

2023 ENVIRONMENTAL STATEMENT ADDENDUM CHANGE 2

Appendix B – ES Appendices Addenda

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 –
Regulations 8(1)(c)

Document Reference Number D.7.22.2

Applicant: Liverpool Bay CCS Limited

Inspectorate Reference: EN070007

English Version

REVISION: A

DATE: May 2023

DOCUMENT OWNER: WSP UK Limited

PUBLIC

QUALITY CONTROL

Document Reference			D.7.22.2		
Document Owner			WSP		
Revision	Date	Comments	Author	Checker	Approver
A	May 2023	Submitted with ES Addendum design change request 2	KE/RC	MT	AV

TABLE OF CONTENTS

1. DESIGN OPTION PS25 – ALLTAMI BROOK EMBEDDED PIPE BRIDGE	1
1.1. Appendix 6.1 - Construction Dust Assessment	1
1.2. Appendix 12.4 – Visual Analysis	3
1.3. Appendix 18.2 Summary of Effects	6
1.4. Appendix 18.3 Water Framework Directive Assessment Addendum	13
1.5. Appendix 18.5 Flood Consequences Assessment	36
2. DESIGN CHANGE PS26: CHANGE TO NEWBUILD INFRASTRUCTURE BOUNDARY AT 2 SISTERS FOOD GROUP LIMITED	44
2.1. Appendix 18.2 Summary of Effects	44
2.2. Appendix 18.3 Water Framework Directive Assessment Addendum	47

TABLES

<i>Table 18 – Potential Dust Emission Magnitude</i>	2
<i>Table 19 – Sensitivity of the Study Area</i>	2
<i>Table 20 – Summary Dust Risk Table to Define Site Specific Mitigation</i>	3
Table 1.1 - Visual Analysis of receptors scoped into the LVIA	4
Table 1.2 - Sensitivity of receptors associated with activities for the DCO Proposed Development for the Embedded Pipe Bridge Design Option	6
Table 1.3 - Directness, duration and reversibility of each potential impact during the Operation stage	7
Table 1.4 - Assessment of impacts to water quality and hydromorphology by entrainment of materials	10
Table 1.5 - Assessment of impacts to water quality by spillage of pollutants	10
Table 1.6 - Assessment of impacts associated with loss of riparian vegetation along watercourses.....	12
Table 1.7 - Assessment of impacts associated with installation of permanent artificial features within the channel of watercourses	12
Table 1.8 - Assessment of impacts on groundwater levels and flows	12
Table 1.9 - Screening of activities	14
Table 1.10 - Scoping of surface, transitional, and coastal WFD quality elements for the Operational Stage	15
Table 1.11 - Scoping of groundwater WFD quality elements for Construction Stage activities ..	17
Table 1.12 - Scoping of groundwater WFD quality elements for the Operational Stage	18
Table 1.13 - Impact on the WFD Quality elements from Embedded Pipe Bridge on relevant water bodies.....	20
Table 1.14 - Activities potentially impacting watercourses within each WFD water body along the DCO Proposed Development.....	35
Table 1.15 - Watercourse Crossings.....	38

Table 2.1 - Sensitivity of Receptors Associated with Activities for the DCO Proposed Development.....	44
Table 2.2 - Screening of activities	48
Table 2.3 - Activities potentially impacting watercourses within each WFD water body along the DCO Proposed Development.....	50

1. DESIGN OPTION PS25 – ALLTAMI BROOK EMBEDDED PIPE BRIDGE

1.1. APPENDIX 6.1 - CONSTRUCTION DUST ASSESSMENT

CONSTRUCTION DUST ASSESSMENT METHODOLOGY

- 1.1.1. The construction dust assessment methodology has not changed due to proposed design option PS25. Therefore, the text within **Section 1** of **Appendix 6.1** of the 2022 ES [APP-081] remains unchanged and valid.

ACTIVITY SPECIFIC CONSTRUCTION DUST ASSESSMENTS

- 1.1.2. There are changes to the likely impacts and effects previously identified within **Section 2** of **Appendix 6.1** of the 2022 ES [APP-081].

- 1.1.3. Due to the inclusion of a new methodology not initially considered to install the embedded pipe bridge at Alltami Brook, the following text should be inserted after **paragraph 2.4.10** of the **Appendix 6.1** of the 2022 ES [APP-081]:

Embedded Pipe Bridge Construction

Assessment of potential dust emission magnitude

Demolition

No demolition activities will occur during this stage of the DCO Proposed Development. Therefore, consideration of the impact of this source on dust soiling and ambient PM₁₀ is not required.

Earthworks

*With a site area of less than 2,500m² construction of the embedded pipe bridge will move less than 20,000 tonnes of material and there are predicted to be fewer than 10 earth moving vehicles active at any one time. Therefore, the dust emission magnitude for earthworks is **Small**.*

Construction

*The embedded pipe bridge construction will involve less than 25,000m³ of building material and will likely consist of pre-cast and cast in-situ concrete, metal and backfill. Therefore, the dust emission magnitude for construction is **Small**.*

Trackout

*The exact number of outward vehicle movements relating to the pipe bridge construction is unknown, but it is likely to be fewer than 10 HDVs per day but over unpaved ground for 50m to 100m. As a worst-case, the dust emission magnitude for trackout is **Medium**.*

Table 18 provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 18 – Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	N/A
Earthworks	Small
Construction Activities	Small
Trackout	Medium

Assessment of the Sensitivity of the Study Area

Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. The embedded pipe bridge construction option is located in a rural area where there are approximately 20 high sensitivity residential receptors within 350m of the works (but none within 100m) and 6 high sensitivity receptors within 20m of the trackout routes.

There is a Local Wildlife Site within 20m of the works.

Taking the above into account and following the IAQM assessment methodology, the sensitivity of the area to changes in dust and PM₁₀ has been derived for each of the construction activities with the outcomes presented in **Table 19**.

Table 19 – Sensitivity of the Study Area

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Low	Low	Medium
Human Health	N/A	Low	Low	Low
Ecological	N/A	Low	Low	Low

Risk of Impacts

The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction stage, prior to mitigation. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 20 – Summary Dust Risk Table to Define Site Specific Mitigation

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Negligible	Negligible	Low Risk
Human Health	N/A	Negligible	Negligible	Low Risk
Ecological	N/A	Negligible	Negligible	Low Risk

1.1.4. No other text within **Section 2** of **Appendix 6.1** of the 2022 ES [APP-081] has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 2** of **Appendix 6.1** of the 2022 ES [APP-081] remains unchanged and valid.

SCREENING OF CONSTRUCTION TRAFFIC FLOWS

1.1.5. The screening on construction traffic flows has not changed due to proposed design option PS25. Therefore, the text within **Section 3** of **Appendix 6.1** of the 2022 ES [APP-081] remains unchanged and valid.

1.2. APPENDIX 12.4 – VISUAL ANALYSIS

1.2.1. Proposed design option PS25 will require a new viewpoint (Viewpoint P2c) to account for sensitive receptors associated with Public Footpath - PRoW 414/39A.

1.2.2. The information for Viewpoint P2c in **Table 1.1** below should be added to **Table 1** under ‘Viewpoints associated with the Carbon Dioxide Pipeline route (P)’ of **Appendix 12.4 [CR1-030]**.

1.2.3. All other viewpoints within **Table 1** and **Table 2** of **Appendix 12.4 [CR1-030]** remains unchanged and valid.

Table 1.1 - Visual Analysis of receptors scoped into the LVIA

Viewpoint Ref, Location and Type	Baseline description and visibility of Site	Susceptibility, value and overall sensitivity	Construction magnitude and effect & Construction night-time magnitude and effect	Operation Year 1	Operation Year 15	Decommissioning
Viewpoints associated with the Carbon Dioxide Pipeline route (P)						
<p>P2c Grid Ref: SJ 27102 67837 (Approximate TBC following Site Survey) Address: Northop Hall, Flintshire</p> <p>Recreational users of Public Footpath - PRoW 414/39A</p>	<p>The viewpoint is located on Public Footpath PRoW 414/39A and is orientated to the east towards the proposed embedded pipeline bridge crossing at Alltami Brook. The view lies within an area of woodland that lines the western edge of the Brook and extends northwards towards Northop Hall and the southern edge of Connah's Quay. The view is predominantly rural in character, however with the A55 North Wales Expressway located within close proximity to the south, detracting from this rural character to a degree, with associated road noise. The viewpoint is situated within the red line boundary and as such views towards the DCO Proposed Development are likely to be available however, filtered to some degree by the existing vegetation.</p>	<p>Receptors are noted to be PRoW users associated with Public Footpath PRoW 414/39A. PRoW users are likely to be using this route seeking enjoyment of the countryside with an appreciation for the wider landscape. The susceptibility of the receptor is recorded as <u>High</u>. The view is not taken from within nationally or regionally significant landscape. The view contains few detracting features and is representative of a more rural character, albeit with the A55 North Wales Expressway introducing an urbanising feature to the south and disrupting the overall tranquillity of the area to a degree. The value of the view is recorded as <u>Medium</u>.</p> <p>Overall Sensitivity: Medium.</p>	<p>Construction activity associated with the DCO Proposed Development will be visible within the view, However, views will be filtered to some extent by the sloping topography and the existing vegetation and woodland cover that lines the western edge of the Brook. The scale of change is <u>High</u>. The DCO Proposed Development spans the length of the view, including a minor PRoW diversion, with required vegetation removal, likely to result in views towards construction activity. Dense vegetation alongside the sloping topography that defines the brook will ensure that views towards the DCO Proposed Development will generally be localised. However, the presence of taller construction elements, including cranes when on site, will be more widely perceived. The geographical extent of change is recorded as <u>Medium</u>. The construction stage is short term, and the duration of change is therefore assessed as <u>Low</u>.</p>	<p>At operation year 1 it is considered the DCO Proposed Development will be barely perceptible from a large section of Public Footpath PRoW 414/39A, with the Newbuild Carbon Dioxide Pipeline located underground. It is noted however that visible changes, such as: the proposed embedded pipeline bridge, regraded land, minor diversion of Public Footpath PRoW 414/39A and associated vegetation loss will be perceptible from a short section of the footpath. Overall, the scale of change is therefore assessed as <u>Low</u>, although it is recognised that for a very short section of the route where receptors will experience close range views of the embedded pipeline bridge the scale of change will be higher. The geographical extent of change will be restricted by the visual containment provided by the valley landform and the dense, mature vegetation on the valley sides. Views towards the embedded pipeline bridge will likely appear visible for only a highly localised stretch of Public Footpath PRoW 414/39A and will be further obscured by proposed mitigation planting and the existing slope although at year 1 the filtering effects of this vegetation will be minimal. The geographical extent of change is therefore considered to be <u>Low</u>. The operational stage comprises the life of the DCO Proposed Development and is therefore assessed as long term. The duration of change is recorded as <u>High</u>.</p> <p>Overall Magnitude: Low.</p> <p>Overall Effect: Minor adverse (not significant).</p>	<p>At operation year 15 it is considered that the DCO proposed development will be barely perceptible from a large section of Public Footpath PRoW 414/39A. Proposed mitigation planting will have matured at year 15 further limiting views towards the DCO Proposed Development. The scale of change is therefore assessed as <u>Negligible</u>. With regard to the geographical extent of change, at year 15 mitigation will have matured and previously glimpsed views towards the embedded pipeline bridge will be further screened. The geographical extent of change is therefore considered to be <u>Negligible</u>. The operational stage comprises the life of the DCO Proposed Development and is therefore assessed as long term. The duration of change is recorded as <u>High</u>.</p> <p>Overall Magnitude: Negligible.</p> <p>Overall Effect: Negligible adverse (not significant).</p>	<p>Decommissioning activity including the presence and operation of large scale machinery and cranes will be visible within the view. However, views will be filtered to some extent by the sloping topography and the existing vegetation and woodland cover that lines the western edge of the Brook. The scale of change is <u>High</u>. The DCO Proposed Development spans the length of the view. The minor PRoW diversion is anticipated to remain in place to minimise further disruption. It is anticipated that some mitigation planting will be removed to facilitate the decommissioning works but that this will be less than that required during construction. Dense vegetation alongside the sloping topography that defines the brook will ensure</p>

