The Planning Inspectorate
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Sizewell C Nuclear Power Station

(EN010012)

Correspondence received after the close of the Examination at 23:59 on Thursday 14 October 2021

No.	From	Organisation	Date received
1		Northumbrian Water Limited	15 October 2021
2	Susan Seabrook		22 October 2021
3		UKPN	1 November 2021
4		NNB Generation Company (SZC) Limited	2 November 2021
5	Nick Scarr		8 November 2021
6		NNB Generation Company (SZC) Limited	9 November 2021
7	Susan Osben		3 December 2021
8	Dawn Lacey		17 December 2021
9		Wickham Market PC	17 December 2021
10	Mike Taylor		21 December 2021
11	John Busby		29 December 2021
12	Ian Galloway		2 January 2022
13	Mike Taylor		2 January 2022
14	MF Rowe		3 January 2022
15	Graham Lacey		10 January 2022
16	Mr & Mrs Lacey		10 January 2022
17	Nick Scarr		11 January 2022
18		Together Against Sizewell C	13 January 2022
19	Mike Taylor		14 January 2022
20	Mike Taylor		19 January 2022
21	Nick Scarr		24 January 2022
22	Paul Collins	Theberton and Eastbridge Parish Council, Middleton cum Fordley Parish Council, Stop Sizewell C, B1122 Action Group and Minsmere Levels Stakeholders Group	29 January 2022
23	Tom Langton		1 February 2022
24	Ruth & David Watson		2 February 2022

25		Together Against Sizewell C	3 February 2022
26	Dr Daniel Poulter MP		4 February 2022
27	MF Rowe		6 February 2022
28	Nick Scarr		7 February 2022
29	Martin Deighton		16 February 2022
30	Mike Taylor		19 February 2022
31	Nick Scarr		21 February 2022
32		Suffolk County Council	22 February 2022
33		Together Against Sizewell C	22 February 2022
34		S.A.G.E	23 February 2022
35		Northumbrian Water Limited	23 February 2022
36	Paul Collins	Theberton and Eastbridge Parish Council, Stop Sizewell C and Minsmere Levels Stakeholders Group	23 February 2022
37		Suffolk Coastal Friends of the Earth	24 February 2022
38		NNB Generation Company (SZC) Limited	24 February 2022
39		S.A.G.E	25 February 2022
40	John Sutherell		25 February 2022
41	G I Bickers		25 February 2022

1. Northumbrian Water Limited – 15 October 2021

From: [redacted]
To: SizewellC
Subject: Update on WINEP Modelling
Date: 15 October 2021 16:08:25

Dear Sirs/Madam

Whilst I appreciate that the Inquiry has now ran its course, I thought it might assist the Authority to have an update on the NWL's WINEP modelling timeline. This was stated in submissions to be expected to conclude by mid-October. The timeline for this has now changed.

NWL held a meeting with Wood Consultants who are completing the WINEP investigations. NWL and Wood have identified further work which needs to be completed before the WINEP can conclude. This will require a further meeting with the EA which is provisionally scheduled for w/c 1 November 2021. However, the WINEP modelling is complex making it very difficult to suggest an absolute deadline for finalising and signing off WINEP investigations and reports.

I trust this assists the Authority.

Kind regards,

Emma

Emma Conwell
Senior Associate

Walker Morris LLP
33 Wellington Street, Leeds, LS1 4DL

[redacted]

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2. Susan Seabrook – 22 October 2021

From: [redacted]
To: SizewellC
Subject: Objection to Construction of Sizewell C and D Nuclear Power Stations
Date: 22 October 2021 12:28:04

Dear Planning Inspectorate,
I wish to register the following observations and concerns relating to the proposed Sizewell C and D developments and to object in the strongest terms to the Planning Application.

1. Nuclear power is outdated, too expensive, polluting, not Green, and most countries in the world will not entertain nuclear power any more, including France who have had a disastrous relationship with EDF and refuse to subsidise them further. We have to ask why?
2. The applicants are finding it difficult to fund their plans and seem to be planning for the British consumer/tax payer to be saddled with the expense and nobody knows what the final cost will be, including the massive problem of getting rid of nuclear waste. Other forms of green energy generation are rapidly on the increase which are safer, cheaper and from which there is no lethal waste to leave for future generations to deal with.
3. East Anglia is the driest area of the UK and there is not enough fresh water to accommodate the needs of a further two nuclear power stations and all the ancillary services required in connection with the build. The developers have no idea where they are going to acquire such volumes of water and "planning on the go" are now talking about building a desalination plant.
4. The East Suffolk coastline is receding at a pace, with the latest massive cliff fall occurring only a few weeks ago. The Sizewell Beach could be, and has been historically, seriously eroded over night. The Sizewell nuclear complex, including the waste that is being stored in Sizewell A, could end up as an island cut off from emergency relief and in a dangerous condition.
5. Sizewell A and B have destroyed and are destroying millions of tons of fish during their operation. Obviously with two more stations operating, the situation can only get worse and cannot be avoided. We need what they destroy for our own food. The fishermen are obliged to throw back undersized fish or get fined while the nuclear power stations scour the seabed and water unquestioned and unaccountable.
6. Our local road network is totally inadequate to cope with the construction/workforce traffic. There is already too much traffic emanating from Sizewell B and A. Through historic lack of investment our roads are full of potholes which no authority seems able to repair. Most of the local roads are too narrow for large lorries/loads to pass unhindered. There will be inevitable traffic jams given that the A12 and A14 are closed on a regular basis, as is the Orwell Bridge.
7. The railway line is inadequate for construction loads in its current state and is single track all the way to Ipswich and Lowestoft .
8. Sizewell nuclear power stations have brought no long-term benefit to Leiston Town and it remains unloved, under-developed and ugly and since the building of both power stations has become a haven for illicit drug activities. Most of the public houses in Leiston have gone bust and closed. There is very little for local youngsters to enjoy, let alone the rest of the population.
9. As a local person, I watched the building of Sizewell B from being a hole in the ground to the placing of the dome. I had two businesses before and during the construction period – a gentlemen's outfitter in Leiston High Street, the Sizewell Beach Café and three letting properties so I have seen it all. There were enormous problems in and around the town

with antisocial behaviour, drug use, fighting and drunkenness amongst other things. The construction period had a profound effect on the clientele that would use my store and my café.

10. The intended site for Sizewell C and D is far too small. It is in an Area of Outstanding Natural Beauty and An SSSI. It will impinge and possibly destroy one of Britain's jewels in the crown, namely Minsmere Bird Reserve, which has been developed and nurtured over decades and draws visitors from all over the world. The area is one of the most beautiful in East Anglia.
11. During the past thirty years and beyond, great emphasis has been put on the development of tourism in this part of Suffolk and heavy investment involved in drawing visitors to the area all year round who come to enjoy the beauty, peace and quiet and quality of life. This will not sit beside the development of a huge industrial site spread over many hundreds of acres of our precious countryside and seaside, bringing pollution of every kind – dust, fumes, light, noise, air – on a massive scale. Tourists will be driven away from the area and many businesses will suffer accordingly.
12. I implore the Planning Inspectorate to consider very deeply the ramifications and costs of all aspects of this planning application.

Thank you.

Yours faithfully,

Susan Seabrook

Sent from Mail for Windows

3. UKPN – 1 November 2021

From: [redacted]
To: SizewellC
Subject: The Sizewell C Project Development Consent Order
Date: 01 November 2021 14:57:26

To whom it may concern

UK Power Networks Ltd (UKPN) and the Applicant have been involved in positive discussions since November 2020 and throughout the examination. As such, UKPN can confirm that they are agreeable in principle to the protective provisions included in the draft DCO, namely Schedule 18, Part 1 Protection for Electricity, Gas, Water and Sewerage Undertakers and subject to the Applicant and UKPN agreeing a side agreement to further deal with UKPN's requirements. UKPN will continue to work with the Applicant as the project progresses.

Regards

Shaun Barrell
Property & Consents Asset Management Manager EPN/SPN
[redacted]
[redacted]@ukpowernetworks.co.uk

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4. NNB Generation Company (SZC) Limited – 2 November 2021

Mistakenly omitted by the Applicant in their Deadline 10 submissions

From: [redacted]
To: [redacted] SizewellC
Cc: [redacted]
Subject: RE: Doc 9.120
Date: 02 November 2021 09:23:28
Attachments: image001.png
Appendix O - D10 BNG note v2.0.pdf

Good Morning Sian,

Unfortunately this was missed in the final PDF stages so not submitted at D10 but attached is Appendix O.

Kind regards
Natasha

Natasha Hyde
Legal Counsel
Nuclear New Build Legal
Governance & Legal Affairs

[redacted]

From: Carly Vince <[redacted]@sizewellc.com>
Sent: 01 November 2021 20:23
To: SizewellC <sizewellc@planninginspectorate.gov.uk>; Natasha Hyde [redacted]@sizewellc.com>
Cc: Emma Wreathall [redacted]@quod.com>
Subject: RE: Doc 9.120

Thanks Sian. Natasha will look into this and respond tomorrow.

With Kind Regards

Carly Vince
Chief Planning Officer

T: [redacted]
E: [redacted]@sizewellc.com
90 Whitfield Street
London. WIT 4EZ
[redacted]

From: SizewellC <sizewellc@planninginspectorate.gov.uk>
Sent: 01 November 2021 15:09
To: Carly Vince <[redacted]@sizewellc.com>

Cc: Emma Wreathall [redacted]@quod.com>; SizewellC <sizewellc@planninginspectorate.gov.uk>
Subject: Doc 9.120

Hi Carly

It has been brought to our attention by an IP that Appendix O appears to be missing from your Deadline 10 submission - *9.120 Comments on Earlier Deadlines, Subsequent Written Submissions to ISH11-14 and Comments on Responses to Change Request 19*. Please can you advise whether this was submitted and, if so, where this is on our website.

If it is missing, please note that if you submit it now we cannot pass it to the Examining Authority but it can be passed to the Secretary of State with the Recommendation Report.

Kind regards

Sian

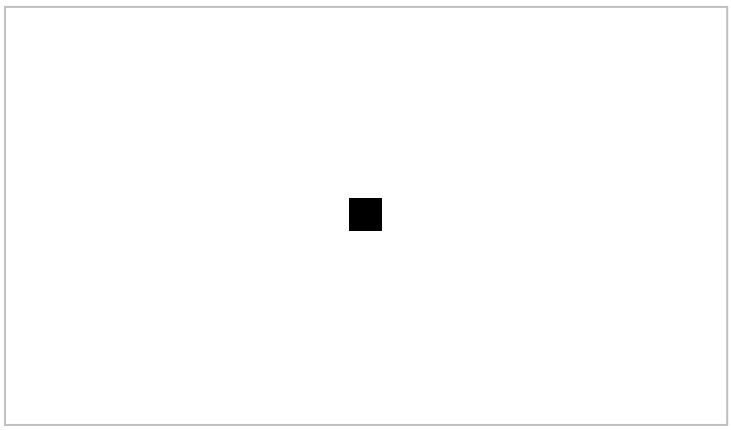
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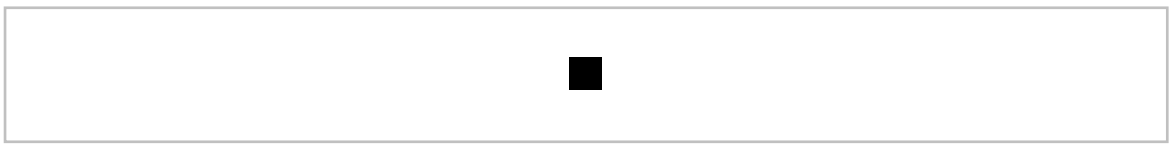
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1 BIODIVERSITY NET GAIN

1.1 Background

1.1.1 This note has been prepared following a meeting with Paul Collins and Bioscan on 21st September 2021 on Biodiversity Net Gain (BNG). A Statement of Common Ground between SZC Co. and Paul Collins is submitted at Deadline 10, at the request of the Examining Authority although no matters are agreed. Paul Collins and Bioscan made it clear at that meeting that a critique of the BNG reports would be submitted by them at Deadline 10. The purpose of this note, also submitted at Deadline 10, is therefore is to provide evidence, in relation to the main development site, as to why the judgements made, in relation to key habitat types, are robust. The key habitat types are those such as arable, grassland and woodland, which because of their large areas are the main contributors to the unit outcome and so drive the outputs of the assessments.

1.1.2 The BNG calculations were carried out voluntarily by the SZC Co. following requests by stakeholders, including Natural England, RSPB and SWT. The BNG values were calculated for the four sites with a predicted permanent land use change (Main Development Site, Two Village Bypass, Sizewell Link Road and Yoxford Roundabout). The assessments were carried out following the current guidance and the current version of the metric available at the time of calculation (at the time Biodiversity Metric 2.0 (BM 2.0). BM 3.0 was released in July 2021). This note focuses on the Main Development Site, as this site is the key driver of the overall net change in biodiversity units associated with the proposed development as a whole.

1.2 Areas included and excluded from the assessment

1.2.1 Under BM 2.0 guidance, Sites of Special Scientific Interest (SSSI) cannot be assessed by the metric as they are 'untradable', i.e. they are considered to be of such a high value that they cannot be adequately assessed by the metric. This means that the portion of the Sizewell Marshes SSSI within the Order Limits and any mitigation and/ or compensation relating to them (e.g. wetland habitat at Aldhurst Farm) must be excluded from the calculations[1].

1.2.2 Areas of dedicated species mitigation, compensation and enhancements, for example the reptile translocation areas at Studio Field Complex, have been included within the calculations, as is appropriate and per the Natural England guidance. Advance habitat creation is encouraged to mitigate for impacts before they happen and to provide the best habitat for excluded or translocated species. This is clearly demonstrated in case studies that are used to support users on the

[1] The impacts to the SSSI are assessed within the Environmental Statement, and two bespoke habitat compensation strategies, the dedicated **Fen Meadow Strategy** (Doc Ref. 10.16) and the **Wet Woodland Strategy** (Doc Ref. 10.31), both secured under the dDCO under Requirement 14A and Requirement 14B respectively, are in place to provide sufficient compensatory habitats to the habitat multipliers requested by Natural England.

tool. For example, CIRIA (2019)[2] (working in partnership with CIEEM) produced a series of case studies relating to good practice around BNG and development. Case studies 13 and 14 for example outline how cirl bunting compensation can align with the delivery of Biodiversity Units and therefore BNG. The BNG assessment process is a habitat driven method which uses a proxy calculation to demonstrate the impact of a development on biodiversity. It assesses the Biodiversity Units of the site before and after the proposed development completion and uses the metric to demonstrate a net change in Biodiversity Units. Species and habitat receptors have also been assessed separately and individually as 'Important Ecological Features' within the Environmental Statement. The BNG assessment process using the metric does not replace these assessments, rather it complements them, nor does BNG replace legal or policy obligations. This means that even if a project delivers 50% BNG, the developer is not exempt from protecting reptiles from deliberate or reckless killing or injury during construction nor does it negate the need to provide dedicated reptile habitat. Conversely dedicated reptile habitats can be included with Biodiversity Metric calculations as it is part of the post development habitat scenario. BNG is a means of quantifying change with regards to overall diversity of habitats to support design decisions and prevent the further erosion of biodiversity due to incremental losses due to development. It is therefore entirely appropriate to include such areas in the BNG calculations.

1.3 Calculation of units

1.3.1 The net change in biodiversity was calculated using BM 2.0, with the results presented directly from this tool. The BM 2.0 calculates the net change in biodiversity units as the total uplift.

1.3.2 Areas within the order limits are defined as 'on-site' and the areas outwith the order limits, but within the wider estate are defined as 'off-site'. The results have been presented in this manner.

1.3.3 The BM 2.0 does not include any temporal multipliers to account for advanced (e.g. Studio Field Complex habitats, i.e. to reflect the reduced difficulty or risk re already created habitats or habitats under establishment) or delayed habitat creation (areas within the order limits where habitat creation will occur post construction). As the guidance does not include such multipliers, none were included.

1.3.4 For 'off-site' habitat creation within the wider estate, the baseline was taken to be the time point before which any advance habitat interventions had begun and where funded by SZC Co. (for example, at Aldhurst Farm and the Studio Field Complex). The time points were specific for each of these areas, depending on when habitat interventions began. Advance habitat creation represents good

[redacted]

practice by ensuring that the habitats are in place ahead of when they are required, given the time taken for habitats to mature[3]. No applicant should be penalised for carrying out habitat improvement works ahead of an application.

1.4 Data entry into BM 2.0

1.4.1 Where multiple small habitat parcels were assessed in the same manner (e.g. same habitat type, conditions etc.), these were aggregated to facilitate data entry into the BM 2.0 spreadsheet tool. As the spreadsheet only allows data to be entered into a limited number of rows (248 rows maximum, with 272 polygons in the post-development scenario condensed down to 34 rows), this aggregation approach was considered to be the most appropriate method. As aggregated data are all assessed in the same manner, and have the same change scenario (e.g. retained, lost etc), there is no need to separate these areas out.

2 HABITAT ASSESSMENTS

2.1.1 Habitats were assessed following the BM 2.0 guidance, utilising the condition sheets. Several illustrative examples of the assessments are presented below, based upon those habitats that are large in area, or are the main contributors to the unit outcome.

2.2 Baseline habitat assessments

a) Plantation coniferous woodland

2.2.2 The main area of plantation coniferous woodland which will be subject to landtake is Goose Hill. This area is predominantly an area of plantation coniferous woodland, dominated by planted Corsican Pine (*Pinus nigra*) and planted Scots Pine (*Pinus sylvestris*). Neither species is native in Suffolk and the first is not native in the UK. The metric defines the classification of plantation coniferous woodland as 'other coniferous woodland'. Due to the high component of Corsican pine, this is considered to be appropriate. Other areas of coniferous woodland are present to the north of the main platform and adjacent to the studio fields complex. These areas are also dominated by Corsican pine and/or Scots pine, so were classified in the same way.

2.2.3 The areas of plantation woodland clearly align with the description of 'poor condition woodland'. The following characteristics of poor condition woodland (as guided by the condition sheet) were present: non-native trees are dominant, there is little age diversity, except in large, discrete areas where clearing has occurred, a consistent planting pattern of trees in rows remains and can be clearly seen in aerial photography or ground based photographs.

[3] Natural England supports advanced habitat creation as evidenced by its repeated requests at examination for the fen meadow and wet woodland habitats to be created in advance of any SSSI landtake for these habitats

Plate 1



SOURCE: https://griffmonster-walks.blogspot.com/2012/10/a-walk-through-woods-on-kenton-and.html

2.2.4 Further, some understorey is present, but the ground flora is dominated by Bramble (*Rubus fruticosus* agg.), Bracken (*Pteridium aquilinum*) and Common Nettle (*Urtica dioica*). A large proportion of the condition criteria for woodland fail:

- Pass – largely complete canopy cover
- Fail – Corsican pine accounts for more than 10% cover.
- Fail – plantation nature of the woodland means that there is little age and height diversity.
- Pass – largely free from damage.
- Fail – plantation nature means that there is limited natural regeneration.
- Fail – minimal deadwood as harvested plantation woodland.
- N/A – limited wetland habitat.
- Pass – precautionary assessment. Some evidence of nutrient enrichment, but area largely appears unaffected by adjacent operations.

- Fail – harvesting of plantation woodland considered inappropriate management
- Pass – Some undesirable species, such as rhododendron, but overall <5% cover.
- Fail – Understorey dominated by bramble and nettle indicates potential nutrient enrichment.
- Fail – low diversity means <3 native tree and shrub species in an average 10m radius.

2.2.5 The areas of coniferous plantation are therefore justifiable assessed as being of poor condition in the BNG assessment.

2.2.6 This area of plantation woodland is currently managed as a crop, with harvesting occurring periodically. The next round of harvest across much of the area is expected to be in the next few years. As such, large areas of this existing plantation woodland would have been lost to timber harvest, albeit with replacement planting of young trees, irrespective of the proposed Sizewell C Project.

2.2.7 The plantation coniferous woodland clearly aligns with the description of poor condition and fails a sufficient number of the condition criteria that poor condition is appropriate. Moderate condition would not be appropriate as the woodland fails too many of the condition criteria to be of moderate condition. Further the woodland does not align with the description of moderate woodland. For example, there is greater than 20% non-native component (Corsican pine).

b) Arable

2.2.8 There is a large amount of arable land across the Sizewell Estate. It is not material to separate out the crop types because cereal and non-cereal crops are assessed in the same manner within the metric (i.e. they are 'scored' the same). Further, farming on the estate is highly fluid, with crop types on any one field varying year on year. As non-cereal crops dominate, all arable land was classified as 'non-cereal crops' (this assumption does not necessarily reflect the approach taken to habitat classification beyond the scope of the BNG assessments (e.g. in the ES)).

2.2.9 An arable weed survey found cultivation on the farmed fields of the estate to be intensive, often under plastic and involving pesticide use, resulting in "clean" crops with weed species being restricted to the margins of the fields or small patches within the fields where crops have failed to establish. Due to the very restricted nature of arable field margins, they were not considered to be material to the assessment.

2.2.10 The condition of arable land is pre-defined within the metric as 'N/A -Agricultural'. As such, no condition assessment is required.

c) Semi-improved acid grassland

2.2.11 There are several areas of existing semi-improved acid grassland on the site. These include on Retsom's field, Broom covert and Black Walks in the north of the site.

2.2.12 Retsom's field is composed of an area of semi-improved acid grassland and an area of dry heath mosaic, the latter of which is considered separately. Retsom's was formerly an arable field but the reversion to grassland occurred prior to the Sizewell C funded habitat creation works and so this reversion has been excluded from the assessment. There is now a short sward, due to regular sheep and rabbit grazing, dominated by Sheep's-fescue (*Festuca filiformis*) and Common Bent (*Agrostis capillaris*). The grassland was assessed as belonging to the U1d National Vegetation Classification (NVC)[4] community, which aligns with the 'other lowland acid grassland'. Retsom's Field was assessed as a poor example of priority grassland habitat because of the low species diversity (dominated by widespread Yorkshire fog and false oat-grass), low levels of positive indicator species (e.g. common stork's-bill (Rare) and sheep's sorrel (Occasional)) and (and the area is not present on the priority habitat inventory). It was assessed as passing condition criteria 4 and 6[5] due to low levels of undesirable species and low cover bracken and scrub. As a result, it was assessed as being of moderate condition.

2.2.13 Broom covert and the semi-improved acid grassland fields to the north and south of Sandy Lane (**Figure 1**) are dominated by Sheep's-fescue with an abundance of Common Bent, Fine-leaved Sheep's-fescue and Sweet Vernal-grass. These areas align with the 'other lowland acid grassland' typology. Broom covert contains stands of Common Nettle, Thistle species (*Cirsium spp.*), Bracken and Gorse (*Ulex europaeus*) scrub and as a result fails condition criteria 4 and 6. There is limited bare ground within the area (resulting in condition criteria 5 failing) and localised damage to sward by stock. As a result, it was assessed as being of moderate condition, because of the failure of all three negative condition criteria (4, 5 and 6). The semi-improved acid grassland fields to the north and south of Sandy Lane was assessed as being of moderate condition, due to the paucity of positive indicator species and presence of undesirable species, such as ragwort.

[4] NVC is a detailed phytosociological *classification system* - [redacted]
[5] Criteria referred to are the 'condition criteria' provided within the BM 2.0 guidance. They a series of pass/fail criteria against which habitats are assessed.

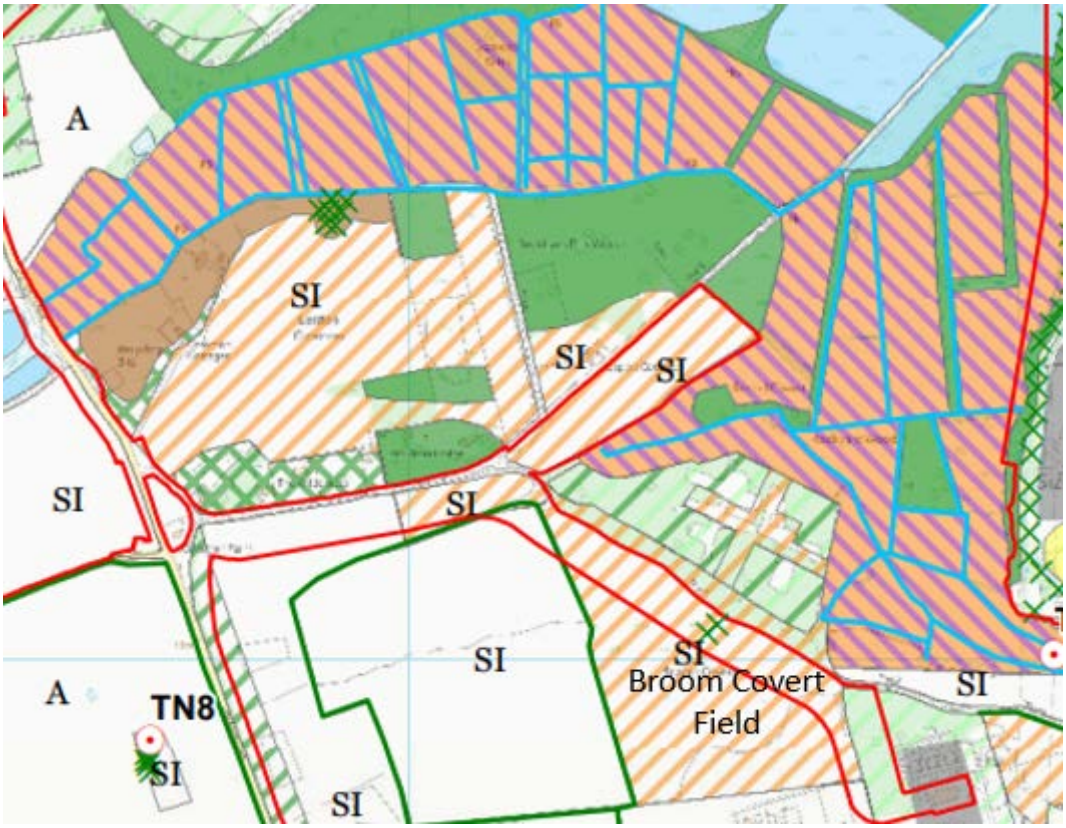


Figure 1: Semi-improved acid grassland fields to the North and South of Sandy Lane, including Broom Covert as labelled

2.2.14 The area of acid grassland at Black Walks is similar in composition to the above areas, aligning predominantly with the U1d and U1b NVC communities, so was also assessed as 'other lowland acid grassland'. The grassland at Black Walks passed condition criteria 1, as it was a good example of the habitat type and condition 4, low cover of undesirable species, and 6 low scrub cover. The habitat failed the remaining condition criteria 2, 3 and 5. Condition 2 is passed if the grassland meets very closely with priority habitat description, condition 3 requires wildflowers, sedges and indicator species of that habitat type to occur at high densities and frequencies. Black Walks did not represent these conditions with only sheep's fescue (*Festuca ovina*) being a typical indicator. Condition 5 requires bare ground cover to be greater than 10%. As a result, it was assessed as being of moderate condition because of the failure of three of the condition criteria (2, 3 and 5). To achieve good condition, they would need to be examples of priority acid grassland habitat with areas of bare ground.

d) Dune grassland

2.2.15 'Coastal sand dune' habitat is present to the east of the main platform. The low-growing sward (between 3 and 5cm high) is species-rich, with 28 grass and forb species recorded in the quadrats. The most abundant grass species were Red

Fescue (*Festuca rubra*), Smooth Meadow-grass (*Poa pratensis*), Sheep's-fescue (*Festuca ovina* agg.) and Sweet Vernal-grass (*Anthoxanthum odoratum*). The low growing forbs recorded included Common Bird's-foot trefoil (*Lotus corniculatus*), Strawberry Clover (*Trifolium fragiferum*), Buck's-horn Plantain (*Plantago coronopus*), English Stonecrop (*Sedum anglicum*), Lady's Bedstraw (*Galium verum*), Harebell (*Campanula rotundifolia*), Ribwort Plantain (*Plantago lanceolata*) and Rough Hawkbit (*Leontodon hispidus*).

2.2.16 The existing habitats are largely considered to meet all of the condition assessment criteria. It is considered to be a good example of the habitat, with native species dominant, variation in the vegetation structure and open ground is present. Some hard engineering is present, however negative indicators from damage are largely absent. As such, the existing habitats is considered to be of good condition.

e) Vegetated shingle

2.2.17 'Coastal vegetated shingle' habitat is present to the east of the main platform, supporting a mixture of sand specialists such as Marram (*Ammophila arenaria*) and Sand Sedge (*Carex arenaria*), together with shingle specialists including Sea-kale (*Crambe maritima*), Sea-holly (*Eryngium maritimum*), Sea Pea (*Lathyrus japonica*) and Sea Campion (*Silene uniflora*), aligning with the species included in the habitat definition.

2.2.18 The existing habitats are largely considered to meet all of the condition assessment criteria. It is a good example of the habitat with uncommon vegetation types present, it is native species dominant with variation in vegetation structure and open ground present. Negative indicators from damage are largely absent. As such, it is considered to be of good condition.

2.3 Post-development habitat assessments

2.3.1 Within the order limits, much of the habitat will be lost during the construction period and the target habitats will be created post-construction.

2.3.2 It is recognised that ambitious but feasible habitat typology and condition targets have been set for the post-development habitats. This reflects the drive to create high-quality replacement habitats for compensate for those lost. The **Outline Landscape and Ecological Management Plan** (Doc Ref. 10.22) for the Main Development Site, secured by Requirement 14, sets out how target habitats will be achieved.

a) Coastal habitats

2.3.3 The vegetated dunes and vegetated shingle habitats described above, within the order limits, will be lost due to the implementation of Sizewell C coastal defences and then reinstated. This same process was carried out during the construction of

Sizewell B. Subsequently, both habitat types have developed to achieve good condition, as described above. It is therefore predicted that in the long-term these habitats re-instated across the Sizewell C coastal defences can also reach their existing baseline state of good condition, based on the Sizewell B experience. The vegetated dunes and vegetated shingle habitats are therefore justifiably predicted to achieve good condition 'Coastal sand dune' and 'Coastal vegetated shingle' habitat respectively.

b) Dry Sandlings Grassland

2.3.4 Much of the site will be converted to the proposed Dry Sandlings Grassland community post-development.

2.3.5 The majority of the post-construction area would be Dry Sandlings Grassland, which was formerly much more extensive in the local landscape. This area would not comprise a single habitat type but form a complex mosaic of dry summer parched grassland, scrub and scattered trees/woodland (particularly around the edges).

2.3.6 It is anticipated that the area would be underlain by dry and low fertility soils, which would naturally support dry summer parched grassland. This would be created through seeding with seeds harvested from acid grassland/heathland habitats in the local area. Management would primarily comprise mowing/topping during the establishment period, with extensive grazing at a sufficiently low density used once the site becomes established to allow natural colonisation of patches of scrub and woodland, giving the area a more natural and wild quality. The summer parched grassland is expected to develop over time into an acid grassland / heathland.

2.3.7 As stated above, the long-term target is a mosaic of acid grassland, heathland and scattered trees. It is assumed that these habitats will be maintained in the following approximate proportions:

- Acid grassland – 80%
- Heathland – 15%
- Scattered trees – 5%

2.3.8 It is considered to be achievable to target a 'Lowland dry acid grassland' sward in most areas of the site. Actions to revert arable habitat to an acidic grassland sward is already underway within Aldhurst Farm and the Studio Fields complex. These areas provide clear evidence of what can be achieved and will be used to inform habitat creation interventions. A species-rich sward will be targeted, with wildflower cover around 30%. Positive management will target achievement of the condition assessment criteria. As such, a condition of 'fairly good' is predicted. This reflects the challenges of creating areas of such habitat and remains realistic, while targeting a positive outcome.

2.3.9 Areas of 'Lowland Heathland' will also be targeted within this mosaic. These heathland habitats would be managed positively, for environmental benefit. As such, a condition of 'fairly good' is predicted. This reflects the challenges of creating areas of such habitat and remains realistic, while targeting a positive outcome. Lowland heathland areas have already been successfully created on the Studio Field complex.

2.3.10 Scattered trees will be allowed to develop, although largely around the peripheries of the habitat areas. These trees are predicted to align with the 'Wood-pasture and parkland' typology as they will largely be individual (or small clusters of) trees within a grassland landscape. As with other elements of the Dry Sandlings Grassland, a condition of 'fairly good' will be targeted, a balance of targeting quality, while remaining realistic. Due to the nature of the habitat, this would likely involve management of invasive species and a lack of nutrient enrichment, which are considered to be achievable.

c) Mixed Woodland

2.3.11 Extensive new areas of woodland would be established through a combination of planting and natural regeneration. The new woodlands would buffer and link the existing areas of woodland within the site. Unlike the existing site, which has extensive blocks of coniferous plantation at Kenton Hills and Goose Hill, the new woodland would be predominantly native broadleaved with a small component of mixed woodland (to increase climate change resilience). It would have a greater structural and species diversity than existing woodland, especially relative to the extensive plantation woodland, and form a closer spatial mosaic with areas of grassland and scrub. Management would be aimed at enhancing biodiversity value rather than commercial timber management.

2.3.12 The goal is to create a high-quality area of woodland, with a long-term view of success. As such, 'Lowland mixed deciduous woodland' will be targeted. It is recognised that this is a difficult habitat to create and this is reflected in the biodiversity unit return predicted for this habitat. However, the woodland will be managed for biodiversity, rather than timber production, as much of the woodland currently is. It is therefore considered that in the long term, this typology is achievable. Through positive management, it will be possible to meet the condition assessment criteria. Proposed management practices are defined in the oLEMP to achieve this, as follows:

- A native woodland with a complete canopy and diverse age structure;
- Minimal negative anthropogenic and faunal impacts;
- Retained dead wood; and
- Management of invasive species.

2.3.13 As such, good condition is predicted.

2.3.14 Several small areas of woodland planting are present in the west of the site around the new roundabout. These areas are small in size and therefore are not expected to align with the lower distinctiveness 'other woodland; broadleaved' category. Through positive management, good condition is predicted to be achievable. The key factors relating to species diversity, retention of deadwood and range of age classes and structure are predicted to be achieved.

5. Nick Scarr – 8 November 2021

From: [redacted]
To: SizewellC
Subject: The implausibility of decommissioning Sizewell C by 2140.
Date: 08 November 2021 08:59:42
Attachments: SzC and flood resilience beyond 2140.pdf

Dear Planning Inspectorate,

Please find enclosed my brief paper outlining the implausibility of decommissioning Sizewell C by 2140.
The inability to decommission Sizewell C by this date has major considerations to flood risk and consequently overall nuclear site safety.

The paper expresses information provided by the Applicant itself, the Nuclear Decommissioning Authority, Radioactive Waste Management Ltd and the ONR.

Kind regards
Nick Scarr IP 20025524

Sizewell C and flood resilience post 2140.

Author: Nick Scarr IP 20025524 4/11/2021

Introduction and purpose of the paper.

The Applicant's flood risk assessment for Sizewell C is committed to 2140 as the 'decommissioned date' confirmed by the following:

- *"The lifetime of the development includes for removal of all spent nuclear fuel by 2140."*
- *"The Application and flood risk assessment are explicit about the timeframes being assessed in relation to 2140."*

> *"6.3 Volume 2 Main Development Site Chapter 5 Description of Decommissioning Secured by:*
>
> - *Funded Decommissioning Programme under the Energy Act 2008*
> - *Nuclear Site License under Nuclear Installations Act 1965*
> - *Radioactive Substances Regulations Environmental Permit under the Environmental Permitting Regulations 2016"*
>
> *'Surface Water and Groundwater; Flood Risk Assessment; Drainage Sizewell C Nuclear Development' EDF.*

This timeframe is important because, according to the Applicant's own modelling, the proposed Sizewell C main nuclear platform has limited flood resilience after this date.

This paper is a response to the stated 'decommissioned date' and posits the view that such a timeframe is implausible and would therefore expose the spent fuel store to unacceptable flood risk.

1. The critical nature of the 2140 date—EDF's assessment of still water and wave overtopping of the main nuclear platform beyond 2140.

> *"2.1.5 Table 2.1 [reproduced below] presents a list of overtopping scenarios for the reasonably foreseeable (RCP8.5 95 percentile) and credible maximum (H++ or BECC Upper) climate change allowances and respective extreme still water levels, highlighting in red bold those scenarios with extreme sea level above platform height that were not undertaken in this assessment"* FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

Table 2.1: Summary of wave overtopping scenarios

Return period	2090 epoch		2140 epoch		2190 epoch	
	RCP8.5	H++	RCP8.5	BECC	RCP8.5	BECC
200-year	4.58	5.19	5.48	7.58	6.31	**8.48**
1,000-year	5.12	5.73	6.02	**8.12**	6.85	**9.02**
10,000-year	5.98	6.59	6.88	**8.98**	7.71	**9.88**

FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

This table clearly shows that beyond 2140 the main nuclear platform is at risk of flooding and that there is a consequent critical requirement for Sizewell C to be decommissioned (at least in terms of spent fuel removal) by this date for the safety of local populations, environment, and staff.

2. The profound difficulties in achieving a decommissioned date of 2140.

Government policy is that spent fuel is transported directly from site of creation to a geological disposal facility (GDF), there is no 'intermediate' location for spent fuel proposed. However:

2.1 Policy: Spent fuel is not waste and *is not destined for geological disposal*.

- *"…your understanding that spent fuel is 'not waste' and is not destined for geological disposal unless and until it is classified as waste, is correct."*
  13th October 2021 email to me from Radioactive Waste Management Ltd.

