installation.

9.22 Accordingly, Natural Resources Wales have granted the Barry Biomass Facility an Environmental Permit in accordance with the Environmental Permitting Regulations (England and Wales) 2016 (Permit Reference EPR/AB3790ZB).

9.23 This permit was determined and granted on the 7<sup>th</sup> February 2018 and stipulates all of the necessary control measures relating to the incoming reception, storage, processing and management of wastes at the facility.

### Study Area

9.24 This chapter describes the types, nature, controls and impacts of all waste materials associated with the ‘As-Built’ operational plant as shown in Figure 1.3.

### Baseline Approach

9.25 All figures produced in this ES chapter relate to the annual emissions and wastes as defined by the permitted and warranted energy mass balance and assume the warranted continuous operation of 8000 hours per year of operation.

9.26 The baseline conditions for this assessment are described in Table 9.1 below:

Table 9.1: Heat and Energy Mass Balance based on constructed			
Ref	Process	Per Annum (tonnes)	Per Hour (kg)
<b>INPUTS</b>			
(1)	Waste wood throughput tonnage	86,400	10,842
(5) (10)	Water	39,360	4,920
(2b) (4)	Urea (40% conc)	2,400	300
(10)	Hydrated Lime	536	67

(9)	Activated Carbon	26	3.25
(3)	Limestone	136	17
(5)	Salt	4	0.5
(4)	Diesel	160	20
(5)	Anti-scalant Chemicals	De-minimis	< 0.1
<b>OUTPUTS</b>			
(1)	Wood	88	11
(1)	Metals	88	11
(8)	Fly Ash	2072	259
(11)	Air Pollution Control Residues	3944	493
(5)	Condensate	31,368	3921