			<p>Overall Magnitude: Medium.</p> <p>Overall Effect: <i>Moderate adverse (significant).</i></p>			<p>that views towards the DCO Proposed Development will generally be localised. However, the presence of taller construction elements, including cranes when on site, will be more widely perceived. The geographical extent of change is recorded as <u>Medium</u>. The construction stage is short term, and the duration of change is therefore assessed as <u>Low</u>.</p> <p>Overall Magnitude: Medium.</p> <p>Overall Effect: <i>Moderate adverse (significant).</i></p> <p>Upon completion of the decommissioning these will reduce to not significant. This is due to the landscape returning to the baseline situation or similar although the loss of some mitigation planting will remain evident in the short to medium term.</p>
--	--	--	---	--	--	---

1.3. APPENDIX 18.2 SUMMARY OF EFFECTS

SUMMARY OF EFFECTS

Introduction

- 1.3.1. This appendix addendum presents the changes, in relation to proposed design option PS25, to the potential effects on the water environment and flood risk as presented within **Appendix 18.2 – Summary of Effects [APP-164]** of the 2022 ES and ES Addendum 1 - Appendix A **[CR1-125]**.
- 1.3.2. With proposed design option PS25, an embedded pipe bridge crossing option of Alltami Brook is also considered. Therefore, the information for ‘High’ sensitivity receptors in **Table 4.1** in ES Addendum 1 - Appendix A **[CR1-125]** should be replaced with the information in **Table 1.2** below.

Table 1.2 - Sensitivity of receptors associated with activities for the DCO Proposed Development for the Embedded Pipe Bridge Design Option

Sensitivity	Receptors
High	Trenchless crossing: River Gowy, Railway Ditch 2, Railway Ditch 1, Broughton Brook, Northop Brook, Principal aquifer, GWDTE
	Open cut crossing: Stanney Mill Brook, Seahill Tributary 2, Seahill Drain, Sandycroft Drain, Chester Road Drain North, Mancot Brook, Chester Road Brook Tributary 2, Willow Park Brook, New Inn Brook, Alltami Brook, Wepre Brook, Secondary A aquifer (bedrock)Principal aquifer, GWDTE.
	Embedded pipe bridge: Alltami Brook
	Outfalls: Wepre Brook

- 1.3.3. In addition, the information in **Table 1.3** below should be added to the end of **Table 1-3** of **Appendix 18.2** of 2022 ES **[APP-164]**.

Table 1.3 - Directness, duration and reversibility of each potential impact during the Operation stage

Operation Impacts	Direct/ Indirect	Short/ Medium/ Long	Temporary/ Permanent
Impacts associated with an embedded pipe bridge crossing a watercourse	Direct	Long	Temporary

- 1.3.4. No other text within **Section 1** of **Appendix 18.2** of the 2022 ES [APP-164] and ES Addendum 1 - Appendix A [CR1-125] has changed due to proposed design option PS25. Therefore, all remaining text within **Section 1** of **Appendix 18.2** of the 2022 ES [APP-164] and ES Addendum 1 - Appendix A [CR1-125] remains unchanged and valid.

ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

- 1.3.5. Proposed design option PS25 will change the assessment of likely impacts and effects assessed within **Appendix 18.2** of the 2022 ES [APP-164].

CONSTRUCTION STAGE

Quantitative Impact to Principal Aquifers

- 1.3.6. Proposed design option PS25 will require excavations (and potentially piling) into the bedrock for the construction of bridge support abutments; therefore, dewatering may be required during excavation in the event that groundwater is intercepted. On this basis, the potential effect remains the same as stated in **paragraph 2.1.72** of **Appendix 18.2** of the 2022 ES [APP-164].

Groundwater Quality Impacts on Groundwater Receptors

- 1.3.7. Proposed design option PS25 includes the construction of bridge support abutments, which may also incorporate piled foundations. Therefore, the potential risks to groundwater quality remain the same as stated in **paragraphs 2.1.87, 2.1.88 and 2.1.99** of **Appendix 18.2** of the 2022 ES [APP-164].

OPERATIONAL STAGE

Impacts associated with loss of riparian vegetation along watercourses

- 1.3.8. Proposed design option PS25 would result in permanent localised loss of riparian vegetation within the footprint of the structure. The impacts of this localised loss of riparian vegetation are minimal. Therefore, the potential loss of riparian vegetation along Alltami Brook remains the same as previously stated in **paragraphs 2.2.1 to 2.2.4** in **Appendix 18.2** of the 2022 ES [APP-164].

Impacts to Surface Water Associated with the New Above Ground Features

- 1.3.9. Proposed design option PS25 is an above ground feature which is impermeable, therefore an update to the impacts to surface water associated with the new above ground features is required. The following text should be inserted after **paragraph 2.2.34** of **Appendix 18.2** of the 2022 ES [APP-164]:

The Alltami Brook embedded pipe bridge option will be capped but will not be fully impervious. Surface water from precipitation will runoff from the sides of the structure into the Alltami Brook, along with discharging to ground from drainage holes within the structure. Surface water will then flow overland to Alltami Brook. There will be no formal outfall structure in the Alltami Brook channel. No drainage treatment is required and the drainage arrangement will be similar to existing regarding quantity of flow due to its proximity to Alltami Brook. No further mitigation is required.

Impacts of Groundwater Levels and Flows

- 1.3.10. Proposed design option PS25 includes permanent infrastructure that may extend below the water table. The potential inclusion of piles within the design may alter the groundwater flow regime (e.g., impede or obstruct flows); however, given the nature of the local geology this is likely to be highly localised and of low significance. The information presented in **paragraph 2.2.45** of **Appendix 18.2** of the 2022 ES [APP-164] remains unchanged.

Impacts to flood risk

- 1.3.11. The potential flood risk associated with proposed design option PS25 has been assessed within **Appendix 18.5 – Flood Consequences Assessment** of this ES Addendum 2. The following text should be inserted after paragraph **2.2.78** of **Appendix 18.2** of the 2022 ES [APP-164]:

The Alltami Brook embedded pipe bridge option was assessed for its impact to coastal, fluvial, pluvial, groundwater, sewer and drainage infrastructure and artificial sources.

The embedded pipe bridge will be designed to prevent any increase in fluvial flood risk to Alltami Brook or elsewhere. The embedded pipe bridge will be designed in a way so as not to disrupt the flow of Alltami Brook. Therefore, during operational stage the pipeline is unlikely to impact or be impacted itself by fluvial flooding.

The embedded pipe bridge will include integral surface water drainage that would discharge surface water runoff from the edge of the pipe bridge to Alltami Brook. Therefore, it is deemed unlikely to increase pluvial flood risk elsewhere.

- 1.3.12. All other text within **Section 2** of **Appendix 18.2** of the 2022 ES [APP-164] remains unchanged and valid.

DECOMMISSIONING STAGE

- 1.3.13. The decommissioning stage will include the removal of the Alltami Brook embedded pipe bridge option, therefore **paragraph 2.3.0** of **Appendix 18.2** of the 2022 ES [APP-164] should be replaced with the following text:

The decommissioning stage will involve the removal of the AGIs, BVSs and the Alltami Brook embedded pipe bridge option, and their associated drainage features. The Carbon Dioxide Pipeline will be left in situ, where it is below ground, and therefore no new trenches across watercourses are anticipated.

*Impacts to water quality during the decommissioning of the embedded pipe bridge, AGIs and BVSs are likely to be similar to those expected during the Construction stage. There is potential for sediment supply to watercourses to be increased during this phase due to works in close proximity to watercourses to remove outfalls and works in the channel to remove the embedded pipe bridge. Similarly, if spillage were to occur during these activities, these could reach the nearby watercourses. Please refer to the impact described in **Section 2.1** and **Table 4.1** and **Table 4.2** for the assessment of these impacts.*

*The embedded pipe bridge is located in an area at risk of flooding and therefore the impacts are likely to be similar to those anticipated during the construction phase. Please refer to the impact described in **Section 2.1** and **Table 4.9** for the assessment of this impact.*

ASSESSMENT OF RESIDUAL EFFECTS

- 1.3.14. The assessment of the residual effects included in **Section 3** of **Appendix 18.2** [APP-164] has not changed due to proposed design option PS25. Therefore, the text within **Section 3** of **Appendix 18.2** of the 2022 ES [APP-164] remains unchanged and valid.

SUMMARY OF ASSESSMENT OF EFFECTS

CONSTRUCTION STAGE

- 1.3.15. During construction, proposed design option PS25 would require works above and adjacent to Alltami Brook. This type of watercourse crossing was not previously assessed within **Tables 4-1** and **4-2** of **Appendix 18.2** of the 2022 ES [APP-164]. Therefore, the information within **Tables 1.4** and **1.5** below related to Alltami Brook should be added to **Tables 4-1** and **4-2** respectively of **Appendix 18.2** of the 2022 ES [APP-164].

Table 1.4 - Assessment of impacts to water quality and hydromorphology by entrainment of materials

Receptor	Sensitivity of receptor	Potential impact	Magnitude of impact	Significance of effect	Mitigation	Residual effect
Alltami Brook	High	The embedded pipe bridge option will include construction work being undertaken adjacent to and over the watercourse. These works have the potential impact to channel geomorphology from increased fine sediment supply, removal of riparian zone vegetation and potential reprofiling of valley sides adjacent to the riverbanks.	Moderate Adverse	Moderate Adverse (Significant)	Implementation of measures outlined in the OCEMP [REP2-021]	Slight Adverse (not significant)

Table 1.5 - Assessment of impacts to water quality by spillage of pollutants

Receptor	Sensitivity of receptor	Potential impact	Magnitude of impact	Significance of effect	Mitigation	Residual effect
Alltami Brook	High	The embedded pipe bridge will include construction work being undertaken adjacent to and over the watercourse. There is potential for spillage of pollutants from machinery and construction activities to occur within or adjacent to the channel.	Moderate Adverse	Moderate Adverse (Significant)	Implementation of measures outlined in the OCEMP [REP2-021]	Slight Adverse (not significant)

OPERATION STAGE

- 1.3.16. Proposed design option PS25 would require works above and adjacent to the Alltami Brook. **Table 4-10 of Appendix 18.2** of the 2022 ES **[APP-164]** assessed Alltami Brook as an open-cut crossing. To summarise the impact associated with the embedded pipe bridge option, the information within **Table 1.6** below should be added to **Table 4-10 of Appendix 18.2** of the 2022 ES **[APP-164]**.
- 1.3.17. Proposed design option PS25 would involve a permanent artificial features within the channel of the watercourse. The assessment in **Table 4-14 of Appendix 18.2** of the 2022 ES **[APP-164]** assessed the open-cut crossing of Alltami Brook. To summarise the impact associated with the embedded pipe bridge option the information within **Table 1.7** below should be added to **Table 4-14 of Appendix 18.2** of the 2022 ES **[APP-164]**.
- 1.3.18. Proposed design option PS25 includes potential piling, permanently constructed into the bedrock within the valley sides at the Alltami Brook, which has not been assessed in **Table 4-16 of Appendix 18.2** of the 2022 ES **[APP-164]**. Therefore, the information within **Table 1.8** below should be added to **Table 4-16 of Appendix 18.2** of the 2022 ES **[APP-164]**.