2.2 Spent Fuel Cooling: High burnup spent fuel of the type produced by Sizewell C *requires a longer cooling period before geological disposal can be considered and that does not correlate with a decommissioned date of 2140.*

- The Nuclear Decommissioning Authority (NDA) suggests the cooling requirements will result in a decommissioning date for Sizewell C between **2180 to 2230**:

  "Current RWMD generic disposal studies for spent fuel define a temperature criterion for the acceptable heat output from a disposal canister. In order to ensure that the performance of the bentonite buffer material to be placed around the canister in the disposal environment is not damaged by excessive temperatures, a temperature limit of 100°C is applied to the inner bentonite buffer surface. ***Based on a canister containing four EPR fuel assemblies, each with the maximum burn-up of 65 GWd/tU and adopting the canister spacing used in existing concept designs, it would require of order of 140 years for the activity, and hence heat output, of the EPR fuel to decay sufficiently to meet this temperature criterion****."*

  *"****It is acknowledged that the cooling period specified above is greater than would be required for existing PWR fuel to meet the same criterion*** **[due to its higher levels of radioactivity and high decay heat radioisotopes]** *and RWMD proposes to explore how this period can be reduced. This may be achieved for instance through refinement of the assessment inventory (for example by considering a more realistic distribution of burn-up), by reducing the fuel loading in a canister* **[which will increase the geological disposal footprint]** *or by consideration of alternative disposal concepts. The sensitivity of the cooling period to fuel burn-up has been investigated by consideration of an alternative fuel inventory based on an assembly irradiation of 50 GWd/tU. For this alternative scenario it is estimated that the cooling time required will reduce to the order of* ***90 years*** *to meet the same temperature criterion."*
  NDA 'Geological Disposal Generic Design Assessment: Summary of Disposability Assessment for Wastes and Spent Fuel arising from Operation of the UK EPR' Jan 2014 section 6, page 6.

'Together Against Sizewell C' raised the above points from the Nuclear Decommissioning Authority (NDA) with the Office for Nuclear Regulation (ONR) who responded as follows with reference to HINKLEY POINT C:

"As an example, for HPC (using indicative timescales and dates):

- *The assumed availability date for the GDF ~2130 for fuel from new reactors.*
- *Assumed start of generation of HPC: 2025*
- *Assumed end of generation of HPC: 2085*
- *The date from which fuel will be sufficiently cool to start to transfer to the GDF (from 55-60 after end of generation): 2140-2145*
- *The date by which all fuel will be transferred to the GDF: ~2150-2155 (assumed to take just over 9 years)*
- *The dry fuel store will not be needed until ~10 years start of operation of HPC: ~2035*
- *The dry fuel store will then be needed for 50 years remaining operation of HPC, 55-60 years for the fuel to cool and 10 years to allow transfer of fuel to the GDF, which is 115-120 years.*
- *Removal of all fuel from site and end of use of the dry fuel store is therefore: ~2150-2155.*
- *The initial design life for the dry fuel store is 120 years (noting the design is conceived to allow for refurbishment or replacement) which would take it to: ~ 2155*
- *"In summary, the number of years before the fuel can be taken off site to the GDF is approximately 55-60 years from end of generation, which is because of the temperature criterion associated with the GDF canister. Fuel could potentially be moved from site safely earlier (but not currently to the GDF), although this is not planned." ONR reference HPGE202006066, 'TASC Review of the Minutes of the ONR/Stop Hinkley Meeting in Bridgewater January 2020 Authors: Chris & Jen Wilson Date: 17 June 2020'.*

The basis of the ONR's 'downward revision' of the NDA's specified high burnup spent fuel cooling period, as proposed in its response above, is that not all fuel will be burnt to 65 GWd/tU. This is accepted although the ONR is not clear as to what the average burn rate will be and hence in my view there is a sense of the arbitrary about the revision which would benefit from more detailed validation.

Even if the 'revised cooling period' from the ONR is accepted and applied to Sizewell C's spent fuel, and we accept the GDF will be commissioned and run smoothly, and we then assume that Sizewell C is completed on time (2035) and will operate until 2095 without lifetime extensions, then spent fuel could be removed by 2160/2165 (2095 + 55-60 years cooling +10 years to remove) at the very earliest.

Summary.

For the spent fuel to be removed from the Sizewell C site by 2140 as stated by EDF is seemingly then, implausible.

For spent fuel to be removed from site by 2160/2165 requires the acceptance of ***major*** assumptions as follows:

1. Spent fuel will be classified as waste. This is currently not the case.

2. That there are no over-runs in construction time of Sizewell C.

3. That there are no lifetime extensions to Sizewell C.

4. That we accept the validity of the ONRs' downward revision of the required cooling period specified by the NDA from 140 years to 55-60 years.

5. That a GDF is available within 120 years, and it will take no more than 10 years to consign the Sizewell C spent fuel.

6. That the GDF can accept and consign Sizewell C's spent fuel at the same time as other nuclear waste if necessary. It is not at all clear that this will be the case.

7. That the timeframe (considered to be 100 years as far as I am aware) for the deposition of other committed nuclear waste to be consigned prior to Hinkley C and Sizewell C— that is, legacy nuclear waste, including spent fuel from power stations and the highly enriched submarine spent fuel— operates within the allocated timescale without over-run.

Therefore, in summary I suggest that the 2140 date for decommissioning is implausible and that even the later dates of 2160/65 prove to be dependent on unreasonable levels of assumption.

The insufficiency of flood risk resilience of the proposed Sizewell C's main nuclear platform beyond 2140, based on EDF's own data, will then expose any onsite spent fuel to unacceptable flood risk and consequently threaten the safety of the environment, local populations, and decommissioning staff.

6. NNB Generation Company (SZC) Limited – 9 November 2021

Mistakenly omitted by the Applicant in their Deadline 10 submissions



The Sizewell C Project

9.64/ 10.6 Draft Fen Meadow Plan - Clean Version

Book 9 Revision:	3.0
Book 10 Revision:	1.0
Applicable Regulation:	Regulation 5(2)(q)
PINS Reference Number:	EN010012

October 2021

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

SizewellC
Doing the power of good for Britain
EDF CGN

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1 INTRODUCTION

1.1 Context

1.1.1 The Sizewell C (SZC) proposals would lead to the permanent loss of approximately 0.46ha of 'fen meadow' habitat from the Sizewell Marshes SSSI [**Section 2.9D** of AS-209]. This permanent loss arises from the size and location of the SZC main platform to the north of the existing Sizewell B station. The loss of this area of fen meadow is therefore unavoidable.

1.1.2 Sizewell Marshes SSSI is designated in part for its fen meadow habitats and the loss of the fen meadow habitat from the SSSI leads to a need to provide compensatory habitat for this loss.

1.1.3 The original compensatory habitat proposals included two sites but a third site (Pakenham) was added to the proposals in January 2021. This was to address a comment from Natural England at Stage 4 pre-application consultation (Ref. 1) which was:

"We advise that the extent of compensatory habitat required is 9x that which would be destroyed by the development; this is considered a suitable multiplier given the complexity of habitat type to be lost, the risk and uncertainty involved in the habitat restoration being successful and the time to fully functioning habitat…"

1.1.4 SZC Co. is therefore proposing to deliver 4.14 ha of compensatory fen meadow habitat. Natural England now considers the quantum proposed, based on the multiplier, to be sufficient as detailed in issue 49 of their written representation [REP2-153].

1.1.5 The application for development consent includes within the draft order limits, three sites identified for delivery of compensatory fen meadow habitat listed below and illustrated in **Figures 1.1-1.3**[1]:

- Fen Meadow compensation site at Benhall;
- Fen Meadow compensation site at Halesworth;
- Fen Meadow compensation site at Pakenham.

1.1.6 Requirement 14A in the **draft DCO** (Doc Ref. 3.1(J)) prevents clearance of vegetation within the SSSI until Fen Meadow Plans for all three sites have been submitted to and approved by the named local authority in consultation with Natural England. The Fen Meadow Plan(s) for Benhall

[1] Note that the order limits have recently been reduced at these three site and these figures reflect the updated limits.

and Halesworth must be approved by East Suffolk Council and the Fen Meadow Plan must be approved by Suffolk County Council. The Plans must be developed in general accordance with the **Fen Meadow Strategy** (Doc Ref. 10.16) and this **Draft Fen Meadow Plan** which have been prepared to define SZC Co's commitment to provide appropriate compensation measures for the loss of fen meadow habitat. This will be achieved through the creation of 4.14ha of compensatory fen meadow habitats, and the provision of a contingency fund which is secured through **Schedule 11** of the **DoO** (Doc Ref. 10.4).

1.1.7 The **Fen Meadow Strategy** (Doc Ref. 10.16) defines a series of three reports, which will lead to the establishment of the final Fen Meadow Plans, which will further define the approaches to maximise the extent of fen meadow habitats at the three sites. Three reports are proposed:

- **Fen Meadow Plan Report 1**. This was submitted at Deadline 3 [REP3-051 and REP3-052] and provides the baseline reports for the sites and water data available to May 2021;
- **Draft Fen Meadow Plan**, This was submitted at Deadline 6 [REP6-026] providing further interim data and defining, in draft, the management interventions required to create fen meadow habitats. The measures seek to maximise the extent of the establishment of fen meadow at each site and the report describes interventions that may be required to ensure the successfully delivery of the habitats at each site. This is the second version of the Draft Fen Meadow Plan, and presents updates made in response to landowner and stakeholder consultation, with the main changes relating to amendments to the order limits and monitoring commitments.
- **Draft Fen Meadow Plans for Consultation** will provide the full scope of the plan after 12 months of water data collection at each site and will be provided for review by the Ecology Working Group. Upon finalisation it will become the Fen Meadow Plan which will be submitted to and approved by East Suffolk Council and Suffolk County Council pursuant to Requirement 14A of the **dDCO**. The final Fen Meadow Plans must be in general accordance with the **Fen Meadow Strategy** (Doc Ref. 10.16) and this **Draft Fen Meadow Plan**.

1.1.8 SZC Co. must implement the establishment of the fen meadow in accordance with the approach and implementation timetable set out in the Fen Meadow Plan approved pursuant to Requirement 14A.

1.2 Status of this Draft Fen Meadow Plan

1.2.1 This draft plan is considered to provide sufficient detail to inform the Examining Authority, the Secretary of State and the other stakeholders as to the proposals at each site.

1.2.2 The proposals presented herein have been informed by all data collected up to and including early July 2021. In relation to hydrology this means that a substantive portion of the data for summer period has informed the proposals. This is important as both groundwater and surface water levels are typically lowest in summer and these levels and related seasonal trends are likely to be amongst the most important variables in determining the potential for establishing new fen meadow on the three sites.

1.2.3 Level 1 control documents will either be certified under the DCO at grant or annexed to the Deed of Obligation (DoO). All are secured and legally enforceable. Some Level 1 documents are compliance documents and must be complied with when certain activities are carried out. Other Level 1 documents are strategies or draft plans which set the boundaries for a subsequent Level 2 document which is required to be approved by a body or governance group. The obligations in the DCO and DoO set out the status of each Level 1 document.

1.2.4 This **Draft Fen Meadow Plan** is a Level 1 document. Pursuant to Requirement 14A of the **dDCO**, prior to any vegetation clearance within the Sizewell Marshes SSSI, Fen Meadow Plans for each of the sites (a Level 2 document) must be submitted for approval by East Suffolk Council and Suffolk County Council, in consultation with West Suffolk Council, and the relevant Statutory Conservation Body and such plans must be in general accordance with this **Draft Fen Meadow Plan**.

1.2.5 Where further documents or details require approval, this document states which body or governance group is responsible for the approval and/or must be consulted. Any approvals by East Suffolk Council, Suffolk County Council or the MMO will be carried out in accordance with the procedure in **Schedule 23** of the **dDCO**. The Deed of Obligation establishes the governance groups and sets out how these governance groups will run and, where appropriate, how decisions (including approvals) should be made. Any updates to these further documents or details must be approved by the same body or governance group and through the same consultation and procedure as the original document or details.

1.2.6 Where separate Level 1 or Level 2 control documents include measures that are relevant to the measures within this document, those measures have not been duplicated in this document, but cross-references have been included for context. Where separate legislation, consents, permits and

licences are described in this document they are set out in the Schedule of Other Consents, Licences and Agreements (Doc Ref. 5.11(C)).

1.2.7 For the purposes of this document the term 'SZC Co.' refers to NNB Nuclear Generation (SZC) Limited (or any other undertaker as defined by the dDCO), its appointed representatives and the appointed construction contractors.

1.3 Environmental Statement and Shadow Habitat Regulations Assessment

1.3.1 The proposals described for each of the three locations will create some small scale and local changes to hydrology within the sites and there will be a need to undertake some shallow excavations. Some protected species are present and other receptors are present nearby, including, in some cases, designated sites or features.

1.3.2 The impacts at the three sites related to the creation of fen meadow habitats were considered in **Volume 2**, **Chapter 14** of the **ES** [AS-033] and **Chapter 2** of the **ES addendum** [AS-181]. The impacts at the three sites were revisited in **Volume 1** of the **Fourth ES Addendum** [REP7-030] submitted at Deadline 7, following issue of the **Draft Fen Meadow Plan** [REP6-026]**.** However, no change to the significance of effects was predicted.

1.3.3 The fen meadow proposals described in this draft plan will have no adverse effects on integrity for any European Site and there are no consequences in the context of the Habitats Regulations. A note on the potential hydrological consequences on the Abbey Meadows compensation site at Snape of proposals at Benhall was submitted at Examination Deadline 5 in response to the Written Representation by the RSPB (**Appendix L** of [REP5-120]). This concluded that there would be no adverse effect on integrity given the extent of the catchment, the effect on availability of water to the Abbey Farm compensation site.

1.4 Recreation of Fen Meadow Habitats

1.4.1 Whilst the term fen meadow covers more than one botanical community in the National Vegetation Classification (NVC) (Wheeler, Shaw and Tanner, 2009, Ref. 2) the target community in the context of the loss at Sizewell Marshes is M22 *Juncus subnodulosus –Cirsium palustre* fen meadow.

1.4.2 To manipulate site conditions such that conditions are suitable for M22 development it is necessary to recognise the characteristics of the community including appropriate eco-hydrological conditions. The characteristics of M22 have been described by Wheeler et al. (Chapter 18 in Ref. 2), including floristic composition, landscape situation and

topography, substratum types, water supply and level required by M22 can be summarised as:

- Overall, M22 is a community that is botanically variable and can occur in a wide range of eco-hydrological situations. Nonetheless, the key conditions required to support M22 can be summarised as base-rich conditions, but relatively low fertility with limited nutrient concentrations (e.g. phosphate, nitrate); and
- Management, by mowing or grazing, which are crucial to the maintenance of M22.

1.4.3 There is an extensive literature on fen meadow restoration in Europe - notably from the Netherlands, Poland and Germany. Van Diggelen & Marrs (2003, Ref. 3) in particular have categorized four essential steps for conservation and restoration of fen meadow:

- establishing or re-establishing the necessary abiotic conditions;
- supplying (sufficient) propagules of constituent species of the target communities;
- creating and maintaining suitable conditions for the (re-) establishment of target species; and
- appropriate management to keep the conditions suitable.

1.4.4 The **Fen Meadow Strategy** (Doc Ref. 10.16) outlines the types of measure likely to be necessary to facilitate development of the compensatory habitat, as represented by the M22 *Juncus subnodulosus – Cirsium palustre* fen meadow community at appropriate sites. A review of the conditions required for recreating fen meadow was presented in response to Examination Question 'Biodiversity 1.86'. The development of the abiotic and biotic conditions for fen meadow referable to the M22 *Juncus subnodulosus – Cirsium palustre* fen meadow community are considered to have the highest chances of success if the following techniques are employed at the three fen meadow sites:

- **Topsoil removal.** Complete or partial topsoil removal will be undertaken within the context of sediment disposition, surface topography and valley flooding regimes, in order to reduce nutrient levels and increase the influence of groundwater on target species.
- **Creation of microtopography.** The ground surface will be sculpted within hydrologically significant tolerances to assist in the successful colonisation and regeneration of target groundwater-dependent species,

particularly those with high light requirements, low competitive abilities and low tolerance of drought or flooding.

- **Rewetting from appropriate water sources**. Rewetting will be undertaken using groundwater-dominated sources to facilitate an appropriate hydrological regime for the target vegetation. Sufficient control is likely to be required to minimise the impact of extreme events leading to flooding by nutrient-rich waters and/or periods of drought, within acceptable limits.

- **Use of hay transfers.** The transfer of hay from suitable sites – or of turves from the FMS donor site – will be undertaken following established best practices. The conditions and timing of collection, transfer and introduction of plant propagules – and their initial establishment – will be carefully monitored to meet restoration requirements.

- **Habitat management.** An agreed annual programme of water and vegetation management will be established and undertaken at appropriate times. These operations – and their impact on the developing fen meadows – will be set with a framework of acceptable limits. Appropriate monitoring will be maintained to enable effective and timely management of the habitat management programme to meet target conditions for the restored fen meadow vegetation.

1.4.5 These techniques will be deployed as relevant in the detailed proposals for each of the three sites set out in this draft plan.

1.4.6 Additionally, in accordance with the **Wet Woodland Strategy** (Doc Ref. 10.31) areas at Benhall and Pakenham have been identified for the delivery of wet woodland. The required measures will be set out in a separate plan (the Wet Woodland Plan)**.** The Wet Woodland Plan must be in general accordance with the **Wet Woodland Strategy** (Doc Ref. 10.31) and the **Draft Wet Woodland Plan** (Doc Ref. 10.13) and must be approved by East Suffolk Council prior to any vegetation clearance in the Sizewell Marshes SSSI being carried out (Requirement 14B). However, given that the compensatory wet woodland will be co-located with fen meadow habitats, the wet woodland areas are also defined spatially in this plan.

1.4.7 The **Wet Woodland Strategy** (Doc Ref. 10.31) requires the delivery of a total of 2.07 ha of wet woodland across the two fen meadow sites at Benhall and Pakenham. The principle of co-location of compensatory wet woodland and fen meadow habitats is supported by Natural England, given that this replicates the situation at the Sizewell Marshes SSSI.

1.5 Fen Meadow Establishment Management Measures and Monitoring

a) Fen Meadow Establishment Management Measures

1.5.2 The detailed proposals provided in Sections 2 to 4 of this **Draft Fen Meadow Plan** are focussed on the establishment phase which will be undertaken in 'Year 1' of the works as outlined in the **Fen Meadow Strategy** (Doc Ref. 10.16). These primarily comprise physical measures to be implemented to create the ground conditions to support fen meadow species and the approach to introducing those species and will be set out in the final Fen Meadow Plans submitted to East Suffolk Council and Suffolk County Council pursuant to Requirement 14A.

1.5.3 In subsequent periods (years 2-5 and 6-10), measures outlined focus on continued introduction of species (as detailed in **Fen Meadow Strategy** (Doc Ref. 10.16) and on-going management approaches. These will need to remain flexible and be adjusted, annually if necessary, based on monitoring of habitat development. Progress will be reviewed annually and any adjustments to the habitat management approaches agreed with the Ecology Working Group. Any substantive changes of approach, which could ultimately impact the ability to deliver the quantum of the target habitat by Year 10, will need to be agreed by the Ecology Working Group.

b) Fen Meadow Monitoring

1.5.4 Given the expected extended periods likely required to establish fen meadow habitats, the **Fen Meadow Strategy** (Doc Ref. 10.16), secured by Requirement 14A, provides that monitoring will extend into the operational period of the power station to ensure the habitats are becoming established and being maintained in accordance with the relevant habitat objectives.

1.5.5 The frequency of monitoring during the construction and operational phases is set out in the **Fen Meadow Strategy** (Doc Ref. 10.16) and monitoring recommendations are provided in each site section in this draft plan.

1.5.6 In the event that any water control structure that could impede fish and eel passage is introduced at the fen meadow sites, a suitable fish pass will be included in the design. Monitoring will be undertaken to ensure any such structures function as required and do not become a barrier to movement.

1.5.7 The final monitoring details for these sites would be agreed via the approval of the final Fen Meadow Plans submitted to and approved by East Suffolk Council and Suffolk County Council following consultation with relevant Statutory Nature Conservation Body pursuant to Requirement 14A.

1.6 Report structure

1.6.1 There is a separate plan for the creation and establishment of fen meadow habitat at each site. The report is structured as follows:

- Section 2 - Benhall;
- Section 3 – Halesworth;
- Section 4 – Pakenham;
- Section 5 – Summary.

2 BENHALL

2.1 Site Baseline

a) Summary of investigations

2.1.2 The investigations being undertaken at Benhall were summarised in the **Fen Meadow Plan Report 1**, with the study reports provided as appendices [REP3-051 and REP3-052]. The studies have mostly been completed, as detailed in Table 2.1 below.

Table 2.1: Status of studies as at July 2021

Site	Study	Status
Benhall	Ecology desk study	Completed in 2020
	Ecology field surveys	Phase 1 habitat survey NVC survey Water vole and otter survey Aquatic invertebrate survey of ditches All completed in 2020
	Hydrogeological desk study	Completed in 2021
	Installation of piezometers, dipwell, gaugeboards	Installed October 2020
	Topgraphic survey of site and installations	Completed 2020
	Water flow, level and quality monitoring	Commenced November 2020 for 1 year.

2.2 Environmental Setting

2.2.1 The **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052] summarised the findings of a series of baseline reports, provided as Appendices, that described the environmental setting of the Benhall site. The majority of the baseline information is not repeated in detail in this draft Fen Meadow Plan although a summary of the ecological setting is provided below and further hydrological monitoring data are now available so the Water Monitoring Summary – Benhall Site 10 & 11, November 2020 to April 2021, has been updated to July 2021 (**Appendix A**). The updated data have also been further interpreted to update the site conceptual model (**Section 2.3**).

2.2.2 Note that in 2019, two sites were identified, referred to as Site 10 (to the north) and Site 11 (to the south) and there was a gap between them. Subsequently, the site boundaries were revised to combine these sites and include the small parcel of land in between and the combined site was included in the application for development consent. Reference is now made to the northern, central and southern compartments (see **Figure 2.1**).

a) Summary of Ecological Setting from Benhall Ecology Baseline report [REP3-051]

2.2.3 There are no statutory designated sites of nature conservation value within the Benhall site boundary. However, a compartment of Manor Farm County Wildlife Site (CWS) is located within the red line, and a further compartment is located adjacent to the western Site boundary. This latter compartment supports fen meadow habitat.

2.2.4 Coastal and floodplain grazing marsh, deciduous woodland and lowland meadows priority habitats are mapped in MAGIC as occurring on Site.

2.2.5 The site comprises poor semi-improved grassland, inundation vegetation, broadleaved wet woodland, scattered trees, flowing water, with fields divided either by hedges or ditches.

2.2.6 The habitats present on site were broadly categorised, during the NVC survey, as Floodplain and toe slope grasslands (of which three communities, including two rush pasture communities, supported suites of groundwater influenced and typical floodplain species), dry valley side grassland and wet woodland.

2.2.7 Giant hogweed and Himalayan balsam were present along the banks of the River Fromus. A small patch of giant hogweed was also noted within the Site.

2.2.8 No sign of otter presence was recorded on site, although the river and some of the wet ditches provide suitable habitat, and there is an otter record nearby.

2.2.9 Four of the 18 transects surveyed provided optimal aquatic habitat for water voles, with a further two meeting most of the noted habitat requirements but holding less water, and eleven containing relatively shallow water. Water vole presence was confirmed on four transects (two ditches and two river transects).

2.2.10 The aquatic invertebrate fauna of the Benhall site comprises predominantly common and local species.

2.3 Site Conceptual Model

2.3.1 The initial site conceptual model is presented in the hydrogeological report (**Appendix D** of the **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052]). This section builds on the assessment provided in the conclusions of that report and all monitoring data collected and made available at the time of writing (July 2021). This section presents the findings on the relationship between ground level, groundwater levels, surface water levels and logged geological strata.

2.3.2 The Benhall site covers an area of 12.9 ha. The surface elevation across much of the northern compartment is relatively flat, generally between 3.8 and 4.0 mAOD (see LIDAR plots in **Appendix A**). At the margins of the site the land surface rises to 6.7 mAOD in the northwest near Aldecar Lane and to 5.2 mAOD in the southwest. The central and southern compartments have a more well-defined slope from west to east towards the River Fromus and contain a cut-off meander channel with a bed level of approximately 3.5 mAOD.

2.3.3 The River Fromus forms the eastern boundary of the Site and flows from north to south.

2.3.4 The bedrock geology at the site is Crag sands (c.10-20m thick) overlying London Clay of the Thames Group. The combined thickness of the Thames Group and Lambeth Group in this locality is thought be c. 25-30 metres in this locality. The Lambeth Group lies over the Chalk Group.

2.3.5 Alluvial deposits of clay, silt, sand and gravel directly overlie the Crag at the Benhall site and borehole logs indicate that they increase in thickness from around 7.7m in the south to >10m in the north of the Site. Head deposits of clay, silt, sand and gravel are mapped at the western edge of the Alluvium close to the boundary of the Site.

2.3.6 The Site is split in two at the boundary of the northern and central compartments by an ordinary watercourse named 'The Canal' which originates to the west of the A12 road. The Canal passes at right angle past two sides of the Benhall Sewage Treatment works before turning east again and discharging to the River Fromus. The Canal is the receiving watercourse for the Benhall Sewage Treatment Works (STW) discharge. The licensed discharge volume is 1.5 Ml/d.

2.3.7 On-site observations suggest that the Canal diverges to the north-east of the STW (downstream of the discharge point) and some water flows into the ditch network which flows northwards towards GB04.

2.3.8 The Benhall site contains a network of land drainage ditches which discharge to the River Fromus at three locations.

2.3.9 There is a licenced surface water abstraction from the River Fromus on the Site boundary (AN/035/0004/017), although this is toward the downstream end of the site away from the potential Fen Meadow areas.

2.3.10 Topographic surveys initially indicated that water levels coming on to the site from the west via the Canal are around 3.9 mAOD and on-site drainage ditches generally between 3.5 and 3.8 mAOD (November 2020). Ditch water levels are slightly lower in the southern half (Ditch W12 and W13) which do not appear to be well connected to other ditches or to the River Fromus.

2.3.11 The ditches in the northern compartment are monitored by GB03, 04 and 05 (**Figure 1.1** in **Appendix**). The STW discharge is upstream of GB03. A plot of the water levels at the three gaugeboards and the groundwater level in the superficial deposits (BHALL_1001_s) shows that the water level at GB03 (which is located on the higher ground to the north-west) appears to be sustained (**Figure C3** in **Appendix**), likely by discharges from the STW. A similar water level response is seen in the downstream gaugeboard at GB04 at the northern boundary of the Site showing the influence of the STW here. GB05 to the centre of the northern compartment, and the groundwater level monitoring well at BHALL_1001_s both show a similar seasonal response with reductions in water levels in mid-April and June and do not appear to be maintained by the discharge. On-site observations have confirmed that this central ditch in Site 10 is significantly drier with very little flow.

2.3.12 At the boundary of the southern and central compartments, the surface water levels are recorded by GB02. The water levels here show no decline in spring despite a drop in the nearby superficial deposits recorded in April and June (BHALL_1002_s and BHALL_1003_s). Again, this is likely to be the influence of the STW discharge to the Canal.

2.3.1 The monitored data available at GB01 suggests that water levels in this ditch are lower than the other watercourses on site. The levels are also lower than the surrounding groundwater levels (shown in the 1102 piezometer and 1104 dipwell), further reiterating earlier assumptions that this watercourse is not well connected to the other ditches on site. This ditch is linked to the River Fromus.

2.3.2 Development of peat has occurred in the northern and central compartments and peat is encountered between 0.4 and 2.5 m below ground surface. The borehole logs indicate a peat thickness of up to 4 m thick in places (Piezometer BHALL_1001_d) with a thickness of 1.1m at

borehole HAL_2803_d. Soil cores show that a silty clay layer is often present above the Peat which may hold a higher water level than that of the underlying sands and gravels. The basal part of the peat was more degraded than the upper part in some areas (Zone C Site 11) which may indicate that the groundwater level is fluctuating through the lower part, though it may rise through the peat during periods of heavier rainfall.

2.3.3 The soil core surveys carried out in April 2019 indicated that the initial water table was generally between 0.5m and 1m below ground level, rising to 0.4 and 0.1m below ground level at two locations after rest. The rising groundwater levels indicates that water in the peat and sands and gravels beneath the silty clay layer near the surface has a positive hydrostatic pressure in some locations. The October 2020 drilling programme recorded similar rest ground water levels (0.48 to 0.84m). General groundwater flow is thought to be towards the River Fromus (west to east) but collected data from the surveys suggest a relatively flat water table at the Benhall site.

2.3.4 The soil core surveys, drilling logs and topographic survey indicate that groundwater levels are in continuity with surface water levels in the on-site ditches. The River Fromus has a bed level of 2.8 mAOD and a water level of 3.51 mAOD at the northern end of the Benhall site and this gently decreases downstream to a bed level of 2.3 mAOD and a water level of 2.9 mAOD at the southern end of the Benhall site, indicating the potential for groundwater discharge to the river.

2.3.5 There is a groundwater abstraction at Ham Farm (7/35/04/*G/0095) which is relatively close to (0.2km), and upgradient of, the Site and has the potential to impact groundwater levels on the Site. The impact is likely to be minimal due to the relatively low abstraction quantities.

2.3.6 The groundwater level plots shown in the monitoring note in **Appendix A** show that the groundwater levels to the north (1001_s, 1002_s, 1003_s) and in the centre (1101_s and 1103_s) of the site in the superficial deposits present a similar pattern with a seasonal response to the dry April causing groundwater levels to decrease.

2.3.7 To the very south of the Site, there is less response to the dry April period in the superficial deposits (1102_s and 1104_s) with a flatter groundwater level hydrograph for these two locations (**Figure A3** in **Appendix A**).

2.3.8 Some of the superficial deposit groundwater levels are showing groundwater levels above the ground level. Notably:

- At 1002_s and 1003_s groundwater levels are above surface in winter (January and early February) but the groundwater level decreases into spring, dropping below ground level (**Figures B3 and B4** in

Appendix A). This results in a depth to water table at these two sites of up to 0.6 m below ground level in spring. Levels in these superficial deposits recovered into early summer.

- At 1104_s the groundwater level is above ground level periodically between November and February and declines to approximately 0.4 m below ground level into spring (**Figure B10** in **Appendix A**).

2.3.9 There is an artesian groundwater level response in two of the Crag boreholes. The groundwater levels at 1101_d is above ground level for most of the monitored data series and at 1102_d the groundwater level goes above ground level periodically (**Figure A4** in **Appendix A**).

2.3.10 The piezometer at 1001 (BHALL_1001_s for superficial deposits, BHALL_1001_d for Crag deposits) shows that the Crag groundwater levels increased slowly over the winter and have now remained static (~3.65 to 3.75 mAOD) since February **Figure A2** in **Appendix A**). Conversely, the superficial deposits are showing more of a seasonal response. It is likely that the Crag here is partly confined. Water levels in the superficial deposits will be supported by the head in the Crag but there may be limited upward flow. It is suspected that the increase of Crag groundwater levels from October to January results from a rebound effect after the cessation of nearby pumping.

2.3.11 It is evident in the 1102 piezometer in the shallow and deep wells (1102_s and 1102_d respectively) that the timing and amplitude of the groundwater fluctuations align very well between the two geological strata (**Figure A4** and **A5** in **Appendix A**). The Crag groundwater level is above that in the superficial deposits, so it is plausible that there is a degree of hydraulic continuity with the Crag in this location which is supporting the water level in the superficial deposits at this location.

2.3.12 Slightly further north at 1101_s and 1101_d the results for the shallow (superficial) and deep (Crag) boreholes respectively show that the magnitude and timing of the fluctuations align well (**Figure A4** and **A5** in **Appendix A**), with the levels marginally higher in the Crag than the superficial deposits, again supporting the theory that there may be some upward flow from the Crag here.

2.3.13 The lowest groundwater level and therefore maximum depth to water in the superficial deposits is listed in **Table 2.2**.

Table 2.2: Groundwater levels and depth to water table

Borehole ID	Ground level (mAOD)	Lowest observed groundwater level (mAOD)	Maximum depth to water table (m)	Highest observed groundwater level (mAOD)	Minimum depth to water table (m)*
BHALL_1001_d	3.91	2.28	1.63	3.98	-0.08
BHALL_1001_s	4.35	3.49	0.85	4.20	0.14
BHALL_1002_s	3.93	3.31	0.62	4.31	-0.38
BHALL_1003_s	3.88	3.29	0.59	4.14	-0.27
BHALL_1101_d	3.91	3.92	-0.01*	4.34	-0.44
BHALL_1101_s	3.91	3.83	0.08	4.24	-0.34
BHALL_1102_d	3.92	3.74	0.18	4.15	-0.23
BHALL_1102_s	3.92	3.50	0.42	4.01	-0.09
BHALL_1103_s	3.95	3.43	0.52	4.17	-0.21
BHALL_1104_s	3.92	3.60	0.32	4.19	-0.28

* negative depth to water table shows where groundwater levels are above ground level.

2.3.14 The groundwater and surface water data shows that the northern compartment of the Site demonstrate two slightly different hydrologic responses:

- In the northern compartment the superficial deposits fluctuate in response to seasonal climatic conditions. Surface water levels in The Canal, central east-west ditch and northern drainage outlet are maintained by the STW discharges. The same is not seen in the central Site 10 ditch which shows a decline in water levels due to its hydraulic continuity with the underlying deposits. The groundwater levels in the data available show that groundwater levels have been above ground level at times, but also extend to around 50-80cm below ground level during the spring and early summer. Further monitoring will be required to assess what happens over the rest of summer 2021 and into autumn. There appears to be limited connectivity with the River Fromus and the underlying Crag here. Groundwater levels in the superficial deposits have peaked at around 4.3 mAOD and have also dropped to around 3.3 mAOD.

- In central and southern compartments, there is a less pronounced impact to seasonal variations in the superficial deposits and it is likely that there is some upward flow from the Crag in the here. This is likely more pronounced at the southern end of the southern compartment.

2.3.15 There is some water quality data available for the Site, with more sampling planned over 2021. The data so far show the following:

- Nitrate concentrations are highest in the ditches to the south of the Site (GB1 and GB2 which measured 48.2 and 71.5 mg/l as NO3 respectively). The concentrations are either below the limit of detection or low in the superficial deposits and underlying Crag.

- The Site generally has very low phosphate concentrations as would be expected, with most samples not showing anything above the level of detection. GB1, GB2 and SP5 locations shows phosphate concentrations at 0.057 mg/l, 11.4 mg/l and 4.77 mg/l respectively whilst the only detected level in groundwater was at 1102_s at 0.053 mg/l.

2.4 Suitability of the site for fen meadow creation

2.4.1 The Benhall site is discussed as three compartments - north, central and south.

a) Northern Compartment

2.4.2 This compartment was identified in the **Fen Meadow Compensation Study** [APP-258] as containing a primary locus for fen meadow in the south-western third (1.5ha) in which it was considered that there was good potential for water management to provide the necessary water to support the habitat. This primary locus area was bordered by a potential additional area for fen meadow (0.7ha), within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies.

2.4.3 In 2021 the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits in the northern compartment are indicated to be maintained below ground level at the location of installation BHALL_1001_s. However, this is in an elevated location on a bund alongside the western ditch. Relative to

the majority of the compartment, water levels are at about ground level over winter falling to, at most, 30cm below a typical ground level of 3.8m AOD (June 2021).

- The presence of relict ditches suggests that the compartment was historically wetter, presumably prior to drainage and at which time fen meadow habitats, or at least groundwater dependent fen meadow species, may have been present.

- Water levels in the central ditch (indicated by GB05) are below, but appear to reflect, those of the shallow groundwater, indicating a hydrological link between the two – with the central ditch potentially limiting the groundwater level in this compartment.

- The compartment is bordered to the west and south by the Canal. The main discharge from the Canal is to the Fromus however there appears currently to be a minor link between the Canal and the ditches within the compartment. Whilst water levels in the Canal, and River Fromus would not be controlled as part of this work due to potential effects off site, it is considered that water levels in the ditch network that drains this compartment can be controlled without adversely affecting areas or receptors off site.

- Groundwater nitrate concentrations are either below the limit of detection or low in the superficial deposits and underlying Crag, and the same applies to the presence of phosphate.

- During high flow events the River Fromus floods the compartment and also backs up the Canal, which is noted as having elevated nitrate and phosphate levels which are likely the result of discharge from the Benhall STW. Whilst river water quality, and that in the Canal, is not considered optimal for fen meadow habitats, during high flow events, nitrate and phosphate concentrations will be diluted and, as indicated in Section 1.5, Wheeler, Shaw and Tanner (2009, Ref. 2) note that the community can accommodate considerable eutrophication without change to its basic composition provided that active management continues.

- Soil data indicates the presence of peat at each of the cored locations, albeit at 50cm+ depth (**Fen Meadow Compensation Study** [APP-258]).

- A network of land drains is visible on LIDAR (see **Appendix A**). These will be reducing the groundwater levels and drying the fields. However, these can be blocked.

2.4.4 Based on the groundwater and surface water level data, and substrate type, it is concluded that it will be possible, by implementing measures detailed in Section 2.5, to provide groundwater influenced conditions in this northern area, potentially with a peaty or gley substrate, that have the potential to support fen meadow habitat.

2.4.5 Water levels in the Canal, and River Fromus to the east, would not be controlled to support these proposals. This is not required under the proposals and could lead to off-site impacts.

a) Central Area of the Site

2.4.6 The southern two thirds of this compartment were identified in the **Fen Meadow Compensation Study** [APP-258] as containing a primary locus for fen meadow (0.5ha) as the area adjacent to the western ditch already contained some fen meadow species. This primary locus area was bordered by a potential additional area for fen meadow (0.5ha), focussed on an area showing groundwater influence, within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies.