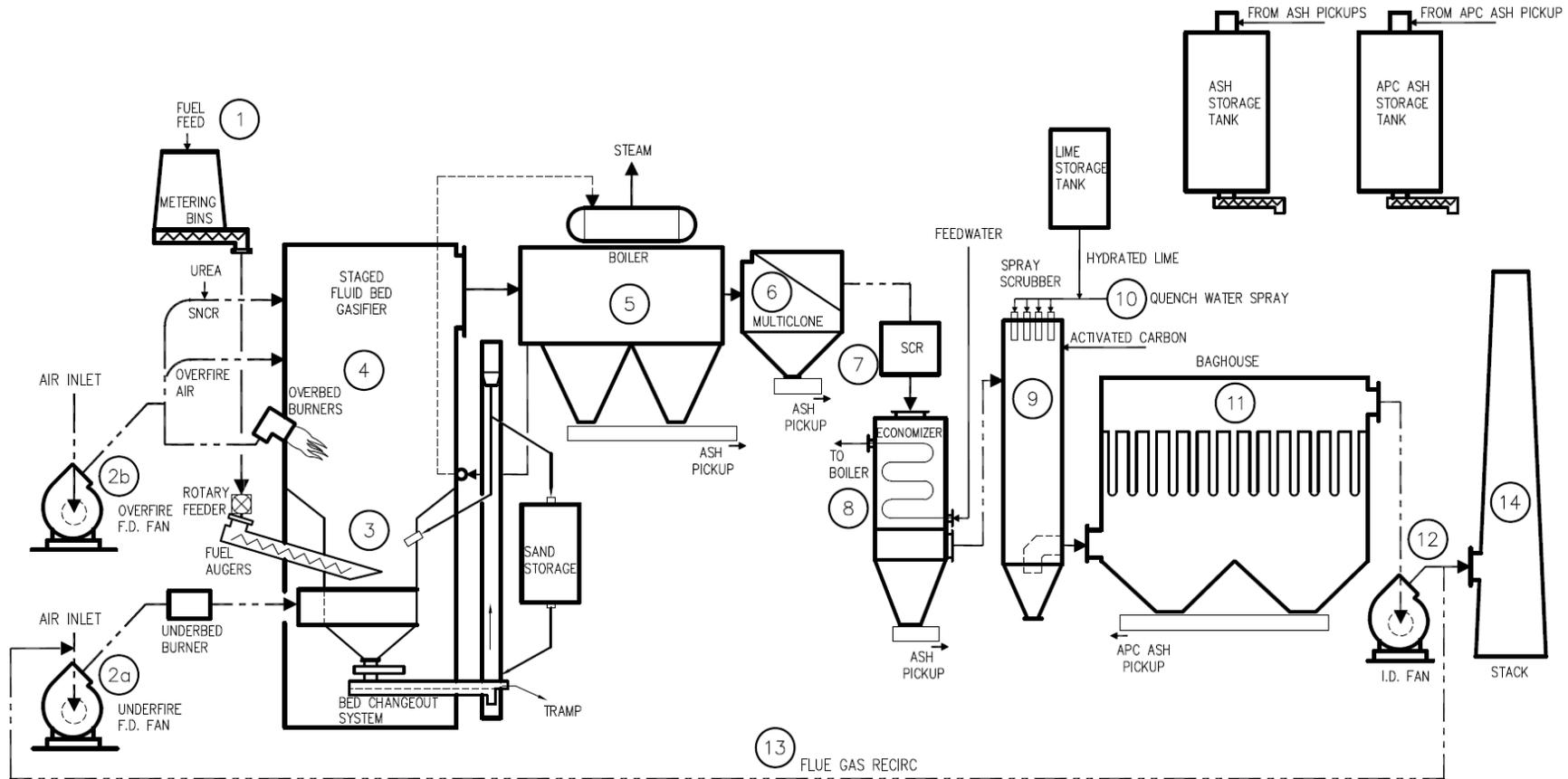


Figure 9.1: Process flow diagram

## Assessment Criteria and Assessment of Significance

### Operational Phase

#### *Incoming Fuel Feedstocks*

9.27 The Barry Biomass Facility is designed to accept and process approximately 72,000 dry tonnes of mixed waste wood per annum. The incoming waste will consist of ‘fuel grade’ mixed waste wood as defined by BS PAS 111: Waste Wood Processing<sup>47</sup>.

9.28 Fuel grade (Grade C) waste wood, is not of sufficient quality to be able to be recycled into wood products such as a chip board and OSB board sector and therefore is most suited for energy recovery.



**Figure 9.2:** Typical Grade C Waste Wood Fuel feedstocks

9.29 Prior to processing, all wastes accepted on site will be subjected to stringent waste acceptance criteria in accordance with the approved NRW permitted Site Environmental Management Plan and

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<sup>47</sup> All waste wood will meet Grade C (Fuel Grade) or better

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associated waste acceptance procedures, which detail the sampling, inspection and monitoring programme for the fuel.

9.30 Under the conditions of the fuel feedstock supply contract, all incoming waste wood fuel feedstock is required to meet a strict specification.

9.31 Conformance to the fuel specification is demonstrated through ongoing fuel sampling carried out daily and in accordance with the agreed Ofgem fuel measurement and sampling (FMS) protocols and the approved inspection and monitoring programme as approved by the NRW / EPR permit.

9.32 Under the terms of the contract, all fuel suppliers are also required to provide independent sampling and approval of all fuel feedstocks being supplied to site.

9.33 The site is permitted by NRW to import non-hazardous waste wood feedstocks that meet with the following European Waste Catalogue (EWC) codes, however typically all fuel is sourced and supplied from approved processors under a 19-12-07 code '*Non-Hazardous Mixed Waste Wood*'.

#### *Incoming Waste Storage*

9.34 All fuel delivery vehicles will enter the site and report to the weighbridge at the site entrance to weigh and record the delivered waste in accordance to the sites working plan procedures.

9.35 All incoming and outgoing delivery vehicles will be recorded via the weighbridge, located at the site entrance.

9.36 All vehicles will be directed from the weighbridge to the fuel storage building via electrically operated roller shutter doors. Waste will then be deposited directly into the reception area of the building.

9.37 Site operators will move the fuel around using a mechanical loading shovel and will load it onto a fuel transfer system for automatic feeding into the gasification system.

9.38 The wood storage building is of sealed construction, fitted with roller shutter doors. Air is extracted from the storage building and directed to the intakes of the main combustion air systems in order to maintain dusts at below occupational exposure levels. There are no direct or uncontrolled releases from the fuel

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storage building to the outside environment as required by both the planning conditions of 2015/00031/OUT and NRW EPR permit.