Table 1.6 - Assessment of impacts associated with loss of riparian vegetation along watercourses

Receptor	Sensitivity of receptor	Potential impact	Magnitude of impact	Significance of effect	Mitigation	Residual effect
Alltami Brook (embedded pipe bridge crossing option)	High	The vegetation at the proposed crossing location is mature woodland on the left bank and mature trees lining the right bank which will need to be removed to complete the construction of the embedded pipe bridge option. Whilst it is expected that most of the vegetation would recover, it is likely that the embedded pipe bridge would result in permanent localised loss of riparian vegetation within the footprint of the embedded pipe bridge structure.	Moderate Adverse	Moderate Adverse (Significant)	Placement of bio-textile matting to reduce risk of scour of bed and banks whilst vegetation is maturing. Vegetation reinstatement should comprise an appropriate species mix and structure within the riparian zone along with enhancements to the existing riparian vegetation to off-set impacts. Any tree loss will be compensated for in accordance with the site wide replanting approach outlined in the REAC [REP2-017] . Additional riparian planting on Friars Park Ditch, Backford Brook and Finchetts Gutter Tributary, where practicable. Any removed habitat to be replaced where practicable.	Slight adverse (not significant)

Table 1.7 - Assessment of impacts associated with installation of permanent artificial features within the channel of watercourses

Receptor	Sensitivity of receptor	Potential impact	Magnitude of impact	Significance of effect	Mitigation	Residual effect
Alltami Brook (embedded pipe bridge crossing option)	High	There will be a permanent structure located on the banks / valley sides of Alltami Brook. This could potentially have a localised impact the channel width and the river continuity.	Minor Adverse	Slight Adverse (not significant)	No mitigation required	Slight adverse (not significant)

Table 1.8 - Assessment of impacts on groundwater levels and flows

Receptor	Sensitivity of receptor	Potential impact	Magnitude of impact	Significance of effect	Mitigation	Residual effect
(Bedrock) Secondary A aquifer	Medium	Impact to groundwater levels and flow from the embedded pipe bridge option support abutments and any associated piling at Alltami Brook.	Minor Adverse	Slight Adverse (Not significant)	None required.	Slight adverse (not significant)

- 1.3.19. No other text within **Section 4 of Appendix 18.2** of the 2022 ES [APP-164] and ES Addendum 1 - Appendix A [CR1-125] has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 4 of Appendix 18.2** of the 2022 ES [APP-164] and ES Addendum 1 - Appendix A [CR1-125] remains unchanged and valid.

1.4. **APPENDIX 18.3 WATER FRAMEWORK DIRECTIVE ASSESSMENT ADDENDUM**

INTRODUCTION

- 1.4.1. This appendix addendum presents the changes, in relation to proposed design option PS25, to the Water Framework Directive assessment (WFDa) as presented within **Appendix 18.3 – Water Framework Directive Assessment** of the 2022 ES [APP-165] and ES Addendum 1 - Appendix A [CR1-125].
- 1.4.2. The introduction of **Appendix 18.3** of the 2022 ES [APP-165] has changed due to proposed design option PS25. There are new activities (PS25) associated with the construction and operation stages at Alltami Brook. The construction stage includes works in close proximity to the watercourse and these activities have already been assessed. Therefore, there is no update required to **paragraphs 1.3.4 to 1.3.23 of Appendix 18.3** of the 2022 ES [APP-165] due to the proposed design option PS25. However, the operational impacts associated with proposed design change PS25 have not been previously assessed. Therefore, the following text should be inserted after **paragraph 1.3.37 of Appendix 18.3** of the 2022 ES [APP-165]:

Embedded Pipe Bridge

The embedded pipe bridge is a encased pipe bridge which spans Alltami Brook and would be in situ for the whole of the design life of the DCO Proposed Development. The bridge support abutments will be located outside of the watercourse. The surface water runoff will be collected from the embedded pipeline structure via drainage pipes built into the structure. The surface water runoff will drain to the ground and flow to the Alltami Brook via existing overland flow routes.

- 1.4.3. Further engagement has taken place with NRW on proposed design option PS25. Therefore, the following text should be inserted after **paragraph 1.4.3 of Appendix 18.3** of the 2022 ES [APP-165]:
- Additional consultation and engagement has been undertaken with NRW on the 22 September 2022, 6 March 2023, 11 May 2023 and 22 May 2023. The meeting minutes of these consultation meetings are provided in **Annex A**.*
- 1.4.4. No other text within **Section 1 of Appendix 18.3** of the 2022 ES [APP-165] has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 1 of Appendix 18.3** of the 2022 ES [APP-165] remains unchanged and valid.

METHODOLOGY

- 1.4.5. The methodology of **Appendix 18.3** of the 2022 ES [APP-165] has not changed due to proposed design option PS25. Therefore, the text within **Section 2** of **Appendix 18.3** of the 2022 ES [APP-165] remains unchanged and valid.

WFD SCREENING AND SCOPING

- 1.4.6. Proposed design change PS25 is located within Wepre Brook (GB111067056880) WFD water body, which was previously assessed within **Section 3** of **Appendix 18.3** of the 2022 ES [APP-165]. The Alltami Brook embedded pipe bridge option is an additional activity and crossing method at Alltami Brook to that assessed in **Section 3**. Therefore, the following changes to **Tables 3-2** and **3-4** to **3-6** of **Appendix 18.3** of the 2022 ES [APP-165] should be made:

- The 'Alltami Brook Embedded Pipe Bridge option' activity in **Table 1.9** below should be added to **Table 3-2**
- The 'Alltami Brook Embedded Pipe Bridge option' Operation Stage activity in **Table 1.10** below should be added to **Table 3-4**
- The 'Alltami Brook Embedded Pipe Bridge option' Construction Stage activity in **Table 1.11** below should be added to **Table 3-5**
- The 'Alltami Brook Embedded Pipe Bridge option' Operation Stage activity in **Table 1.12** below should be added to **Table 3-6**

Table 1.9 - Screening of activities

Activity	Screened in or out?	Justification
Operation Stage		
Alltami Brook Embedded Pipe Bridge option	In	Potential impact on physico-chemical and hydromorphological processes. Potential impacts on habitats for fish, invertebrates, and macrophytes.

Table 1.10 - Scoping of surface, transitional, and coastal WFD quality elements for the Operational Stage

WFD Quality Element	Activities
	Alltami Brook Embedded Pipe Bridge option
	<i>Water bodies</i>
	<i>Wepre Brook</i>
<u>Surface water</u>	
<i>Biological</i>	
Fish	In – Embedded pipe bridge can potentially impact this element.
Invertebrates	In – Embedded pipe bridge can potentially impact this element.
Macrophytes & Phytobenthos	In – Embedded pipe bridge can potentially impact this element.
<u>Surface water</u>	
<i>Physico-Chemical</i>	
Thermal Conditions	Out – Embedded pipe bridge is not expected to impact this element. This is due to the watercourse being heavily shaded under baseline conditions, plus the flowing water will not have residency time within the zone of shading caused by the proposed structure. Therefore, no impacts to thermal conditions are anticipated either locally or at the water body scale.
Oxygenation Conditions	Out – Embedded pipe bridge is not expected to impact this element. The proposed structure will not directly interact with the watercourse during operation therefore no impacts to oxygenation conditions are anticipated locally or at the water body scale
Salinity	Out – Embedded pipe bridge is not expected to impact this element.
Acidification Status	Out – Embedded pipe bridge is not expected to impact this element.
Nutrient Conditions	Out – Embedded pipe bridge is not expected to impact this element. The proposed structure will not directly interact with the watercourse during operation therefore no impacts to nutrient conditions are anticipated locally or at the water body scale.
Priority Hazardous Substances	Out – Embedded pipe bridge is not expected to impact this element. The proposed structure will not directly interact with the watercourse during operation therefore no impacts from priority hazardous substances are anticipated locally or at the water body scale
<i>Hydromorphological</i>	
Quantity and Dynamics of Flow	In – Embedded pipe bridge can potentially impact this element.

WFD Quality Element	Activities
	Alltami Brook Embedded Pipe Bridge option
	<i>Water bodies</i>
	<i>Wepre Brook</i>
Connection to Groundwater	Out – Embedded pipe bridge is not expected to impact this element.
River Continuity	In – Embedded pipe bridge can potentially impact this element.
River Depth and Width Variation	In – Embedded pipe bridge can potentially impact this element.
Structure and Substrate of the River Bed	Out – Embedded pipe bridge is not expected to impact this element.
Structure of the Riparian Zone	In – Embedded pipe bridge can potentially impact this element.
<u>Transitional / Coastal</u>	
<i>Physico-Chemical</i>	
Transparency	Out – Embedded pipe bridge is not expected to impact this element.
Thermal Conditions	Out – Embedded pipe bridge is not expected to impact this element.
Oxygenation Conditions	Out – Embedded pipe bridge is not expected to impact this element.
Nutrient Conditions	Out – Embedded pipe bridge is not expected to impact this element.
Priority Hazardous Substances	Out – Embedded pipe bridge is not expected to impact this element.
<i>Hydromorphological</i>	
Depth Variation	Out – Embedded pipe bridge is not expected to impact this element.
Quality, Structure and Substrate of the Bed	Out – Embedded pipe bridge is not expected to impact this element.
Structure of the Intertidal Zone	Out – Embedded pipe bridge is not expected to impact this element.
Freshwater Zone	Out – Embedded pipe bridge is not expected to impact this element.
Wave Exposure	Out – Embedded pipe bridge is not expected to impact this element.

Table 1.11 - Scoping of groundwater WFD quality elements for Construction Stage activities

WFD Quality Element	Alltami Brook Embedded Pipe Bridge option
<u>Quantitative</u>	
Saline Intrusion	Out- Activity not situated in an area subject to saline intrusion.
Water Balance	Out- Due to temporary nature of embedded pipe bridge foundation excavation works (and any required dewatering), no change to overall long term groundwater balance.
GWDTes	Out- No identified GWDTes have been found to be present.
Dependent Surface Water Body	Out- Due to temporary nature of embedded pipe bridge foundation excavation works, no sustained impact on dependent surface water bodies.
<i>Chemical</i>	
Drinking Water Protected Area	Out- embedded pipe bridge foundation excavation works not expected to result in any groundwater quality impacts beyond standard construction related risks (which are mitigated by pollution prevention measures implemented in a CEMP).
General Chemical Test	Out- embedded pipe bridge foundation excavation works not expected to result in any groundwater quality impacts beyond standard construction related risks (which are mitigated by pollution prevention measures implemented in a CEMP).
Chemical GWDTes	Out- No identified GWDTes have been found to be present.
Chemical Dependent Surface Water Body Status	Out- No groundwater quality impacts expected from proposed design which could impact Chemical Dependent Surface Water Body Status.
Saline Intrusion	Out- Site not situated in an area subject to saline intrusion.

Table 1.12 - Scoping of groundwater WFD quality elements for the Operational Stage

WFD Quality Element	Alltami Brook Embedded Pipe Bridge option
<u>Quantitative</u>	
Saline Intrusion	Out- Activity not situated in an area subject to saline intrusion.
Water Balance	Out- Would not result in any change to groundwater balance
GWDTEs	Out- No identified GWDTEs have been found to be present.
Dependent Surface Water Body	Out- No change is expected to the dependency of surface water bodies on groundwater
Drinking Water Protected Area	Out- Embedded pipe bridge does not impact drinking water protected status.
<i>Chemical</i>	
General Chemical Test	Out- No groundwater quality impacts expected from proposed design which could impact WFD status.
Chemical GWDTEs	Out- No identified GWDTEs have been found to be present.
Chemical Dependent Surface Water Body Status	Out- No groundwater quality impacts expected from proposed design which could impact Chemical Dependent Surface Water Body Status.
Saline Intrusion	Out- Activity not situated in an area subject to saline intrusion

1.4.7. No other text within **Section 3** of **Appendix 18.3** of the 2022 ES [APP-165] and **Section 5.3** of ES Addendum 1 - Appendix A [CR1-125] has changed due to proposed design option PS25. Therefore, all remaining text within **Section 3** of **Appendix 18.3** of the 2022 ES [APP-165] and **Section 5.3** of ES Addendum 1 - Appendix A [CR1-125] remains unchanged and valid.