2.4.7 Note that the northern third of the compartment was not assessed in the **Fen Meadow Compensation Study** [APP-258] and was included subsequently when the boundary was re-drafted.

2.4.8 In 2021 the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits at the northern boundary of this compartment (indicated by BHALL1003_s) are above surface in winter (January and early February) but decrease into spring by up to 0.6 m below ground level.

- Groundwater levels in the shallow deposits in the western central area of the site are indicated to be maintained at about ground level (BHALL_1101_s) over the monitoring period to late June 2021. An upward gradient from the deeper deposits is also maintained over the monitoring period. These installations are in a location that was marked by the presence of plant species indicating groundwater influence (phreatophytes), and was identified in the **Fen Meadow Compensation Study** [APP-258] as a primary locus.

- East of installation BHALL_1101_s is BHALL_1103_s groundwater levels in the shallow deposits in the eastern central area of the site are indicated to be maintained at about ground level over the winter but fall from March onwards (to 50cm below ground level at the lowest point to date), and show a much more marked fluctuation than BHALL_1101_s. The vegetation at this location was also not suggestive of a groundwater influence at the surface.

- Groundwater levels in the shallow deposits are typically at, or above, the adjacent ditch levels suggesting there is potential for groundwater discharge to the adjacent ditches.

- The presence of relict ditches suggests that the compartment was historically wetter, presumably prior to drainage and at which time fen meadow habitats, or at least more groundwater dependent fen meadow species, may have been present.

- Groundwater nitrate concentrations are either below the limit of detection or low in the superficial deposits and underlying Crag, and the same applies to the presence of phosphate.

- Water quality data in the western boundary ditch, and the river, indicate elevated nitrate and phosphate levels, likely the result of discharge from the Benhall Sewage Treatment Works, and, possibly (not confirmed at present), septic tank discharge.

- Although a relict ditch remains, there are no active ditches crossing this central area of the site linking to the surface watercourses. The only interaction this area would have with surface water is therefore via periodic overtopping during high flow events in the River Fromus. Whilst river water quality is not optimal for fen meadow habitats, during high flow events, nitrate and phosphate concentrations will be diluted and, as indicated in **Section 1.5**, Wheeler, Shaw and Tanner (2009, Ref. 2) note that the community can accommodate considerable eutrophication without change to its basic composition provided that active management continues.

- Soil data indicates the presence of peat below surface at the northern end of this compartment [APP-258].

2.4.9 Based on the groundwater and surface water level data, and substrate type, it is concluded that it will be possible, by implementing measures detailed in Section 2.5, to provide groundwater influenced conditions in this central area, potentially with a peaty or gley substrate, that have the potential to support fen meadow habitat.

2.4.10 Water levels in the western boundary ditch, and River Fromus to the east, would not be controlled to support these proposals. This is not required under the proposals and could lead to off-site impacts.

c) Southern Compartment

2.4.11 This compartment was identified in the **Fen Meadow Compensation Study** [APP-258] as containing a potential additional area for fen meadow (0.7ha). The location of this area served to focus the detailed hydrological studies now on-going.

2.4.12 In 2021 the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits in this compartment are indicated (BHALL_1104_s) to be maintained at about ground level over the winter but fall below surface from March onwards (to 25cm below ground level at the lowest point to date).
- Whilst the vegetation present is a form of rush pasture, it lacks the key groundwater indicator species present to the north.
- Groundwater levels in the shallow deposits are typically at, or above, the ditch level (indicated by GB01) suggesting there is potential for groundwater discharge to the adjacent ditch.
- Groundwater nitrate concentrations are either below the limit of detection or low in the superficial deposits and underlying Crag, and the same applies to the presence of phosphate.
- Water quality data in the ditch at the northern end of this compartment, indicate elevated nitrate and phosphate levels, likely the result of discharge from the Benhall Sewage Works and, possibly (not confirmed at present), septic tank discharge.
- A small area of peat was identified at depth in this area during the site investigation. However other core samples taken in this compartment indicate an absence of peat.
- Water levels in the ditch that flows through the compartment, and River Fromus to the east, however would not be controlled as part of this work due to potential for effects off site. Additionally, this area is topographically lower than the central and northern compartments and as a result is likely to flood more frequently than these areas.

2.4.13 Based on review of the data available, it is concluded that the potential area that could be made suitable for fen meadow would be too restricted to be viable and fen meadow is not proposed in this compartment. It is, therefore, excluded from the fen meadow habitat creation proposals, although access through this area is still required for establishment and subsequent management of the fen meadow habitat in the northern and central compartments, as the only access to the Benhall site is from the A1094 at the southern end of the site.

2.5 Proposed layout and features

a) Proposed layout – Northern Compartment

2.5.2 For the northern compartment the key aim of the proposals is to exert control over the drainage ditch network, reducing drainage from the compartment and sculpt the ground to increase the groundwater influence at the surface.

2.5.3 Exerting control over the drainage ditch network will support groundwater levels in the shallow deposits such that they are maintained at, or just above, ground level (target approximately 3.85m AOD).

2.5.4 The ground surface to the east of the central (north-south oriented) drain will be sculpted to create a matrix of terrestrial, wetland and shallow open water habitat niches to maximise the potential for target species to colonise. It is anticipated that 20-30cm of the surface material will need to be removed to deliver the proposed matrix of habitats, subject to the results of focussed soil coring during the implementation stage.

2.5.5 Natural colonisation, from the nearby fen meadow habitat on the Manor Farm Meadows County Wildlife Site (CWS), will form a component of the habitat development. However, green hay transfer, from Sizewell Marshes SSSI, or another nearby fen meadow source, to the sculpted areas in mid-summer will assist with species introduction. Application to areas of bare earth is beneficial in respect of establishment of species with high light requirements and low competitive abilities, whilst creation of a matrix will maximise the potential for species that have low tolerance of drought or flooding, to find an appropriate niche. Application of green hay may be undertaken on more than one occasion.

2.5.6 M22 species introduction will also occur through translocation of turves from the area of M22 being lost at Sizewell Marshes to within the areas identified for creation of a habitat matrix. This approach has the added benefit of providing the appropriate substrate for the species introduced. Use of this approach is subject to programme considerations and will only be undertaken once.

2.5.7 An area for wet woodland creation (0.6ha) has also been identified at Benhall. The approach to creation of this habitat is set out in the **Wet Woodland Strategy** (Doc Ref. 10.31).

2.5.8 Site proposals are indicated on **Figure 2.1**. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

i. Physical measures in northern compartment

2.5.9 Physical measures proposed to be implemented in the northern compartment are:

- Controlling water levels by installing a finely adjustable water control structure on the ditch linking to the watercourse that forms the northern compartment boundary. The water control structure will support levels in summer but will also enable any river flood waters getting onto the compartment in winter to escape. The water control structure will be set to around 3.85-3.90 m AOD initially. This could be adjusted up or down, if required, based on effectiveness indicated through monitoring of the levels and the conditions within the habitat creation areas;
- If confirmed that a culvert exists at the southern end of the central ditch, this will be blocked, as will a potential culvert, indicated on **Figure 2.1** on the south-eastern corner of the existing wet woodland;
- Sculpting of the land east of the central ditch, removing up to 20-30cm of soil;
- Blocking or breaking up land drains, where encountered, to reduce drainage from the compartment;
- Removal of a 3-4m wide bund of arisings from ditch clearance from both banks of the central ditch;
- Installation of stock proof fence to control stock access to areas of created habitat;
- Application of green hay to areas of bare earth; and
- Translocation of turves from the area of M22 being lost at Sizewell Marshes to the areas identified for creation of the habitat matrix in the northern compartment.

2.5.10 Additionally, there will be no more dredging of the site drains to allow them to gradually silt up thereby reducing their drainage potential.

b) Proposed layout – Central Compartment

2.5.11 The key aim of the proposals is to sculpt the ground surface to increase the groundwater influence at the surface and create a matrix of terrestrial, wetland and shallow open water habitat niches to maximise the potential for target species to colonise. It is anticipated that 30-40cm of the surface material will need to be removed to deliver the proposed matrix of habitats, subject to the results of focussed soil coring at the time.

2.5.12 Natural colonisation, from the nearby fen meadow habitat on the Manor Farm Meadows CWS, will form a component of the habitat development. However, green hay transfer, from Sizewell Marshes SSSI, or another nearby fen meadow source, to the sculpted areas in mid-summer will assist with species introduction. Application to areas of bare earth is beneficial in respect of establishment of species with high light requirements and low competitive abilities, whilst creation of a matrix will maximise the potential for species that have low tolerance of drought or flooding, to find an appropriate niche. Application of green hay may be undertaken on more than one occasion.

2.5.13 M22 species introduction will also occur through translocation of turves from the area of M22 being lost at Sizewell Marshes to within the areas identified for creation of a habitat matrix. This approach has the added benefit of providing the appropriate substrate for the species introduced. Use of this approach is subject to programme considerations and will only be undertaken once.

2.5.14 Site proposals are indicated on **Figure 2.1**.

i. Physical measures in central compartment

2.5.15 Physical measures proposed to be implemented in the central compartment are:

- Sculpting of the land to the south, and immediately north of the relict drain, removing up to 30-40cm of soil;
- Blocking or breaking up land drains, where encountered, to reduce drainage from the compartment;
- Provision of a boardwalk along the footpath in the central compartment to provide walkers a dry route;

- Installation of stock proof fence to control stock access to areas of created habitat;
- Application of green hay to areas of bare earth; and
- Translocation of turves from the area of M22 being lost at Sizewell Marshes to the areas identified for creation of the habitat matrix in the central compartment.

a) Habitat creation works

2.5.16 Any additional consents which become necessary will be sought for structures and works where they are located within, or fall within specified distances of, ordinary or Main watercourses.

2.5.17 A temporary site compound will be established and access routes marked for the habitat creation works. Indicative locations for site compound and access routes, and notes on accessibility, are provided in **Figure 2.2**. Of particular note is that a new bridge will be needed to cross the Canal to enable equipment to access the northern compartment. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

2.5.18 Arisings will be removed from the floodplain, off-site.

2.5.19 The establishment works described above will be undertaken in late spring/summer, avoiding periods with the highest risk of surface inundation and the highest water tables that result in soft ground.

2.5.20 Working areas will be subject to ecological walkovers to confirm and update ecological constraints. Works to ditch banks will be micro-sited to avoid effects on water voles. A Protected Species Licence will be sought from Natural England in the event that one is required, although, based on the reported ecological baseline [REP3-051 and REP3-052] it is considered that effects requiring licensing can be avoided.

2.5.21 Activities will also be controlled via measures in the **Code of Construction Practice** (Doc Ref.10.2)) (secured by Requirement 2 of the dDCO).

2.6 Conservation management

2.6.1 Management measures during the establishment period (Year 1) and in Years 2-5 and 6-10 are summarised below and will be confirmed in the Fen Meadow Plans submitted to East Suffolk Council and Suffolk County Council for approval pursuant to Requirement 14A.

a) Management units

2.6.2 Stock proof fence will be used to control stock access to areas of created habitat in both the Northern and Central compartments, particularly during the sensitive establishment phase in Year 1, and during years 2-5, depending upon ground conditions. Proposed fence lines are indicated on **Figure 2.1**.

2.6.3 Management of areas outside the fen meadow creation areas/fence lines will comprise taking a hay crop, followed by aftermath grazing.

b) Fen Meadow Establishment period (Year 1)

2.6.4 Hay transfer will be achieved within a few hours of harvesting, with green hay spread thinly and evenly in the receptor areas on bare ground. Seed-drop from the strewn hay will be completed within 1-3 weeks. Seed will be pressed into the ground using stock (ideally cattle), if ground conditions allow, or a roller.

2.6.5 Where germination is sub-optimal, subsequent hay-transfer during August-September will be undertaken.

2.6.6 Following hay-transfer, colonization of the receptor areas by perennial weeds and/or slug populations will be monitored and, if required, treated appropriately to protect the new seedlings.

2.6.7 In the period after hay-transfer (July-November and again in the early part of the following growing season) germination will be favoured by maintaining a short sward.

2.6.8 During and following the first growing season, further introductions of green hay – or of collected propagules of target species – will be undertaken as appropriate, for example if insufficient vegetation establishment was achieved in the first growing season.

2.6.9 Subject to programme considerations, translocation of turves from the area of M22 being lost at Sizewell Marshes to the Benhall site will take place within a few hours to minimise the potential for drying prior to placement. The turves will be re-laid as a sward to retain the integrity of the turves and maximise the potential for survival of the translocated species.

2.6.10 The water control structure in the northern compartment will require adjustment as appropriate, based on monitoring, to deliver the target water level conditions for fen meadow habitat.

c) Fen Meadow Management – Years 2-5 and 6-10

2.6.11 In the first spring after initial hay transfer cutting, or grazing where ground conditions allow, may be required to avoid seedlings being shaded out.

2.6.12 Any perennial weeds that colonise will be controlled by spot treatment with herbicide and, as in Year 1, slug populations controlled as required.

2.6.13 From Year 3 onwards, the receptor areas will be managed as hay meadows and therefore cut late (for example, after mid July), with swath turning or tedding undertaken to assist seed shedding. The cutting date will be matched to that of the donor meadow, if possible. The use of livestock, particularly for aftermath grazing, is important, where ground conditions allow, because they create gaps in the sward and trample in the seed, which helps the introduced species to spread.

2.6.14 There will be no use of inorganic fertilisers or widespread application of herbicides.

2.6.15 The water control structure in the northern compartment will require adjustment as appropriate, based on monitoring, to deliver the target water level conditions for fen meadow habitat.

2.7 Monitoring

2.7.1 The effects on ground and surface water levels, and surface wetness, will be monitored for effectiveness using existing installations and observation.

2.7.2 An annual botanical assessment of the establishment of species in the area will be undertaken, including assessment of the presence of phreatophyte species characteristic of M22. Note that some of the introduced species may take several years to appear and so the success of the hay transfer should not be judged immediately but kept under review.

2.7.3 Monitoring to ensure fish passage is not impeded will also be undertaken.

2.7.4 Management of the water levels and habitats developing on site will be amended as required based on the monitoring results.

2.7.5 A monitoring report will be submitted to the Ecology Working Group on an annual basis to document works undertaken and the monitoring described above.

2.8 Area of Potential Fen Meadow

2.8.1 The initial primary loci and potential additional areas for fen meadow provided in the **Fen Meadow Compensation Study** [APP-258] were used

to focus the detailed hydrological studies. Based on the data now available it is considered that implementing the proposed measures in the northern and central compartments will result in elevated water levels and/or creation of a habitat matrix, creating the conditions for establishment of fen meadow habitat across 2.4 ha of the site. This figure supersedes the primary loci and potential additional areas for fen meadow provided in the **Fen Meadow Compensation Study** [APP-258].

2.8.2 An additional area of 0.6ha has also been identified for inclusion of wet woodland in the northern compartment.

3 HALESWORTH

3.1 Site Baseline

a) Summary of investigations

3.1.2 The investigations being undertaken at Halesworth were summarised in the **Fen Meadow Plan Report 1**, with the study reports provided as appendices [REP3-051 and REP3-052]. The studies have mostly been completed, as detailed in **Table 3.1** below.

Table 3.1: Status of studies as at July 2021

Site	Study	Status
Halesworth	Ecology desk study	Completed in 2020
	Ecology field surveys	Phase 1 habitat survey NVC survey Water vole and otter survey Aquatic invertebrate survey of ditches All completed in 2020
	Hydrogeological desk study	Completed in 2021
	Installation of piezometers, dipwell, gaugeboards	Installed October 2020
	Topgraphic survey of site and installations	Completed 2020
	Water flow, level and quality monitoring	Commenced November 2020 for 1 year.

3.2 Environmental Setting

3.2.1 The **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052] summarised the findings of a series of baseline reports, provided as Appendices, that described the environmental setting of the Halesworth site. The majority of the baseline information is not repeated in detail in this Fen Meadow Plan Draft 1.1 although a summary of the ecological setting is provided below and further hydrological monitoring data are now available so the Water Monitoring Summary – Halesworth Site 28, November 2020 to April 2021, has been updated to July 2021 (**Appendix B**). The updated data have also been further interpreted to update the site conceptual model (**Section 3.3**).

a) Summary of Ecological Setting from Halesworth Ecology Baseline report [REP3-051]

3.2.2 There are no statutory, or non-statutory, designated sites of nature conservation value within the Site or immediately adjacent to it.

3.2.3 Coastal and floodplain grazing marsh priority habitats are mapped in MAGIC as occurring on Site. There are no areas of existing fen meadow habitat nearby.

3.2.4 The site comprises a mix of semi-improved neutral grassland (most of it marshy), with scrub, scattered broadleaved trees, a defunct species-poor hedge, flowing and standing water.

3.2.5 Four distinct grassland-types were recorded during the NVC survey. An area of rush pasture flanking the catch-dyke contained species indicating groundwater influence.

3.2.6 No sign of otter presence was recorded on site.

3.2.7 A number of ditches provided optimal water vole habitat and water vole presence was located on seven of the surveyed transects (3 different ditches) in the summer, although no presence was recorded in the autumn hen water levels were high.

3.2.8 The aquatic invertebrate fauna of the Halesworth site comprises predominantly common and local species.

3.3 Site Conceptual Model

3.3.1 The initial site conceptual model is presented in the hydrogeological report (**Appendix F** of the **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052]). This section builds on the assessment provided in the conclusions of that report and all monitoring data collected and made available at the time of writing (July 2021). This section outlines the findings on the relationship between ground level, groundwater levels, surface water levels and logged geological strata.

3.3.2 The surface elevation slopes gently from northwest to southeast towards the Walpole River, which is a main river that flows north-easterly. Ground elevations are highest in the northwest at 7.5-8.25 mAOD, flattening out to between 6.6-7 mAOD across much of the Site (see LIDAR plots in **Appendix B**). The Walpole River cuts a channel past the south-eastern boundary of the Site and has relatively steep banks, particularly to the south.

3.3.3 The site contains a network of land drainage ditches, most of which feed into a main catch-dyke.

3.3.4 Surface drainage from Blyth Road industrial estate is culverted beneath the catch-dyke but discharges to an open ditch and is conveyed along the lower part of the site before discharge to the Walpole River via a second culvert.

3.3.5 Topographic surveys initially indicate that water levels in the catch-dyke and attached drainage ditches are between 6.4 and 6.5 mAOD (November 2020). The Blyth Road drainage channel (W6) recorded a water level of 5.69 mAOD during the survey visit and Walpole River levels were 5.6 mAOD.

3.3.6 The bedrock geology at the site is Crag sands (c.21-26m thick) overlying London Clay. Although the Site is near the feather edge of the London Clay it is recorded to have a >10m thickness at the deeper on site borehole. The London Clay overlies the Chalk. Superficial deposits of Lowestoft Sands and Gravels overlie the Crag sands which are in turn overlaid by a combination of Alluvium (clay, silt, sand and gravel) and Head deposits.

3.3.7 Development of peat has occurred on the southern side of the catch-dyke and is encountered between 0.4 and 0.7 m bgl with a thickness of 1.1m at borehole HAL_2803_d. Soil cores show that a silty clay layer is often present above the Peat and is likely to impede movement of groundwater, rainwater and also flood water.

3.3.8 The soil core survey (the **Fen Meadow Compensation Study** [APP-258]) indicated that groundwater levels were within the Peat (often below its upper surface) between 0.45 and 0.9 m bgl. The October 2020 drilling programme, which occurred during a relatively wet few weeks, showed a slightly higher rest groundwater level between 0.07 and 0.2 m, which indicates that the upper part of the peat may experience seasonal wetting and drying as the water table changes. Groundwater flow is generally toward the Walpole river in the southeast.

3.3.9 Groundwater in the deeper Crag sands is under positive hydrostatic pressure, resulting in slightly artesian conditions at piezometer HAL_2803_d (**Figure A1** in **Appendix B**). This indicates the presence of semi-confining clay layers within the Crag.

3.3.10 Groundwater levels at HAL-2802_s and HAL-2802_d show that the Crag and superficial deposits demonstrate the same magnitude and timing of fluctuations therefore in hydraulic continuity here (**Figure A2** in **Appendix B**). The peaks generally correlate with peaks to the surface water level GB03 (**Figure A2** in **Appendix B**) indicating a response to recharge from rainfall. There may be some upward flow from the Crag.

3.3.11 To the north-east, the superficial deposit groundwater levels exhibit a similar response in HAL-2802_s to those at the centre of the site (**Figure A2** in **Appendix B**). Whilst the surface water levels at GB01 on site decrease during the dry April, the same decrease in water level is not seen in GB02 which receives a discharge from the Blyth Road Industrial Estate which may provide additional support during this dry period.

3.3.12 Groundwater levels recorded in the monitoring installations in the superficial deposits drop to between 6 and 6.2 mAOD (**Figure A2** in **Appendix B**).

3.3.13 The soil core surveys, drilling logs and topographic survey indicate that groundwater levels are in continuity with surface water levels in the on-site ditches. The catch-dyke intercepts groundwater flow from the northwest. Beyond the catch-dyke to the southeast the water table flattens out and is higher than the Walpole River water level, indicating the potential for groundwater discharge to the river.

3.3.14 There are two significant groundwater abstractions licences for public water supply from six boreholes within 1.2km of the Halesworth site. These abstractions are sourced from the Chalk aquifer and their potential impact on near surface groundwater levels below the Site is likely to be small due to the presence of London Clay and semi-confining clay layers within the Crag. Nevertheless, the Site falls within Zone 3 of the groundwater protection zones for those sources.

3.3.15 The Halesworth STW discharges to the Walpole River approximately 50m downstream of the Site. The licensed discharge volume is 3.553 Ml/d. Flow is not gauged in the Walpole River. The closest permanent flow gauging station is located on the River Blyth approx. 2km downstream (east) of the Site at Holton (Ref No. 35013) which has an average flow of 0.46 m3/s (39.7 Ml/d).

3.3.16 The spot flow data for the site shows very limited surface water flows within the onsite drainage channels (**Table 4.1** in **Appendix B**).

3.3.17 There is some water quality data available for the site, with more sampling planned over 2021 and 2022. The data available to date shows the following:

- Nitrate concentrations are very low across the site. Where nitrate is present above the limit of detection it is in the deeper Crag deposits and Walpole River.
- Phosphate concentrations are below the level of detection across the site.

3.4 Suitability of the site for fen meadow creation

3.4.1 The site was identified in the **Fen Meadow Compensation Study** [APP-258] as containing a primary locus for fen meadow (1.2ha) spanning the catch-dyke (the west-east aligned ditch that is the main drainage pathway for the site) where the vegetation indicates groundwater influence near to the surface. This primary locus area was bordered by a potential additional area for fen meadow (1.3ha), within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies now on-going.

3.4.2 In 2021 the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits north of the catch-dyke are variable and show a general downward gradient to the deeper deposits. Winter levels in HALL_2803_s and HALL_2804_s fluctuate 15-30cm below ground level, but recess in the spring and early summer to 50-70cm below ground level.

- However, the groundwater levels in the shallow deposits north of the catch-dyke are, in general, above those of the catch-dyke, which has a typical level of between 6.3m AOD and 6.4m AOD (**Figure A1** in **Appendix B**). It is noted also that recorded levels in the catch-dyke at GB01 peaked over winter at about 6.98m AOD, with lesser peaks reaching 6.8m AOD (**Figure A1** in **Appendix B**). At these elevations, significant areas of the site south of the catch-dyke will have been under water, albeit the peaks are very short-lived. These peaks were likely the result of backing up of the catch-dyke as a result of high river levels downstream.

- South of the catch-dyke installations HALL 2802_s and _d show a similar pattern of fluctuation as those to the north but maintain an upward hydraulic gradient. In this area however, the adjacent ditch, that conveys the surface drainage from the nearby industrial estate, to the river is likely acting to drain the nearby surface deposits.

- Whilst not clearly apparent from the spring groundwater level data, the vegetation lying either side of the catch-dyke, represented in the National Vegetation Classification (NVC) survey reported in **Appendix B** of **Fen Meadow Plan Report 1** [REP3-051 and REP3-052], as MG10b *Holco-Juncetum effusi, Juncus inflexus* sub-

community (referred to as stand C2), contained species indicative of flushing with mildly calcareous groundwater.

- Soil data for the area north of the catch-dyke indicates an absence of peat; silty clay and sands forming the full depth of cores taken. To the south of the catch-dyke silty clay overlies peat encountered at around 40cm below ground (**Fen Meadow Compensation Study** [APP-258]).
- Nitrate concentrations are very low across the site and phosphate concentrations are below the level of detection.
- Water quality data for the catch-dyke indicate a very low concentration of nitrate, and phosphate below detection limits, indicating that the Halesworth STW, is not influencing the ditch water quality.
- A network of land drains is visible on LIDAR (see **Appendix B**). These will be reducing the groundwater levels and drying the fields. However, these can be blocked.

3.4.3 Based on the groundwater and surface water level data, substrate type, and vegetation indicators it is concluded that it will be possible, by implementing measures detailed in Section 3.5, to provide groundwater influenced conditions in the area of the catch-dyke, potentially with a peaty substrate to the south of the dyke, that have the potential to support fen meadow habitats.

3.4.4 Water levels in the River Walpole will not be controlled to support these proposals. This is not required under the proposals and could lead to off-site impacts.

3.5 Proposed layout and features

3.5.1 The key aim of the proposals is to exert control over the drainage ditch network, with the effect of raising the base surface water level and supporting the groundwater levels in the shallow deposits, reducing drainage from the site and sculpting the ground to increase the groundwater influence at the surface.

3.5.2 The target catch dyke water level will be 6.6-6.7m AOD.

3.5.3 To the north of the catch dyke ground levels rise towards the northern site boundary (the northern bank level varying from 6.8-7.1m AOD and rising northwards). Therefore, whilst groundwater at the surface will be unlikely to occur, additional surface water level control will reduce leakage and support flushed situations in the immediate vicinity of the dyke.

3.5.4 Removal of a bund of recently placed arisings from the northern bank of the catch-dyke, will also facilitate a reduction in the ground level by a few centimetres to increase the potential for fen meadow species in this mildly flushed area.

3.5.5 Ground levels to the south of the dyke are lower (the southern bank level varying from 6.6 (at the extreme eastern end) - 6.8m AOD. Raising the dyke water level is expected to support shallow groundwater levels such that groundwater may occur at the surface in the vicinity of the dyke.

3.5.6 The ground surface to the south of the dyke, between the existing ditches, will be sculpted to create a matrix of terrestrial, wetland and shallow open water habitat niches to maximise the potential for target species to colonise. It is anticipated that 30-40cm of the surface material will need to be removed to deliver the proposed matrix of habitats, subject to the results of focussed soil coring during the implementation stage.

3.5.7 The three westernmost ditches on site are blind ended and hence retain water. However, the ditch that conveys the industrial estate drainage, and which is likely also draining the near surface deposits, will be infilled and the drainage discharge piped down the river. This will reduce the drainage from the shallow deposits in this area. No works are proposed to the ditch on the eastern site boundary as this will be downstream of the proposed water control structure.

3.5.8 There is no adjacent seed source for natural colonisation. Therefore, green hay transfer, from Sizewell Marshes SSSI, or another nearby fen meadow source, to the sculpted areas in mid-summer will assist with species introduction. Application to areas of bare earth is beneficial in respect of establishment of species with high light requirements and low competitive abilities, whilst creation of a matrix will maximise the potential for species, that have low tolerance of drought or flooding, to find an appropriate niche. Application of green hay may be undertaken on more than one occasion.

3.5.9 M22 species introduction will also occur through translocation of turves from the area of M22 being lost at Sizewell Marshes to within the areas identified for creation of a habitat matrix. This approach has the added benefit of providing the appropriate substrate for the species introduced. Use of this approach is subject to programme considerations and would only be undertaken once.

3.5.10 Site proposals are indicated on **Figure 3.1**. No wet woodland is proposed at this site. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

a) Physical measures

3.5.11 Physical measures proposed to be implemented on site are:

- Controlling water levels by installing a finely adjustable water control structure on the catch-dyke. The water control structure will support levels in summer but will also enable any river flood waters getting onto the site in winter to escape. As indicated above the target level will be 6.6-6.7m AOD, which dictates that it be located adjacent to the bridge crossing the catch-dyke. Much further east the land levels will be too low, and the dyke water could overtop the south bank;
- Setting the water control structure to around 6.7m AOD initially. This could be adjusted up or down, if required, based on effectiveness indicated through monitoring of the levels and conditions within the habitat creation areas;
- Piping the industrial estate drainage to the river and infilling the ditch that currently carries the drainage in an open channel;
- Preventing groundwater from following the path of the former ditch by including clay stanks at approximately 25m intervals;
- Sculpting land to the south of the catch-dyke, removing up to 30-40cm of soil. The sculpting works will extend approximately 60m from the catch-dyke towards the river, working within existing topographic features (e.g. avoiding works to elevated ground alongside the river);
- Removal of a 3-4m wide bund of recently placed arisings from the northern bank of the catch-dyke. This will also facilitate a reduction in the ground level by a few centimetres to increase the potential for fen meadow species in this mildly flushed area;
- Blocking or breaking up land drains, where encountered, to reduce drainage from the site;
- Installation of stock proof fence to control stock access to areas of created habitat;
- Application of green hay to areas of bare earth; and
- Translocation of turves from the area of M22 being lost at Sizewell Marshes to the areas identified for creation of the habitat matrix.

3.5.12 Additionally, there will be no more dredging of the Catch Drain, or other on site drains to allow them to gradually silt up thereby reducing their drainage potential.

b) Habitat creation works

3.5.13 Any additional consents which become necessary will be sought for structures and works where they are located within, or fall within specified distances of, ordinary or Main watercourses.

3.5.14 A temporary site compound will be established and access routes marked for the habitat creation works. Indicative locations for site compound and access routes, and notes on accessibility, are provided in **Figure 3.2**. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

3.5.15 Arisings will be used to infill the ditch and/or removed from the floodplain, off-site.

3.5.16 The establishment works described above will be undertaken in late spring/summer, avoiding periods with the highest risk of surface inundation and the highest water tables that result in soft ground.

3.5.17 Working areas will be subject to ecological walkovers to confirm and update ecological constraints. Works to ditch banks will be micro-sited to avoid effects on water voles. A Protected Species Licence will be sought from Natural England in the event that one is required, although, based on the reported ecological baseline [REP3-051 and REP3-052] it is considered that effects requiring licensing can be avoided.

3.5.18 Activities will be controlled via implementation of measures in the **Code of Construction Practice** (Doc Ref. 10.2)) (secured by Requirement 2).

3.6 Conservation management

3.6.1 Management measures during the establishment period (Year 1) and in Years 2-5 and 6-10 are summarised below and will be set out in the final Fen Meadow Plans approved by East Suffolk Council and Suffolk County Council pursuant to Requirement 14A.

a) Management units

3.6.2 Stock proof fence will be used to control stock access to areas of created habitat, particularly during the sensitive establishment phase in Year 1, during years 2-5, depending upon ground conditions. Proposed fence lines are indicated on **Figure 3.1**.

3.6.3 Management of areas outside the fen meadow creation areas/fence lines will comprise taking a hay crop, followed by aftermath grazing.

b) Fen Meadow Establishment period (Year 1)

3.6.4 As described for Benhall.

c) Fen Meadow Management – Years 2-5 and 6-10

3.6.5 As described for Benhall.

3.7 Monitoring

3.7.1 The effects on ground and surface water levels, and surface wetness, will be monitored for effectiveness using existing installations and observation.

3.7.2 An annual botanical assessment of the establishment of species in the area will be undertaken, including assessment of the presence of phreatophyte species characteristic of M22. Note however that some of the introduced species may take several years to appear and so the success of the hay transfer will not be judged immediately but kept under review.

3.7.3 Monitoring to ensure fish passage is not impeded will also be undertaken.

3.7.4 Management of the water levels and habitats developing on site will be amended as required based on the monitoring results.

3.7.5 A monitoring report will be submitted to the Ecology Working Group on an annual basis to document works undertaken and the monitoring described above.

3.8 Area of Potential Fen Meadow

3.8.1 The initial primary loci and potential additional areas for fen meadow provided in the **Fen Meadow Compensation Study** [APP-258] were used to focus the detailed hydrological studies. Based on the data now available it is considered that implementing the proposed measures on site will result in elevated water levels and/or creation of a habitat matrix, creating the conditions for establishment of fen meadow habitat across 1.0 ha of the site. This figure supersedes the primary loci and potential additional areas for fen meadow provided in the **Fen Meadow Compensation Study** [APP-258].

4 PAKENHAM

4.1 Site Baseline

a) Summary of investigations

4.1.2 The investigations being undertaken at Pakenham were summarised in **Fen Meadow Plan Report 1**, with the study reports available at the time provided as appendices [REP3-051 and REP3-052]. Since the **Fen Meadow Plan Report 1** [REP3-051 and REP3-052] was produced, the NVC survey and spring water vole and otter survey have been completed and therefore studies are now mainly complete, as detailed in **Table 4.1**.

Table 4.1: Status of studies as at July 2021

Site	Study	Status
Pakenham	Ecology desk study	Completed in 2021
	Ecology field surveys	Phase 1 habitat survey completed May 2021 NVC survey completed June 2021 Spring water vole and otter survey completed May 2021 Aquatic invertebrate survey undertaken late June 2021
	Hydrogeological desk study	Completed in 2021
	Installation of piezometers, dipwell, gaugeboards	Completed March 2021
	Topgraphic survey of site and installations	Undertaken March 2021
	Water flow, level and quality monitoring	Commenced April 2021 for 1 year

4.2 Environmental Setting

4.2.1 The **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052] summarised the findings of a series of baseline reports, provided as Appendices, that described the environmental setting of the Pakenham site. The majority of the baseline information is not repeated in detail in this **Draft Fen Meadow Plan** although a summary of the ecological setting is provided

below, accompanied by a summary of the results of the NVC and water vole/otter surveys, which are also are provided in:

- Pakenham Site 54 Ecology Baseline (NVC and water vole/otter survey) in **Appendix C**;

4.2.2 Further hydrological monitoring data are also now available and the Water Monitoring Summary – Pakenham Site 54, April 2021, has been updated with data to July 2021 (**Appendix D**). The updated data have also been further interpreted to update the site conceptual model (**Section 4.3**).

a) Summary of Ecological Setting from Pakenham Ecology Baseline report [REP3-051]

4.2.3 There are no statutory, or non-statutory, designated sites of nature conservation value within the Site. However, Pakenham Meadows SSSI is located adjacent to the Site, to the east of Pakenham Stream, and Pakenham Fen Meadows County Wildlife Site is also located to the east of Pakenham Stream. Both of these designated sites contain fen meadow habitat.

4.2.4 Coastal and floodplain grazing marsh and deciduous woodland priority habitats are mapped in MAGIC as occurring on Site.

4.2.5 The site comprises a mix of grassland (some of it marshy), semi-improved and improved grassland, broadleaved wet woodland, swamp, standing water and running water, with fields divided either by hedges or ditches.

b) Pakenham Site 54 Ecology Baseline (NVC and water vole/otter survey) (Appendix C)

i. National Vegetation Classification (NVC) survey

4.2.6 The NVC survey identified vegetation-types from six phytosociological groups within and on the margin of the floodplain. These vegetation types are assigned to the following NVC communities:

Fen meadow

- M22b *Juncus subnodulosus-Cirsium palustre* fen meadow, *Briza media-Trifolium* spp. sub-community; and

- M22a *Juncus subnodulosus-Cirsium palustre* fen meadow, Typical sub-community.

Rush pasture

- MG10b *Holcus lanatus-Juncus effusus* rush pasture, *Juncus inflexus* sub-community; and
- MG10b/S22c *Holcus lanatus-Juncus effusus* rush pasture, *Juncus inflexus* sub-community, grading to *Glyceria fluitans* water-margin vegetation, *Alopecurus geniculatus* sub-community.

Inundation grassland

- MG13 *Agrostis stolonifera-Alopecurus geniculatus* grassland.

Floodplain grassland

- MG7b/MG10b *Lolium perenne-Poa trivialis* ley grading to *Holcus lanatus-Juncus effusus* rush pasture, *Juncus inflexus* sub-community;
- MG7b *Lolium perenne-Poa trivialis* leys ; and
- MG7c *Lolium perenne-Alopecurus pratensis-Festuca pratensis* grassland.

Valley footslope grasslands

- MG7d *Lolium perenne-Alopecurus pratensis* grassland;
- MG7a *Lolium perenne-Trifolium repens* leys;
- MG1e *Arrhenatherum elatius* grassland, *Centaurea nigra* sub-community; and
- MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community.

Fertile reed-fen

- S25a *Phragmites australis-Eupatorium cannabinum* tall-herb fen, *Phragmites australis* sub-community.

Poplar woodland

- W6b *Alnus glutinosa-Urtica dioica* woodland, *Salix fragilis* sub-community.

4.2.7 The grassland habitats present qualify as coastal and floodplain grazing marsh, whilst the woodland qualifies as deciduous woodland, both of which are habitats of principal importance listed under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006.

ii. Otter and water vole survey

4.2.8 The Site contains suitable habitat and conditions to support both water vole and otter.

4.2.9 During the presence/absence survey, two water vole latrines were located (one on each of two ditches), as were two feeding stations (both on the same ditch) and small mammal runs on four ditches. No water vole burrows were identified however it is noted that due to unseasonably wet conditions encountered in spring 2021, some of the potential field signs identified during the survey may have been diluted or hidden by rising water levels etc. and hence water vole may make more use of the site than was recorded in May.