9.39 The wood storage area within the building has an approximate storage volume of 2,000m<sup>3</sup> and equipped with internal water mist dust suppression and control systems to maintain an internal environment that meets occupational exposure requirements.

9.40 All vehicle doorways are designed to be fast acting and configured to automatically close either upon entry or exit of the building.

9.41 In addition to the above dust mitigation system, the fuel storage building is equipped with heat sensing cameras, flame detection and a deluge system to ensure that any fire or localised hotspot related to stored fuel feedstocks can be identified and resolved in advance of a runaway thermal event occurring. All fire prevention measures on site are specified to meet the requirements of the NRW's Fire Prevention and Mitigation Plan.

#### *Fuel Reclaim System / Waste Feeding System / Material Handling System*

9.42 The fuel storage building is equipped with a push floor which provides intermediate storage and transport of the fuel feedstock. The walking floor consists of several metal conveyors, which are driven by hydraulic actuators, which pull the fuel to the conveyor transport system.

9.43 To ensure that any residual contamination within the fuel is removed, the conveyor system is equipped with a ferrous and non-ferrous metal separator to remove any metals contained within the feedstock materials. Metals are separated using an overband magnet and eddy current separator and segregated into a dedicated containers.

9.44 Downstream of the metal separator, the fuel is passed over a screen where both oversize and undersize feedstock is separated and collected within separate containers.

9.45 All screened fuel feedstock is then transported towards the gasifier metering bins and onwards into the gasifier.

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### *Ash Residues*

9.46 The Barry Biomass Facility produces two main residues; a combined stream of bottom ash (IBA) and Fly Ash, as well as Air Pollution Control Residues (APCR). Both will be subject to testing and analysis to determine the correct waste classification prior to export offsite for recycling or disposal.

### *Bottom Ash and Fly Ash*

9.47 Bottom ash and fly ash is produced from within the gasification chamber from the combustion of waste wood materials and is collected from the boiler, multicyclone and economiser systems within the fluidised bed combustion process.

9.48 Due to the nature of the gasification process, the fluidized limestone bed breaks down over time and is ejected from the gasifier in the fly ash stream and hence, no large solid bed material is produced by the plant.

9.49 The bottom ash/fly ash contains a mixture of non-combusted inert waste materials, bed material (fired refractory clay / sand), limestone bed additive and urea residue from SNCR injection into the chamber.

9.50 Following commencement of operations and the implementation of an IBA testing scheme in accordance with the ESA protocol, the IBA was able to be classified as non-hazardous and is therefore classified as EWC codes 19-01-14 *'Fly ash other than those mentioned in 19-01-13'*.

### *APCR*

9.51 The APCR is produced as a result of the sites flue gas treatment system which includes the following:

- Limestone and urea injection (SNCR) into the combustion chamber;
- Selective Catalytic Reduction (SCR);
- Lime and Powdered Activated Carbon (PAC) injection into the scrubber; and
- Bag house filter to remove particulates, complete with APC ash tank.

9.52 The flue gas treatment system removes spent reagent, which may contain hazardous substances from the flue gas stream prior to its release. As such the resultant APCR is designated as being a hazardous waste.

9.53 Analysis of APCR on the behalf of the operator has identified that the material is alkaline and predominantly composed of calcium, with chlorides, sulphur and traces of metals such as titanium and magnesium.

9.54 Initial WM3 waste classification assessment has classified the APCR as hazardous for a number of potential hazardous properties. This will be the assumed classification for the Barry facility unless ongoing laboratory analysis and classification indicates otherwise.

#### *Ash Handling, Storage and dust mitigation*

9.55 The site is equipped with a sealed mechanical ash system for the continuous collection and transport from each discharge point of the process to a multi-day storage tank.

9.56 The Installation will have two ash systems.

- The first system handles the ash from the boiler, multi-clone and the economiser; and
- The second system will remove and store the ash from the air pollution control devices.

9.57 All aspects of the ash handling system are sealed and equipped to the main extraction and baghouse filtration system to prevent any uncontrolled releases to atmosphere.