BASELINE CONDITIONS

1.4.8. The baseline conditions of **Appendix 18.3** of the 2022 ES [APP-165] and ES Addendum 1 - Appendix A [CR1-125] has not changed due to proposed design option PS25. Therefore, the text within **Section 4** of **Appendix 18.3** of the 2022 ES [APP-165] and **Section 5.4** of ES Addendum 1 - Appendix A [CR1-125] remains unchanged and valid.

DETAILED IMPACT ASSESSMENT

1.4.9.

Section 5 of **Appendix 18.3** of the 2022 ES [**APP-165**] has changed due to proposed design option PS25. The method for crossing Alltami Brook, which is within the Wepre Brook (GB111067056880) WFD water body, now includes an embedded pipe bridge option. Therefore, **Table 1.15** should be inserted after **Table 5-10** in **Appendix 18.3 [APP-165]**,

Table 1.13 - Impact on the WFD Quality elements from Embedded Pipe Bridge on relevant water bodies

Quality Element	Potential Impact	Mitigation
Relevant water bodies: Wepre Brook		
Surface water		
Biological		
Invertebrates	The Alltami Brook embedded pipe bridge option (Wepre Brook WFD water body) can cause direct damage or death to invertebrates, and the loss, degradations and fragmentation of habitats during the Construction Stage.	<p>The invertebrate community within Alltami Brook consisted of common, non-protected species. The rapid re-colonisation and re-establishment of the invertebrate community is expected. Nevertheless, the following procedures from the REAC [REP2-017] are to be implemented to mitigate the impact the effects of the embedded pipeline bridge on invertebrates:</p> <ul style="list-style-type: none"> • D-WR-029 • D-BD-052 • D-BD-057 • D-BD-059 <p>Implementation of the OCEMP [REP2-021], which would include pollution control measures, and an appropriate lighting design whereby artificial light does not spill the full width of affected watercourses.</p> <p>Therefore, by applying these mitigation measures, no impact to invertebrates is predicted at the WFD water body scale.</p>
Fish	<p>The Alltami Brook embedded pipe bridge option (Wepre Brook water body) can potentially result in the following impacts during the Construction Stage, which may cause direct damage, disturbance, and the loss, abandonment and/or fragmentation of habitats:</p> <ul style="list-style-type: none"> • Artificial light pollution; • Vibration and noise from drilling and pile driving; and • Impediment of fish passage by access routes and causeways. 	<p>The maximum width of the embedded pipe bridge across the watercourse would be 4m, standing at a height of approximately 1.5m above the watercourse. Within this length of the watercourse there would be removal of riparian vegetation and temporary culverting of the watercourse. The following procedures are to be implemented to mitigate the impact the effects of the embedded pipe bridge on fish:</p> <ul style="list-style-type: none"> • Reinstatement of riparian vegetation post-construction, planting riparian species, including trees where practicable (D-WR-028 of the REAC [REP2-017]); • Implementation of a Noise and Vibration Management Plan. This is to include a) Utilisation of press or vibratory pile driving methods, b) Soft-starts to pile driving to allow for fish dispersal, and c) Phased or intermittent works schedule (break periods) to allow for recovery windows (D-BD-057 of the REAC [REP2-017]); • Where practical and reasonable, timings of works scheduled to avoid sensitive lifecycle stages (migration and spawning) (D-BD-058 of the REAC [REP2-017]); • All temporary access routes/causeways spanning watercourses would adhere to the Environment Agency's fish pass standards (D-BD-051 of the REAC [REP2-017]); • Implementation of a suitable lighting design. This to include avoidance of artificial lighting of watercourses, particularly during the hours of darkness, to prevent impacts to fish behaviour or passage (D-BD-015 of the REAC [REP2-017]); and • Implementation of the OCEMP [REP2-021], which would include pollution control measures, and an appropriate lighting design whereby artificial light does not spill the full width of affected watercourses. <p>The impacts of shading on the watercourse are deemed to be minimal based on the size and design (set-back abutments) of the embedded pipe bridge. Existing shading of the riparian vegetation and river corridor topography will also dampen impacts of shading caused by the embedded pipe bridge.</p> <p>Therefore, in consideration of the above and by applying these mitigation measures, no impact to fish is predicted at the WFD water body scale.</p>
Macrophytes and phytobenthos	The Alltami Brook embedded pipe bridge option (Wepre Brook water body) will lead to permanent loss of bank and riparian vegetation.	<p>The maximum width of the embedded pipe bridge across the watercourse would be 4m, standing at a height of approximately 1.5m above the watercourse. Within this length of the watercourse there would be removal of riparian vegetation and temporary culverting of the watercourse. The following procedures are to be implemented to mitigate the impact the effects of the embedded pipeline bridge on macrophytes:</p> <ul style="list-style-type: none"> • Reinstatement of riparian vegetation post-construction, planting riparian species, including trees where practicable (D-WR-028 of the REAC, [REP2-017]); and • Implementation of the OCEMP [REP2-021], which would include pollution control measures, and an appropriate lighting design whereby artificial light does not spill the full width of affected watercourses.

Quality Element	Potential Impact	Mitigation
		<p>Baseline macrophyte diversity was poor. The impacts of shading on the watercourse are deemed to be minimal based on the size and design (set-back abutments) of the embedded pipe bridge. Existing shading of the riparian vegetation and river corridor topography will also dampen impacts of shading caused by the embedded pipe bridge.</p> <p>Therefore, in consideration of the above and by applying these mitigation measures, no impact to macrophytes is predicted at the WFD water body scale.</p>
Hydromorphological		
Quantity and Dynamics of Water Flow	<p>The Alltami Brook embedded pipe bridge option may impact flow dynamics locally as it creates a constriction to the channel during high flow events. There would be no impact to quantity of flow.</p>	<p>Should proposed design option PS25 be adopted, the following mitigation measure will be added to the REAC [REP2-017]:</p> <p>“D-WR-075 - The design of the embedded pipe bridge will need to ensure a minimum freeboard of 300mm above the 1 in 100-year fluvial flood level including the allowances for climate change.”</p> <p>If the proposed design option PS25 is adopted, and the above mitigation measures implemented, there would be negligible impact to dynamics of flow in events with flows less than the return period stated</p>
River Continuity	<p>The Alltami Brook embedded pipe bridge option is a clear span structure and therefore would not impact longitudinal continuity. There would be no changes to the bed of the watercourse.</p>	<p>No further mitigation required.</p>
River Depth and Width Variation	<p>The Alltami Brook embedded pipe bridge option will fix the river width and depth locally however this over a 4m length of the watercourse and therefore will not have an effect at a water body scale.</p>	<p>No further mitigation required.</p>
Structure of the Riparian Zone	<p>The Alltami Brook embedded pipe bridge option would result in a loss of riparian habitat and vegetation locally however this over a 4m length of the watercourse and therefore will not have an effect at a water body scale.</p>	<p>No further mitigation required.</p>

- 1.4.10. The following text should be inserted after **paragraph 5.5.5 of Appendix 18.3** of the 2022 ES **[APP-165]**:

At the Alltami Brook, embedded pipe bridge option would not cause deterioration in ecological potential or status of the Wepre Brook water body. Impacts would be localised and not at a water body scale. Post-decommissioning the watercourse would be returned to its current state with no permanent impact on the bedrock bed of the watercourse.

- 1.4.11. No other text within **Section 5 of Appendix 18.3** of the 2022 ES **[APP-165]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 5 of Appendix 18.3** of the 2022 ES **[APP-165]** remains unchanged and valid.

CONSTRUCTION IMPACTS

- 1.4.12. The construction impacts of **Appendix 18.3** of the 2022 ES **[APP-165]** has not changed due to proposed design option PS25. Therefore, the text within **Section 6 of Appendix 18.3** of the 2022 ES remains unchanged and valid.

CONCLUSIONS

- 1.4.13. Detailed assessment of the proposed design option PS25 concludes that the Alltami Brook embedded pipe bridge option is WFD compliant. Therefore, the conclusions of the WFD assessment have not changed due to proposed design option PS25. Therefore, all text within **Section 7 of Appendix 18.3** of the 2022 ES **[APP-165]** remains unchanged and valid.

ANNEX A

- 1.4.14. Additional meetings have been undertaken since the submission of **Appendix 18.3** of the 2022 ES **[APP-165]** on the subject of proposed design option PS25. Therefore, additional meeting minutes presented below should be included within **Annex A of Appendix 18.3** of the 2022 ES **[APP-165]**.

AGENDA & MEETING NOTES 5

PROJECT NUMBER	70070865	MEETING DATE	21 September 2022
project name	Hynet DCO Pipeline	VENUE	MS Teams
CLIENT	Eni	RECORDED BY	FM
meeting subject	WFD Mitigation and Conclusions		

Present	NRW: Chris Jones, Helen Millband, Oliver Lowe, Stefan Le Roy, Matthew Ellis, George Nuttall Eni/Progressive Energy: James Glass, Chris Taylor, William Dickson WSP: Frances Marlow, Helena Parsons, Akshat Vipin
Apologies	Rachael Chambers (WSP), Georgie Kleinschmidt, Declan Franklin-Losardo, Chloe Lewis
Distribution	As above
CONFIDENTIALITY	Restricted

ITEM	SUBJECT	ACTION	DUE
	Introductions		
	Programme Update AV explained that the DCO submission to PINS will be 30 th September 2022. The TCPA will be submitted in Q3/Q4, date tbc.		
	Recap of consultation to date FM provided a summary of the consultation with NRW to date. In summary: 7 February 2022: WFD Screening and scoping presentation 8 April 2022: WSP provided technical note to satisfy some questions from NRW on the WFD screening presentation 25 May 2022: presentation of Alltami Brook crossing options 28 June 2022: Email from NRW with further questions on Alltami Brook crossing options 19 July 2022: Presentation of reasons for discounting trenchless crossing of Alltami Brook and discussing other WFD constraints 8 August 2022: NRW's comments of crossing options received via email		
	WFD Compliance FM presented a summary on the WFD conclusion regarding most of the activities assessed. All activities are deemed to		

	<p>be WFD compliant with the mitigation commitments in the DCO submission</p>		
	<p>Alltami Brook FM explained that open cut method has been assessed in the WFD assessment FM recognised there would be a permanent change to the watercourse due to inability to reinstate bedrock. FM presented the committed mitigation measures which reduce the impacts as far as practicable, including:</p> <ul style="list-style-type: none"> ■ Working width in riparian corridor would be a maximum of 16m (this is reduced from the 32m previously stated) ■ Maximum length of Alltami Brook with modified bed/banks would be 4m (this is reduced from the 32m previously stated) ■ A bespoke geomorphological assessment will be carried out to inform: <ul style="list-style-type: none"> ■ Micro-siting the crossing location of the pipe to the least sensitive section of river bed ■ Detailed design of the permanent works installed as part of the reinstatement of the watercourse ■ Further engagement with NRW and LLFA to inform methodology of this geomorphological assessment ■ Gravel augmentation through the modified section of the Alltami Brook to offset potential reduction in spawning habitat. To be detailed in collaboration with the geomorphological assessment ■ Reinstatement of riparian planting – trees where practicable, shrub, scrub and grasses elsewhere. <p>Concluded that permanent changes are much smaller than watercourse length (<0.1% of Alltami Brook, <0.04% of Wepre Brook), therefore impacts to hydromorphology and fish are not significant at the waterbody scale. There is a risk of impact to waterbody scale should the permanent works fail in the future. The following mitigation measure is committed: Geomorphological and ecological monitoring of the permanent works would be carried out, post construction, to identify any potential failure of the permanent works which could lead to a deterioration in WFD status. Type, duration and frequency of monitoring is to be determined through the development of the geomorphological assessment and detailed design, and in consultation with NRW and FCC LLFA. Adaptive mitigation would be implemented to prevent deterioration from occurring.</p>		
	<p>Questions/comments CJ stated NRW would be able to provide more questions and comments in due course or after submission. CJ queried the working width reduction and FM confirmed this had been reduced from 32m to 16m in order to minimise impact.</p>		