4.2.10 A number of otter spraints were recorded, all from the Pakenham Stream. No signs of otter presence were recorded from ditches on site.

4.3 Site Conceptual Model

4.3.1 The initial site conceptual model is presented in the hydrogeological report (**Appendix H** of the **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052]). This section builds on the assessment provided in the conclusions of that report and all monitoring data collected and made available at the time of writing (July 2021). This section presents the findings on the relationship between ground level, groundwater levels, surface water levels and logged geological strata.

4.3.2 The Pakenham Site covers the valley floor of the Pakenham Stream. The bedrock geology underlying the Site is Chalk. The chalk is overlain by superficial deposits of varying thicknesses; the most dominant is Peat, but there are also river terrace sands and gravels and Head deposits which thin towards the western margin. The boundary to the west is the upland toeslope. The margin of this upland is composed of sands and gravels. The upland also has a pronounced sandy terrace toe-slope occupying much of the northern part of this site. To the east, the site is bounded by the Pakenham Stream. There is a buried valley running roughly south of the course of the River Sapiston (Black Bourn) and another which dissects the site which is filled with Glacial Till/ Boulder Clay.

4.3.3 Development of peat has occurred at the site and is encountered between 0.1 and 0.6 m bgl with a thickness of up to 2.9 m at borehole PAK-HA-2. Soil cores show that where present the peat is between 30 and 110 cm thick. Most cores exhibited the deposition of peat over sand, with chalky boulder clay or ‘putty’ chalk proved in cores in the centre of the survey or the south west corner, respectively

4.3.4 The highest ground is to the west of the Site with elevations to over 32.5 mAOD. The catchment topography generally slopes towards the Pakenham Stream to the east, however, LiDAR data for the site shows that the central ditch which bisects the site is the low point at around 30 mAOD (see **Appendix D**). The Pakenham Stream to the east of the site is the main drainage channel for the wider catchment and there is a bund on the left bank which is at about 31.5 mAOD, although a low point is indicated by the LIDAR data (see **Appendix D**) immediately to the north of the footpath, where cattle gather to drink and have eroded the bank. Although not recorded in the available data, during initial visits this area of the site was noted to be under water, arising from flooding from the Stream. Generally, over the main central Pakenham Site the ground levels are between 30.5 and 31 mAOD.

4.3.5 The Pakenham site contains a network of land drainage ditches. The main ditch across the site runs from south to north parallel with the Pakenham Stream. This central ditch is bisected by a second west-east primary ditch; both ditches appear to be carriers for near-surface groundwater. There are several small boundary drains which appear to drain along the upland margin and run to the main central drain.

4.3.6 Data obtained from the topographic surveys initially indicate that water level in the Pakenham Stream is around 31.1 mAOD. The lowest elevation of the channel bed on the short Pakenham Stream reach accessible during the topographic survey (water levels were very high in March 2021) was 29.9 mAOD. The Pakenham Stream is at a higher elevation than the central ditch, although there is still likely continuity between the Pakenham Stream and groundwater levels.

4.3.7 Site visits have identified a breach in the Pakenham Stream bank where the stream crosses over the west-east ditch, which is culverted at this location. The flow, from east to west, in to the site in this ditch, and subsequently in to the central ditch, is being supported by flow from Pakenham Stream via this breach.

4.3.8 The topographic survey indicated initially that water level in the central ditch is around 30.4 mAOD. The lowest channel elevation recorded in the topographic survey was 28.6 mAOD. Groundwater levels across the site recorded at between around 29.5 mAOD and 30.6 mAOD for the same day.

4.3.9 Regionally, groundwater flow in the chalk is towards the Little Ouse but is considered to deflect towards the Pakenham Stream locally and to the north-east regionally. Chalk groundwater levels are generally considered to be at between 32 mAOD and 36 mAOD in the regional groundwater model produced by the Environment Agency.

4.3.10 The water levels in the chalk borehole monitored on Site (BH-2_d,) shows that the piezometric surface of the Chalk is higher than ground level at between 33.25 mAOD in early spring (29th March 2021) and 32.4 mAOD by summer 2021 (12th July 2021). Ground level at BH2 is 32.22 mAOD. The groundwater level data at BH-2_d demonstrates that there has been a generally declining trend over the spring and early summer of 2021 (**Figure A4** in **Appendix D**). BH-2_s which measures the water level in the superficial deposits at the same location shows a clear declining trend over the same period which aligns with that seen in BH-2_d (**Figure A4** in **Appendix D**) indicating some hydraulic continuity of the near surface deposits with the underlying chalk. Groundwater levels are below ground level at 30.25 mAOD in early spring (29th March 2021) and 29.59 mAOD by summer 2021 (12th July 2021).

4.3.11 In the centre of the site, the central ditch has a water level around 30.4 mAOD (as monitored by GB01 and GB03, **Figure A3** in **Appendix D**). There are no significant fluctuations in the observed data. The land to the east of the central ditch is mostly flat between 30.35 and 30.5 mAOD and very similar to the water levels in the ditch.

4.3.12 The ditch to the north-west of the central ditch has a higher water level (GB02) at 31.4 mAOD, most likely a function of the higher topography to the west of the site. The base of the ditch at GB02 is approximately 1.3 mAOD above the base of the central ditch.

4.3.13 The water levels in the near surface dipwells (PAK-HA-1 to PAK-HA-6) all show a similar hydrogeologic response (**Figure A3** in **Appendix D**).

4.3.14 It is noted that the groundwater levels observed are generally similar between the central ditch (GB01 and GB03) and the surrounding boreholes closest to the ditch (HA-3, HA-4 and HA-6) and that groundwater levels here are close to ground level (**Figure A3** in **Appendix D**).

4.3.15 Groundwater levels in PAK-HA-2 are significantly below ground level (~1-1.5m) (**Figure B14** in **Appendix D**) and this is repeated in the soil core sample (Core 1) which shows no obvious water table to 1.25m bgl. Similar depth to water, and corresponding lower absolute water levels (in mAOD), are seen at PAK-HA-1 and PAK-HA-5, reflecting local variability in behaviour of the superficial deposits.

4.3.16 To the north of the Site, the water levels in PAK-HA-1, PAK-HA-2 and PAK-HA-3 show a similar water level trend (**Figure A3** in **Appendix D**). PAK-HA-3 has a higher absolute level than the other two boreholes.

4.3.17 The surface water levels in the GB02 and GB04 are higher than the main central ditch, which is in part a function of the topography which is higher at

these two locations. Water will therefore drain towards the central ditch and ultimately flow northwards.

4.3.18 The groundwater level response in PAK-BH-1 shows less pronounced fluctuations in the groundwater levels. BH-1 measures the groundwater conditions in the buried valley, and close to the surface water abstraction. BH1 is not considered to be in hydraulic continuity with the rest of the superficial deposits at the site.

4.3.19 The lowest groundwater level and therefore maximum depth to water in the superficial deposits is listed in **Table 4.2** below.

Table 4.2: Groundwater levels and depth to water table

Borehole ID	Ground level (mAOD)	Lowest observed groundwater level (mAOD)	Maximum depth to water table (m)	Highest observed groundwater level (mAOD)	Minimum depth to water table (m)*
PAK-BH-1	31.9	30.2	1.7	30.6	1.3
PAK-BH-2_d	32.2	32.4	-0.2*	33.2	-1.0*
PAK-BH-2_s	32.2	29.6	2.6	30.3	2.0
PAK-HA-1	30.7	29.2	1.5	29.8	0.9
PAK-HA-2	30.7	29.1	1.5	29.6	1.0
PAK-HA-3	30.6	30.2	0.4	30.6	0.0
PAK-HA-4	30.7	30.2	0.5	30.7	0.0
PAK-HA-5	30.9	29.5	1.4	30.1	0.8
PAK-HA-6	30.7	30.3	0.5	30.6	0.2

* negative depth to water table shows where groundwater levels are above ground level.

4.3.20 Anecdotal evidence suggests that the ground around HA-1 (current Fen Meadow) is damp underfoot. The groundwater data do not show this, which implies that there is locally perched water table here which is currently not being measured, potentially due to layering in the peat. There is also potential for this area to be supported by winter flooding from Pakenham Stream and the on-site ditches.

4.3.21 Two surface water abstraction points, from one abstraction licence, are located on the ditches on site. One further abstraction, which abstracts during the winter, is located on the Pakenham Stream adjacent to the site and piped to the west under the site.

4.3.22 The soil cores also showed little in terms of water. It is likely that the historical water table relates to the zones of sapric peat or, in Core 9, where manganiferous streaks were proved. It is also evident that where peat is at the ground surface, it is in poor condition, and recorded as earthy peat. The reduction of the water table from the ground surface is clearly long-standing.

4.3.23 The water quality data available to date shows the following:

- Nitrate concentrations are highest at BH2_S in the superficial deposits at 99.7 mg/l as NO3. Concentrations are lower in the underlying chalk (BH2_D) which monitored nitrate at 33.7 mg/l as NO3. Elsewhere concentrations are high at the nearby surface water monitoring point at GB03 (50.8 mg/l as NO3) but low across the main central Pakenham dipwells (<2 mg/l as NO3). The Pakenham Stream nitrate concentrations are at 36.4 mg/l as NO3.

- The site generally has very low phosphate concentrations as would be expected, with most samples below detection limits. The Pakenham Stream shows phosphate concentrations at 0.958 mg/l, and elsewhere there are low concentrations at HA-2 (0.273 mg/l) and GB02 (0.602 mg/l).

4.4 Suitability of the site for fen meadow creation

4.4.1 The Pakenham site is discussed as two compartments, north and south.

a) Northern Compartment

4.4.2 This compartment was identified in the **Fen Meadow Compensation Study** [APP-258] as containing two areas of primary locus for fen meadow (totalling 3.2ha), one incorporating the western slope of the site to the west of the central drain, and the other around the north side of an area of existing fen meadow habitat. The western primary locus area was bordered by a potential additional area for fen meadow to the east of the central drain (4ha), within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies.

4.4.3 However, in 2021, the NVC survey identified that the northern primary locus, which sits to the north of existing fen meadow vegetation, is also fen meadow. Therefore, no measures to create fen meadow are required in this part of the compartment. Nonetheless, the potential for fen meadow creation in the remainder of this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the

necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits in the primary locus area to the west of the central ditch fall significantly below ground level (up to 1.5m in PAK-HA-2), which is also 1m below the ditch water level (around 30.4m AOD). This depth to water reflects the results of a soil core from a similar area reported in the **Fen Meadow Compensation Study** [APP-258], which did not strike water in a depth of 125cm.

- However, to the east of the central ditch shallow water levels remain within 25cm of the ground surface (PAK-HA-3), a similar elevation as the stream water level. It is noted, although not confirmed, that the groundwater levels may be supported by occasional overtopping from the Stream. A soil core in the same area recorded water at 60cm depth.

- Although not recorded in the available data, during initial visits this area of the site was noted to be under water, arising from flooding from the Stream. The lowest point in the bank appears, from LIDAR data (**Appendix D**), to be located immediately adjacent to the north of the footpath crossing the Stream.

- The rush pasture communities present either side of the central ditch at its northern end (MG10b and MG10b/S22c, see NVC report in **Appendix C**), contain a combination of obligate and non-obligate phreatophytes, suggesting that the near surface deposits are, or have been, influenced by groundwater.

- Substrate both sides of the central ditch was found to be peat over marl, and so substrate is appropriate for fen meadow.

- There are some instances of elevated nitrate concentrations in groundwater, although concentrations in most groundwater monitoring installations are low, with phosphate below the level of detection.

- Elevated nitrate concentrations have been recorded from surface water samples, which likely reflects surrounding, arable, land uses. Phosphate above the level of detection was also recorded from Pakenham Stream, indicating the presence of a sewage treatment works discharge upstream.

- The drainage system is complex and there are a number of factors to consider in respect of supporting water levels on site:

  - Due to its linkage with Pakenham Meadows SSSI to the east of Pakenham Stream, it is not possible to raise the levels in the system, without potentially also affecting levels in the SSSI.
  - Levels in the system at this end of the site may be being supported by the leak from the Pakenham Stream.
  - There is a spring/summer abstraction from the ditches on the western site margin that will depress the ditch water levels, although currently these are being supported by the leak from the Pakenham Stream bank.
- LIDAR data suggests the presence of land drains running parallel north-south between the central ditch and Pakenham Stream, presumably draining to the cross ditches. It is possible, although they are not visible on LIDAR, that similar drains are present in the western compartment. These will be reducing groundwater levels and drying the field surface. However, these can be blocked.

4.4.4 Based on the data available, the substrate type is appropriate and, with implementation of the measures detailed in Section 4.5, it is considered that it will be possible to deliver groundwater influenced surface conditions in this compartment, particularly to the east of the central ditch, and potentially also to the eastern side of the western area alongside the central ditch.

b) Southern Compartment

4.4.5 This compartment was identified in the **Fen Meadow Compensation Study** [APP-258] as containing an arrow shaped area of primary locus for fen meadow bordering the wet woodland at the southern end of the site (1.7ha). An area of fen meadow habitat is located immediately adjacent to the south-west of the primary locus to the north of the woodland as indicated (see the **Fen Meadow Compensation Study** [APP-258]). The area of primary locus was flanked by a more extensive potential additional area for fen meadow (4.3ha) within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies now on-going.

4.4.6 In 2021, the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

4.4.7 In respect of the suitability for fen meadow in the area to the north and upslope of the woodland:

- Groundwater levels in the shallow deposits upslope of the primary locus area to the north of the woodland (and its boundary ditch that joins the main central ditch to the north of the woodland/reed fen area) fall significantly below ground level (almost 1.4m in PAK-HA-5), approaching 1m below the ditch water level (around 30.4m AOD). This depth to water reflects the results of Core 14 from a similar elevation reported in the **Fen Meadow Compensation Study** [APP-258], which did not strike water in a depth of 125cm. However, downslope of PAK-HA-5 Core 17 struck water at a depth of 63cm.

- The botanical community present in the field north of the woodland is a floodplain grassland, MG7b, which contains no obligate phreatophytes and only low numbers of non-obligate phreatophytes, suggesting that there is little groundwater influence at the surface.

- Upslope to the north of the woodland, substrate was found to be sand to 60cm in Core 14, and predominantly sands and gravels in the PAK-HA-5, however Core 17 downslope was found to be peat. To the east of the woodland Core 16 was earthy peat over marl and then peat. Substrate appears to be more appropriate for fen meadow on the lower margins of this field.

- There are some instances of elevated nitrate concentrations in groundwater at the northern end of the Pakenham site, although concentrations in most groundwater monitoring installations are low, with phosphate below the level of detection.

- Elevated nitrate concentrations have however been recorded from surface water samples, which likely reflects surrounding arable land uses. Phosphate above the level of detection was also recorded from Pakenham Stream, indicating the presence of a sewage treatment works discharge upstream.

- As indicated for the northern compartment, the drainage system is complex and in general it is not possible to manipulate the levels. However, it is considered that:

  - The ditch separating the fen meadow from the floodplain grassland could be managed without affecting off-site receptors. Although not currently monitored, field observations suggest that it receives run-off, originating as groundwater, from the fen meadow compartment. As such it is expected that water quality would be good.

  - The ditch along the northern edge of the woodland could be controlled without affecting off-site receptors provided that this

control occurred before it's confluence with the central ditch. This would reduce drainage from the area, at least from the south-western end of the field.

- No field drains are evident in this field on LIDAR data (**Appendix D**) in this field, although there is a suggestion of presence in the fen meadow field (running north-west to south-east), perhaps evidence of historic efforts to drain the area.

4.4.8 In respect of the suitability for fen meadow in the area to the east of the woodland:

- To the east of the woodland and the central ditch shallow water levels (PAK-HA-6) remain within 45cm of the ground surface, a similar elevation as the stream water level. Core 16 in the area struck water at 80cm below ground level. Core 15 in the same field, but to the north, struck water at 50cm below ground level.

- To the east of the woodland, the floodplain grassland is transitional rush pasture (MG7b/MG10b). This contains a very low number of obligate phreatophytes and a greater number of non-obligate phreatophytes, suggesting a greater current, or historic, groundwater influence at the surface.

- To the east of the woodland Core 16 was earthy peat over marl and then peat, whilst Core 15 was earthy peat over peat. Substrate appears to be appropriate for fen meadow in this field.

- This field is bordered by the central ditch to the west, and Pakenham Stream to the east. No water level control on these watercourses is considered possible without affecting off site receptors.

- There are some instances of elevated nitrate concentrations in groundwater at the northern end of the Pakenham site, although concentrations in most groundwater monitoring installations are low, with phosphate below the level of detection.

- Elevated nitrate concentrations have however been recorded from surface water samples, which likely reflects surrounding, arable, land uses. Phosphate above the level of detection was also recorded from Pakenham Stream, indicating the presence of a sewage treatment works discharge upstream.

- LIDAR data suggests the presence of land drains running parallel north-south between the central ditch and Pakenham Stream (**Appendix D**). It is likely, although they are not visible on LIDAR, that similar drains are present in the western compartment. These will be

reducing groundwater levels and drying the field surface. However, these can be blocked.

4.4.9 As for the northern compartment, based on the data available, the substrate type is appropriate and, with implementation of the measures detailed in Section 4.5, it is considered that it will be possible to deliver groundwater influenced surface conditions to the east of the woodland. However, it is concluded that the potential area that could be made suitable for fen meadow to the north of the woodland would be too restricted to be viable. This conclusion is based on the requirement for significant on-going management of water level control structures and any shallow water distribution channels and the very small area in the south-western corner of this field over which conditions for fen meadow habitat could be provided. Fen meadow is therefore not proposed in this area of the southern compartment and it is therefore excluded from the proposals.

4.5 Proposed layout and features

a) Proposed layout (Northern compartment)

4.5.2 The key aim is to achieve groundwater influence at the surface by lowering the surface and reducing the contribution from surface water in the area between the central ditch and Pakenham Stream, and also to the west of the central ditch.

4.5.3 There will be no control of surface water levels in the drainage ditch network. However, the final fen meadow plan will consider the detailed interaction of the proposals with Pakenham Water Mill.

4.5.4 The ground surface between the central ditch and the Pakenham Stream, and also immediately to the west of the central ditch, will be sculpted to create a matrix of terrestrial, wetland and shallow open water habitat niches to maximise the potential for target species to colonise. It is anticipated that 30-40cm of the surface material will need to be removed to deliver the proposed matrix of habitats, subject to the results of focussed soil coring at the time.

4.5.5 There is a nearby seed source from adjacent areas of non-designated fen meadow habitats within the wider site which will support natural colonisation. However, to assist the colonisation process, green hay from on site or, with permission from the owner and Natural England, from Pakenham Meadows SSSI, will be applied to the sculpted areas in mid-summer. Application to areas of bare earth is beneficial in respect of establishment of species with high light requirements and low competitive abilities, whilst creation of a matrix will maximise the potential for species

that have low tolerance of drought or flooding to find an appropriate niche. Application of green hay may be undertaken on more than one occasion.

4.5.6 Site proposals are indicated on **Figure 4.1**. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

i. Physical measures

4.5.7 Physical measures proposed to be implemented in the northern compartment are:

- Sculpting of the land between the central ditch and the Pakenham Stream, and also immediately to the west of the central ditch, removing up to 30-40cm of soil;
- Blocking or breaking up of land drains, where encountered, to reduce drainage from the compartment;
- Raising the western bank of Pakenham Stream immediately to the north of the footpath crossing to the same level as elsewhere on site (level to be determined by further topographic survey) to reduce the potential for site flooding, without affecting the floodplain function of the area. An Environmental Permit will be required from the Environment Agency to enable this work to take place as set out in the **Schedule of Other Consents, Licences and Agreements** (Doc. Ref. 5.11(C))
- Application of green hay to areas of bare earth; and
- Provision of a boardwalk along the footpath to provide walkers a dry route.

4.5.8 Although not physical measures it is noted that:

- Continued operation of the summer surface water abstraction presents a significant risk to the successful provision of appropriate conditions for fen meadow because it suppresses ditch water levels in the summer, which results in a greater drainage effect on the adjacent land, and hence reduced groundwater levels in the northern compartment. Additionally, as the drain from which the abstraction takes place is a continuation of the drain that is culverted under Pakenham Stream and forms the northern boundary drain of Pakenham Meadows SSSI, the abstraction also has the potential to reduce water levels in the SSSI. However, the full effects of the

abstraction on ditch, and adjacent groundwater, levels are currently buffered by the leak from Pakenham Stream (see below), so the level of effect on the ditch, and groundwater, levels is not apparent in the monitoring data. The level of risk to the creation of conditions for fen meadow is therefore not quantifiable at this stage. To maximise potential for fen meadow habitat in this location, and to reduce risks to existing areas of fen meadow, the strong preference is that this abstraction should cease; and

- Retention of the leak from Pakenham Stream supports, and is therefore beneficial to, ditch water levels on site, and also those in Pakenham Meadows SSSI, as it is supporting levels in the ditch forming the northern boundary of the SSSI.

b) Proposed layout (Southern compartment)

4.5.9 The key aim is to achieve groundwater influence at the surface by lowering the surface, sculpting the land to create a habitat matrix. Given the presence of marl in this area to the east in particular it is proposed that the matrix removes a greater depth than proposed elsewhere, up to 45cm, to create areas of calcareous standing water, as well as adjacent wetland habitats, including fen meadow, subject to the results of focussed soil coring at the time during the implementation stage.

4.5.10 The approach to establishing fen meadow species in sculpted areas will be the same in the southern compartment as in the northern compartment.

4.5.11 An area for wet woodland creation (1.47 ha) has also been identified at Pakenham in this compartment. The approach to creation of this habitat is set out in the **Wet Woodland Strategy** Doc Ref. 10.31) secured pursuant to Requirement 14B).

4.5.12 Site proposals are indicated on **Figure 4.1**.

i. Physical measures

4.5.13 Physical measures proposed to be implemented in the southern compartment are:

- Sculpting the land between the central ditch and the Pakenham Stream to the east of the woodland, removing up to 45cm of soil.
- Blocking or breaking up of land drains, where encountered, to reduce drainage from the compartment to the east of the woodland; and.
- Application of green hay to areas of bare earth.

c) Habitat creation works

4.5.14 Appropriate consents will be sought for works where they fall within specified distances of, ordinary or Main watercourses.

4.5.15 A temporary site compound will be established and access routes marked for the habitat creation works. Indicative locations for site compound and access routes, and notes on accessibility, are provided in **Figure 4.2**. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

4.5.16 Arisings will be removed from the floodplain, off-site.

4.5.17 Works will take place in late spring/summer, avoiding periods with the highest risk of surface inundation and the highest water tables that result in soft ground.

4.5.18 Working areas will be subject to ecological walkovers to confirm and update ecological constraints. Works to ditch banks will be micro-sited to avoid effects on water voles and otters. A Protected Species Licence will be sought from Natural England in the event that one is required, although, based on the reported ecological baseline [REP3-051 and REP3-052] it is considered that effects requiring licensing can be avoided.

4.5.19 Activities will be controlled via implementation of measures in the **Code of Construction Practice** (Doc Ref. 10.2) secured pursuant to Requirement 2.

4.6 Conservation management

4.6.1 Management measures during the establishment period (Year 1) and in Years 2-5 and 6-10 are summarised below and will be set out in the final Fen Meadow Plans submitted to East Suffolk Council and Suffolk County Council for approval pursuant to Requirement 14A.

a) Management units

4.6.2 Stock proof fence will be used to control stock access to areas of created habitat, particularly during the sensitive establishment phase in Year 1, and during years 2-5, depending upon ground conditions. Proposed fence lines are indicated on **Figure 4.1**.

4.6.3 Management of areas outside the fen meadow creation areas / fence lines will comprise taking a hay crop, followed by aftermath grazing.

b) Fen Meadow Establishment period (Year 1)

4.6.4 Hay transfer will be achieved within a few hours of harvesting, with green hay spread thinly and evenly in the receptor areas on bare ground. Seed-drop from the strewn hay will be completed within 1-3 weeks. Seed will be pressed into the ground using stock (ideally cattle), if ground conditions allow, or a roller.

4.6.5 Where germination is sub-optimal, subsequent hay-transfer during August-September will be undertaken.

4.6.6 Following hay-transfer, colonization of the receptor areas by perennial weeds and/or slug populations will be monitored and, if there is a risk of adverse impacts on the seedlings, treated appropriately to protect the new seedlings.

4.6.7 In the period after hay-transfer (July-November and again in the early part of the following growing season) germination will be favoured by maintaining a short sward.

4.6.8 During and following the first growing season, further introductions of green hay – or of collected propagules of target species – will be undertaken.

c) Fen Meadow Management – Years 2-5 and 6-10

4.6.9 In the first spring after initial hay transfer cutting and where ground conditions allow, grazing may be required to avoid seedlings being shaded out.

4.6.10 Any perennial weeds that colonise will be controlled by spot treatment with herbicide and, as in Year 1, slug populations controlled.

4.6.11 From Year 3 onwards, the receptor areas will be managed as hay meadows and therefore will be cut late (for example, after mid July), with swath turning or tedding undertaken to assist seed shedding. The cutting date will be matched to that of the donor meadow, if possible. The use of livestock, particularly for aftermath grazing, is important, where ground conditions allow, because they create gaps in the sward and trample in the seed, which helps the introduced species to spread.

4.6.12 There will be no use of inorganic fertilisers or widespread application of herbicides.

4.7 Monitoring

4.7.1 The effects on ground and surface water levels, and surface wetness, will be monitored for effectiveness using existing installations and observation.

4.7.2 An annual botanical assessment of the establishment of species in the area will be undertaken, including assessment of the presence of phreatophyte species characteristic of M22. Note however that some of the introduced species may take several years to appear and so the success of the hay transfer will not be judged immediately but kept under review.

4.7.3 Management of the water levels and habitats developing on site will be amended as required based on the monitoring results.

4.7.4 A monitoring report will be submitted to the Ecology Working Group on an annual basis to document works undertaken and the monitoring described above.

4.8 Area of Potential Fen Meadow

4.8.1 The initial primary loci and potential additional areas for fen meadow provided in the **Fen Meadow Compensation Study** [APP-258] were used to focus the detailed hydrological studies. Based on the data now available it is considered that implementing the proposed measures on site will result in elevated water levels and/or creation of a habitat matrix, creating the conditions for establishment of fen meadow habitat across 4.73 ha of the site. This figure supersedes the primary loci and potential additional areas for fen meadow provided in the **Fen Meadow Compensation Study** [APP-258].

4.8.2 An additional area of 1.47 ha has also been identified for inclusion of wet woodland in the southern compartment.

5 SUMMARY

5.1.1 Implementation of proposals in this **Draft Fen Meadow Plan** are expected to deliver conditions to support fen meadow species on each of the three sites.

5.1.2 The proposals are intended to result in elevated water levels and/or creation of a habitat matrix, creating the conditions for establishment of fen meadow habitat.

5.1.3 The proposals are therefore anticipated to deliver conditions suitable to support fen meadow habitat across the site areas summarised below:

- Benhall – 2.4 ha of fen meadow, 0.6 ha of wet woodland;
- Halesworth – 1.0 ha of fen meadow; and
- Pakenham: 4.73 ha of fen meadow, 1.47 ha of wet woodland.

5.1.4 In total therefore the plan could deliver up to **8.13 ha** of fen meadow and **2.07 ha** of wet woodland.

5.1.5 Within any of the sites, it is not possible to set a single ground level that will deliver appropriate conditions for fen meadow year round allowing for a smaller area to be identified for fen meadow delivery, because of the uncertainties in groundwater level fluctuation with a limited ability to control these on these sites, and uncertainties in the precise development of the habitat in any one particular location within the site. Instead, the sculpting approach proposed, results in a variable micro-topography that will support a range of hydrological conditions, varying from shallow open water through to more terrestrial habitat. This maximises the provision of areas with appropriate hydrology, and hence potentially suitable area for fen meadow, whilst allowing for the uncertainties in groundwater level fluctuation and limited ability to control these.

5.1.6 The proposals in this draft plan have been prepared with reference to the data available to the beginning of July 2021 (**The Fen Meadow Plan Report 1 – Baseline Report** [REP3-051 and REP3-052], provides a summary of data available until May 2021) and data collection is on-going at each site. Final Fen Meadow Plans in general accordance with the **Fen Meadow Strategy** (Doc Ref.10.16) and this **Draft Fen Meadow Plan** (Doc Ref.10.6) must be submitted to and approved by East Suffolk Council and Suffolk County Council prior to any vegetation clearance in the Sizewell Marshes SSSI being carried out. The Fen Meadow Plans must be implemented as approved.

REFERENCES

1. Natural England (2020). Stage 4 pre-application consultation. [Online] available at: [redacted]

2. Wheeler B.D., Shaw S. & Tanner K. (2009). A wetland framework for impact assessment at statutory sites in England and Wales. Science report: SC030232. Environment Agency, Bristol.

3. van Diggelen R. & Marrs R.H. (2003). Restoring plant communities – Introduction. Appl. Veg. Sci. 6: pp. 105-110.

APPENDIX A: WATER MONITORING SUMMARY – BENHALL SITE 10 & 11, NOVEMBER 2020 TO PRESENT (JULY 2021) – REFER TO FEN MEADOW PLAN DRAFT 1 [REP6-026]

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Technical note:
Sizewell C Fen Meadow Compensation Water Monitoring Summary – Benhall Site November 2020 to July 2021

1. Introduction

The technical note summarises water monitoring data collected between November 2020 and July 2021 at the Benhall site (hereafter referred to as 'the Site') which has been identified as a potential fen meadow development area. Benhall was originally identified as two sites (Sites 10 and 11) however, these were subsequently combined into one, with areas now referred to as the northern compartment (former Site 10) and the central and southern compartments (former Site 11). The site referencing is however retained in the naming of the installations.

This technical note is predominantly a factual presentation of the data rather than an interpretive report.

Figure 1.1 shows a map of the Site and the installations referred to in this technical note.

2. Groundwater Level Monitoring

Ten groundwater monitoring points were installed at the Sites between 5th and 23rd October 2020. Seven shallow dipwells were installed to measure groundwater levels in the shallow superficial near surface deposits and three piezometers were installed to measure groundwater levels in the underlying sands and gravels. Two of the sands and gravels piezometers are nested (within the same borehole) with a dipwell. An installation summary is provided in Table 2.1 below.

Table 2.1 Summary of groundwater monitoring installations

Name	Drillers ID	NGR	Datum: Metal Cover (mAOD)	Ground Level (mAOD)	Depth (m bgl*)	Diameter (mm)	Notes
BHALL_1001_d	bh1001	TM3824360485	7.254	6.689	10	50	
BHALL_1001_s	ws1001	TM3823760625	4.177	3.906	3	19	
BHALL_1002_s	ws1002a	TM3828760508	4.671	4.347	3	19	
BHALL_1003_s	ws1003	TM3824060487	4.207	3.931	3	19	
BHALL_1101_d	bh1101	TM3817360414	4.190	3.875	10	50	Nested with BHALL_1101_s
BHALL_1101_s	ws1101	TM3817360414	4.178	3.906	2.4	50	Nested with BHALL_1101_d

Name	Drillers ID	NGR	Datum: Metal Cover (mAOD)	Ground Level (mAOD)	Depth (m bgl*)	Diameter (mm)	Notes
BHALL_1102_d	bh1102	TM3813060268	4.178	3.906	10	50	Nested with BHALL_1102_s
BHALL_1102_s	ws1102	TM3813060268	4.147	3.92	3	50	Nested with BHALL_1102_d
BHALL_1103_s	ws1103	TM3820260405	4.147	3.92	3	50	
BHALL_1104_s	ws1104	TM3810560190	4.252	3.952	3	50	

s = shallow; d = deep
*m bgl = metres below ground level

Each installation is fitted with a water level datalogger which is being downloaded on a quarterly basis. Table 2.2 and 2.3 summarise the data collected manually between November 2020 and present (July 2021) for installations in the northern and central areas of the site respectively. BHALL_ 1002_s was entirely flooded in November 2020. In December 2020 BHALL_ 1003_s was flooded. Hydrographs, presenting both logger and manually collected data) for the installations are provided in Appendix A (Combined Hydrograph Figures A1 to A5) and Appendix B (Individual Groundwater Hydrographs Figures B1-B20). Note that in Appendix B there are a combination of hydrographs providing both absolute water levels and depth to water table.

Table 2.2 Groundwater Levels (m bgl and mAOD) in installations in the northern area of the site

Date	BHALL_ 1001_d	BHALL_ 1001_s	BHALL_ 1002_s	BHALL_ 1003_s
m bgl				
19-20/11/20	0.837	0.423	0.033	0.042
09/12/20	0.569	0.376	-0.016	-0.03
13/01/21	0.79	0.78	0.04	0.33
17/02/21	0.386	0.316	-0.013	-0.024
10/03/21	0.365	0.746	0.416	0.415
27/04/21	0.45	0.96	0.88	0.89
11/05/21	0.406	0.788	0.692	0.594
08/06/21	0.52	1.029	-.94	0.873
13/07/21	0.466	0.836	0.476	0.446
mAOD*				
19-20/11/20	3.069	3.924	3.898	3.833
09/12/20	3.337	3.971	3.947	3.905

13/01/21	3.387	3.891	4.167	3.860
17/02/21	3.791	4.031	3.944	3.899
10/03/21	3.812	3.925	3.791	3.775
27/04/21	3.727	3.711	3.327	3.300
11/05/21	3.771	3.883	3.515	3.596
08/06/21	3.657	3.642	3.267	3.317
13/07/21	3.711	3.835	3.731	3.744

*m AOD = metres above ordnance datum
Note: negative m bgl value indicates positive hydrostatic pressure

Table 2.3 Groundwater Levels (m bgl and mAOD) in installations in the central area of the site

Date	**BHALL_ 1101_d**	**BHALL_ 1101_s**	**BHALL_ 1102_d**	**BHALL_ 1102_s**	**BHALL_ 1103_s**	**BHALL_ 1104_s**
m bgl						
19-20/11/20	-0.052	-0.017	0.233	0.213	0.057	0.115
09/12/20	-0.077	-0.07	-0.106	0.135	-0.08	-0.017
13/01/21	0.1	0.1	0.38	0.41	0.36	0.36
17/02/21	-0.110	0.169	-0.042	-0.007	0.221	-0.125
10/03/21	0.155	0.305	0.386	0.422	0.418	0.330
27/04/21	0.83	1.05	0.81	0.52	0.77	0.36
11/05/21	1.082	1.237	0.42	0.434	0.56	0.414
08/06/21	1.15	1.282	0.528	0.554	0.739	0.52
13/07/21	0.892	1.064	0.324	0.496	0.426	0.532
mAOD*						
19-20/11/20	3.958	3.923	3.687	3.707	3.895	3.801
09/12/20	3.983	3.976	4.026	3.785	4.032	3.933
13/01/21	4.016	4.078	3.767	3.737	3.892	3.919
17/02/21	4.016	3.737	3.962	3.927	3.731	4.041
10/03/21	4.023	3.873	3.761	3.725	3.834	3.949

27/04/21	3.348	3.128	3.337	3.627	3.482	3.919
11/05/21	3.096	2.941	3.727	3.713	3.692	3.865
08/06/21	3.896	4.028	3.619	3.593	3.513	3.759
13/07/21	4.035	4.114	3.823	3.651	3.826	3.474

*m AOD = metres above ordnance datum
Note: negative m bgl value indicates positive hydrostatic pressure

3. Surface Water Level Monitoring

Five gaugeboards were installed between 12th and 16th October 2020 to allow monitoring of surface water levels across the site's watercourses / drains. All gaugeboards included stilling wells and water level data loggers. An installation summary is given in Table 3.1 below.

Table 3.1 Summary of gaugeboard installations

Ref.	GPS Grid Ref.	Top of Gaugeboard Datum (mAOD*)	Gaugeboard Length (m)	Datalogger	Log Interval (minutes)
SNP-GB01	TM 38130 60235	3.73	1	OTT Orpheus Mini	15
SNP-GB02	TM 38249 60509	4.24	1	OTT Orpheus Mini	15
SNP-GB03	TM 38207 60658	4.8	1	OTT Orpheus Mini	15
SNP-GB04	TM 38350 60725	4.72	2	OTT Orpheus Mini	15
SNP-GB05	TM 38300 60618	4.71	2	OTT Orpheus Mini	15

*mAOD = metres above ordnance datum

Table 3.2 summarises the gaugeboard water level readings taken manually between November 2020 and June 2021. The water level at all gaugeboard locations is continuously monitored and are downloaded on a monthly basis during spot gauging visits. Hydrographs of surface water levels are presented in Appendix C, and in combination with groundwater hydrographs in Appendix A (data are currently available to mid June 2021).

Table 3.2 Surface Water Levels (mAOD)

Date	SNP-GB01	SNP-GB02	SNP-GB03	SNP-GB04	SNP-GB05	SNP-SF05*
19-20/11/20	3.028	3.623	4.096	3.575	3.653	4.605
09/12/20	3.178	4.039	4.255	4.195	4.048	4.489
13/01/21	3.109	3.701	4.137	3.741	3.725	4.44

17/02/21	3.255	3.760	4.181	3.855	3.815	
10/03/21	2.952	3.651	4.104	3.538	3.666	4.709
08/04/21	2.933	3.61	4.09	3.454	3.621	4.668
11/05/21	2.962	3.64	4.085	3.498	3.63	4.635
08/06/21	2.962	3.637	4.072	3.495	3.531	4.702

*Manual reading from dip point (no gaugeboard or datalogger).

4. Spot Flow Gauging

Monthly spot flow gauging of five gaugeboard locations commenced in November 2020. Results to date are shown in Table 4.1 below. Negative flow readings in Table 4.1 indicate static conditions where flow is not sufficiently high to be measurable.