9.58 Both ash hoppers are fitted with a rapid unloading and conditioning system to empty the ash storage tank into sealed articulated vehicles for removal from site.

9.59 Both ash collection hoppers are equipped with fabric filter vent that filters the air of particulate prior to venting to atmosphere. The storage system is complete with supports, fluidising nozzles to enhance mass flow and an isolation slide gate valve to facilitate the controlled unloading and discharge into sealed ash collection trailers.

9.60 An ash wetting system is included to condition the fly ash and suppress fugitive dust during the normal unloading operation from the storage bin.

9.61 All aspects of the site pollution and abatement systems are managed in accordance with the Sites EPR permit conditions and in accordance with an approved dust and emissions management programme.

9.62 The requirements of the Environmental Permitting Regulations and Sector BREF stipulate that all fugitive emissions are captured, controlled and filtered such that they are fully contained and managed.



**Figure 9.3:** Enclosed Ash Silos showing sealed fill pipes and enclosed discharge

#### *Other waste sources*

9.63 The Barry Biomass Facility also generates a number of other tertiary waste sources including the following:

- Extracted metals and oversize wood from fuel screening system;
- Separated bed materials (inert clinkers and metals) from bed vibratory screens;
- Domestic / office general wastes; and

- Specialist oils and chemicals wastes arising from turbine and water treatment plant maintenance.

9.64 With the exception of specialist oil and chemical wastes, all other waste streams are stored in dedicated localised covered skips and containers. All skips and containers are managed under contract and are controlled in accordance with the site permitting requirements and prevailing Environmental ‘Duty of Care’ Regulations.

9.65 All oil and chemical wastes are limited to planned and scheduled maintenance activities, are small volume and limited to less than 2m<sup>3</sup> at any one time. All maintenance wastes are stored in sealed barrels and containers removed from site by the maintenance contractors for treatment and/or disposals. All such wastes are managed entirely by contracted and approved third parties.

#### **Sensitive Receptors**

9.66 Releases relating to the storage of wastes, principally releases from the fuels storage buildings, ash silos and handling systems, have the potential for localised onsite and offsite impacts and are limited to dust and particulate emissions only.

9.67 All potential emissions of dust from the site are managed and regulated in accordance to an agreed Dust and Emissions Management Plan approved by the NRW as part of the permitted management activities under EPR Permit Reference EPR/AB3790ZB.

9.68 The very specific nature of the plant means that the potential emissions of dust are limited to a small number of point source releases namely high-level silo vents, ash unloading enclosure and fuel storage building doorways.

9.69 Given the highly localised sources of emissions at the site, in the event of an environmental releases all impacts are limited to immediate business and residential neighbours only.

9.70 Under normal operation, the site will not give rise to any offsite fugitive dust releases and as such, will not have any offsite impacts.

9.71 In the event of a failure relating to the onsite control measures i.e. silo vent filter failure or ash unloading valves, then the impacts will be very localised, short term and immediately rectifiable.

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## ENVIRONMENTAL IMPACTS OF WASTE MANAGEMENT

### *Incoming Waste Wood Feedstocks*

9.72 All incoming waste wood feedstocks are proposed to be sourced from a single supplier and transported to site via approved waste carriers. All waste wood supplied to the site will be sourced regionally (i.e. within south wales) and is transported to site by road.

9.73 Since the implementation of the Landfill Directive and in accordance with the objectives of both TAN 21 and Article 4 of the Waste Framework Directive, the disposal of ‘fuel grade’ PAS 111 Grade C waste wood to landfill is neither considered to align with Policy nor considered to comply with the objectives of the waste hierarchy. Grade C wood typically cannot be recycled and therefore the accepted best practice, as outlined PAS111 is for use as energy recovery, as opposed to landfill.

9.74 Grade C mixed waste wood is a certified 100% renewable fuel that meets the definition of biomass<sup>48</sup> as defined by OFGEM in the context of the Renewables Obligation Order<sup>49</sup> and the Renewable Energy Directive. All direct carbon emissions from the plant are therefore considered to be renewable, as such all emissions are considered to be carbon neutral.