	<p>OL asked if the options appraisal would be presented in the WFD assessment. AV confirmed consideration of alternatives is presented in the Environmental Statement.</p> <p>OL asked for clarity on the monitoring mitigation measure and commented that adaptive mitigation may be too late. HP confirmed that monitoring would occur in order to identify potential risk of failure and implementing adaptive mitigation before failure occurs.</p> <p>ME stated that there is Annex 1 woodland further upstream of the A55. asked if there was opportunity to secure more land for nature conservation for Annex 1 communities.</p> <p>CT and VP confirmed that areas within the Newbuild Infrastructure Boundary have been designated as areas for woodland planting for essential mitigation.</p> <p>SLR asked how the bedrock would be removed, what the competency of the bedrock and what are the impacts to bedrock and groundwater flow.</p> <p>JG could not confirm the exact excavation methodology at this stage but it would be investigated at detailed design.</p> <p>FM confirmed that GI in this area is limited due to land access. JG believes it is soft bedrock but to be confirmed.</p> <p>FM stated that the geomorphological assessment would account for these concerns and NRW would be consulted during this assessment.</p>		
	<p>Post meeting note:</p> <p>The mitigation measure regarding monitoring has been reworded to reflect the discussion in the meeting asking for clarity. The new commitment is the following:</p> <p><i>Geomorphological and ecological monitoring of the permanent works would be carried out, post construction, to ensure the integrity of the reinstated channel and to identify any early intervention that may be required to ensure no deterioration in WFD status. Type, duration and frequency of monitoring is to be determined through the development of the geomorphological assessment and detailed design, and in consultation with NRW and FCC LLFA. Adaptive mitigation would be implemented to maintain the integrity of the reinstated channel.</i></p>		

Next meeting

TBC.

AGENDA & MEETING NOTES 6

PROJECT NUMBER	70070865	MEETING DATE	06 March 2023
project name	HyNet CO2 Pipeline DCO	VENUE	MS Teams
CLIENT	EPUK	RECORDED BY	FM
meeting subject	Alltami Brook & WFD		

Present	<p>NRW: Chris Jones (CJ - Planning Lead), Oliver Lowe (OL – Geomorphology), Stefan Le Roy (SL - Hydrogeology), Helen Millband (HM), Sophie Lucas (SL)</p> <p>Eni UK, together with EPUK: Dan Hooley (DH), Chris Taylor (CT), Ricardo Argiolas (RA)</p> <p>PEL: James Glass (JG)</p> <p>WSP: Helena Parsons (HP), Frances Marlow (FM), Lee Garrett (LG), Akshat Vipin (AV), John Chapman (JC), Thomas Eckhardt (TE), Matt Lohead (ML)</p>
Apologies	Apologies: Natalie Corless, Maeve McWilliams, Callam Pearce
Distribution	As above
CONFIDENTIALITY	Restricted

ITEM	SUBJECT	ACTION	DUE
	Introductions		
	<p>Alltami Brook Geomorphological Assessment HP (WSP): identified the specific relevant representations related to this topic.</p> <p>HP (WSP): presented a map and photographs of the site. There is a large area within the Order Limits so that there is scope for micro-siting the proposed crossing. The watercourse at the A55 crossing is the most modified reach.</p> <p>HP (WSP): presented geomorphological assessment proposals:</p>		

<ul style="list-style-type: none"> • Fluvial geomorphology walkover survey and Wolman count • Detailed topographical and bathymetry survey to inform the hydraulic model build • 2D hydraulic model for the following scenarios: <ul style="list-style-type: none"> • Baseline for the 1 in 2-year, 1 in 10-year, 1 in 20-year, 1 in 100-year, and 1 in 100-year +CC flood return periods (assume x3) • As above for construction & operation phase • Sensitivity testing on baseline model: <ul style="list-style-type: none"> • +/- 20% inflow • +/- 20% Manning's n • +/- 20% structure coefficients • +/- 20% change in downstream boundary (slope or level) • Geomorphological dynamic assessment 2D model outputs: <ul style="list-style-type: none"> • Velocity, depth, stream power, shear stress & Froude (habitat biotopes) for each flood return period for baseline, construction & operation • Consultation with NRW to present the results • Detailed Geomorphology Assessment Technical report • Consultation with NRW to present and discuss the finalised report. <p>There were site access restrictions when preparing for the DCO application that prevented ground investigation in this area but access has now been resolved for non-intrusive surveys only.</p> <p>OL (NRW): NRW had a pre-meeting about this. Queried whether the scope of work proposed addressed NRW's concerns. Concerned that proposal for the geomorphological assessment will not be relevant until we understand interaction with groundwater. NRW are not highlighting sediment continuity as an issue. More about interaction between the water and its bed (losing water to ground). This can impact water quality, quantity and fish in WFD.</p>		
---	--	--

	<p>NRW were expecting a geology assessment. What is the risk of losing river water to the geology with the open cut method? The information that NRW has suggests this is a risk, especially with the historic mines.</p> <p>OL (NRW): asked HP to clarify what benefit this geomorphological assessment will bring.</p> <p>HP (WSP): Relevant Reps raised concern that the geomorphological assessment in the REAC was being left to detailed design. Proposal to bring this forward to examination period. Assessment looks at how the open cut crossing affects the processes in the channel.</p> <p>HP (WSP): presented some example model outputs.</p> <p>NRW asked if decommissioning covered as well?</p> <p>JG (Eni UK): Decommissioning of pipelines involves grouting sensitive sections of the pipeline (such as the brook) and leaving in situ in line with industry practice to avoid significant environmental issues and disruption caused by removal of the pipeline</p> <p>HP: presented the cross sections proposed for the model:</p> <ul style="list-style-type: none"> • US extent of model • Pinfold Lane culvert • US and DS end of A55 culvert • Every 20m through 500m reach DS of A55 • Every 50 through 250m reach to the Wepre Brook confluence <p>Regarding cumulative impacts to Wepre Brook and water body scale, the other open cut crossing is through a modified section of the watercourse and impacts would be in the construction phase only. There is an outfall proposed further upstream but there will be no engineered feature on the watercourse as the outfall will connect to Wepre Brook via an open ditch.</p>		
	<p>Hydrogeology JC (WSP): Concern for loss of flow – the Applicant does not agree it's a realistic risk. Type of geology</p>		

<p>(Pennine Middle Coal Measures – Secondary A Aquifer). It is likely there is near surface fracturing and the amount of flow that would be lost to have impact is not likely given the geology.</p> <p>JC (WSP): presented a cross section of watercourse. It's likely that the watercourse is representing the groundwater level in this location. Loss to bedrock requires a hydraulic gradient which the Applicant don't believe exists because it is a fractured bedrock. Lacking GI currently but this is the assumption. Legacy mining – mine plans indicate that the workings are >100m from proposed crossing location. Geophysical surveys completed. Between Pinfold Lane and Alltami Brook there is no indication of voids. This may be obscured by made ground. Construction approach – whilst excavated, the watercourse will be diverted through a temporary pipe so no loss of water to ground during this phase. Installation of concrete increases impermeability of the bed.</p> <p>The Applicant doesn't believe loss of water to ground is likely. More GI is expected to be complete prior to construction.</p> <p>TE (WSP): Does NRW have any information which is driving the concern?</p> <p>SL (NRW): showed some geology mapping. Maps show site is on bedrock. Fault lines nearby. SuDS map shows fracture flow. Borehole logs. Tectonic and anthropogenic influences in the area. Disused mine shaft map shows its nearby. Risk of landslide – very significant. Ground stability – significant potential for geohazard. Depth to groundwater - <3m. Don't know what the interactions are at this location (superficial/bedrock?)</p> <p>SL (NRW): we don't know the nature of disturbance during construction, invert depth of excavation, method of excavation, duration of temporary works. All introduce uncertainty – Eurocode7 Assessment should be completed for ground-truthing at structures. GI is planned but if anything unknown is discovered, what will the next steps be?</p> <p>What is in the ground locally to this crossing point?</p>		
--	--	--

<p>Need to look at the rationale for this option and not a pipe-bridge.</p> <p>OL (NRW): without knowing what is in the ground, the geomorphology assessment isn't necessarily useful. NRW have consistently said that open cut is most risky. If taken forward then more information is required.</p> <p>TE (WSP): The uncertain ground conditions to regulators/designers is one issue raised. Regarding environmental impacts: for significant losses to occur, need hydraulic gradient for it to occur and a sufficient pathway. No evidence of voids to receive water. Fracturing is not known. But if fractured, then it will be saturated because of the local environment.</p> <p>So GI is needed for the designers to know how to do the work. But not needed for environmental impact assessment.</p> <p>SL (NRW): Need to have precautionary sense without the information. Don't know what method will be taken.</p> <p>OL (NRW): if assumption is wrong and water does go to ground, it's more difficult to fix the problem. Recommend GI occurs upfront</p> <p>HP (WSP): if any loss is during construction phase only, then river is piped past the excavation so loss won't take place.</p> <p>OL (NRW): During operation phase, how is it possible to make a waterproof joint between the bedrock and the concrete that will last mass movement/temperature change etc. forever? Reservoirs are known to have similar issues.</p> <p>TE (WSP): reservoirs are storing water so there is hydraulic gradient. This doesn't exist at Alltami Brook</p> <p>OL (NRW): don't know the depth of the fractured rock/unfractured rock. Need GI to know what is present before concluding there is no impact.</p> <p>SL (NRW): borehole would provide ground-truth.</p>		
--	--	--

	<p>TE (WSP): Why do we need to know if its fractured?</p> <p>SL (NRW): need to know if saturated of unsaturated? Informs method for excavation.</p> <p>RA (Eni UK): Two arguments: compound of uncertainty (agree) and water flow (confident of conditions but not certain – agree). Some slope stability concerns – agree. Need to agree a plan which can make some uncertainties, certain.</p> <p>TE (WSP): GI is needed, what amount of GI is sufficient?</p> <p>SL (NRW): fracture index, water levels, depth which is deeper than the likely invert of any excavation.</p>		
	<p>OL (WSP): what is the driver for open cut and not a pipe bridge?</p> <p>JG (Eni UK): steepness/depth of valley makes trenchless crossings very difficult which would have significantly large earth excavations.</p> <p>Steel Pipe bridge – creates a discontinuity in the pipeline for the purposes of Cathodic Protection. Above ground structure considered an eye-sore adjacent to PRow. Wouldn't use this for safety/long term liability Issue related to unauthorised access and attractive nuisance, exacerbated by proximity to potentially vulnerable populations (Asylum Centre nee. Wedding value)</p> <p>OL (WSP): put a bridge over the pipeline to remove the liability?</p> <p>JG (Eni UK): Use of above ground pipe bridges is not UK best-practice.</p>		
	<p>HP (WSP): If geomorphological assessment is required then it's programme critical and needs to be started this week in time to be finished ahead of DCO hearings. If the assessment is not necessary then need to make a decision on this soon.</p> <p>OL (WSP): GI needs to inform the geomorphological assessment.</p> <p>HP (WSP): Geomorphological assessment wouldn't be completed in time for the Examination period.</p>		