Table 4.1 Spot Flow (m^3/s)

Date	SNP-SF01	SNP-SF02	SNP-SF03	SNP-SF04	SNP-SF05
19-20/11/20	0.0015	0.0128	0.0012	No suitable location to gauge. Channel too deep to wade.	0.0718
09/12/20	0.0098	-0.0651	0.0207	No suitable location to gauge. Channel too deep to wade.	0.1909
13/01/21	0.0036	0.0282	0.0047	No suitable location to gauge. Channel too deep to wade.	0.2646
17/02/21	0.0163	0.0470	0.0162	No suitable location to gauge. Channel too deep to wade.	Too deep to safely wade, severe flooding and significant snow meltwater from previous days.
10/03/21	0.0023	0.0324	0.0024	No suitable location to gauge. Channel too deep to wade.	0.0637
08/04/21	0.0024	0.0226	-0.0002	No suitable location to gauge. Channel too deep to wade.	0.0571
11/05/21	0.0025	0.022	0.0012	No suitable location to gauge. Channel too deep to wade.	0.0576
08/06/21	0.002	0.0327	0.0007	No suitable location to gauge. Channel too deep to wade.	0.0519.

5. Water Quality Monitoring

In-situ water quality readings are collected from all groundwater and surface water installations on a monthly basis. *In-situ* water quality results are presented in Table 5.1 below.

In addition to this, water quality samples have been collected quarterly at selected locations and sent for laboratory analysis. Quarterly sampling was undertaken in January 2021 (for groundwaters only) and April 2021 (both groundwater and surface water), with samples (both groundwater and surface water) collected in July 2021 being analysed. Available results for key water quality parameters indicative of nutrient enrichment, and its source (nitrate, phosphate and chloride), are presented in Table 5.2. In April 2021, SNP_1001_d could not be sampled due to a blockage and insufficient water.

Table 5.1 In-situ Water Quality Results

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
19/11/20	BHALL_1001_d	12	4.2	1398	6.94	3.2	22.2
09/12/20	BHALL_1001_d	9.9	48.6	1362	6.97	-25.4	57
13/01/21	BHALL_1001_d	7.1	26.9	1244	6.91	134.2	19.5
17/02/21	BHALL_1001_d	7.2	42.9	1391	6.64	-115.3	96.7
10/03/21	BHALL_1001_d	7.6	41.9	1421	6.5	-101.3	9.96
27/04/21	BHALL_1001_d	11.6	30.3	1447	6.61	1001	19.3
11/05/21	BHALL_1001_d	12.5	15.8	1452	6.73	-97.8	58.68
24/05/21	BHALL_1001_d	11.6	30.3	1447	6.61	1001	19.3
08/06/21	BHALL_1001_d	13.7	11.9	1438	6.7	-107.8	13.25
13/07/21	BHALL_1001_d	13.4	249	1441	6.62	-102.8	29.6
20/11/20	BHALL_1001_s	cns	cns	cns	cns	cns	cns
09/12/20	BHALL_1001_s	cns	cns	cns	cns	cns	cns
13/01/21	BHALL_1001_s	5.5	19.4	938	7.17	137.6	249
17/02/21	BHALL_1001_s	7.2	58.8	545	7.18	-111.9	78.2
10/03/21	BHALL_1001_s	6.9	59	1040	6.87	-51.1	51.92
11/05/21	BHALL_1001_s	12.7	69.3	1081	7.22	-62.7	23.7

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
08/06/21	BHALL_1001_s	n/a	n/a	n/a	n/a	n/a	n/a
19/11/20	BHALL_1002_s	9.6	35	804	7.68	-20.5	329.1
09/12/20	BHALL_1002_s	8.1	53	370.5	9.1	67.4	176.5
13/01/21	BHALL_1002_s	3.4	28.7	630	8.47	140.8	80.4
17/02/21	BHALL_1002_s	7	73.2	566	7.85	125.1	144.2
10/03/21	BHALL_1002_s	6.2	43	768	7.01	-13	157.77
11/05/21	BHALL_1002_s	12.1	58.1	1027	7.51	-114.9	66.78
08/06/21	BHALL_1002_s	16	43.7	1110	7.03	-98.6	56.23
13/07/21	BHALL_1002_s	14	279	1521	6.55	-99.1	794
19/11/20	BHALL_1003_s	12.1	32.2	1611	6.82	-70.2	137.05
09/12/20	BHALL_1003_s	7.5	63	588	7.46	32.8	192
13/01/21	BHALL_1003_s	7.7	23.4	947	6.72	137.2	>1050
17/02/21	BHALL_1003_s	6.3	58.5	434.3	7.5	110	164.5
10/03/21	BHALL_1003_s	6.1	52.5	668	6.95	-97.3	122.81
27/04/21	BHALL_1003_s	9.4	20.3	1268	6.54	95.8	259
11/05/21	BHALL_1003_s	13.8	37.7	16.13	6.78	-83.3	39.34
24/05/21	BHALL_1003_s	9.4	20.3	1268	6.54	95.8	259
08/06/21	BHALL_1003_s	n/a	n/a	n/a	n/a	n/a	n/a
13/07/21	BHALL_1003_s	13.2	27.3	1705	6.58	-54.3	257
19/11/20	BHALL_1101_d	11.4	3	1000	7.05	-120.9	13.34
09/12/20	BHALL_1101_d	8.4	19.9	1000	6.97	-88.8	94.2
13/01/21	BHALL_1101_d	8.7	17	910	7.07	137.9	40.3
17/02/21	BHALL_1101_d	7.7	31.8	985	6.97	-118.9	2.9
10/03/21	BHALL_1101_d	7.7	11	990	6.74	-72.8	8.7
27/04/21	BHALL_1101_d	10.5	20	956	5.89	85.3	136

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
11/05/21	BHALL_1101_d	15.1	21.2	999	7.06	-42.5	25.65
24/05/21	BHALL_1101_d	10.5	20	956	5.89	85.3	136
08/06/21	BHALL_1101_d	18.5	23.8	999	6.98	-40	58.17
13/07/21	BHALL_1101_d	16.2	176	1008	7	-18.9	113
19/11/20	BHALL_1101_s	10.8	3.4	1024	7.5	-142.3	19
09/12/20	BHALL_1101_s	8	30.9	1006	7.03	-101.6	16
13/01/21	BHALL_1101_s	6.6	34.1	919	7.13	143.7	289
17/02/21	BHALL_1101_s	7.9	35.3	992	6.95	-91.6	861.1
10/03/21	BHALL_1101_s	7.5	21.6	986	6.8	-73.1	124.32
27/04/21	BHALL_1101_s	10.7	32.7	961	5.96	89.9	>1050
11/05/21	BHALL_1101_s	13.6	23.6	997	7.07	-37.1	15.61
24/05/21	BHALL_1101_s	10.7	32.7	961	5.96	89.9	>1050
08/06/21	BHALL_1101_s	17.2	32.5	988	7.2	-62.1	46.78
13/07/21	BHALL_1101_s	15.1	344	1007	7.11	-51.2	>1050
19/11/20	BHALL_1102_d	11.1	31.2	1187	10.05	-31.1	291.4
09/12/20	BHALL_1102_d	7.6	26	1012	8.16	-194.6	37.9
13/01/21	BHALL_1102_d	6.4	17.8	968	7.28	175.2	28.6
17/02/21	BHALL_1102_d	7.2	38.5	877	7.16	-102.6	51
10/03/21	BHALL_1102_d	7.2	39.5	1050	7.06	-52.8	181.53
27/04/21	BHALL_1102_d	11.2	35.2	1080	7.16	84.7	42.6
11/05/21	BHALL_1102_d	13.8	47.1	1096	7.19	-48.4	96.19
24/05/21	BHALL_1102_d	11.2	35.2	1080	7.16	84.7	42.6
08/06/21	BHALL_1102_d	16.7	39.2	1068	7.27	-75.5	38.25
13/07/21	BHALL_1102_d	13.8	400	1131	7.26	-63.4	1332
19/11/20	BHALL_1102_s	10.6	3.7	1318	7.46	-157.2	26.45

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
09/12/20	BHALL_1102_s	7.7	49.6	1252	7.16	87.2	41
13/01/21	BHALL_1102_s	7.1	19.1	1117	6.98	165.3	25.2
17/02/21	BHALL_1102_s	7.7	45.2	1090	7.06	-164.7	191.8
10/03/21	BHALL_1102_s	7.7	20.7	1158	6.78	-104.9	47.15
27/04/21	BHALL_1102_s	12.1	7.9	1056	7.39	72.6	>1050
11/05/21	BHALL_1102_s	11.8	16.4	1083	7.18	5.9	39.28
24/05/21	BHALL_1102_s	12.1	7.9	1056	7.39	72.6	>1050
08/06/21	BHALL_1102_s	15.5	27.3	1065	7.16	-47.8	30
13/07/21	BHALL_1102_s	14.5	114	1122	6.99	-74.3	>1050
19/11/20	BHALL_1103_s	11	3.6	1385	6.88	-146.8	71.24
09/12/20	BHALL_1103_s	7.7	48.9	1373	6.95	-109.9	156.7
13/01/21	BHALL_1103_s	6.3	11.9	1147	6.99	133.2	154
17/02/21	BHALL_1103_s	6.6	63.5	876	7.23	-86.9	38
10/03/21	BHALL_1103_s	6.6	37	1268	6.57	-75.1	65.1
11/05/21	BHALL_1103_s	11.3	17	1231	6.84	-72.5	11.49
08/06/21	BHALL_1103_s	12.9	17.2	1245	6.76	-92.3	11.08
19/11/20	BHALL_1104_s	11.1	6.5	1160	7.06	-134.9	54.4
09/12/20	BHALL_1104_s	7.6	40.3	953	6.89	241.9	50.1
13/01/21	BHALL_1104_s	6.9	22.8	886	6.95	199.1	78.2
17/02/21	BHALL_1104_s	9	42.2	906	7.17	-60.8	211.7
10/03/21	BHALL_1104_s	7.5	21.1	990	6.83	120.2	20.21
11/05/21	BHALL_1104_s	12.8	51.5	981	7.22	257.4	4.73
08/06/21	BHALL_1104_s	15.2	49.7	969	7.33	180.2	8.3
27/04/21	BHALL_FRO	9.8	87.2	964	7.44	113.3	12.5
24/05/21	BHALL_FRO	9.8	87.2	964	7.44	113.3	12.5

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
13/07/21	BHALL_FRO	16.3	703	1032	7.46	62.4	6.7
19/11/20	BHALL_GB1	10	34.2	1022	7.28	41	1.9
09/12/20	BHALL_GB1	5.5	60	1077	7.22	223	7.3
17/02/21	BHALL_GB1	5.3	53.7	835	7.29	135.5	12.3
10/03/21	BHALL_GB1	7.7	62.4	998	7.4	149.1	3.1
27/04/21	BHALL_GB1	11.9	91.1	943	7.22	73.7	9.77
11/05/21	BHALL_GB1	13.2	101	1008	7.23	247.2	4.09
24/05/21	BHALL_GB1	11.9	91.1	943	7.22	73.7	9.77
08/06/21	BHALL_GB1	13.3	70.1	1017	7.18	114.1	-0.63
19/11/20	BHALL_GB2	12.3	56.7	1618	7.46	88.1	4.45
09/12/20	BHALL_GB2	5.2	95.4	836	7.85	81.3	64
17/02/21	BHALL_GB2	8.1	81.5	1141	7.47	91.4	15.2
10/03/21	BHALL_GB2	8.7	50.4	1664	6.93	1.3	262.78
27/04/21	BHALL_GB2	11.7	84.5	1511	7.46	111.5	16
11/05/21	BHALL_GB2	15.9	68	1479	7.27	-85	4.75
24/05/21	BHALL_GB2	11.7	84.5	1511	7.46	111.5	16
08/06/21	BHALL_GB2	18.8	40	1786	7.18	44.7	55.36
13/07/21	BHALL_GB2	19.8	230	1618	7.33	69.5	10.9
20/11/20	BHALL_GB3	5.6	56.9	1067	7.6	5.6	3.49
09/12/20	BHALL_GB3	5	92.1	871	7.74	87.3	70.3
17/02/21	BHALL_GB3	5.1	90.2	629	7.58	80.8	21
10/03/21	BHALL_GB3	6.5	80.5	956	7.25	-77.2	26.41
11/05/21	BHALL_GB3	14.5	68.2	1031	7.38	10	10
08/06/21	BHALL_GB3	18.5	63.4	961	7.51	-8.8	7.43
20/11/20	BHALL_GB4	5	41.7	1227	7.52	-21.4	10.1

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
09/12/20	BHALL_GB4	5.3	88.6	888	7.67	92.2	42.1
17/02/21	BHALL_GB4	7.2	73.9	875	7.49	121.9	36
10/03/21	BHALL_GB4	6.1	62.7	1021	7.15	16.2	11.6
27/04/21	BHALL_GB4	16.5	96	991	7.63	84.2	30.7
11/05/21	BHALL_GB4	14.5	62.5	1032	7.37	-16.1	14.28
24/05/21	BHALL_GB4	16.5	96	991	7.63	84.2	30.7
08/06/21	BHALL_GB4	16.3	46.2	1035	7.26	-73.3	11.19
13/07/21	BHALL_GB4	16.5	664	991	7.5	65	12.1
20/11/20	BHALL_GB5	7.6	5.4	1581	7.09	-176.4	4.3
09/12/20	BHALL_GB5	5.4	57.3	1006	7.49	86.3	4
17/02/21	BHALL_GB5	7	67.3	857	7.47	127.1	22.4
10/03/21	BHALL_GB5	5.8	30.7	1096	6.84	-9	55.26
27/04/21	BHALL_GB5	8.5	29.6	1350	6.92	134.1	>1050
11/05/21	BHALL_GB5	16.8	100.6	947	7.29	-66.1	46.33
24/05/21	BHALL_GB5	8.5	29.6	1350	6.92	134.1	>1050
08/06/21	BHALL_GB5	17	5	995	6.86	-82.9	203.5
13/07/21	BHALL_GB5	17.1	415	946	7.15	-70.3	16.1
19/11/20	BHALL_SP5	9.5	65.2	1037	7.52	178.7	3.82
09/12/20	BHALL_SP5	4.9	82	1108	7.43	26.5	115
17/02/21	BHALL_SP5	4.5	87	675	7.68	214.5	22.1
10/03/21	BHALL_SP5	7.7	74.1	1084	7.26	203.7	7.43
27/04/21	BHALL_SP5	12.5	113.2	1208	7.62	71.4	16.3
11/05/21	BHALL_SP5	12.2	70.2	922	7.19	324	27.22
24/05/21	BHALL_SP5	12.5	113.2	1208	7.62	71.4	16.3
08/06/21	BHALL_SP5	14.3	47.3	1120	7.19	191	1.89

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
13/07/21	BHALL_SP5	16.2	52.6	1062	7.08	-5.6	13.8

cns = could not sample. Insufficient water / blockage

Table 5.2 Results for key water quality parameters

Location ID	Date	Chloride (mg/l)	Nitrate as NO3)mg/l)	Phosphate (Ortho as PO4 mg/l)
BHALL - 1001_D	13/01/2021	132	<0.3	<0.05
BHALL - 1001_D	27/04/2021	67.5	<0.3	<0.05
BHALL - 1003_S	13/01/2021	37.2	27.6	<0.05
BHALL - 1003_S	27/04/2021	118	5.72	<0.05
BHALL - 1003_D	27/04/2021	113	<0.3	<0.05
BHALL - 1101_D	13/01/2021	64.9	<0.3	<0.05
BHALL - 1101_D	27/04/2021	63.6	9.22	<0.05
BHALL - 1101_S	13/01/2021	90.8	<0.3	<0.05
BHALL - 1101_S	27/04/2021	63.2	<0.3	<0.05
BHALL - FRO	27/04/2021	79.5	13.4	<0.05
BHALL - GB1	27/04/2021	69.4	48.2	0.057
BHALL - GB2	27/04/2021	267	71.5	11.4
BHALL - GB5	27/04/2021	89.8	<0.3	<0.05
BHALL - SP5	27/04/2021	145	38.7	4.77
BHALL-1102-D	13/01/2021	79.4	<0.3	<0.05
BHALL-1102-D	27/04/2021	78.2	<0.3	<0.05
BHALL-1102-S	13/01/2021	63.7	<0.3	<0.05
BHALL-1102-S	27/04/2021	88	<0.3	0.053
BHALL-GB4	27/04/2021	89.4	7.55	<0.05

6. LIDAR Data

To aid interpretation of the data, two LIDAR plots have been added in Appendix D. The first (D1) illustrates available data on a graded scale and the second (D2) provides the data sub-divided into elevation bands. The graded scale enables fine topographic features to be discerned, whilst the figure with data sub-divided into height bands enables identification of areas at broadly similar elevations.

Issued by	Approved by
.....	.....
Jon Mainhagu	**Ellie Creer**

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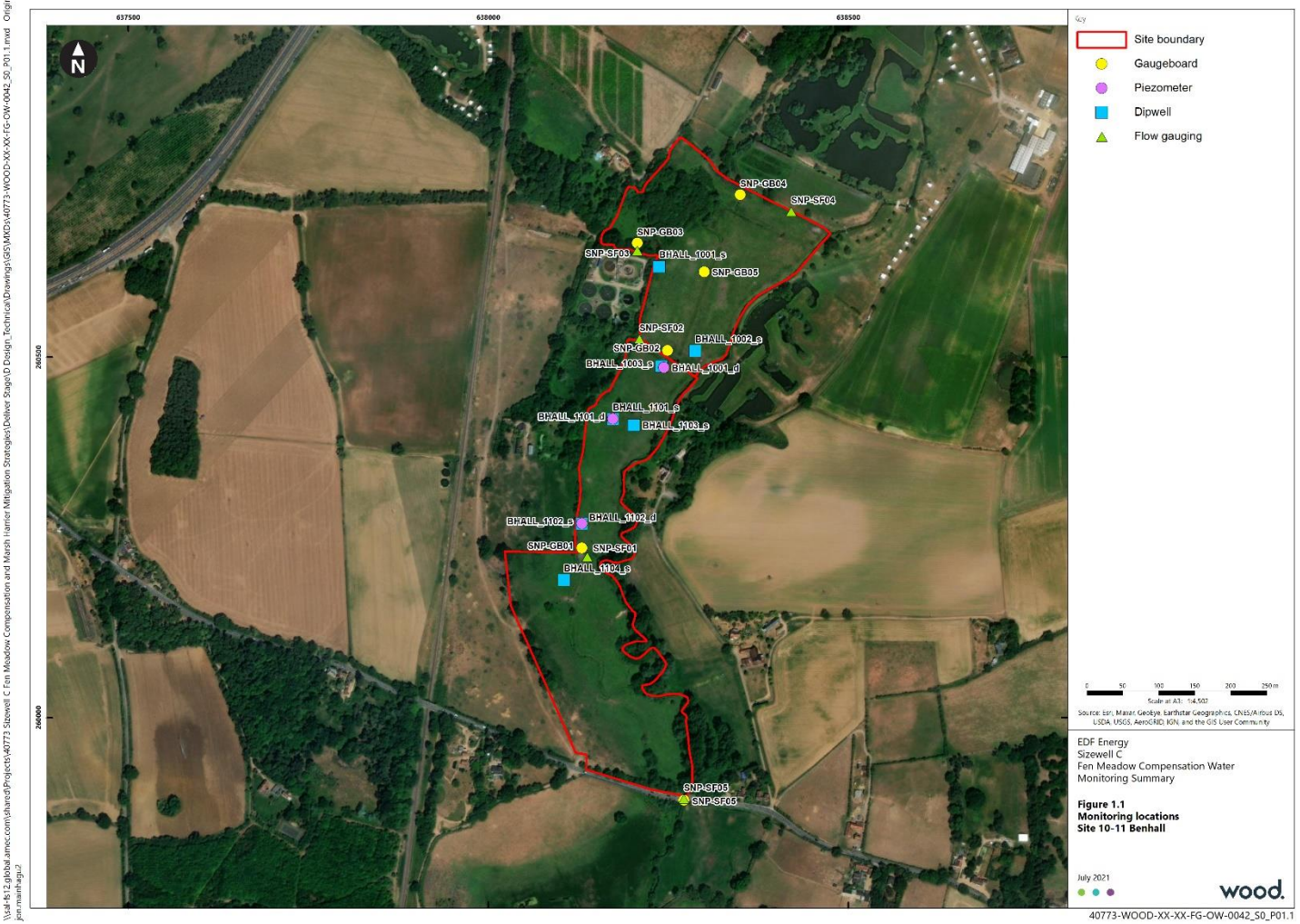
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Figure

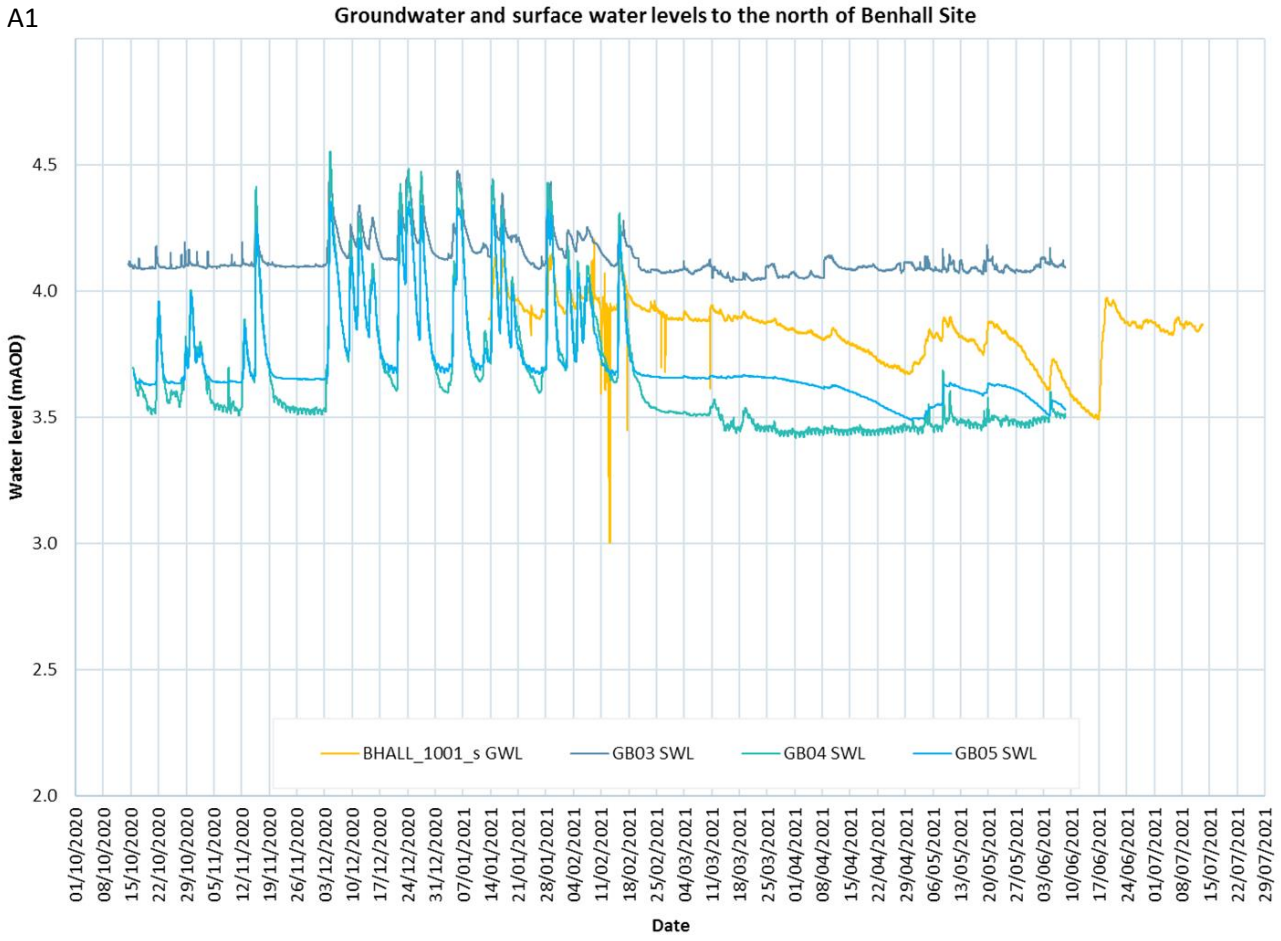


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Appendix A
Combined Hydrographs

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A1

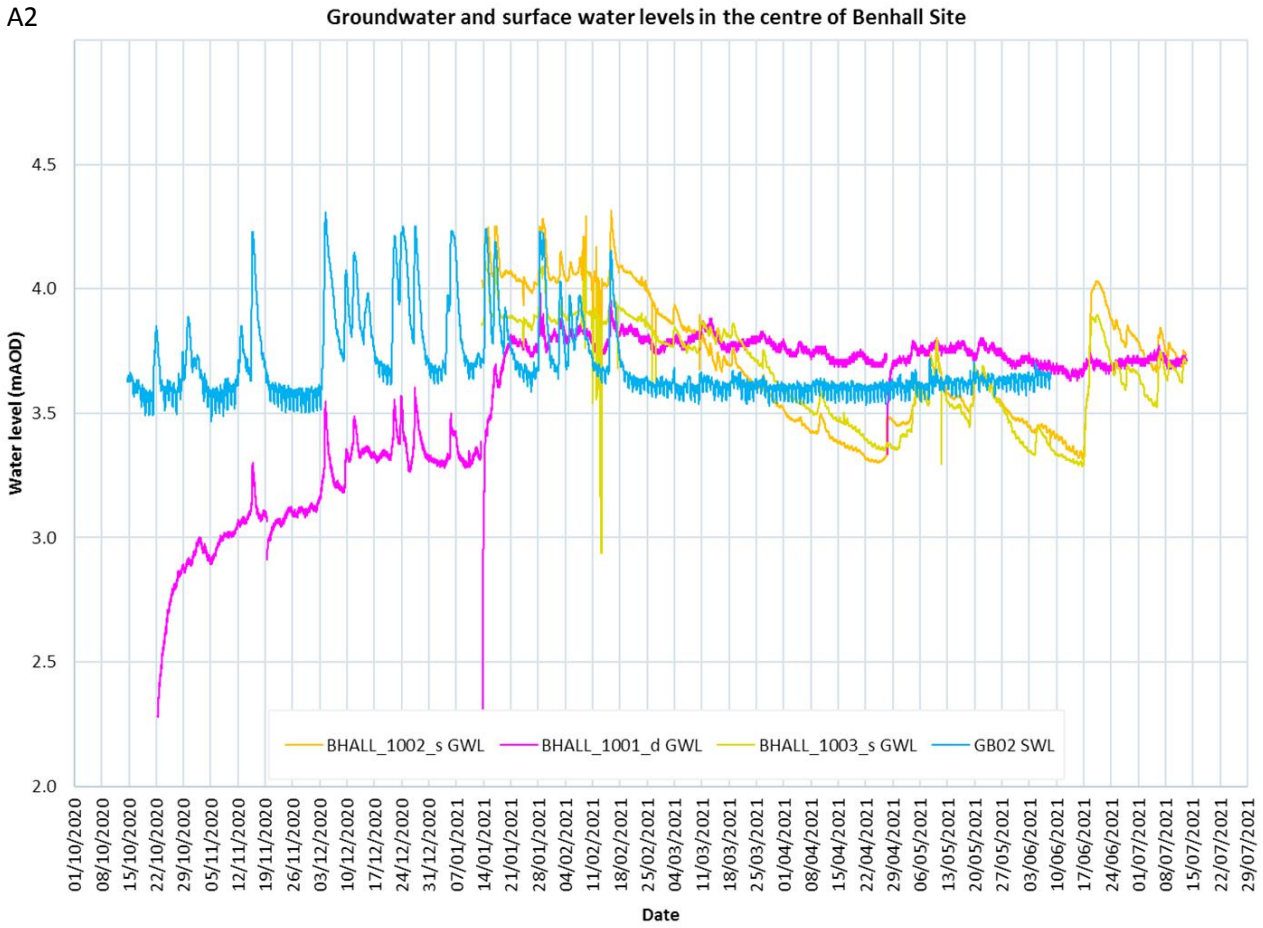




BHaLL1001_s and GB05 showing similar response – decrease in superficial water levels in spring months?
GB03 has higher levels – is this where the WRCSTW discharge is? No access to the area to double check for a potential discharge.
River flows from outside the site via GB03 location

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A2



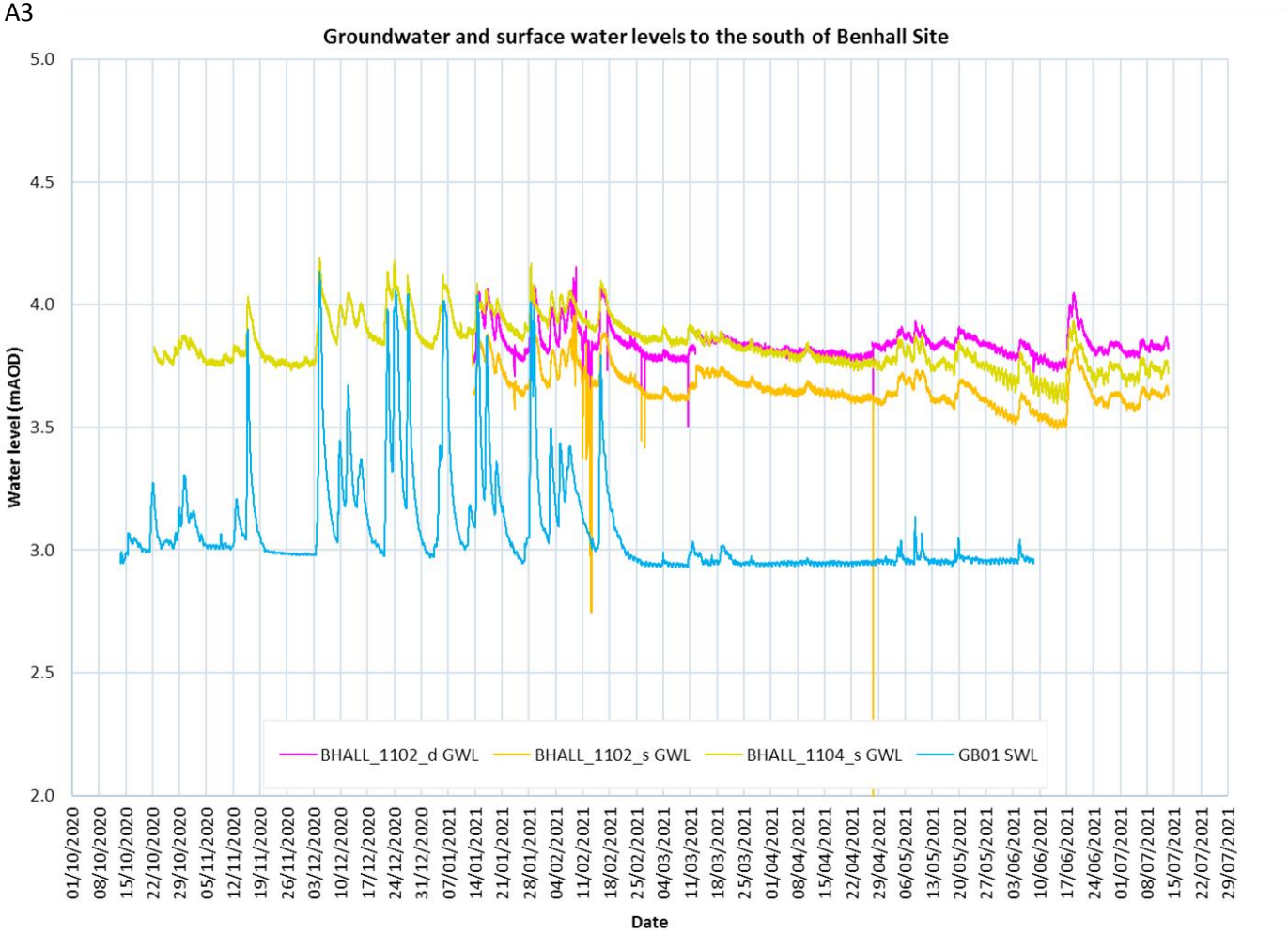


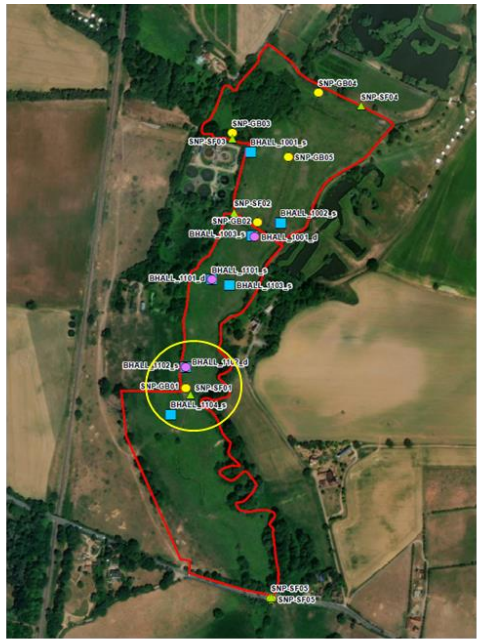
The superficial deposits 1002_s and 1003_s are showing decreases over the spring period, the same is not seen in the Crag borehole 1001_d.

Water levels in GB02 are being maintained despite drop in water levels in the superficial – No other visible input upflow

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A3

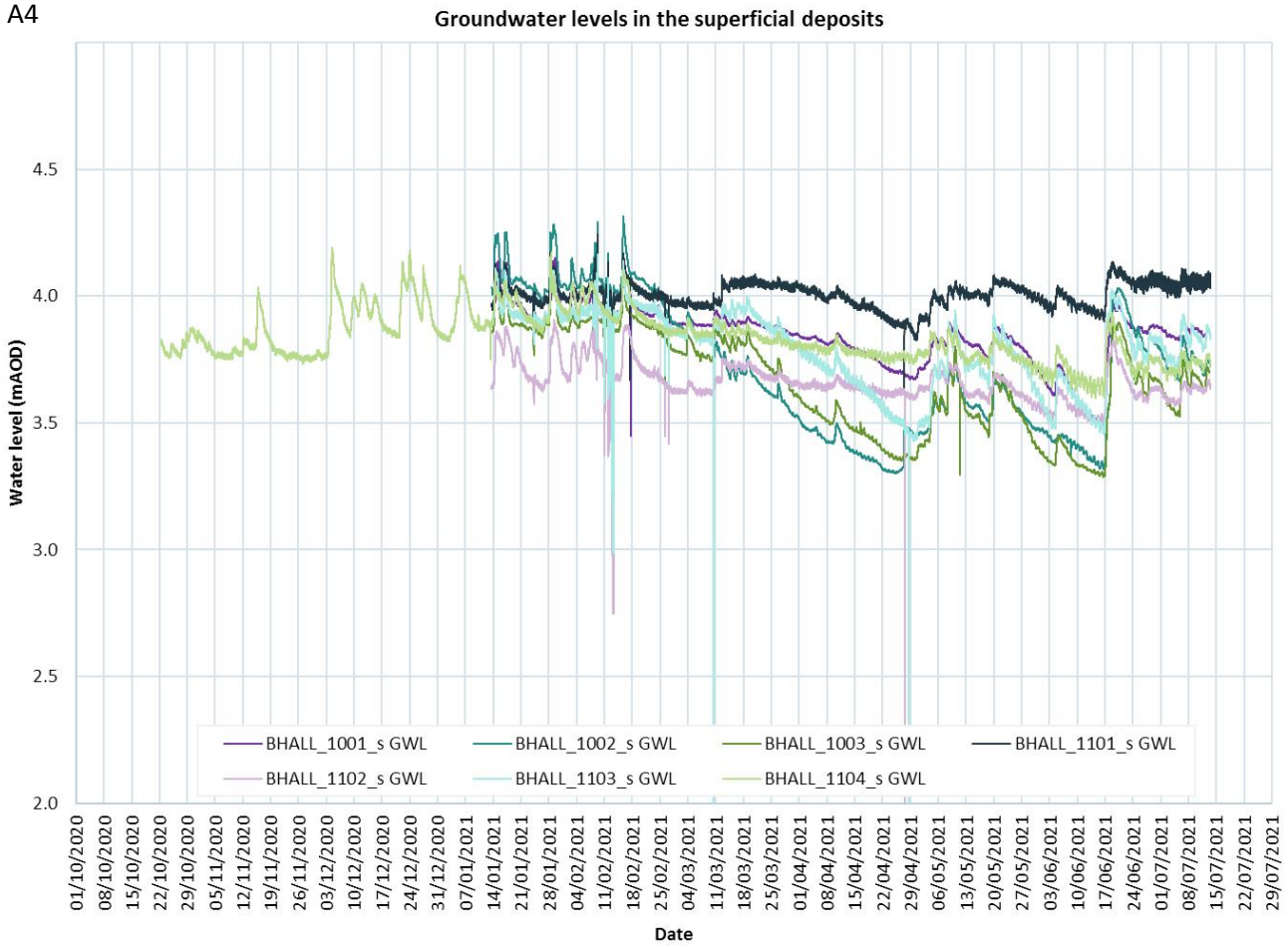




1102_d and 1102_s showing similar levels of fluctuation although deeper borehole water level is slightly above that of superficals – some upward flow?
Timing in fluctuations in SW GB01 same as in piezometer and dipwell.