9.75 The use of ‘non-recyclable’ Grade C mixed waste wood to produce electricity directly displaces grid generated electricity so therefore has an indirect environmental benefit in terms of Greenhouse Gas generation. The carbon benefits of this aspect of the operating plant have been evaluated as part of Chapter 8 - Climate Change.

### *Ash Residues (APCR and IBA/Bottom Ash)*

9.76 The ash by-products resulting from the combustion of waste wood biomass are transported off site and recycled for use as a recycled aggregate material at a regional treatment facility<sup>50</sup>. All direct impacts

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<sup>48</sup> For the purpose of the Renewables Obligation, biomass is fuel used in a generating station with at least 90 per cent of its energy content derived from material which is derived directly or indirectly from plant matter, animal matter, fungi or algae. If fossil fuel forms part of the fuel, please see the guidance for further information.

<sup>49</sup> The Renewables Obligation is a support scheme for renewable electricity projects in the UK. It puts an obligation on UK electricity suppliers to source an increasing proportion of their electricity from renewable sources.

<sup>50</sup> The treatment plant utilized for the processing of ash products from the plant is located in Waunaryllydd, Swansea, South Wales and is operated by the Treatment Hub Ltd.

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arising from the transportation of the ash products to the processing site have been accounted as part of Chapter 8 - Climate Change.

9.77 The use of incineration ash products for the production of aggregates significantly reduces the impact associated with the production of cementitious construction materials.

*Other materials*

9.78 All oversize wood and fuel products are returned to the waste processor for further shredding and recycling. Ultimately the wood will be reprocessed and returned to site for the production of renewable energy.

9.79 All ferrous and non-ferrous metals removed by the screening tower are collected for local recycling, ultimately being processed at the nearby Port Talbot steel works site.

9.80 All domestic waste arisings are removed by the contract cleaners and disposed in accordance with regulatory requirements.

9.81 All specialist oil and chemical wastes are removed directly by the maintenance contractors and recovered in accordance with regulatory requirements.

9.82 A summary of the waste treatment and environmental fate of the wastes is provided in Table 9.4.

**Table 9.4: Waste Summary**

Waste	EWC Code	Approx. Quant (tonnes/yr)	Source	R / D Code	Environmental Fate
Mixed Waste Wood	19 12 07	72,000 (dry) approx. 86,400 (AR)	Incoming Wastes	R1 (recovery)	Energy Recovery / Combustion
Bottom Ash	10 01 15	3,944	Gasifier	R5 (Off site recycling)	Aggregate
Fly Ash (Air Pollution Control (APC) residues)	19 01 05*	2,072	Emissions Treatment Plant	R5 (Off site recycling)	Reclaimed and reused
Oversized Particles	20 03 01	88	Fuel Screening	R5 (Off site recycling)	Reclaimed and reused
Metals	02 01 10	88	Fuel Screening	R5 (Off site recycling)	Reclaimed and reused
Used Bed Material	10 01 15	Not known but assumed to be 400 T PA	Gasifier	R5 (Offsite recycling)	Aggregate
Domestic Wastes		< 2	Offices	R6 Reclamation/recycling	Recovery & Disposal
Oils and Chemicals	Various	< 5	Maintenance	R9 Recovery Refining	Treatment

## SIGNIFICANCE OF EFFECTS

### Operational Development

9.83 Under normal operation of the site and in accordance with the permit conditions at the site, all emissions relating to the control of wastes are managed such that there are no direct or indirect releases to the environment.

9.84 On the basis that under normal operations there will be no direct releases to the environment relating to the waste storage and management activities at the Barry Biomass Facility, there will be no environmental or human health impacts associated with the site.

9.85 Under abnormal situations, i.e. in the event of a silo filter or unloading valve blockage or failure, then the impacts will be very localised and contained on site.

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9.86 Under emergency conditions, i.e. major site fire within the main fuel storage building, the fire protection measures will ensure that any fire will be controlled and extinguished within 4 hours and that any offsite impacts are minimised. It is stipulated as a requirement of the NRW Fire Prevention and Mitigation Plan that all liquid waste and polluted runoff emissions arising from an emergency fire event are controlled, contained and retained on site.