	<p>CT (PEL): need to know what information is necessary to inform examination period.</p> <p>OL (WSP): GI. Can't assess geomorphology without understanding groundwater losses.</p> <p>HP (WSP): can run assessment with some assumed losses? – 20% reduced flows?</p> <p>SL (NRW): reduction in flows would be related to Qmed/flood flows not groundwater losses. No concerns from a flooding point of view.</p> <p>CJ (NRW): With timescales, can NRW see proposed scope for pre-construction GI?</p> <p>DH (NRW): What is required to provide the certainty needed? (e.g. how many boreholes?)</p> <p>RA (Eni UK): need a cut assessment – need to understand where the cutting may be to know where to put the boreholes.</p>		
	<p>OL (NRW): NRW has not permitted the permanent change to bedrock in Wales. This would be a shift from operational guidance. NRW need to check with legal advisors over whether this is permitted anyway. Modification of a natural geological feature (hard bedrock bed), has not been permitted previously. In Operational Guidance Note that it is not permitted. Fish passes to natural geological steps and pools have not previously been approved.</p> <p>HP (WSP): This has previously been identified as a risk at the project level. Fish pass on a natural watercourse is not a direct comparison as it was a modification to a natural barrier to fish movement.</p> <p>OL (NRW): geomorphology assessment is good idea but needs to be informed by the GI.</p> <p>JG (Eni UK): currently no GI planned before end of examination.</p>		
	<p>AV (WSP): Proposed site visit</p> <p>RA (Eni UK): walkovers are always worthwhile. Might not change opinion but can help understand bigger picture.</p>		

<p>OL (NRW): Agree site visits are useful but wouldn't want walkover to hamper any GI from being completed.</p> <p>All: dates discussed CJ: CJ, OL, SL should all attend the site visit. CT: JG, CT, DH from EPUK HP: and JC.</p> <p>CT (PEL): Applicant to discuss offline which deliverables to complete and the programme.</p> <p>Main Conclusion from the discussion: all parties agree that a GI is required to close most, if not all, uncertainties.</p>		
--	--	--

AGENDA & MEETING NOTES 7

PROJECT NUMBER	70070865	MEETING DATE	11 May 2023
project name	HyNet CO2 Pipeline DCO	VENUE	MS Teams
CLIENT	EPUK	RECORDED BY	FM
meeting subject	WFDSoCG/Relevant Reps		

Present	NRW: Chris Jones (CJ - Planning Lead), Oliver Lowe (OL – Geomorphology), Stefan Le Roy (SL - Hydrogeology), Helen Millband (HM), Sophie Lucas (SL - Hydrology) PEL: WSP: Helena Parsons (HP), Frances Marlow (FM), Akshat Vipin (AV), John Chapman (JC), Callam Pearce (CP)
Apologies	Apologies: Chris Taylor, Natalie Corless
Distribution	As above plus Matt Lohead
CONFIDENTIALITY	Restricted

ITEM	SUBJECT	ACTION	DUE
	Introductions		
	SoCG HP: Alltami Brook update: working on an embedded pipe bridge option as an addendum to the ES. More information to follow on 22 nd May 2023 Putting together an options appraisal document for the Alltami Brook crossing which will be issued to NRW soon.		

	<p>JC: Hydrogeology work in ongoing. This includes a hydrogeological risk assessment for an HRA which will set out a conceptual understanding of hydrogeology in the area of proposed crossing. It will be informed by a 1:10,000 BGS geological map and a walkover by an experienced geologist. This information will be presented before 22nd May 2023 (although walkover information won't be available by that date). It is not possible to conduct intrusive GI due to previously mentioned land access issues and permissions at this location.</p> <p>AV: Notification of a second change request which includes the option to the examining authority which is on PINS website. PINS have provided a response. There is a further change request for order limits at the 2 Sisters factory in Sandycroft.</p> <p>CJ: Noted. Currently doing an internal response to the first change request.</p> <p>CP shared the library reference.</p>		
	<p>More information to follow on 22nd May but as much as practicable is being done.</p>		
	<p>Options appraisal report should be shared soon.</p>		
	<p>Producing the ES option addendum and the further hydrogeology work which should inform this discussion on 22nd May.</p>		
	<p>Cumulative effects: temporary works having short term and local effects, so cumulative effects are not anticipated. Concerns around the Alltami Brook should be addressed by the further work which is currently ongoing.</p> <p>CJ: will cumulative effects be assessed in the WFD?</p> <p>HP: need to seek advice on when to do it. It depends on the Alltami Brook conclusion.</p>		
	<p>CJ: when will SoCG update be submitted for next response?</p> <p>CP: Can update SoCG based on this meeting for deadline 3, but it won't have the conclusions of 22nd May meeting.</p>		
	<p>Relevant Reqs</p> <p>Calculations for works footprint – Agreed no longer required</p> <p>Construction impacts – agreed that statement can be removed from WFDa at the end of examination as no material update to the assessment</p> <p>Finchetts Gutter – Agreed that a sentence is to be added to WFDa to clarify the England/Wales split. There are crossings in English reportable water bodies where Welsh legislation will be applicable. To be updated at the end of examination as no material update to the assessment.</p> <p>Protected areas – Agreed that more information can be provided at end of examination as not considered to be a material change. Any potential issues should have been covered in the HRA</p>		

	RBMP – Agreed no material change to assessment so can be updated at end of the examination.		
	<p>AOB</p> <p>CJ: legal advisor to NRW has recommended some changes to the SOCG which will be added when NRW review the latest version.</p> <p>CP: aim to submit SoCG to NRW w/c 15th May 2023.</p> <p>AV: Will need response from NRW by COP 19th May 2023 for SoCG to be submitted at deadline 3.</p> <p>CJ: Noted. Need to receive SoCG draft early w/c 15th May 2023 and will check availability of colleagues.</p> <p>HP: those attending in person on 22nd May 2023 will need to do a site induction so please arrive 10 minutes early.</p>		

1.4.15. Minutes for the 22 May 2023 meeting with NRW are currently not available.

1.4.16. No other text within **Annex A** of **Appendix 18.3** of the 2022 ES [APP-165] has changed due to proposed design option PS25. Therefore, all remaining text within **Annex A** of **Appendix 18.3** of the 2022 ES [APP-165] remains unchanged and valid.

ANNEX B

1.4.17. The WFD scoping for coastal and transitional water bodies has not changed due to proposed design option PS25. Therefore, the text within **Annex B** of **Appendix 18.3** of the 2022 ES [APP-165] remains unchanged and valid.

ANNEX C

1.4.18. The baseline information has not changed due to proposed design option PS25. Therefore, the text within **Annex B** of **Appendix 18.3** of the 2022 ES [APP-165] and ES Addendum Appendix A [CR1-125] remains unchanged and valid.

ANNEX D

1.4.19. Proposed design option PS25 will include an addition to the proposed activities at Alltami Brook. Therefore, the 'Wepre Brook (GB111067056880)' water body in **Table 5.3** in ES Addendum - Appendix A [CR1-125] should be removed and replaced with the information in **Table 1.17** below.

Table 1.14 - Activities potentially impacting watercourses within each WFD water body along the DCO Proposed Development

Water body Name and ID	Watercourse Name	Watercourse Type	Proposed activities
Wepre Brook (GB111067056880)	New Inn Brook	Ordinary Watercourse	Open cut crossing

Water body Name and ID	Watercourse Name	Watercourse Type	Proposed activities
	Alltami Brook	Ordinary Watercourse	Open cut crossing or Embedded pipe bridge crossing option
	Wepre Brook	Ordinary Watercourse	Open cut crossing Drainage (Northop Hall AGI)

1.4.20. No other text within **Annex D** of **Appendix 18.3** of the 2022 ES [APP-165] and ES Addendum - Appendix A [CR1-125] has changed due to the proposed design option PS25. Therefore, all remaining text within **Annex D** of **Appendix 18.3** of the 2022 ES [APP-165] and ES Addendum Appendix A [CR1-125] remains unchanged and valid.

ANNEX E

1.4.21. The design principles for watercourse reinstatement have not changed due to proposed design option PS25. Therefore, the text within **Annex E** of **Appendix 18.3** of the 2022 ES [APP-165] remains unchanged and valid.

1.5. APPENDIX 18.5 FLOOD CONSEQUENCES ASSESSMENT

INTRODUCTION

1.5.1. **Appendix 18-5 – Flood Consequences Assessment (FCA) [AS-004 to AS-006]** investigates flood risk for the DCO Proposed Development located from the England/Wales border to the Babell Block Valve Station (BVS) in Wales. This FCA Addendum considers only the likely significant effects resulting in changes in flood risk as a result of proposed design option PS25.

1.5.2. The introduction for the FCA has not changed due to proposed design option PS25. Therefore, the text within **Section 1** of **Appendix 18-5 [AS-004 to AS-006]** and **Section 6.1** of ES Addendum 1 - Appendix A [CR1-125] remains unchanged and valid.

BASELINE DESCRIPTION

LOCATION OF THE DCO PROPOSED DEVELOPMENT

1.5.3. The Alltami Brook embedded pipe bridge option (PS25) falls into Pipe Reach 5, between Aston Hill BVS and Northop Hall AGI. The embedded pipe bridge is located within the Newbuild Infrastructure Boundary which remains unchanged at this location. Therefore, with the exception of an optional change to the crossing method at Alltami Brook within Pipe Reach 5, the text within **Section 2.2** of **Appendix 18-5 [AS-004 to AS-006]** remains unchanged and valid.

SITE TOPOGRAPHY

- 1.5.4. There are no changes to existing text for **Section 3.3** of **Appendix 18-5 [AS-004 to AS-006]**, however additional information has been provided on the topography at Alltami Brook at the location of the indicative embedded pipe bridge option. The following text should be added after **paragraph 2.3.5** of **Appendix 18-5 [AS-004 to AS-006]**:

A review of LiDAR (2023) indicates that, along Alltami Brook, the highest elevation is 165m AOD in the upper reaches of the catchment of Alltami Brook on the Mold Bypass (A55). The lowest elevation is 79m AOD and is located at its confluence with Wepre Brook further downstream.

Local surveys and channel cross sections of Alltami Brook at the indicative embedded pipe bridge location shows the northern and southern banks lie at around 80mAOD and 85mAOD AOD respectively, whilst the bed level sits at around 73.51m AOD.

The water level was noted to be 73.70mAOD at the indicative embedded pipe bridge location within the above survey and at this stage, this observed water level is assumed to be the dry weather flow level in the channel at this location. This water level is controlled by the culverted section of Alltami Brook located approximately 30m upstream of the indicative embedded pipe bridge beneath the A55.

- 1.5.5. No other text within **Section 2.3** of **Appendix 18.5 [AS-004 to AS-006]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 2.3** of Appendix 18.5 **[AS-004 to AS-006]** remains unchanged and valid.

GEOLOGY AND HYDROGEOLOGY

- 1.5.6. The Geology and Hydrogeology presented in the FCA has not changed due to proposed design option PS25. Therefore, the text within **Section 2.4** of **Appendix 18-5 [AS-004 to AS-006]** remains unchanged and valid.

EXISTING WATERBODIES

- 1.5.7. The existing waterbody in relation to proposed design option PS25 is the Alltami Brook which originates near the town of Alltami and flows in a northerly direction towards Northop where it is culverted beneath the A55 before joining Wepre Brook.
- 1.5.8. **Table 1.15** - in **Appendix 18-5 [AS-004 to AS-006]** has changed as result changed crossing method across Alltami Brook. Therefore, the 'Alltami Brook' watercourse within **Table 1** in **Appendix 18.5 [AS-004 to AS-006]** should be removed and replaced with the information in **Table 1.18** below.