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A4

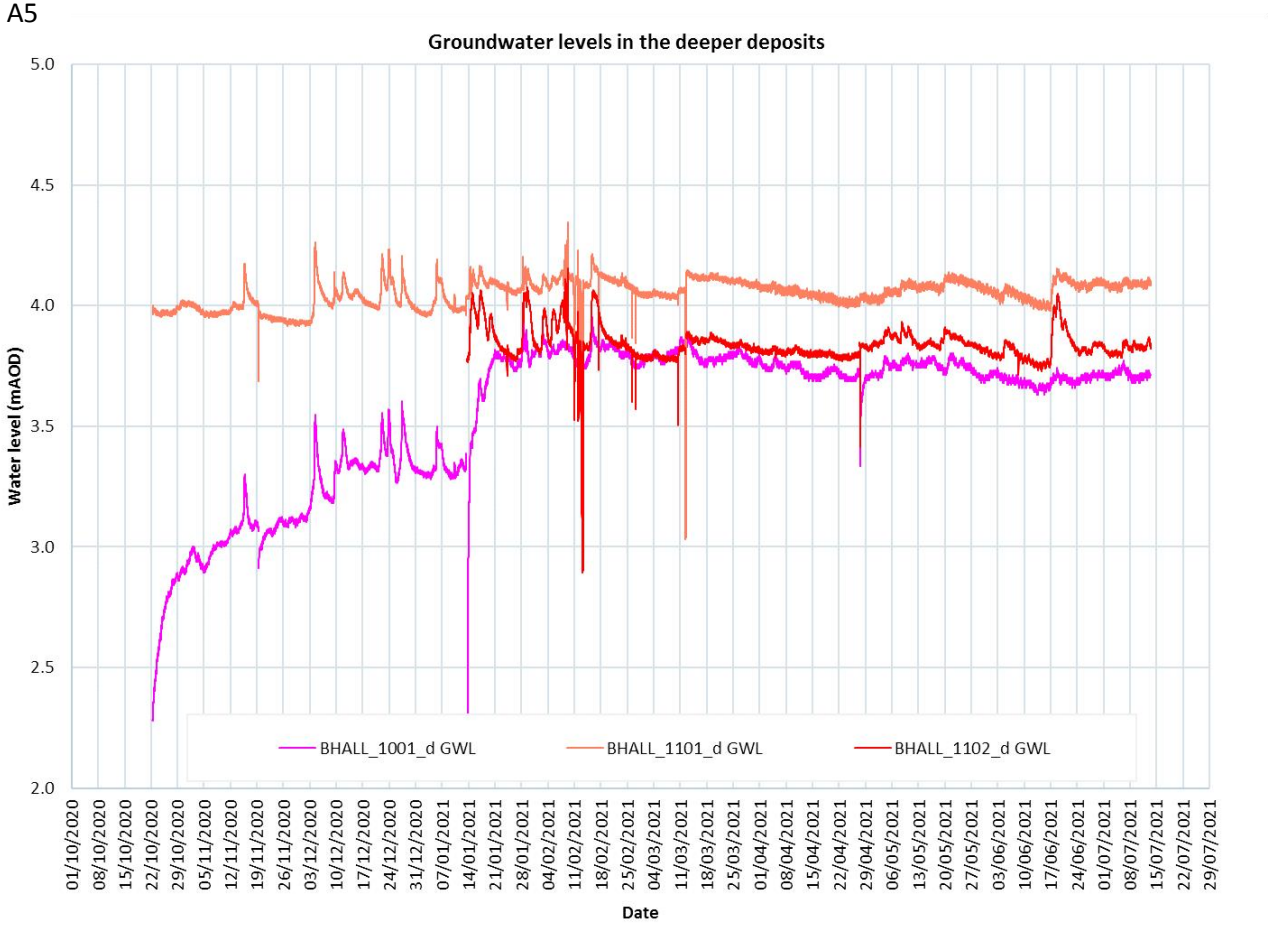




All showing similar decline over spring period. Fluctuation muted in 1102_s (upward flow from Crag to support levels?)

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A5





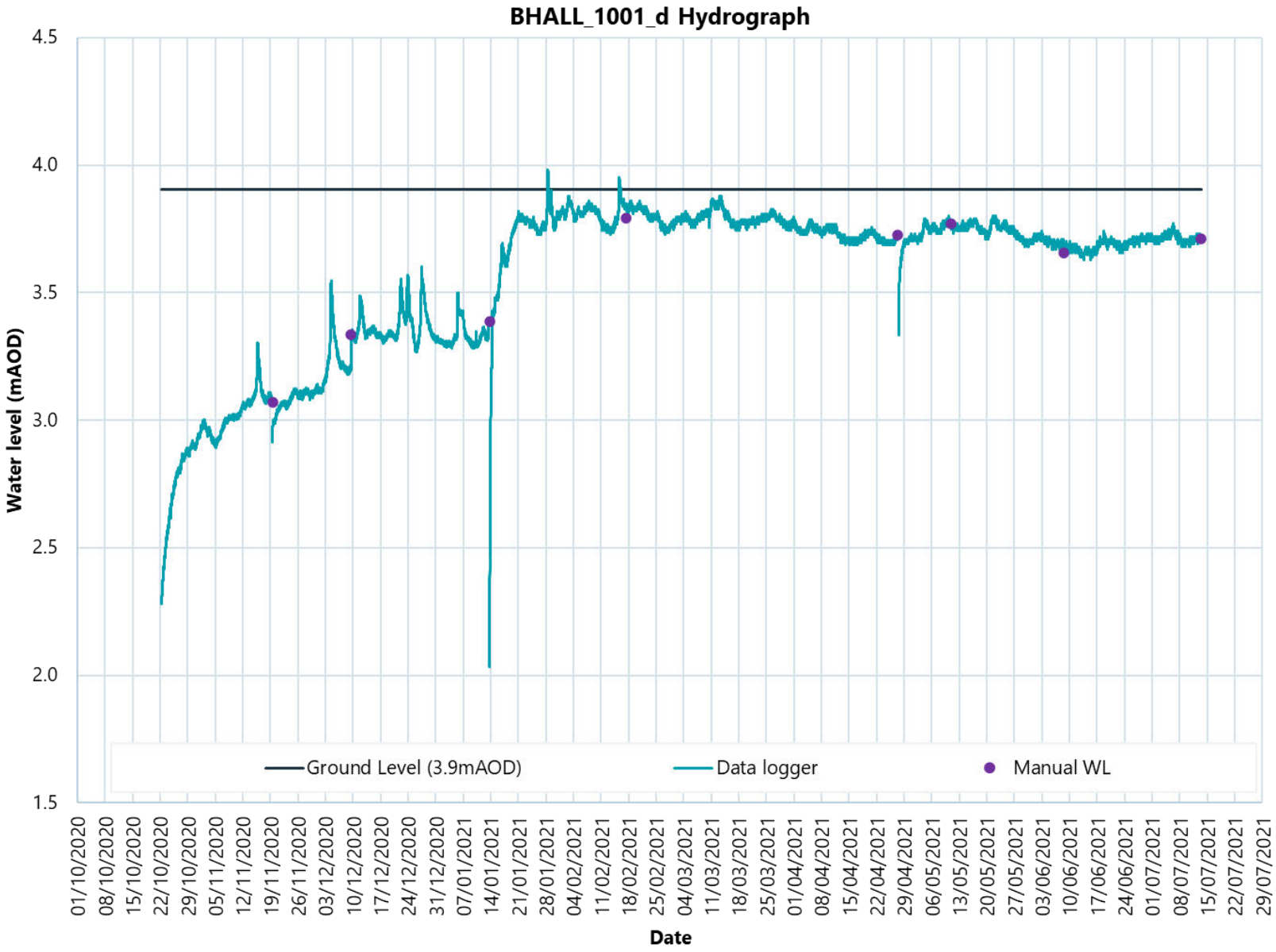
Pattern shows a much small decrease in the drier spring months as compared to the superficial deposits

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Appendix B
Individual Groundwater Hydrographs

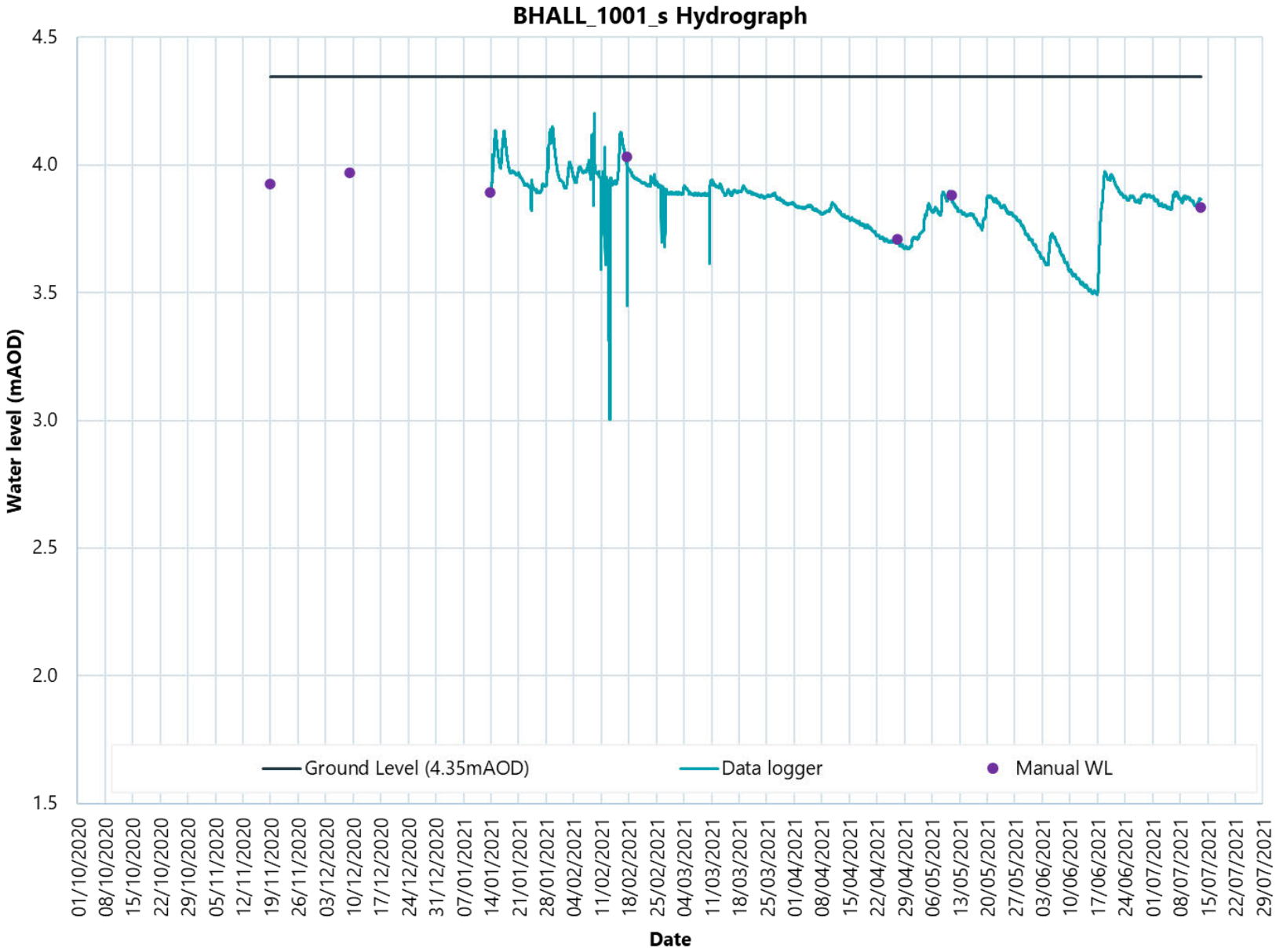
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B1