#### **LIMITATIONS OF THE ASSESSMENT**

9.87 This assessment only considered the onsite control, storage and management of solid and liquid wastes. Impacts arising from the combustion of the waste fuel feedstocks within the gasification process are assessed as part of the Air Quality and Human Health Impacts assessments within Chapter 7 – Air Quality and Human Health Impacts.

#### **MITIGATION MEASURES ADOPTED AS PART OF THE PROJECT**

##### **Operational Phase Mitigation**

9.88 The Barry Biomass Facility has been designed with an number of mitigation measures for the purposes of ensuring that impacts to the environment are minimized and prevented. These measures are summarized within Table 9.5 below.

9.89 All control measures have been documented and considered by the NRW as part of the Environmental Permit determination process and considered to meet the requirements of BAT.

Table 9.5: Mitigation measures for the prevention of releases of waste

Source	Nature of Release	Nature of potential impact	Control Measure	Residual Impact
Incoming Waste Deliveries	Uncontrolled releases from waste delivery vehicles	Localised releases of respirable wood dust from the site	All fuel delivery vehicles are equipped with sheeted (walking floor trailers) and sealed.  All vehicles are from a single contracted waste supplier and no open sided vehicles are permitted to deliver to site.	None – There is no potential for uncontrolled releases from delivery vehicles to arise at site.
Delivery of Fuel Feedstocks	Uncontrolled releases escaping from the fuel storage building	Localised releases of respirable wood dust from the site	All fuel deliveries take place within the fuel storage building.  The building is equipped with fast acting roller shutter doors to ensure that no fugitive releases can occur during fuel deliveries.  Fuel storage building is equipped with extraction and dust mitigation to prevent any airborne dust emissions from the building.	None – there are no dust releases from the main fuel storage building
Dust escape from fuel storage building	Dust emissions being tracked out of the fuel storage building by delivery vehicles and site mobile plant	Localised releases of respirable wood dust from the site	As above.  In additional the site maintains continuous onsite maintenance and cleaning activities to ensure that no wood dusts are allowed to collect or become windswept form the site.	None – there are no dust releases from the main fuel storage building

Failure of dust extraction and mitigation systems	Dust extraction and mitigation systems leading to escape from opening doors and high-level building vents	Short term and localised releases – from building doors only	Failure of main extraction systems is indicative of main plant failure. In such circumstances, all waste deliveries would cease and building would be locked down.	None – no releases would occur.  All buildings sealed until main extraction and combustion systems operable
Failure of ash and APCR silo vents and filters	Vent filter failure leading to the release of hazardous and non-hazardous ash products to the environment	Short term and localised releases from silo's only.	All filtration systems are linked to the plant DCS system and would alarm in the event of failure. In the event of an alarm, all ash transfers would cease and the filter plant repaired with immediate effect. No releases to environment would occur.  Plant forms part of planned maintenance activities	None – all releases prevented very minor releases would occur.
Failure of ash and APCR silo unloading valves	Valve failure leading to the spillage of hazardous and non-hazardous ash products to the environment	Short term and localised releases from silo's only.  Immediately cleared up and prevented	A blockage or failure in the unloading valves would be detected by the plant DCS. In the event of an alarm, the valve would be immediately repaired and or replaced.  Any spillages would be immediately contained, swept up and controlled. No releases to environment would occur.  Plant forms part of planned maintenance activities	None – all releases prevented very minor releases would occur.
Spillage during ash unloading	Uncontrolled releases from ash collection vehicles	Localised releases of hazardous and non-hazardous ash from the unloading activities at the site	All ash collection vehicles are equipped with a sealed delivery system that prevents escape during transport and loading.	None – Under normal operation the potential for uncontrolled releases is considered negligible.