Table 1.15 - Watercourse Crossings

Watercourse	Designation	Proposed Crossing Type
Alltami Brook	Ordinary	OC or Embedded Pipe Bridge option

1.5.9. No other text within **Section 2.5 of Appendix 18.5 [AS-004 to AS-006]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 2.5 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

EXISTING SEWER AND DRAINAGE INFRASTRUCTURE

1.5.10. The Existing Sewers and Drainage Infrastructure information presented in the FCA has not changed due to proposed design option PS25. Therefore, the text within **Section 2.6 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

EXISTING FLOOD DEFENCES

1.5.11. The Existing Flood Defences presented in the FCA has not changed due to proposed design option PS25. Therefore, the text within **Section 2.7 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

STAKEHOLDER ENGAGEMENT

1.5.12. The scoping opinion has not changed, and additional consultation has been undertaken regarding FCA. No amendments to **Appendix 1.3 – Environmental Statement – Scoping Opinion Responses [APP-076]** are required in relation to flood risk due to proposed design option PS25.

1.5.13. Following liaison with NRW they have stipulated that the soffit level of the Alltami Brook embedded pipe bridge crossing option should be designed with at least 300mm freeboard above 100 year plus climate change water level (central estimate). Should proposed design option PS25 be adopted, the above proposal and mitigation measure will be added to the **REAC [REP2-017]**.

1.5.14. No other text within **Section 3 of Appendix 18.5 [AS-004 to AS-006]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 3 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

CLIMATE CHANGE

1.5.15. The climate change information presented in the FCA has not changed due to proposed design option PS25. Therefore, the text within **Section 4 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

DEFINITION OF A FLOOD HAZARD

- 1.5.16. **Sections 5.1 to 5.2** presented in the FCA has not changed due to proposed design option PS25. Therefore, the text within **Sections 5.1 to 5.2 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

FLOODING FROM COASTAL SOURCES

- 1.5.17. Alltami Brook is not tidally influenced, therefore the embedded pipe bridge option is unlikely to be affected by coastal flooding or tidal variations. Therefore, the text within **Section 5.3 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

FLOODING FROM FLUVIAL SOURCES

- 1.5.18. The fluvial flood risk of the Alltami Brook embedded pipe bridge option has been assessed. The following text should be added after **paragraph 5.4.9 of Appendix 18.5 [AS-004 to AS-006]**.

Alltami Brook Embedded Pipe Bridge option

At this stage there is no hydraulic modelling information available for the Alltami Brook. NRW have advised that a minimum freeboard to the soffit of the pipe bridge of 300mm will need to be allowed for above the 100-year plus climate change allowance water level in the brook.

Flows and therefore water levels in Alltami Brook are controlled by the culverted section of the A55 located just upstream of the proposed pipe bridge. This culvert is approximately 1800mm in diameter.

At this stage, in the absence of hydraulic modelling and assuming a worst-case scenario approach, a qualitative review of existing local conditions has been made for the assessment of fluvial flood risk to the proposed structure.

The soffit of the embedded pipe bridge option will have a minimum 1500mm clearance from the assumed dry weather flow water level in the brook. This will provide a conservative allowance to cater for increases in the fluvial flow and water levels due to the impacts of climate change.

Due to the deep channel at this location, current NRW flood mapping suggests fluvial flows remain within the channel in the area at the indicative embedded pipe bridge location during flood conditions. This indicates that there is a very low risk of the channel overtopping its banks and affecting the proposed structure during a fluvial flood event.

The embedded pipe bridge abutments will be located above the Alltami Brook normal flow water levels within the deep channel and further up the bank to minimise the risk of obstruction from debris. Due to the proposed freeboard, there is low risk of the proposed structure causing obstructions during a fluvial flood event.

The above measures and existing flow control measures with the upstream A55 culvert will ensure that there are no restrictions to fluvial flow during normal flow and flood conditions within Alltami Brook. On the basis of the above the proposed structure is assessed to be at low risk of flooding in the present day scenario or when climate change is considered. The embedded pipe bridge is also unlikely to increase fluvial flood risk elsewhere.

The above qualitative assessment indicated minimal risk of fluvial flooding. A hydraulic model for this section of the Alltami Brook will be undertaken during the detailed design stage to confirm the design parameters such as the soffit level, freeboard levels and also inform the application for a flood risk activity permit for the embedded pipe bridge crossing option.

- 1.5.19. No other text within **Section 5.4 of Appendix 18.5 [AS-004 to AS-006]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 5.4 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

FLOODING FROM PLUVIAL SOURCES

- 1.5.20. The pluvial flood risk of the Alltami Brook embedded pipe bridge option has been assessed. The following text should be added after **paragraph 5.5.13 of Appendix 18.5 [AS-004 to AS-006]**.

Alltami Brook Embedded Pipe Bridge option

The Alltami Brook embedded pipe bridge option will include an increase in impermeable areas and therefore an increase in surface water runoff. The proposed surface water drainage for the embedded pipe bridge will be located within the bridge structure of the embedded pipe bridge design (i.e. in the base of the concrete trough) and similar to a French drain/perforated pipe. The proposed system will discharge surface water at a restricted rate from the ends of the bridge into the Alltami Brook.

This proposed method for surface water drainage will attenuate any increase in surface water runoff from the increase in impermeable areas and on this basis the embedded pipe bridge is unlikely to increase pluvial (surface water) flood risk to the proposed structure and elsewhere.

- 1.5.21. No other text within **Section 5.5 of Appendix 18.5 [AS-004 to AS-006]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 5.5 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

FLOODING FROM GROUNDWATER SOURCES

- 1.5.22. Flooding from groundwater sources presented in the FCA has not changed due to proposed design option PS25. Therefore, the text within **Section 5.6 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

FLOODING FROM SEWER AND DRAINAGE INFRASTRUCTURE

- 1.5.23. Flooding from sewers and drainage infrastructure presented in the FCA has not changed due to proposed design option PS25. Therefore, the text within **Section 5.7 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

FLOODING FROM ARTIFICIAL SOURCES

- 1.5.24. Flooding from artificial sources presented in the FCA has not changed due to proposed design option PS25. Therefore, the text within **Section 5.8 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

ASSESSMENT OF ACCEPTABILITY CRITERIA

- 1.5.25. **Sections 6.2 to 6.4** presented in the FCA have not changed due to proposed design option PS25. Therefore, the text within **Sections 6.2 to 6.4 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

LOSS OF FLOODPLAIN

- 1.5.26. The following text should be added after **paragraph 6.5.2 of Appendix 18.5 [AS-004 to AS-006]**:

The Alltami Brook has a relatively small upstream catchment and given that the indicative Alltami Brook embedded pipe bridge option is within a deep part of a small valley of the brook, the fluvial floodplain of the brook is noted to be generally constrained to the brook's channel. The NRW flood maps do not indicate the presence of fluvial or tidal floodplains on the banks of Alltami Brook at the indicative embedded pipe bridge location.

The embedded pipe bridge abutments will be constructed within the deep channel above the normal water levels. As the flood map indicates the water levels tend to remain within the deep channel and in the absence of a local floodplain, the loss of fluvial floodplain is likely to be negligible. Therefore, there are no requirements for floodplain compensation for the Alltami Brook embedded pipe bridge option.

- 1.5.27. No other text within **Section 6.5 of Appendix 18.5 [AS-004 to AS-006]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 6.5 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

NO INCREASE IN FLOOD RISK ELSEWHERE

- 1.5.28. The details for no increase in flood risk elsewhere presented in the FCA has not changed due to proposed design option PS25. Therefore, the text within **Section 6.6 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

ACCEPTABLE CONSEQUENCES FOR NATURE OF USE

- 1.5.29. The acceptable consequences for nature of use presented in the FCA has changed due to proposed design option PS25. The following text should be added after **paragraph 6.7.2 of Appendix 18.5 [AS-004 to AS-006]**.

Alltami Brook Embedded Pipe Bridge option

This qualitative assessment and NRW recommend that the Alltami Brook embedded pipe bridge option be located above the 100 year plus climate change allowance level with a minimum of 300mm of freeboard so as to not disrupt the flow of the Brook in flood conditions. The bridge abutments should also be constructed above the normal water levels and therefore will satisfy the criteria of Section A1.14 of Appendix 1 of TAN15.

- 1.5.30. No other text within **Section 6.7 of Appendix 18.5 [AS-004 to AS-006]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 6.7 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

AWARENESS OF FLOOD RISK AND FLOOD WARNING SYSTEMS

- 1.5.31. The awareness of flood risk and flood warning systems presented in the FCA has changed due to proposed design option PS25. Therefore, **paragraph 6.8.1 of Appendix 18.5 [AS-004 to AS-006]** should be replaced with the following text.

Due to the nature of the majority of the Newbuild Carbon Dioxide Pipeline (embedded structure) it will not be subject to ongoing manned access. The Alltami Bridge embedded pipe bridge option (if taken forward) will require limited manned access for inspections. Given the location of the proposed pipeline and embedded pipe bridge are within Flood Zones B, C and C1, any planned inspections will need to take into account the risk of flooding in the area and any flood alerts/warnings issued by the NRW.

- 1.5.32. No other text within **Section 6.8 of Appendix 18.5 [AS-004 to AS-006]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 6.8 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

- 1.5.33. The conclusion presented in the FCA has changed due to proposed design option PS25. Therefore, **paragraph 7.1.5 of Appendix 18.5 [AS-004 to AS-006]** should be replaced with the following text.

The risk of flooding of the Newbuild Carbon Dioxide Pipeline resulting from various sources including sewers, fluvial, tidal, and reservoir has been

considered to be “negligible”. This is because the Newbuild Carbon Dioxide Pipeline is an embedded structure for the majority of its path and will remain unaffected from sources of flooding on the ground surface.

The Alltami Brook embedded pipe bridge option will not be buried, however it will be designed in such a way as to prevent any increase in fluvial flood risk to the embedded pipe bridge or elsewhere. The design will comply with the requirements of NRW to allow for adequate freeboard above the recommended design flood levels.

- 1.5.34. **Paragraph 7.1.7 of Appendix 18.5 [AS-004 to AS-006]** should also be replaced with the following text:

Although the Newbuild Carbon Dioxide Pipeline crosses 18 open watercourses and some parts of the Newbuild Carbon Dioxide Pipeline are proposed within Flood Zone C1, with the Newbuild Carbon Dioxide Pipeline being a mostly subsurface structure, during the operational stage the pipeline is unlikely to be affected by fluvial flooding from these watercourses.

The Alltami Brook embedded pipe bridge option will cross over the Alltami Brook in the form of an embedded pipe bridge. However, this will be designed in a way so as not to disrupt the flow of the Alltami Brook, and thus will remain unaffected from fluvial flooding.

- 1.5.35. No other text within **Section 7.1 of Appendix 18.5 [AS-004 to AS-006]** has changed due to the proposed design option PS25. Therefore, all remaining text within **Section 7.1 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

RECOMMENDATIONS

- 1.5.36. It is recommended to undertake a hydraulic model for the section of Alltami Brook to confirm the design criteria for the embedded pipe bridge option as part of the detailed design stage.
- 1.5.37. All other recommendations presented in the FCA have not changed due to proposed design change PS25. Therefore, the text within **Section 7.2 of Appendix 18.5 [AS-004 to AS-006]** remains unchanged and valid.

2. DESIGN CHANGE PS26: CHANGE TO NEWBUILD INFRASTRUCTURE BOUNDARY AT 2 SISTERS FOOD GROUP LIMITED

2.1. APPENDIX 18.2 SUMMARY OF EFFECTS

INTRODUCTION

- 2.1.1. This appendix addendum presents the changes, in relation to proposed design change PS26, to the potential effects on the water environment and flood risk as presented within **Appendix 18.2 – Summary of Effects** of the 2022 ES [APP-164] and the ES Addendum 1 – Appendix A [CR1-125].
- 2.1.2. The change to the Newbuild Infrastructure Boundary at 2 Sisters Food Group (PS26) will result in a greater proportion of Chester Road Drain North being within the Newbuild Infrastructure Boundary and a temporary crossing installed across this watercourse for site access.
- 2.1.3. Therefore, **Table 2.1** below should replace **Table 4-1** in ES Addendum 1 – Appendix A [CR1-125].