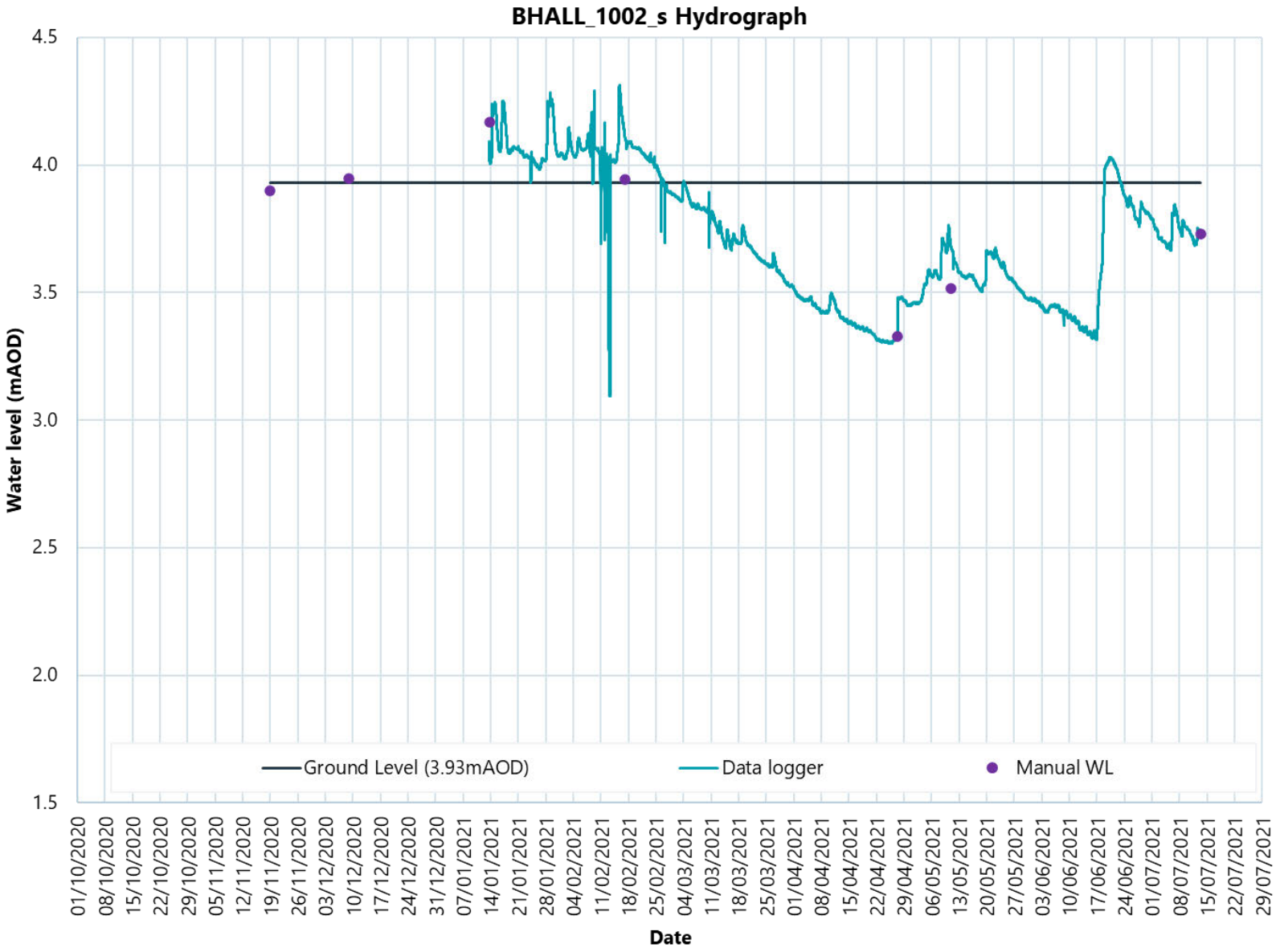
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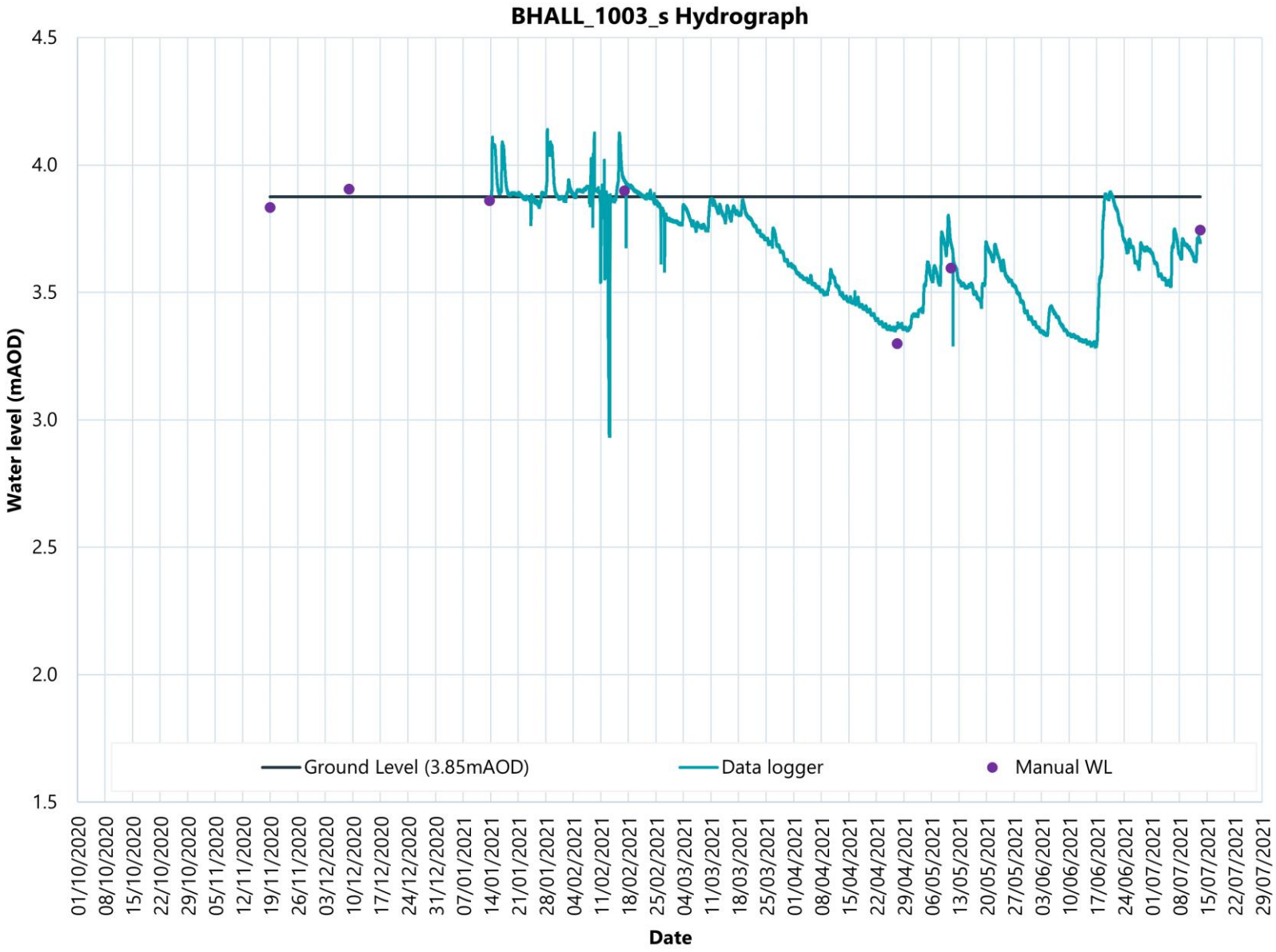
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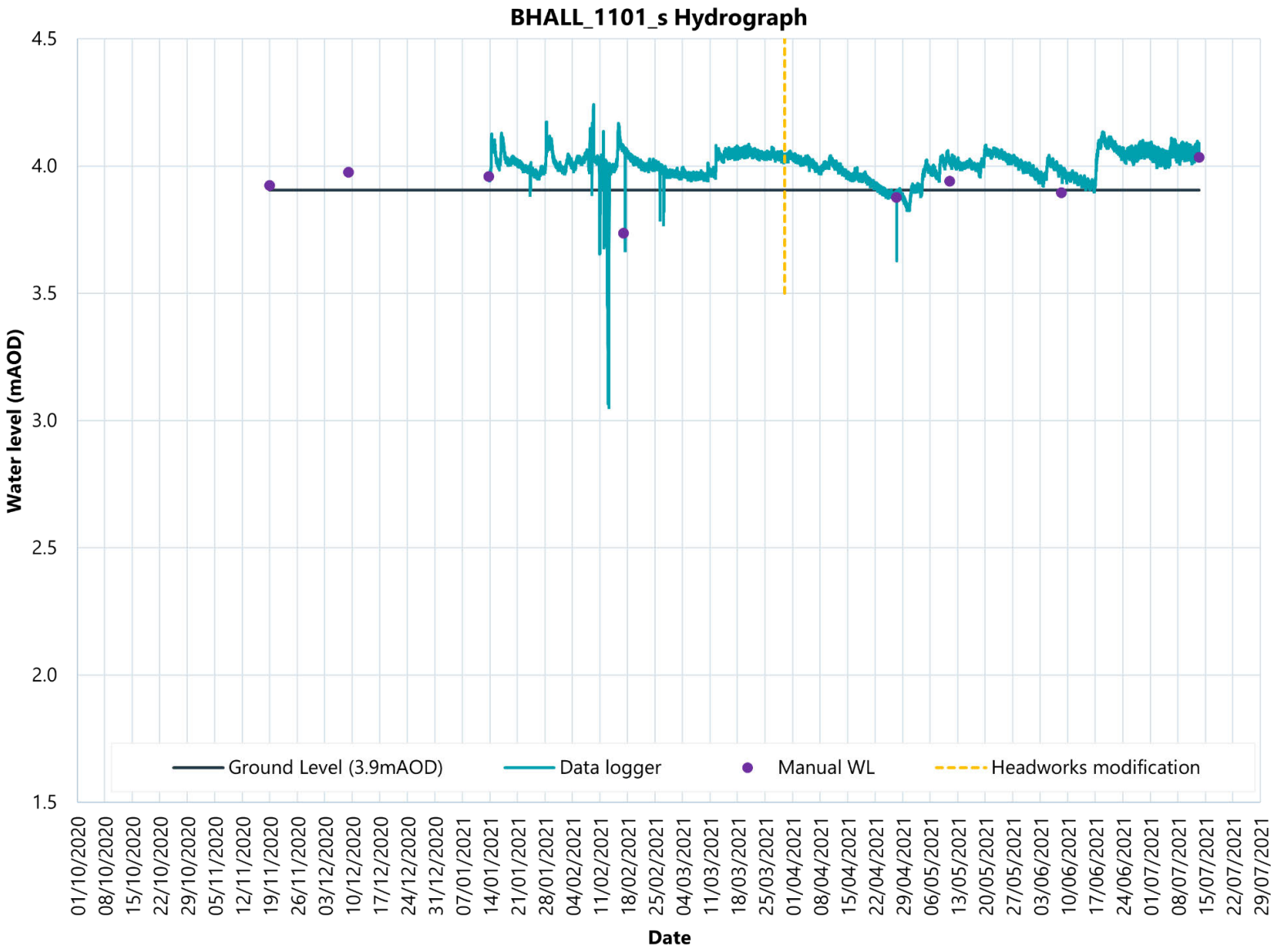
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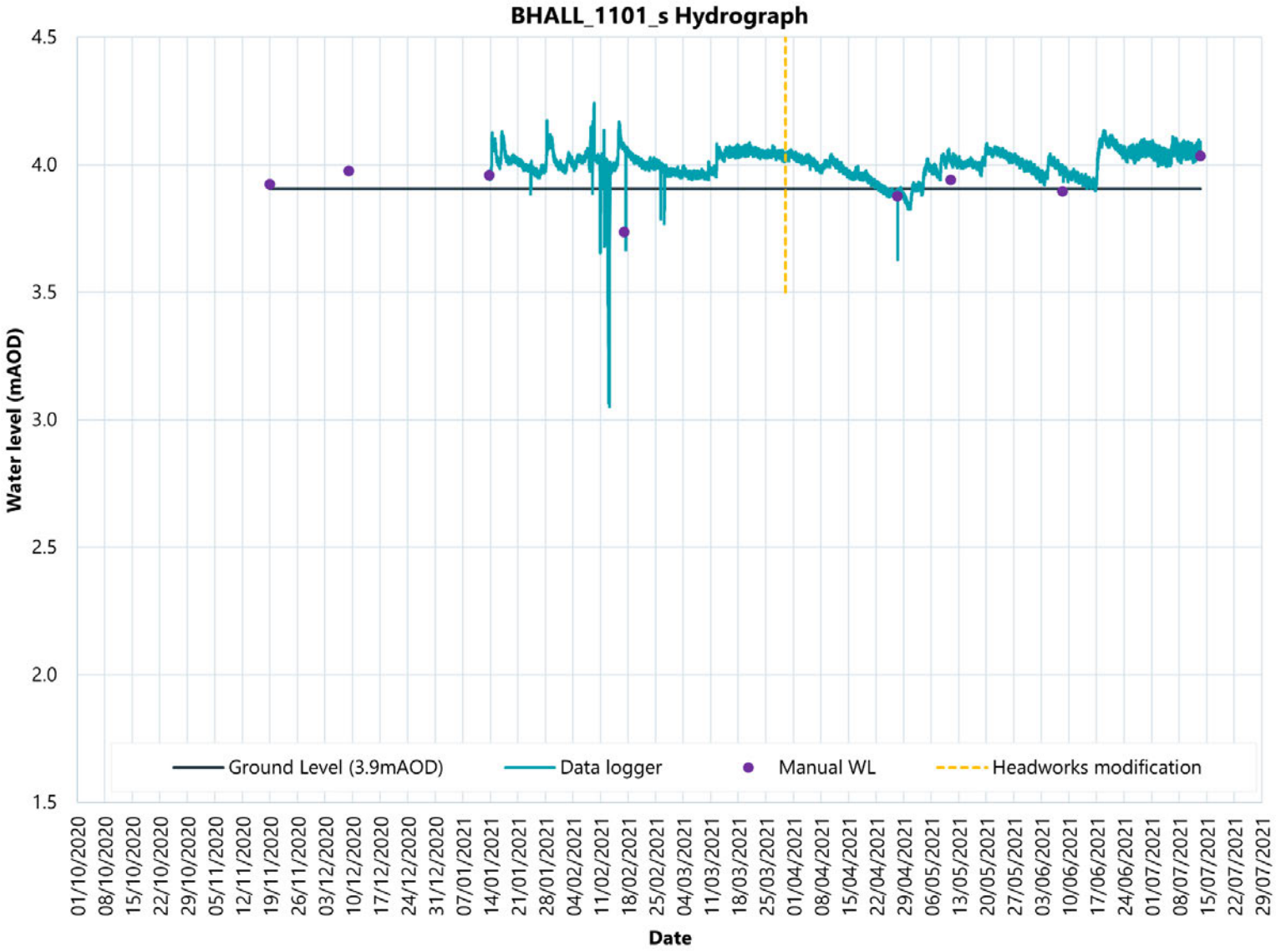
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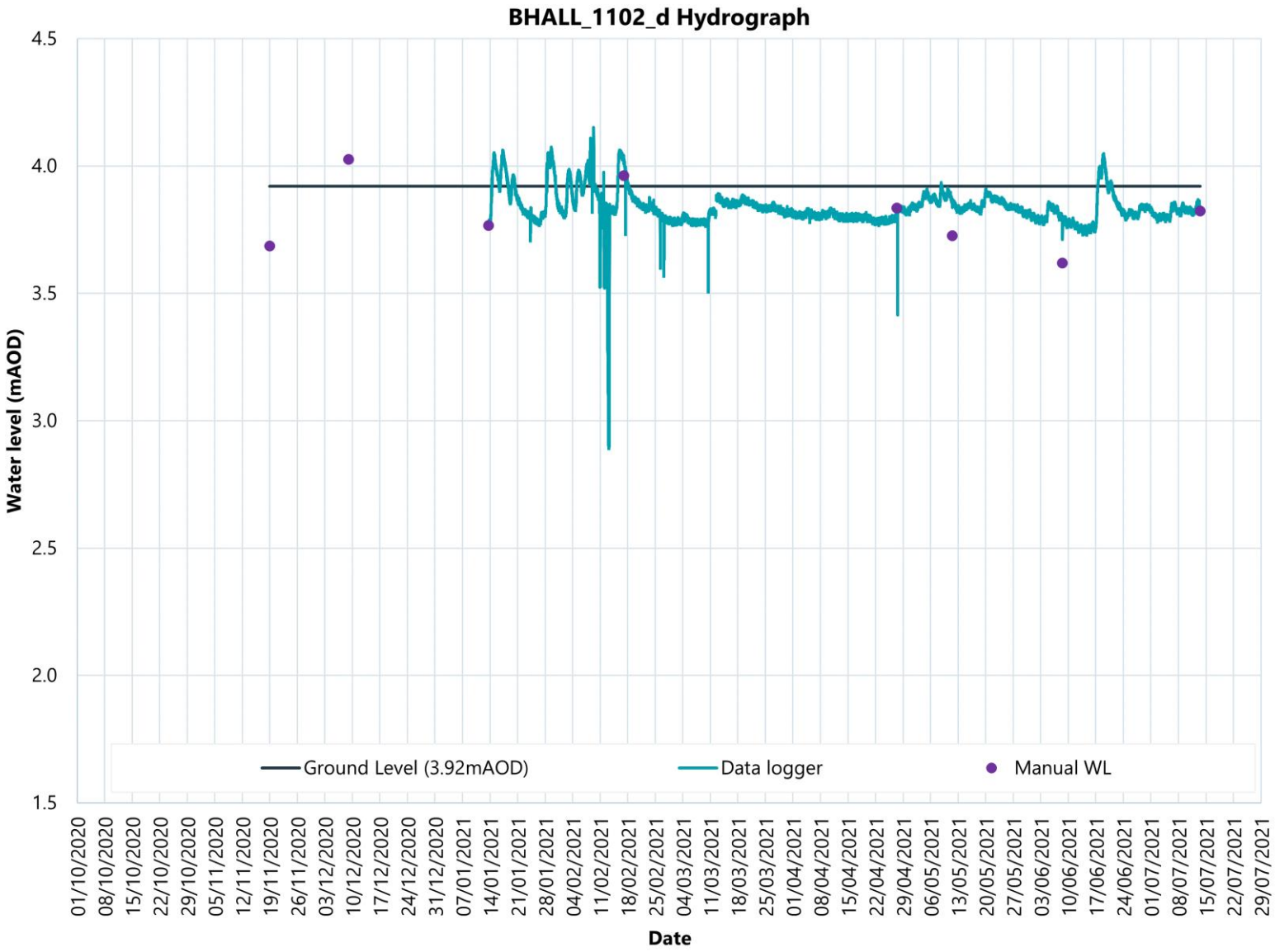
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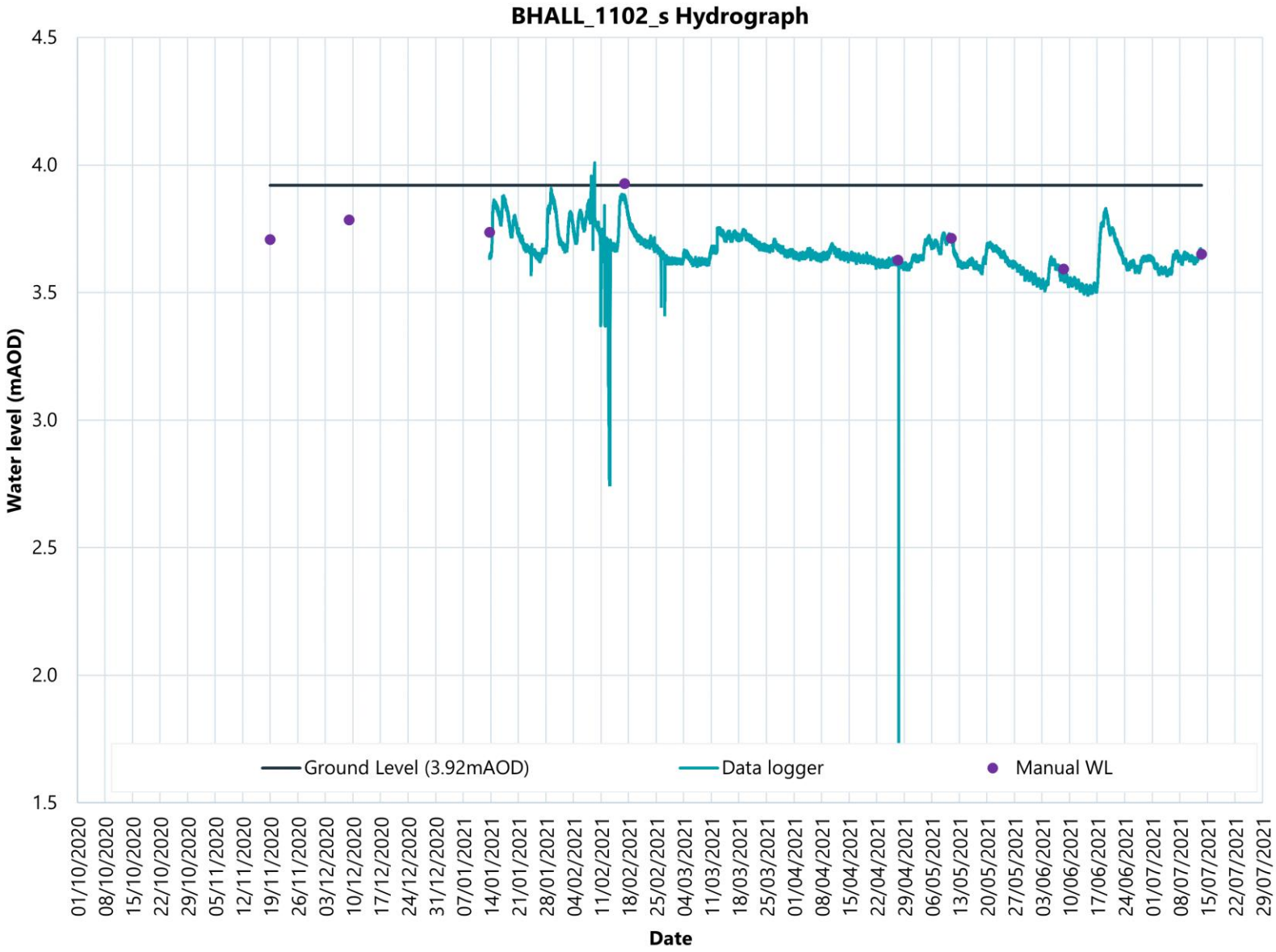
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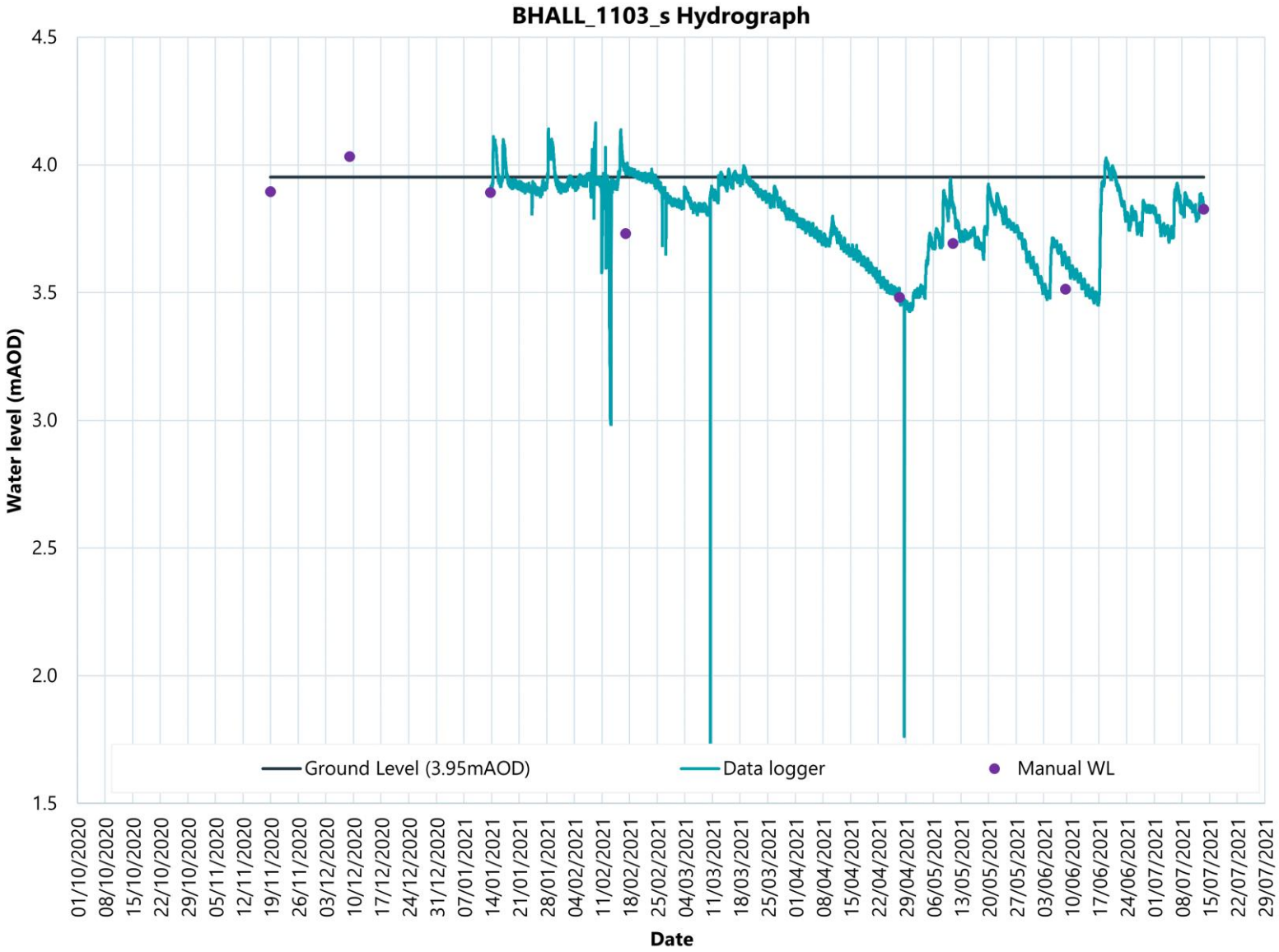
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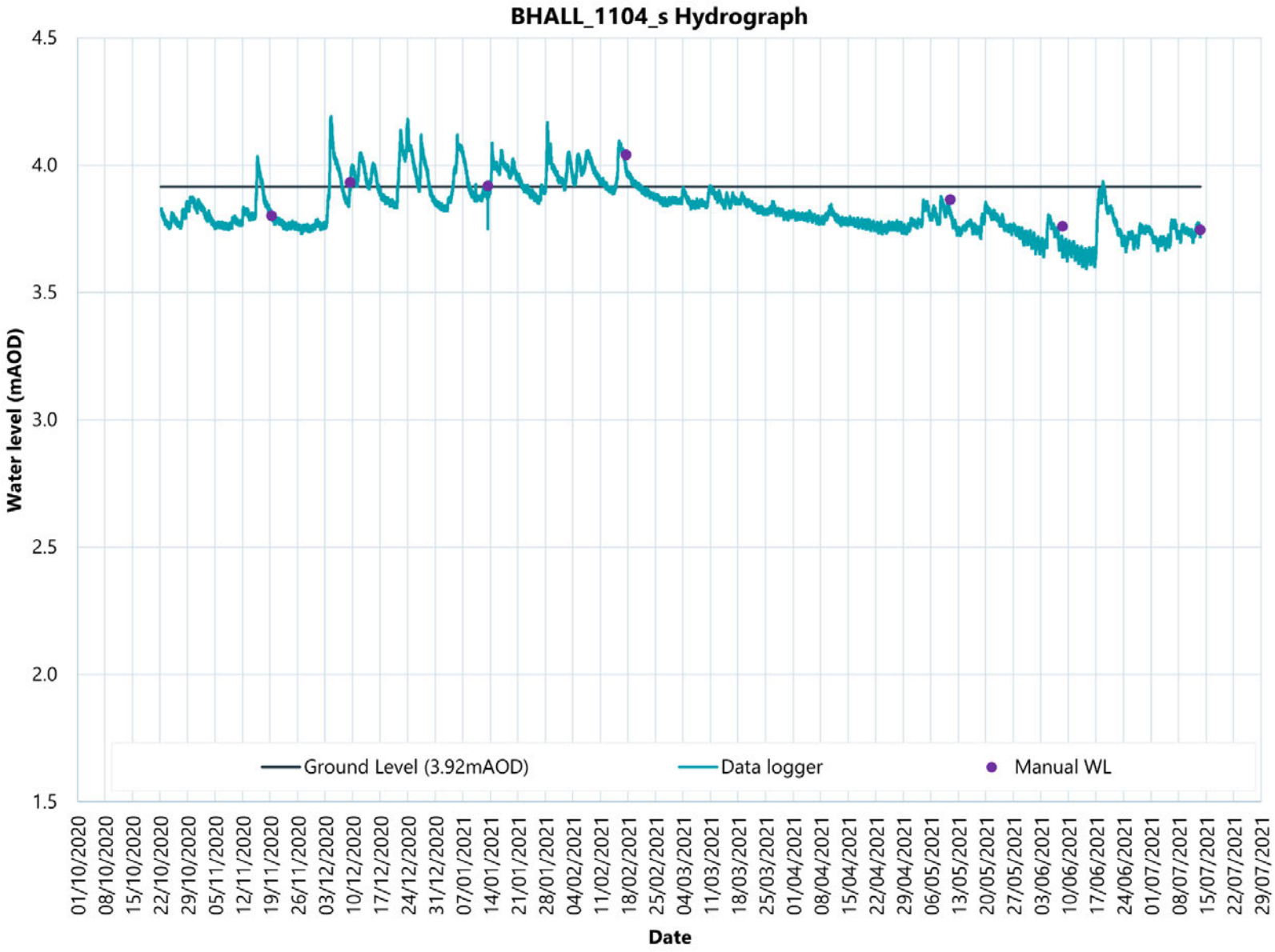
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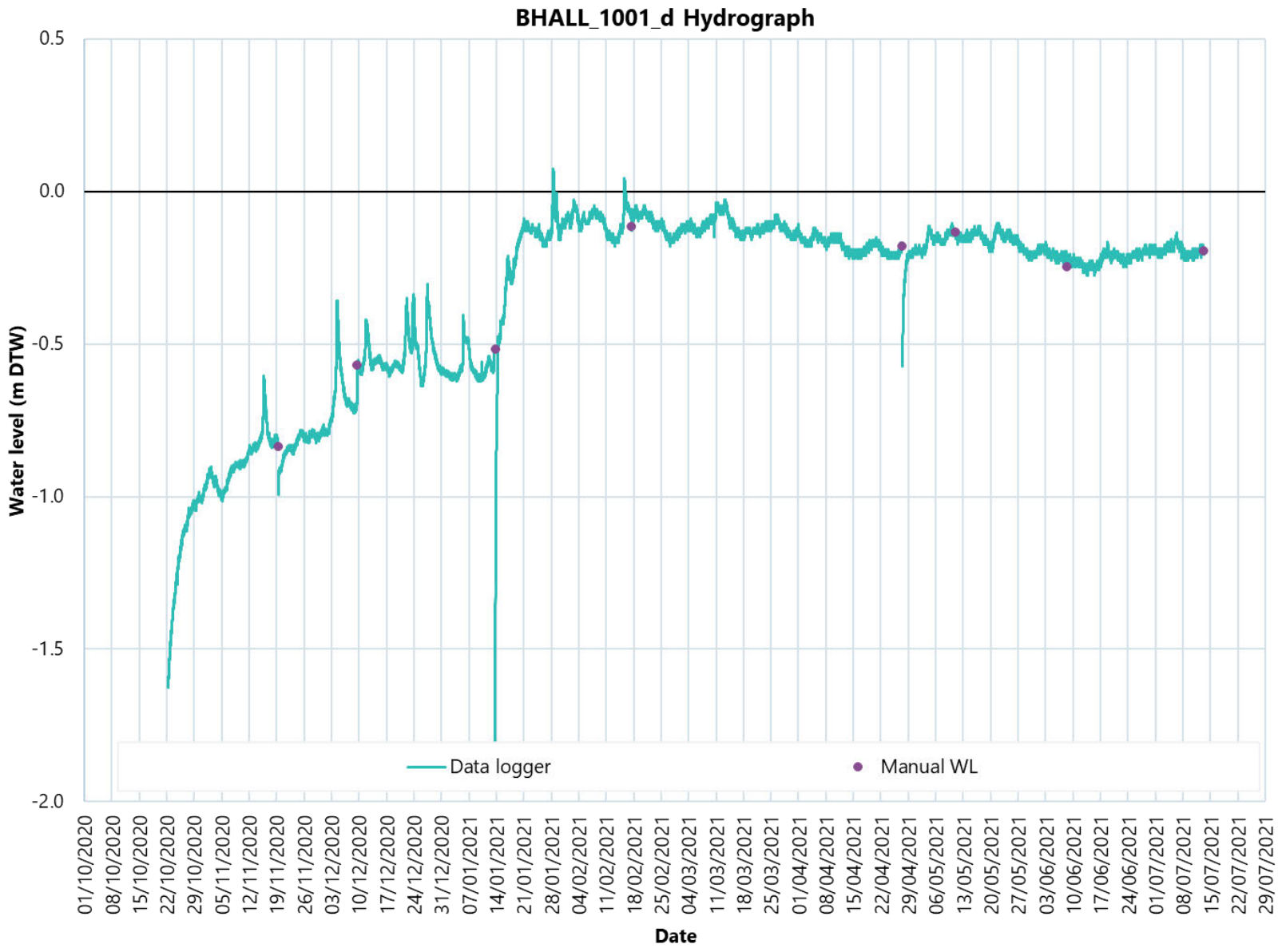
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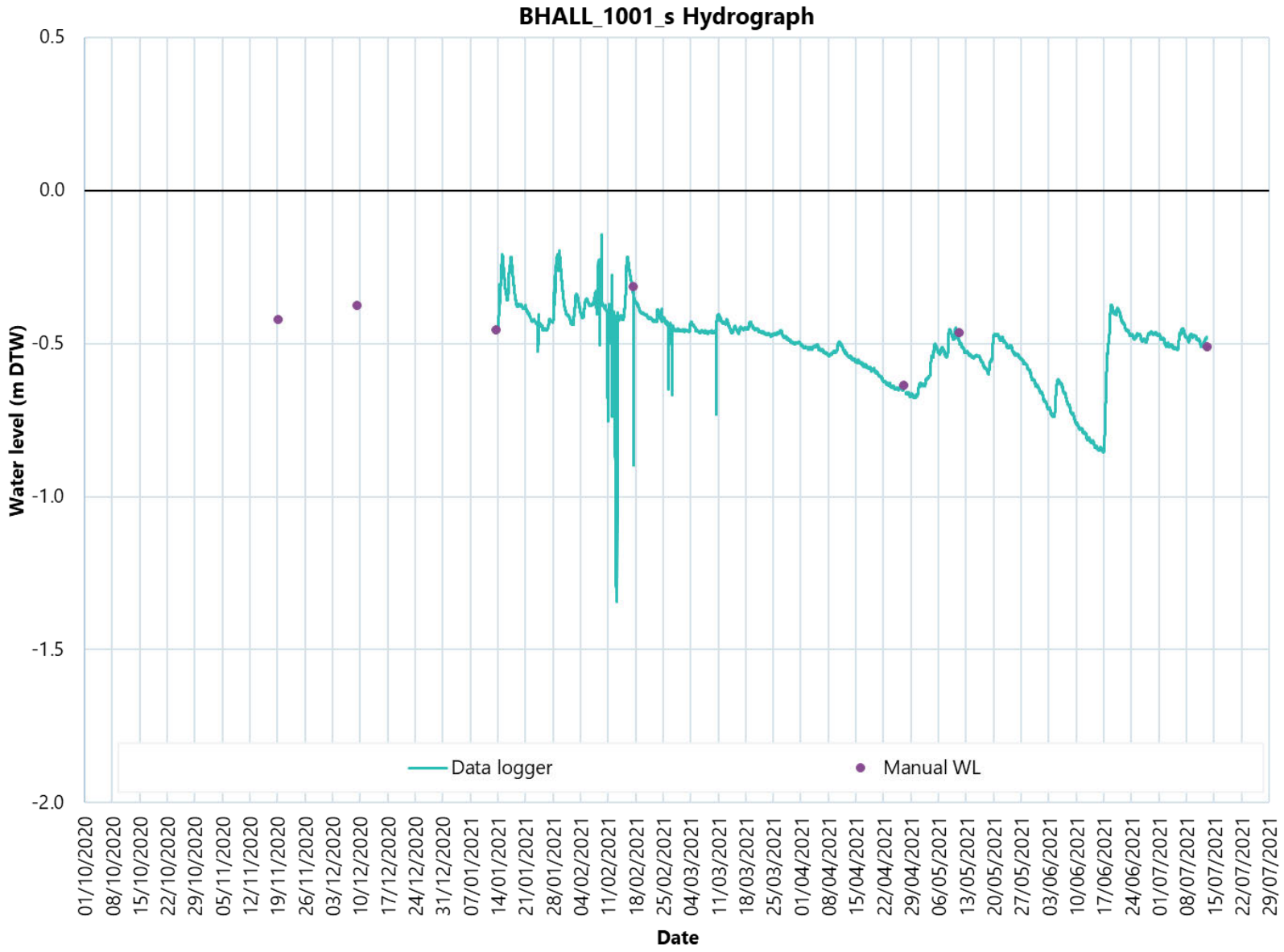
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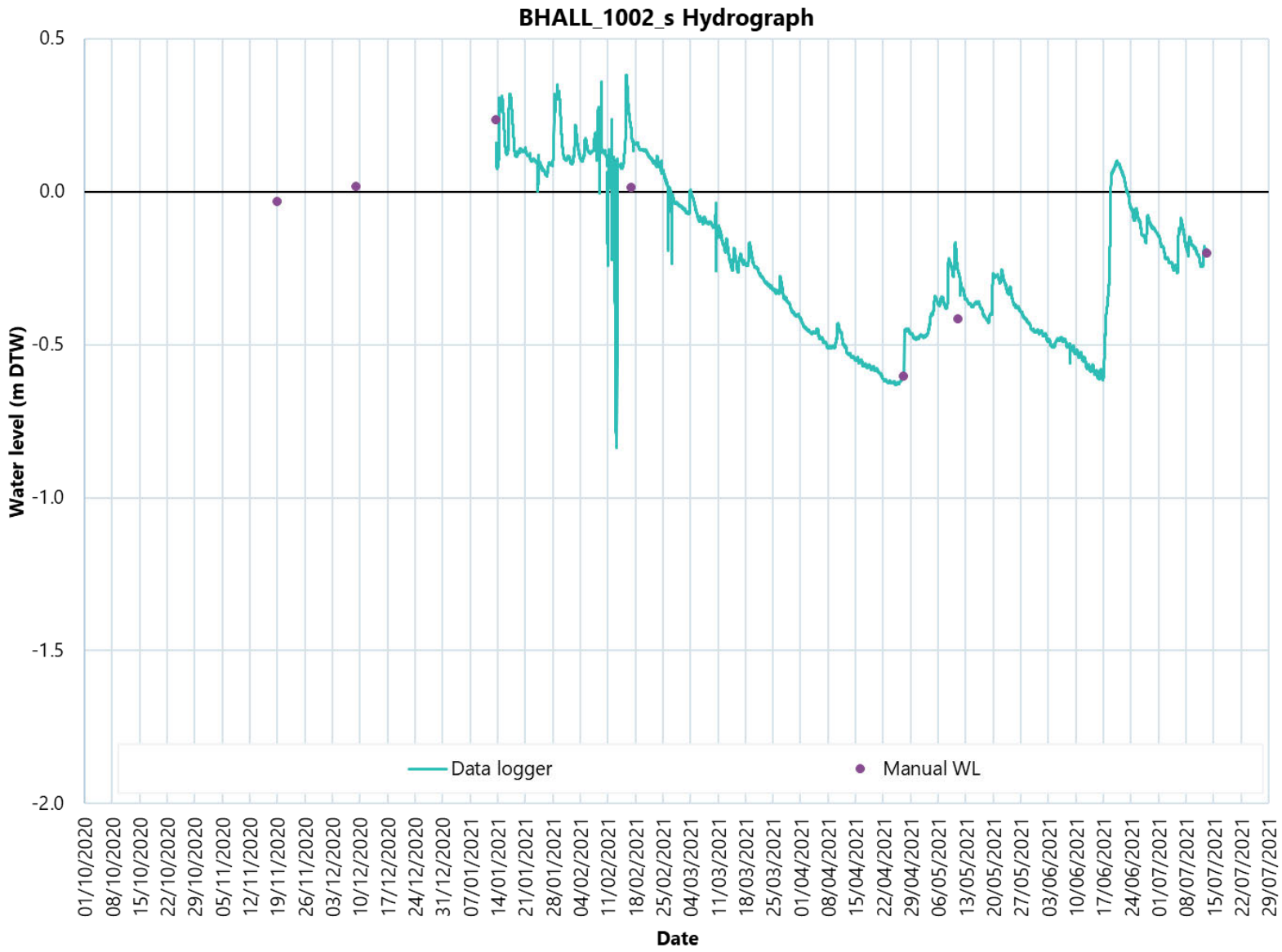
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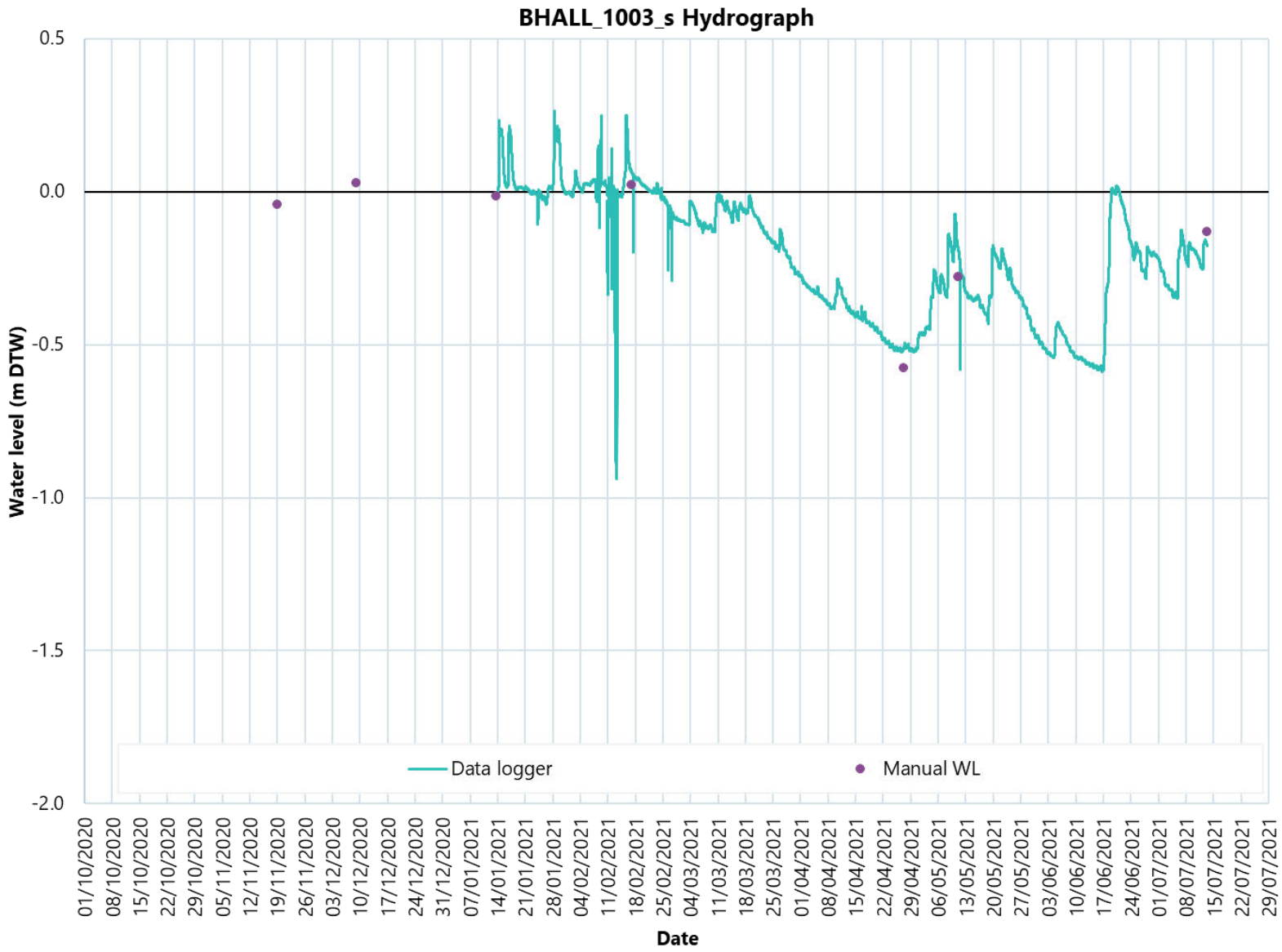
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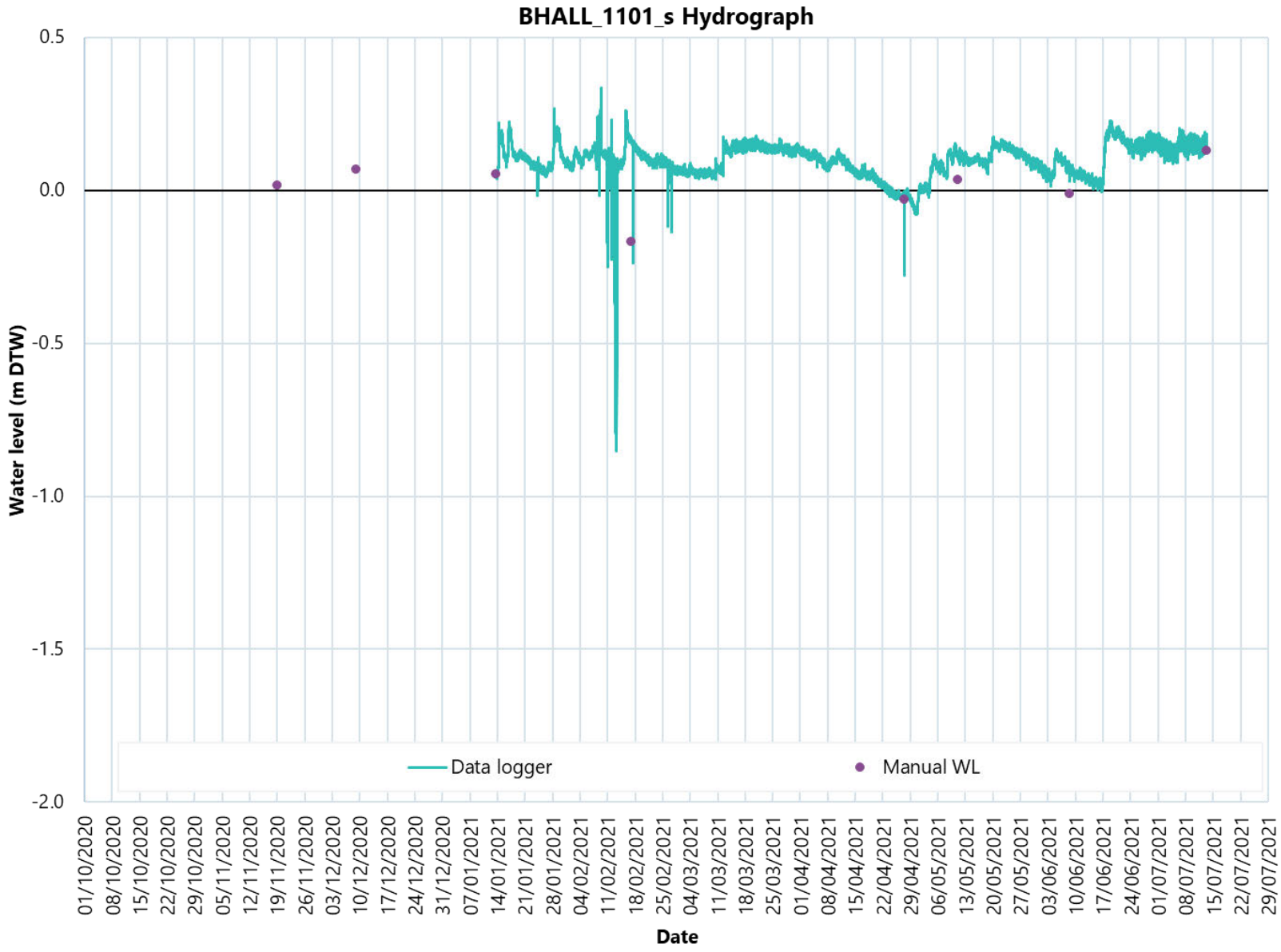
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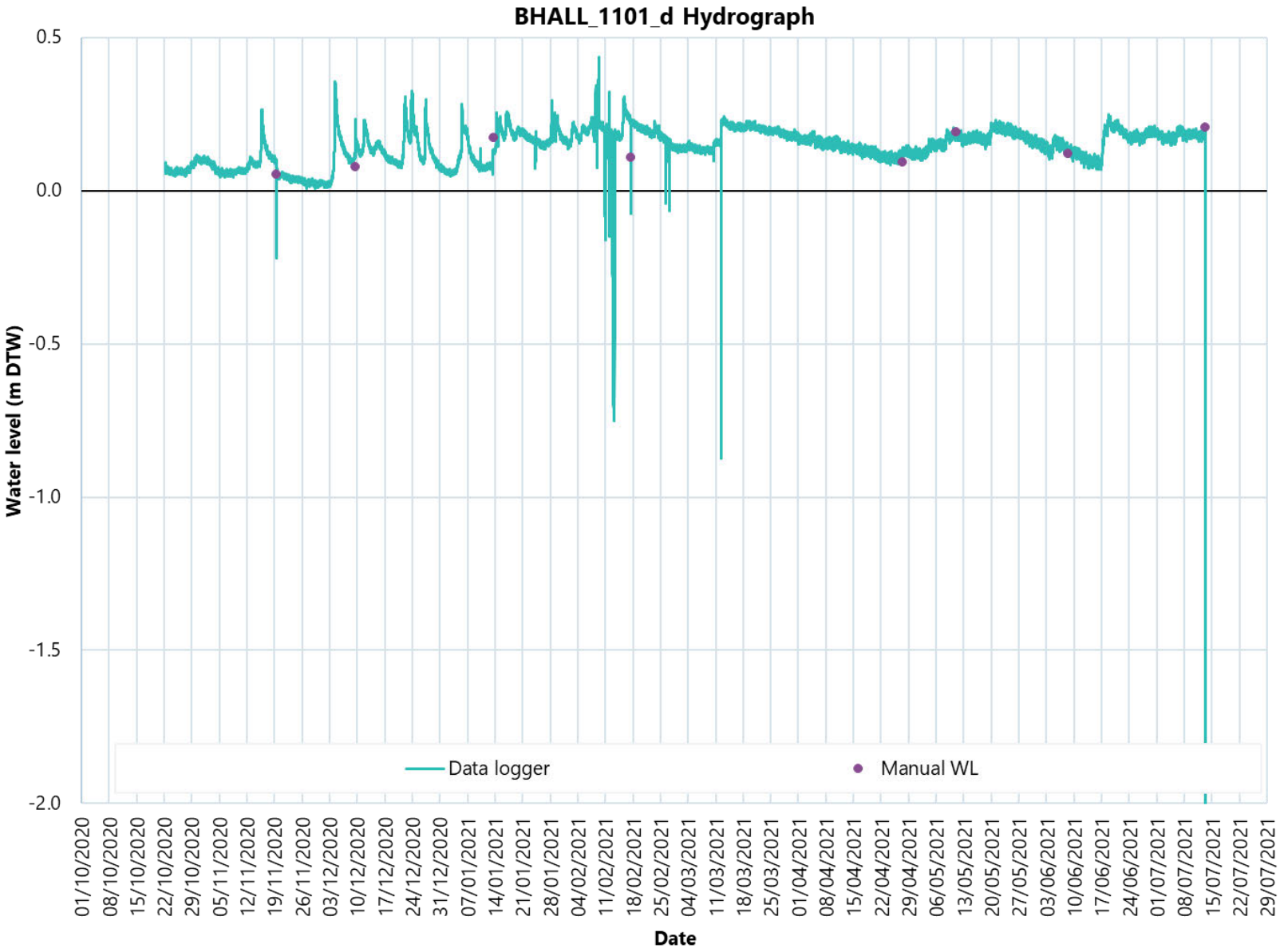
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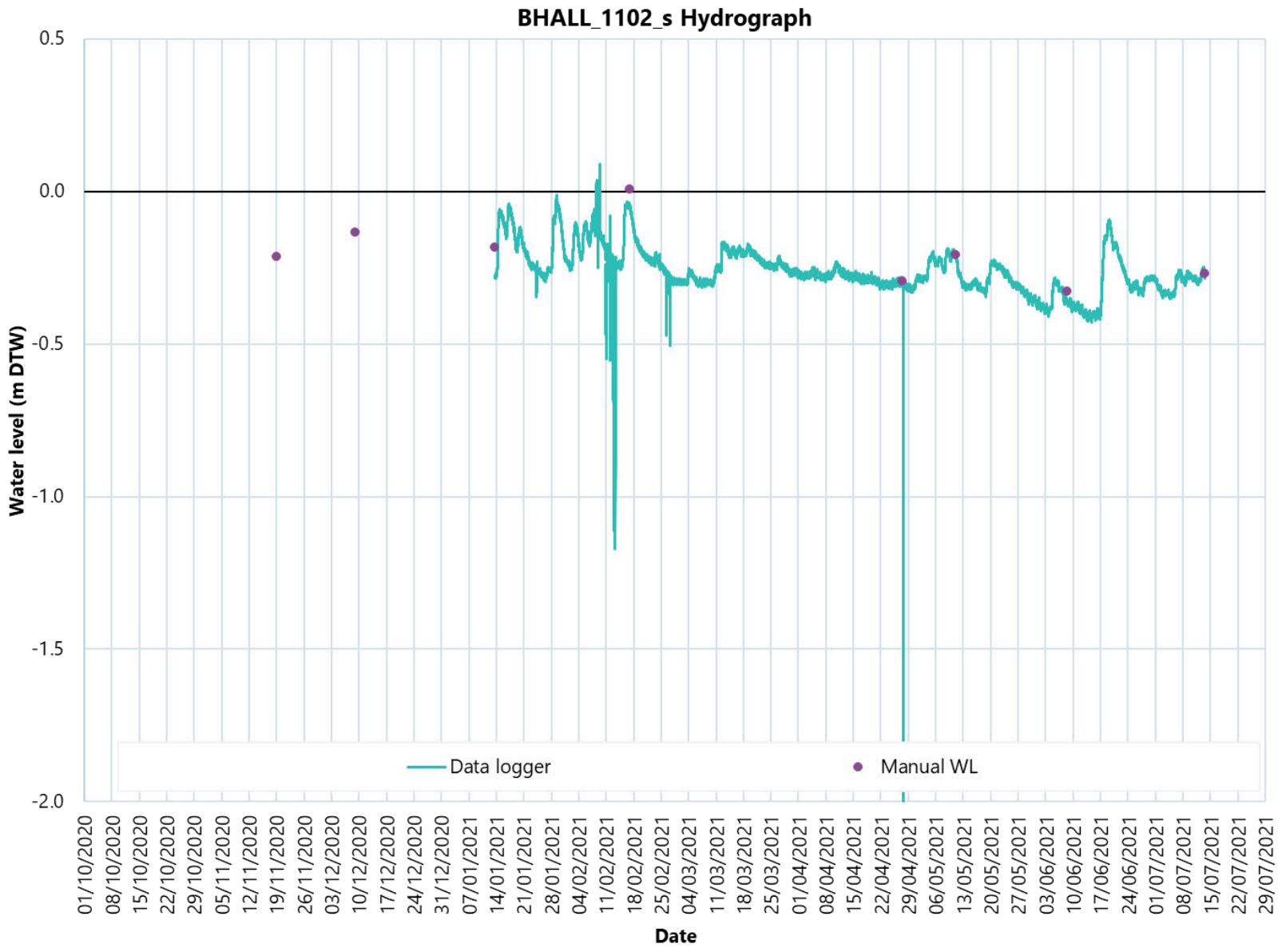
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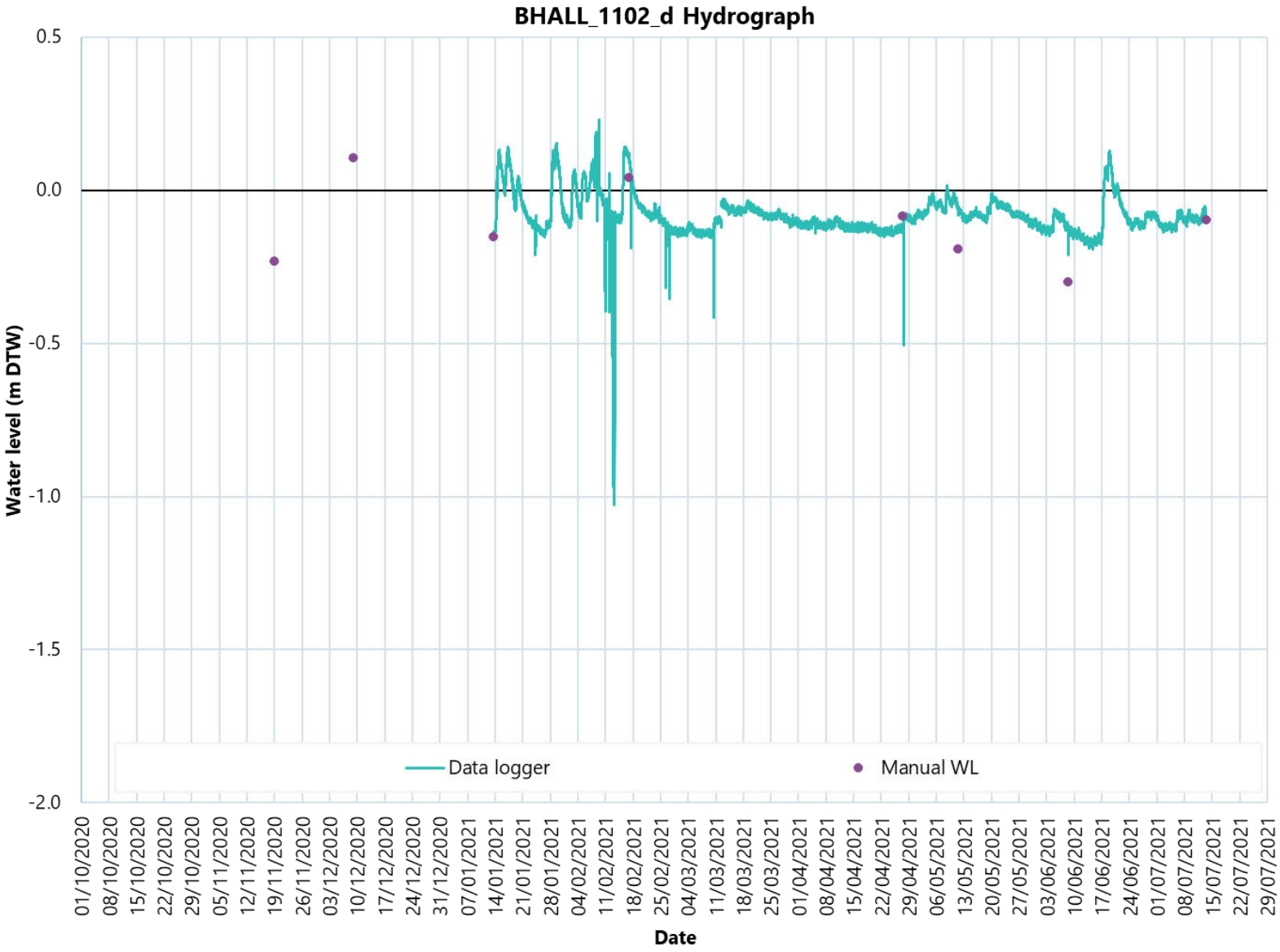
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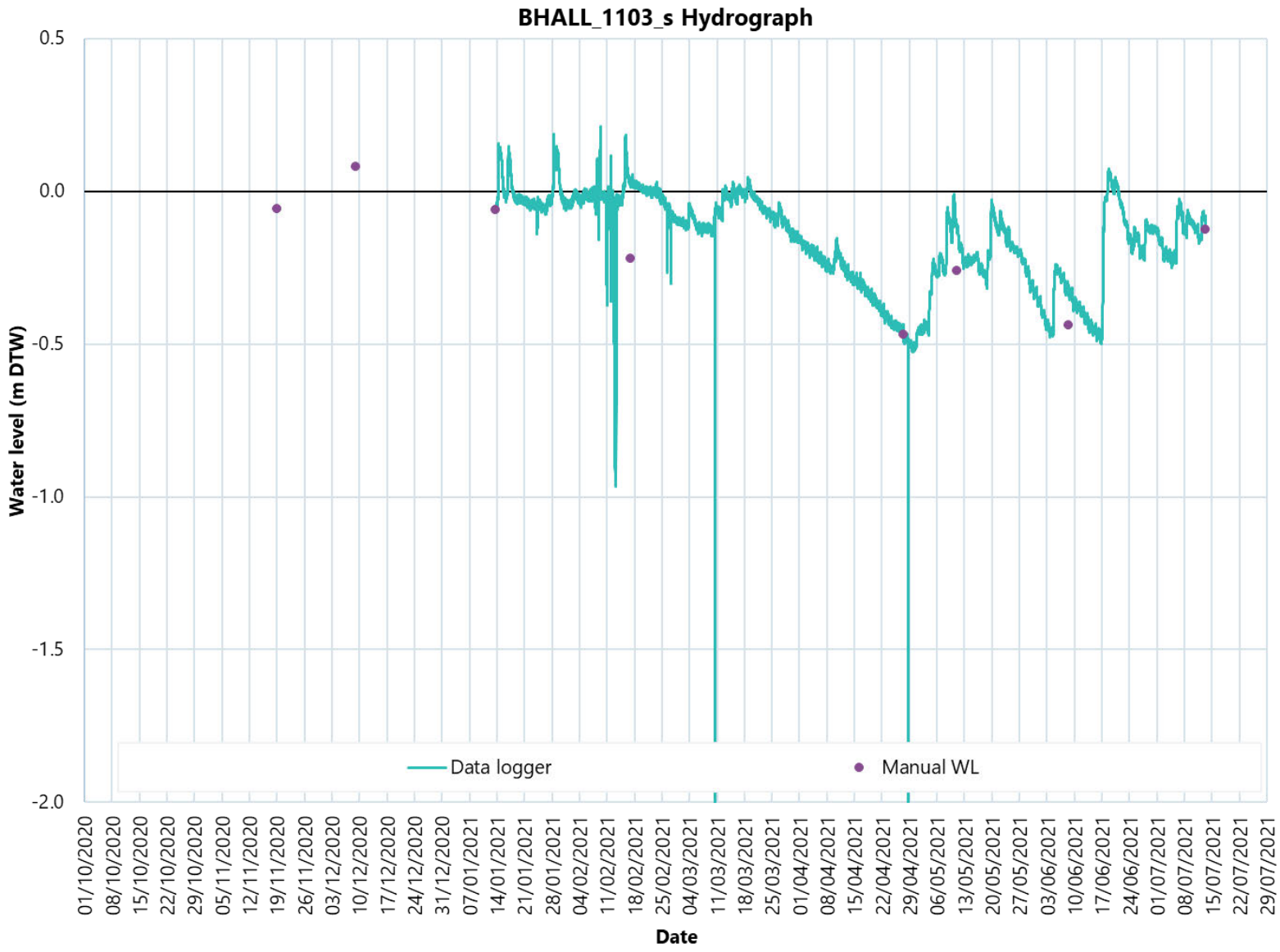
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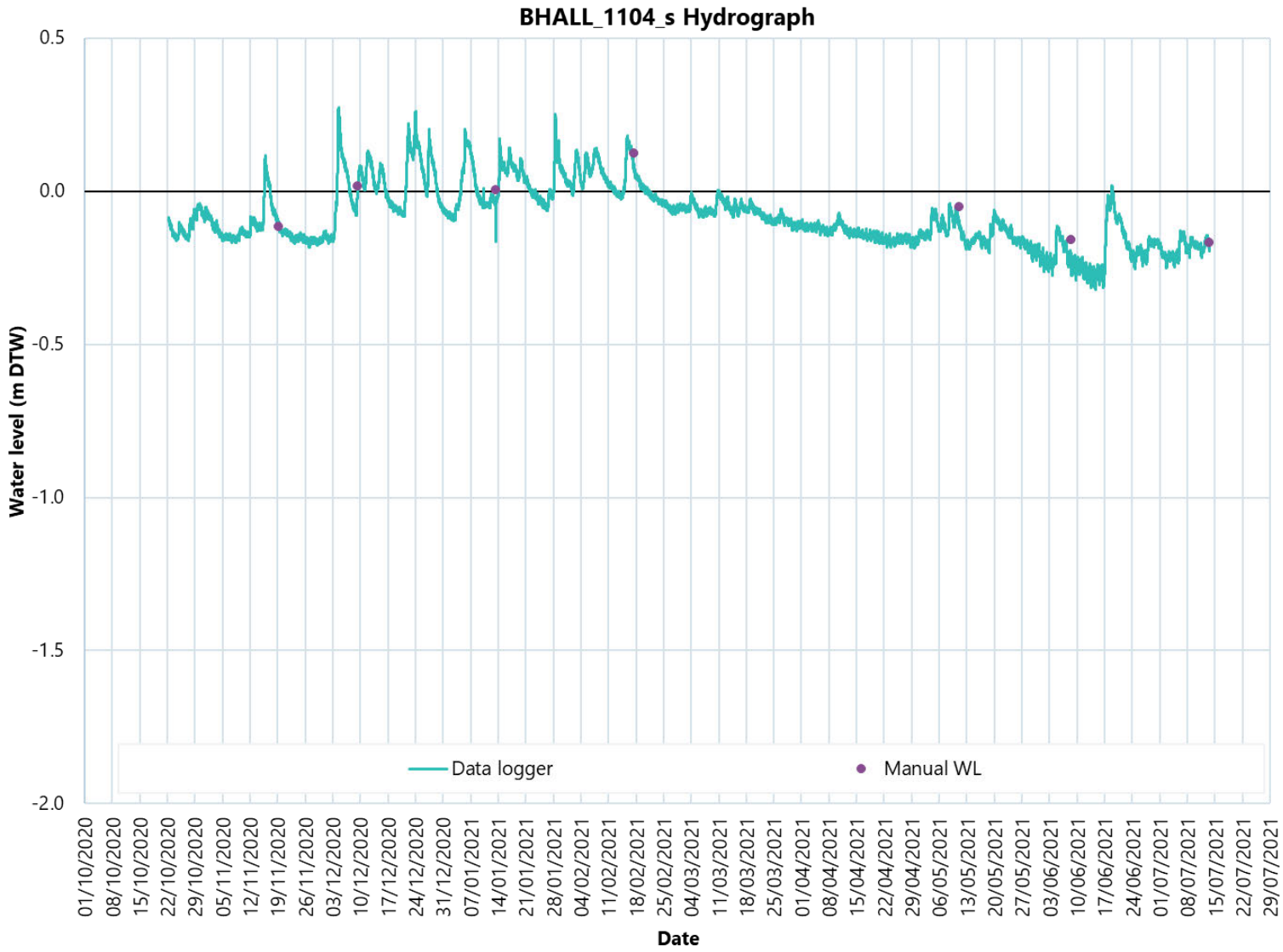
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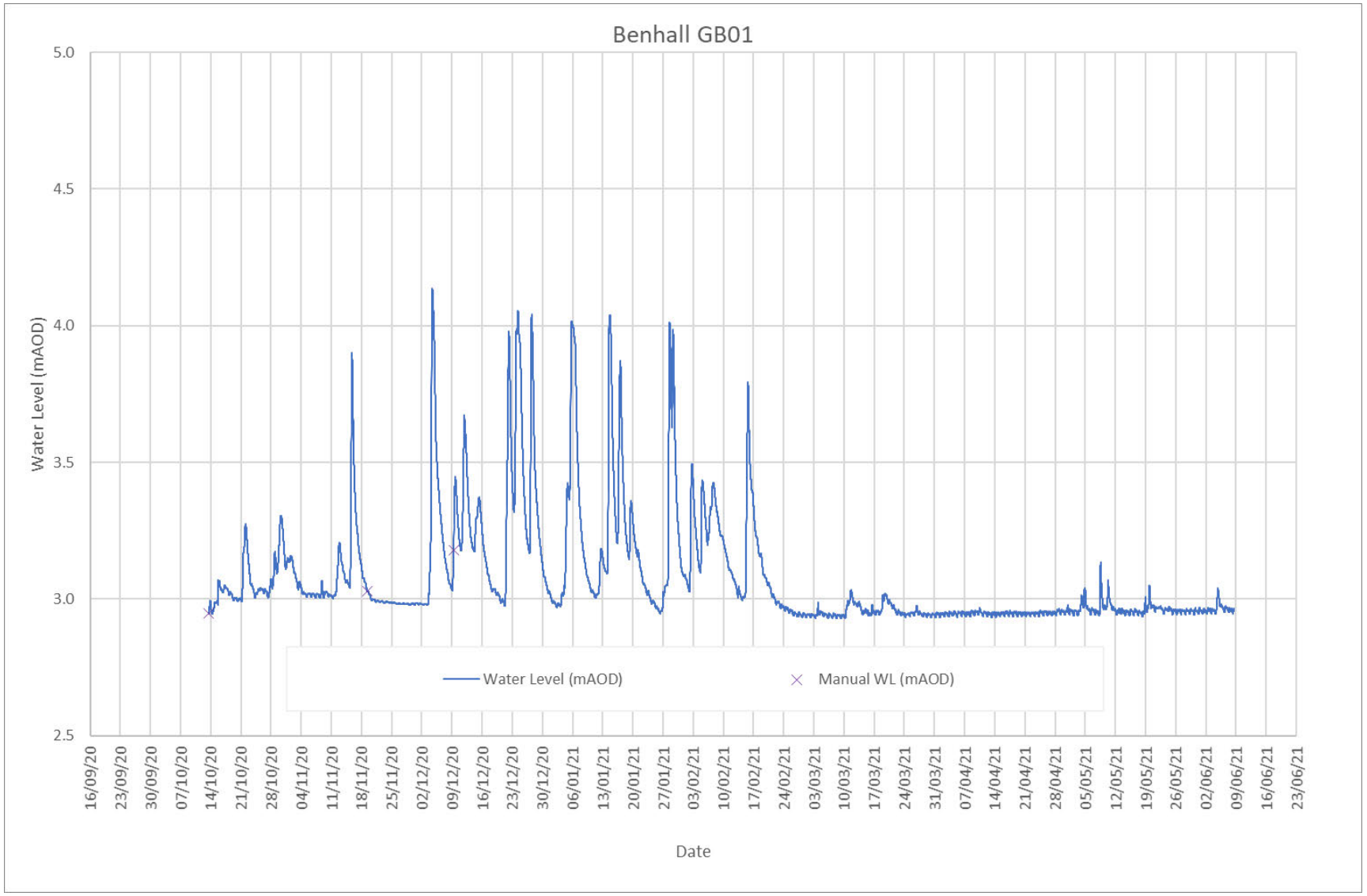