			All vehicles are from a dedicated ash handling contractor. All operators trained and competent.	
Uncontrolled releases of other wastes	Spillage or leakage of other non-hazardous solid wastes (domestic wastes, metals and screenings) to the environment	Very localised releases of non-hazardous solid wastes.  Immediately cleared up and removed	Any local spillage of localised solid wastes immediately cleared up and contained.	None
Uncontrolled releases of hazardous liquids	Spillage and leakage of oils and chemicals during maintenance	Localised containment of liquid wastes within bunded / secondary containment or drainage systems	Any local spillage will be contained in the infrastructure of the site and not released to the environment. Leakages into the surface water drainage systems can be isolated and contained and removed from site.	None – No releases will occur. The storage of all hazardous liquids are within dedicated sealed and contained areas with no potential for off site release.

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## ASSESSMENT OF OPERATIONAL EFFECTS

9.90 The control measures incorporated into the design of the Barry Biomass Facility are considered to meet the requirements of BAT and therefore under normal, abnormal and emergency operational scenarios are adequate to control, contain and mitigate the impacts to the environment.

9.91 It is considered that under normal operating conditions the magnitude of the impacts arising from the storage and handling of waste materials is **Negligible with a Negligible significance.**

9.92 In the event of a significant on-site emergency, such as a major fire within the fuel storage and handling systems the control measures employed at the facility are adequate to ensure that the impacts are very Short Term (i.e. less than 4 hours) and Minor, in that smoke and emissions released from the facility may impact the immediate locale of the plant.

## SUMMARY OF EFFECTS

9.93 The above chapter has outlined the potential operational effects associated with onsite control, storage and management of solid and liquid wastes at the Barry Biomass Facility.

9.94 This has included both incoming fuel feedstocks, namely waste wood, and residues produced by the process.

9.95 The assessment has shown that under normal operating conditions the impacts and effects from storage and handling of waste materials onsite is **negligible.**

9.96 In the event of an emergency such as a major fire, the impacts are considered to be **minor, local and short term** only.

Table 9.6 – Effects Summary

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Fugitive Emissions	Temporary	Negligible	Plant has been designed with a number of control measures to contain and mitigate the impacts to the environment	Negligible
	Short			
	Local			
Fire	Temporary	Minor		Minor
	Short Term			
	Local			

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## REFERENCES

**Ref 9.1:** Planning Policy Wales Edition 10, Welsh Government 2014 & Government of Wales Act 2006, s.79; Welsh Government (May 2009) One Wales: One Planet - The sustainable development scheme of the Welsh Assembly Government.

**Ref 9.2:** Directive 1999/31/EC on the landfill of waste, OJ [1999] L182/1 Directive 2008/98/EC on waste, OJ [2008] L312/3

**Ref 9.3:** Directive 2008/98/EC of the European Parliament

**Ref 9.4:** The Environmental Permitting (England and Wales) Regulations 2016

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## 10 CONCLUSIONS

10.1 This chapter contains the overall conclusions of the EIA. The EIA has examined the potential impacts associated with the 'As-Built' development during the operational phase only, and is retrospective following construction of the Barry Biomass Facility.

10.2 The EIA has been prepared in accordance with the scope and requirements agreed between the Owner and the Welsh Assembly Government and without prejudice to the 2015 Planning Permission.

10.3 The conclusions from each topic assessed in the EIA are provided below.

### Landscape and Visual Impact

10.4 This chapter outlines the findings of a Landscape and Visual Impact Assessment incorporating a review of the areas considered to be deficient in the ES Adequacy Report undertaken by WSP in 2019. The scope of the LVIA, including methodology and approach was formally agreed with the Welsh Government prior to commencement.

10.5 The LVIA assesses the landscape and visual effects of the 'As-Built' development, including the building heights as specified in the approved scheme drawings and structures plan which are now apparent on the ground. Full consideration of the sensitivity of receptors and the magnitude of change which has occurred as a result of the development was undertaken.

10.6 The effects of the development on all identified landscape and visual receptors, for both day time and night time views are considered to be **Not Significant**.

### Noise and Vibration

10.7 An assessment of the likely environmental effects with respect to noise from the facility has been undertaken in accordance with BS 4142:2014+A1:2019. This has included background noise survey to determine the baseline noise environment and noise modelling using Cadna-A software to determine calculated rating levels of the plant and associated excess noise levels over background.

10.8 The assessment has been based on the computer noise model and been informed and validated using environmental noise measurements and data provided for the plant items.