Table 2.1 - Sensitivity of Receptors Associated with Activities for the DCO Proposed Development

Sensitivity	Receptors
Very High	Protected Areas: Dee Estuary Special Protection Area, Mersey Estuary Site of Special Scientific Interest (including Shellfish Water and Cockle Regulating Order)
	Trenchless crossing Shropshire Union Canal, River Dee
	Downstream of watercourse receiving drainage and open cut crossing Manchester Ship Canal
	Residents and users of the surrounding land
High	Trenchless crossing: River Gowy, Railway Ditch 2, Railway Ditch 1, Broughton Brook, Northop Brook, Principal aquifer, GWDTE
	Open cut crossing Stanney Mill Brook, Seahill Tributary 2, Seahill Drain, Sandycroft Drain, Chester Road Drain North, Mancot Brook, Chester Road Brook Tributary 2, Willow Park Brook, New Inn Brook, Alltami Brook, Wepre Brook, Principal aquifer, GWDTE.
	Outfalls: Wepre Brook

Sensitivity	Receptors
	Crossed using temporary crossing: Chester Road Drain North
Medium	<p>Trenchless crossing: Sandycroft Drain, Secondary A aquifers, private, unlicensed abstractions.</p> <p>Open cut crossing: East Central Drain, West Central Drain, Hapsford Brook, Gale Brook, Thornton Uplands, Stanney Main Drain, Gowy Tributary 2, Rake Lane Brook, Backford Brook, Friars Park Ditch, Finchetts Gutter Tributary, Sealand Main Drain, Secondary A aquifers, private, unlicensed abstractions.</p> <p>Outfalls: East Central Drain, Gale Brook, Little Lead Brook, Nant-y-Fflint</p> <p>Within Newbuild Infrastructure Boundary: Western Boundary Drain</p> <p>Crossed using temporary crossings: Hawarden Brook</p> <p>Construction Workers</p>
Low	<p>Trenchless crossing: Elton Lane South Ditch, Elton Marsh 1, Elton Brook Tributary 1, Wervin Hall Ditch Tributary</p> <p>Trenched crossing: Elton Lane Ditch 1, Elton Lane Ditch 4, Elton Marsh 2, Elton Marsh 13, Hall Green Lane Brook, Thornton Ditch 1, Thornton Ditch 2, Collinge Wood Brook, Grove Road Ditch, Gypsy Lane Brook, Mancot Brook Tributary, Oakfield Ditch 3, Northop Brook Tributary 2, Northop Brook Tributary 1, Canal Ditch.</p> <p>Within the Newbuild Infrastructure Boundary which could be subject to trenched crossing measures: Elton Marshes West, Elton Marsh 12, Elton Marsh 11, Thornton Ditch 4, Thornton Ditch 5, Thornton Ditch 5, Thornton Ditch 6, Thornton Ditch 3, Oakfield Ditch 1</p> <p>Outfalls: Canal Ditch, Overwood Ditch, Aston Hill Brook Tributary, Wepre Brook Tributary 1</p> <p>Within Newbuild Infrastructure Boundary: Goldfinch Meadow Drain, Marsh Lane Drain, Elton Lane Ditch 2, Elton Lane Ditch 6, Glass Factory Ditch, Elton Marsh 3 Elton Marsh 10, Gowy Tributary 2</p>

- 2.1.4. All other information presented within **Section 1** of **Appendix 18.2** of the 2022 ES **[APP-164]** and **Section 4.1** of the ES Addendum 1 – Appendix A **[CR1-125]** are not affected by the proposed design changes and therefore remain unchanged and valid.

ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

- 2.1.5. The assessment of likely impacts and effects included in **Section 2** of **Appendix 18.2** of the 2022 ES **[APP-164]** has not changed due to proposed design change PS26. Therefore, the text within **Section 2** of **Appendix 18.2** of the 2022 ES **[APP-164]** remains unchanged and valid.

ASSESSMENT OF RESIDUAL EFFECTS

- 2.1.6. The assessment of the residual effects included in **Section 3** of **Appendix 18.2** of the 2022 ES **[APP-164]** has not changed due to proposed design change PS26. Therefore, the text within **Section 3** of **Appendix 18.2** of the 2022 ES **[APP-164]** of the 2022 ES remains unchanged and valid.

SUMMARY OF ASSESSMENT OF EFFECTS

CONSTRUCTION STAGE

- 2.1.7. The change of the Newbuild Infrastructure Boundary at 2 Sisters Food Group (PS26) increases the length of Chester Road Drain North which lies within the Newbuild Infrastructure Boundary.
- 2.1.8. Chester Road Drain North is a watercourse with a $Q_{95} > 0.001 \text{m}^3/\text{s}$ not monitored under WFD crossed by temporary crossing and has a high sensitivity. The change in the Newbuild Infrastructure Boundary at the Chester Road Drain North is a local change and therefore the assessment of effects presented in **Tables 4-1, 4-2** and **4-3** of **Appendix 18.2** of the 2022 ES **[APP-164]** and ES Addendum 1 – Appendix A **[CR1-125]** remains unchanged and valid.
- 2.1.9. No other text included in **Section 4** of **Appendix 18.2** of the 2022 ES (**APP-164**) and **Section 4.4** the ES Addendum 1 – Appendix A **[CR1-125]** is affected by the proposed design changes and therefore remains unchanged and valid.

2.2. APPENDIX 18.3 WATER FRAMEWORK DIRECTIVE ASSESSMENT ADDENDUM

INTRODUCTION

- 2.2.1. This appendix addendum presents the changes, in relation to proposed design change PS26, to the Water Framework Directive assessment (WFDa) as presented within **Appendix 18.3 – Water Framework Directive Assessment** of the 2022 ES [APP-165] and the ES Addendum 1 – Appendix A [CR1-125].
- 2.2.2. The introduction of **Appendix 18.3** of the 2022 ES [APP-165] has changed due to proposed design change PS26. The construction phase activities at Sandycroft Drain (GB111067052160) have been updated. Therefore **paragraph 1.3.11** of **Appendix 18.3 [APP-165]** should be replaced with the following text:
- Temporary Watercourse Crossings will occur on watercourses not crossed by the pipeline, but where construction vehicles must cross in order to provide access to working areas. These crossing are expected at Ince Marshes, Gowy, Stanney Mill Brook, Finchetts Gutter, Garden City Drain, Wepre Brook, Sandycroft Drain and Hawarden Brook WFD surface water bodies.
- 2.2.3. The remaining text within the introduction of **Appendix 18.3 [APP-165]** has not changed due to proposed design change PS26.

METHODOLOGY

- 2.2.4. The methodology of **Appendix 18.3 [APP-165]** has not changed due to proposed design change PS26. Therefore, the text within **Section 2** of **Appendix 18.3 [APP-165]** remains unchanged and valid.

WFD SCREENING AND SCOPING

- 2.2.5. Proposed design change PS26 includes a change to the Newbuild Infrastructure Boundary and a temporary watercourse crossing within the Sandycroft Drain (GB111067052160) WFD waterbody. Sandycroft Drain (GB111067052160) was previously assessed within **Appendix 18.3 [APP-165]** for other activities but has not been previously assessed for a temporary watercourse crossing. The WFD screening and scoping of **Appendix 18.3 [APP-165]** has changed due to proposed design change PS26.
- 2.2.6. Therefore, the information provided for temporary watercourse crossings in **Table 3-2** of **Appendix 18.3 [APP-165]** should be replaced with the information provided in **Table 2.2** below:

Table 2.2 - Screening of activities

Activity	Screened in or out?	Justification
Temporary watercourse crossings	In	<p>Disruption of watercourse through temporary culverts could impact the hydromorphological, biological and chemical quality of watercourses and their downstream receptors.</p> <p>The following water bodies are assessed for this activity:</p> <p>Ince Marshes; Gowy; Stanney Mill Brook; Finchetts Gutter; Garden City Drain; Wepre Brook; Sandycroft Drain and Dee (N. Wales)</p>

2.2.7. Sandycroft Drain should also be added as a waterbody under the ‘temporary watercourse crossing’ heading in **Table 3-3** of **Appendix 18.3 [APP-165]**.

2.2.8. The remaining text within **Section 3** of **Appendix 18.3 [APP-165]** has not changed due to proposed design change PS26.

BASELINE CONDITIONS

2.2.9. The baseline conditions of **Appendix 18.3** in the 2022 ES **[APP-165]** and ES Addendum 1 – Appendix A **[CR1-125]** have not changed due to the proposed design changes. Therefore, the text within **Section 4** of **Appendix 18.3 (APP-165)** and **Section 5.4** of the ES Addendum 1 – Appendix A **[CR1-125]** remains unchanged and valid.

DETAILED IMPACT ASSESSMENT

2.2.10. Proposed design change PS26 includes a change to the Newbuild Infrastructure Boundary and a temporary watercourse crossing within Sandycroft Drain (GB111067052160) which was not previously assessed.

2.2.11. Therefore, Sandycroft Drain should be added to the ‘Relevant water bodies’ heading in **Table 5-5** of **Appendix 18.3 [APP-165]**.

2.2.12. The remaining text within **Section 5** of **Appendix 18.5 [APP-165]** has not changed due to proposed design change PS26.

CONSTRUCTION IMPACTS

- 2.2.13. The construction impacts presented in **Appendix 18.3 [APP-165]** have not changed due to proposed design change PS26. Therefore, the text within **Section 6** of **Appendix 18.3 [APP-165]** of the 2022 ES remains unchanged and valid.

CONCLUSIONS

- 2.2.14. Proposed design change PS26 has not been scoped in for detailed assessment for WFD compliance. The conclusions of the WFD assessment have not changed due to proposed design change PS26. Therefore, **Section 7** of Appendix 18.3 of the 2022 ES **[APP-165]** and ES Addendum 1 - Appendix A **[CR1-125]** remains unchanged and valid.

ANNEX A

- 2.2.15. Meetings notes presented in **Appendix 18.3 [APP-165]** have not changed due to proposed design change PS26. Therefore, the text within **Annex A** of **Appendix 18.3** of the 2022 ES **[APP-165]** remains unchanged and valid.

ANNEX B

- 2.2.16. The WFD scoping assessment for coastal and transitional water bodies has not changed due to proposed design change PS26. Therefore, the text within **Annex B** of **Appendix 18.3** of the 2022 ES **[APP-165]** remains unchanged and valid.

ANNEX C

- 2.2.17. The content of **Annex C** of **Appendix 18.3** of the 2022 ES **[APP-165]** and ES Addendum 1 – Appendix A **[CR1-125]** has not changed due to proposed design change PS26.

ANNEX D

- 2.2.18. Proposed design change PS26 requires an additional activity to be assessed on Chester Road Drain North.

2.2.19. Therefore, the information provided for Sandycroft Drain (GB111067052160) in **Table D-1 of Annex D of Appendix 18.3 [APP-165]** should be replaced with the information provided in **Table 2.3** below:

Table 2.3 - Activities potentially impacting watercourses within each WFD water body along the DCO Proposed Development

Water Body Name and ID	Watercourse Name	Watercourse Type	Proposed Activities
Sandycroft Drain (GB11106705 2160)	Railway Ditches	Ditch	Trenchless crossing
	Broughton Brook	Main River	Trenchless crossing
	Sandycroft Drain	Main River	Open cut crossing Trenchless crossing
	Mancot Brook	Ordinary Watercourse	3x open cut crossing
	Chester Road Drain North	Main River	Trenchless crossing Temporary watercourse crossing
	Chester Road Drain Tributary 1	Main River	Trenchless crossing

ANNEX E

2.2.20. The design principles for watercourse reinstatement have not changed due to proposed design change PS26. Therefore, the text within **Annex E of Appendix 18.3** of the 2022 ES **[APP-165]** remains unchanged and valid.