10.9 The Barry Biomass Facility has been designed with a number of noise control and mitigation measures and is operated in accordance with the NRW approved Noise Management Plan and the approved planning conditions.

10.10 The assessment, based on the information provided in conjunction with measurements undertaken at existing sites, indicates nearby receptors will experience **Negligible** significant effects during typical onsite activities. This assessment opinion is consistent with the conclusions made by the NRW following their permit determination and public consultation process and aligns with the regulatory guidance relating to the Horizontal Guidance relating to the control and management of noise impacts from EPR Installations.

### **Air Quality and Human Health**

10.11 An assessment has been carried out to determine the local air quality impacts associated with the operation of the Barry Biomass Facility.

10.12 Detailed air quality modelling using the AERMOD 7 dispersion model has been undertaken to predict the impacts associated with stack emissions from the Site. As a worst-case, emissions from the development have been assumed to be at IED limits. Actual emissions from the Site are likely to be significantly lower.

10.13 The assessment has shown that the pollutant concentrations are predicted to be below the relevant air quality assessment levels at both the sensitive human receptors in the vicinity of the Site and on nearby sensitive ecological habitats. The significance of the impacts has been assessed as **Negligible** in accordance with the Environment Agency's criteria.

10.14 Maximum impacts both off-site and at sensitive receptors have also been determined for a number of potential abnormal emissions scenarios for the facility, including failure of the Urea injection operation. Predicted short-term concentrations of all affected pollutants are of **Negligible Significance** compared with the relevant air quality standards.

### **Climate Change**

10.15 An assessment of the potential climate change impacts has been carried out using the UK Government 2019 Greenhouse Gas Emissions Reporting calculators.

10.16 The operation of the Biomass Facility provides a modern renewable energy facility that directly displaces the grid electricity and the associated carbon emissions.

10.17 The project directly aligns with and meets UK and local energy and decarbonization policy and facilitate the removal of biodegradable wastes to landfill. The project therefore provides a current and ongoing reduction in baseline greenhouse gas emissions.

10.18 The proposals would deliver carbon equivalent savings of -51,570.26 tCO<sub>2</sub>e/annum under normal operating conditions (assuming no offsite heat export).

10.19 The conclusion of the chapter is that the Barry Biomass Facility has a positive benefit in terms of carbon and climate change and provides a **significant Beneficial** and meaningful reduction of carbon emissions when compared to the baseline.

### Site Waste Management

10.20 As the development is fully constructed, with all construction management of wastes controlled through the construction site waste management plan (SWMP) which had been approved by the Vale of Glamorgan planning authority, only the solid and liquid waste management aspects of the operational development have been considered in this chapter.

10.21 The facility will accept and process only non-hazardous waste wood which is accepted in accordance with a strict specification (PAS 111 Grade C Waste Wood). Wastes produced by the process include ash residues, extracted metal and oversize from processing of incoming waste streams and separated bed materials, domestic/office general wastes and specialist oils/chemicals from plant maintenance.

10.22 Ash residues can be separated into two main streams from the plant; non-hazardous mixed bottom ash and fly ash and hazardous APCR. All ash residues are collected, stored and handled in such a manner as to minimise potential fugitive emissions from the site.

10.23 Where possible all wastes produced by the plant are recycled.

10.24 Releases relating to the storage of wastes, principally releases from the fuels storage buildings, ash silos and handling systems, have the potential for localised onsite and offsite impacts and are limited to dust and particulate emissions only.

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10.25 The site will be operated under a permit regulated by the Environment Agency under the Environmental Permitting (England and Wales) (Amendment) Regulations 2016 (Permit Ref: EPR/AB3790ZB). As such, all potential emissions of dust from the site are managed and regulated in accordance to an agreed Dust and Emissions Management Plan approved by the NRW as part of the permitted management activities and in accordance with BAT.

10.26 As such the assessment considers that under normal operating conditions the magnitude of the impacts arising from the storage and handling of waste materials is **Negligible with a Negligible Significance**.

10.27 In the event of a significant on-site emergency, such as a major fire, the control measures employed at the facility are adequate to ensure the impacts are **Minor, Local and Short Term** only.