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Appendix C
Individual Surface Water Hydrographs

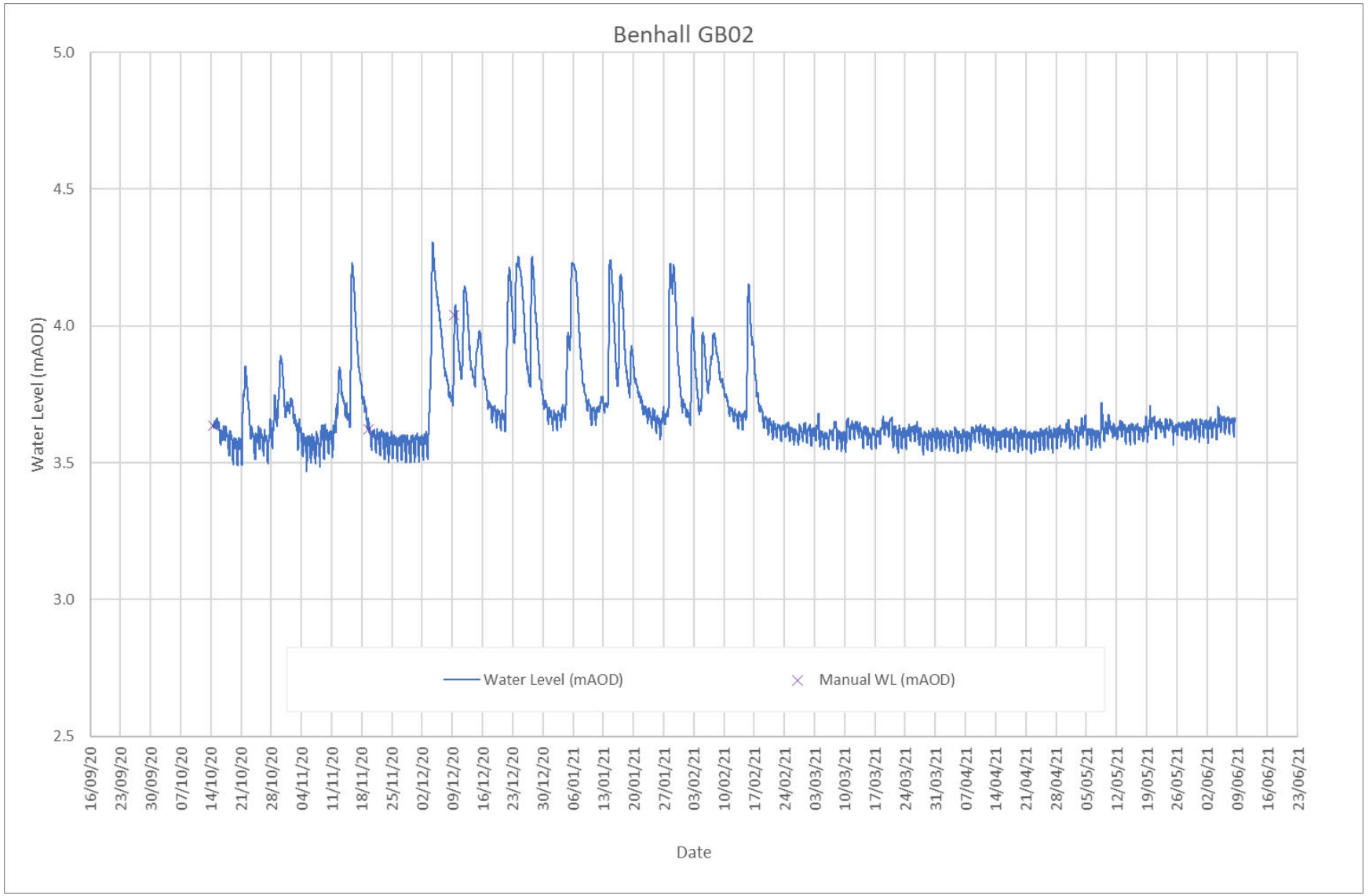
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C1



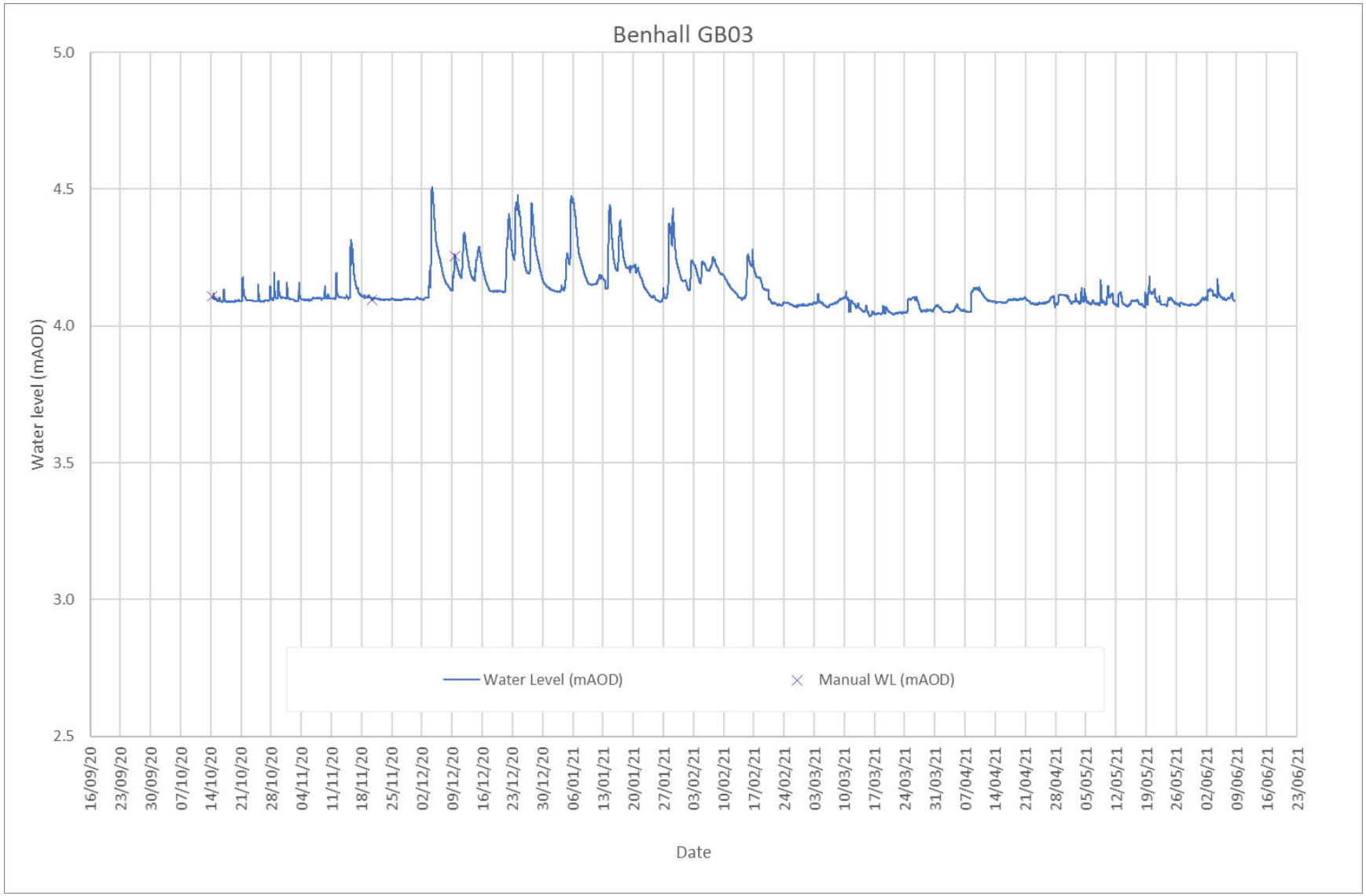
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C2



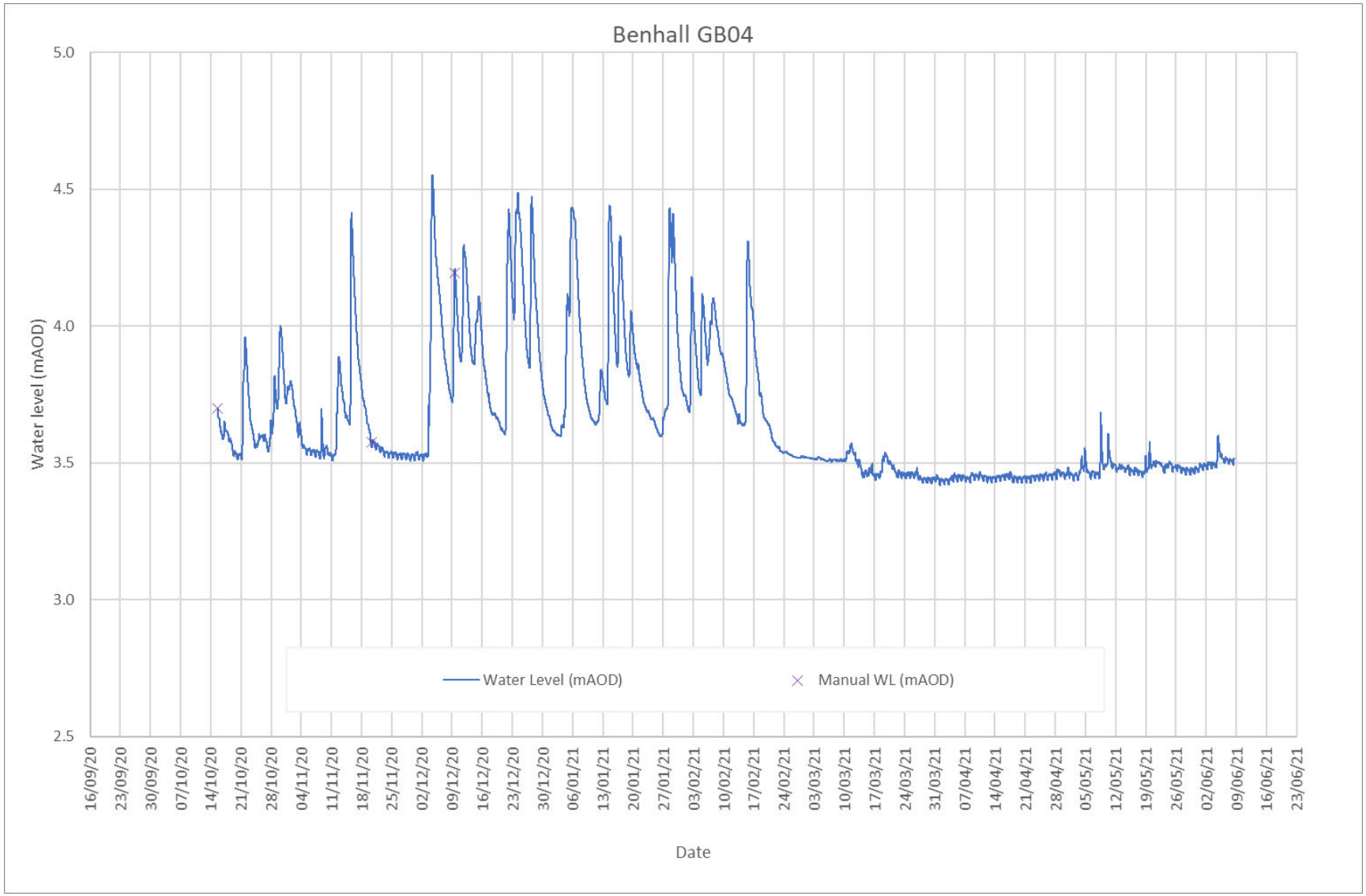
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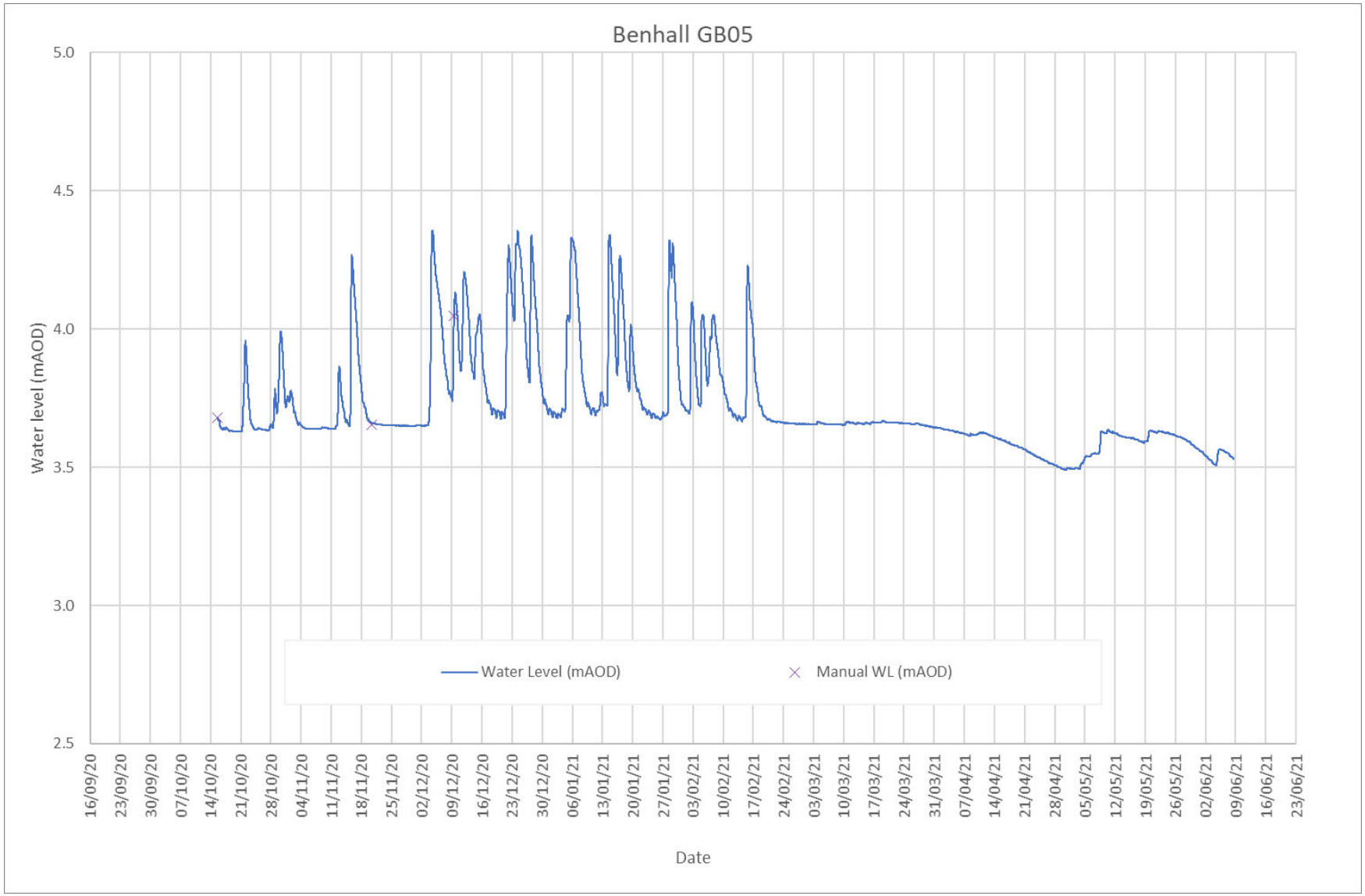
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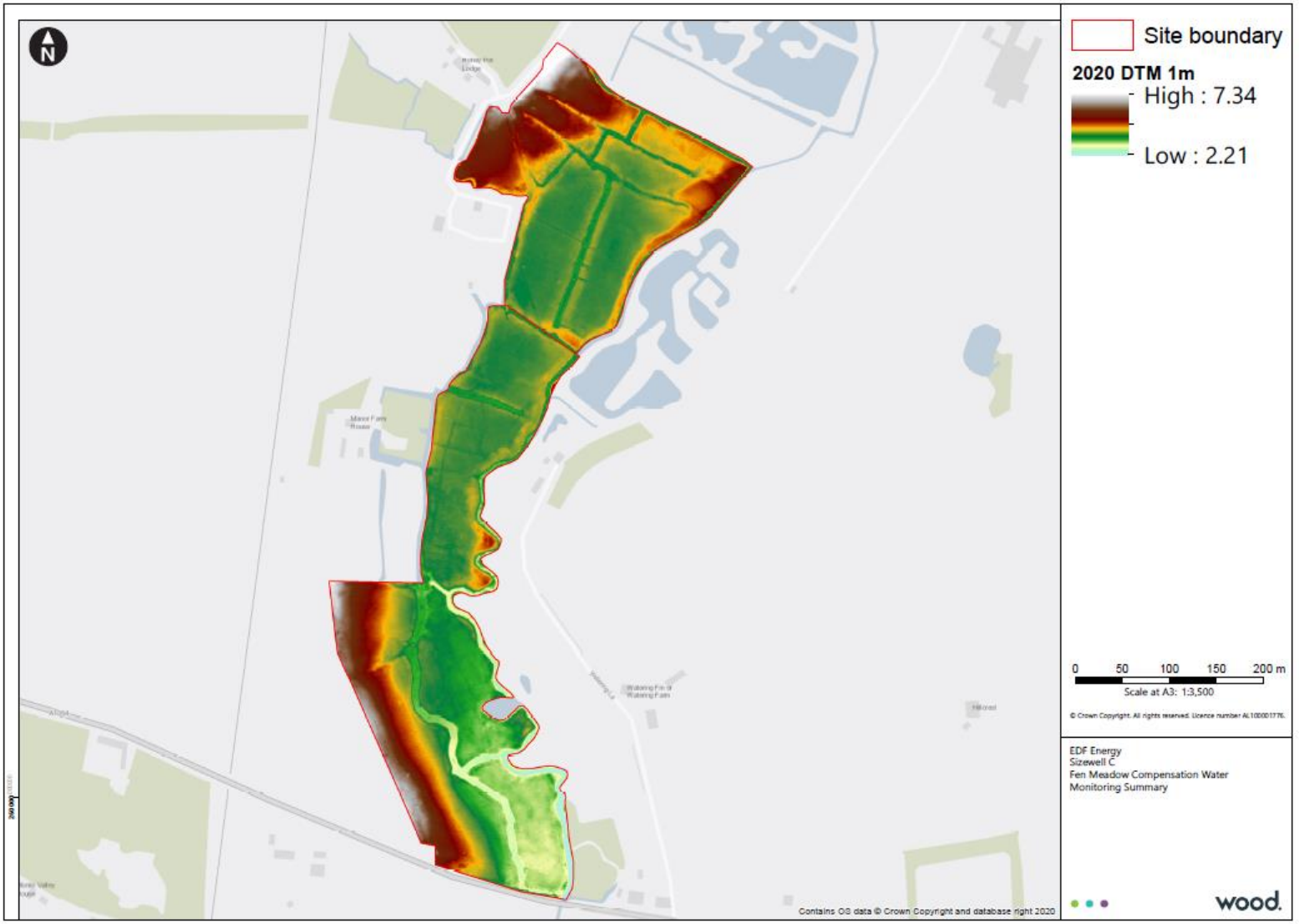


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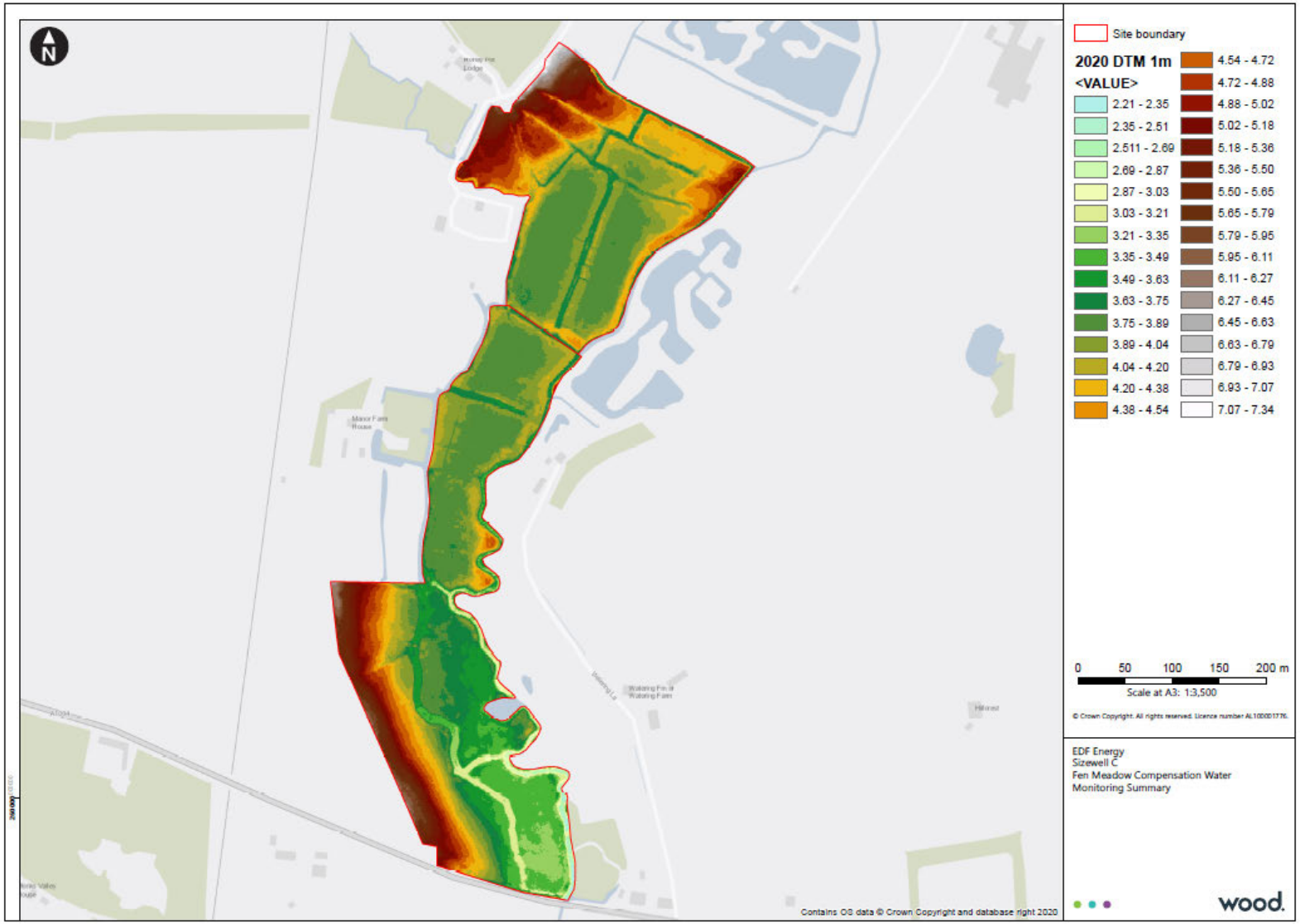
Appendix D
LIDAR Plots for the Site

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D1



D2


N
Site boundary
2020 DTM 1m
<VALUE>
2.21 - 2.35
2.35 - 2.51
2.511 - 2.69
2.69 - 2.87
2.87 - 3.03
3.03 - 3.21
3.21 - 3.35
3.35 - 3.49
3.49 - 3.63
3.63 - 3.75
3.75 - 3.89
3.89 - 4.04
4.04 - 4.20
4.20 - 4.38
4.38 - 4.54
4.54 - 4.72
4.72 - 4.88
4.88 - 5.02
5.02 - 5.18
5.18 - 5.36
5.36 - 5.50
5.50 - 5.65
5.65 - 5.79
5.79 - 5.95
5.95 - 6.11
6.11 - 6.27
6.27 - 6.45
6.45 - 6.63
6.63 - 6.79
6.79 - 6.93
6.93 - 7.07
7.07 - 7.34
0 50 100 150 200 m
Scale at A3: 1:3,500
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EDF Energy
Sizewell C
Fen Meadow Compensation Water
Monitoring Summary
wood.
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APPENDIX B: WATER MONITORING SUMMARY – HALESWORTH SITE 28, NOVEMBER 2020 TO PRESENT (JULY 2021) – REFER TO FEN MEADOW PLAN DRAFT 1 [REP6-026]

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Technical note:
Sizewell C Fen Meadow Compensation
Water Monitoring Summary – Halesworth Site 28 November 2020 to July 2021

1. Introduction

The technical note summarises water monitoring data collected between November 2020 and July 2021 at the Halesworth site (hereafter referred to as 'the Site') which has been identified as a potential fen meadow development area. This technical note is predominantly a factual presentation of the data rather than an interpretive report.

Figure 1.1 shows a map of the Site and the installations referred to in this technical note.

2. Groundwater Level Monitoring

Seven groundwater monitoring points were installed at the Site between 5th and 23rd October 2020. Four shallow dipwells were installed to measure groundwater levels in the shallow superficial near surface deposits. Three piezometers were installed to measure groundwater levels in the Crag, one of which was originally planned to penetrate the underlying chalk but complications during drilling (collapse) resulted in completion of this installation near the base of the Crag deposits. Two of the Crag piezometers are nested (within the same borehole) with a dipwell. An installation summary is provided in Table 2.1 below.

Table 2.1 Summary of groundwater monitoring installations

Name	Drillers ID	NGR	Datum: Metal Cover (mAOD)	Ground Level (mAOD)	Depth (m bgl*)	Diameter (mm)	Notes
HAL_2801_d	bh2801	TM 38990 76600	7.254	6.689	10	50	Nested with HAL_2801_s
HAL_2801_s	WS2801	TM 38990 76600	7.254	6.869	40	50	Nested with HAL_2801_d
HAL_2802_d	bh2802	TM 39098 76604	6.886	6.653	10	50	Nested with HAL_2802_s
HAL_2802_s	WS2802	TM 39098 76604	6.886	6.653	10	50	Nested with HAL_2802_d
HAL_2803_d	bh2803	TM 38985 76600	7.142	6.881	40	50	
HAL_2803_s	ws2803	TM 39051 76659	7.312	7.05	3	50	

Name	Drillers ID	NGR	Datum: Metal Cover (mAOD)	Ground Level (mAOD)	Depth (m bgl*)	Diameter (mm)	Notes
HAL_2804_s	ws2804	TM 39143 76703	7.114	6.869	2	50	

s = shallow; d = deep
*m bgl = metres below ground level

Each installation is fitted with a water level datalogger which is being downloaded on a quarterly basis. Table 2.2 summarises the data collected manually between November 2020 to present (July 20201). Hydrographs, presenting both logger and manually collected data for the installations are provided in Appendix A (Combined Hydrograph Figures A1 to A3) and Appendix B (Individual Groundwater Hydrographs Figures B1-B10). Note that in Appendix B there are a combination of hydrographs providing both absolute water levels and depth to water table. Data from 2801 are not presented due to anomalous behaviour currently being investigated.

Table 2.2 Groundwater Levels (m bgl and mAOD)

Date	HAL_2801_d	HAL_2801_s	HAL_2802_d	HAL_2802_s	HAL_2803_d	HAL_2803_s	HAL_2804_s
m bgl							
20/11/20	-0.265	-0.063	0.202	0.319	0.226	0.421	0.381
10/12/20	-0.274	-0.094	0.096	0.169	0.12	0.468	0.233
14/01/21	0.28	-0.2	0.2	0.26	-0.2	0.42	0.66
18/02/21	-0.333	-0.214	0.012	0.117	-0.01	0.144	0.176
11/03/21	0.223	0.190	0.303	0.426	0.315	0.569	0.544
28/04/21	0.70	1.27	1.35	1.51	0.39	0.41	ND
12/05/21	0.66	1.22	1.41	1.564	0.458	0.748	0.655
09/06/21	0.452	0.889	1.533	1.675	0.642	1.044	0.837
14/07/21	0.71	1.345	1.3	1.6	0.38	0.73	0.8
mAOD							
20/11/20	6.954	6.932	6.451	6.334	6.655	6.448	6.669
10/12/20	6.963	6.963	6.557	6.484	6.761	6.401	6.817
14/01/21	6.974	7.454	6.686	6.626	7.342	6.694	6.652
18/02/21	7.022	7.083	6.641	6.536	6.891	6.725	6.874

Date	HAL_2801_d	HAL_2801_s	HAL_2802_d	HAL_2802_s	HAL_2803_d	HAL_2803_s	HAL_2804_s
11/03/21	7.031	7.064	6.583	6.460	6.827	6.743	6.570
28/04/21	6.554	6.684	6.456	6.176	6.752	6.704	ND
14/05/21	6.594	6.034	5.476	5.322	7.52	6.564	6.459
09/06/21	6.802	6.365	6.273	6.131	7.336	6.268	6.277
14/07/21	6.373	6.497	6.363	6.081	7.463	6.387	6.217

*m AOD = metres above ordnance datum

3. Surface Water Level Monitoring

Four gaugeboards were installed between 12th and 16th October 2020 to allow monitoring of surface water levels in site watercourses / drains. Three of the gaugeboards included stilling wells and water level data loggers. An installation summary is given in Table 3.1 below.

Table 3.1 Summary of gaugeboard installations

Ref.	GPS Grid Ref.	Bottom of Gaugeboard Datum (mAOD*)	Gaugeboard Length (m)	Datalogger	Log Interval (minutes)
HAL-GB01	TM 39161 76703	5.81	1	OTT Orpheus Mini	15
HAL-GB02	TM 39185 76674	5.43	1	OTT Orpheus Mini	15
HAL-GB03	TM 39132 76581	5.37	2	OTT Orpheus Mini	15
HAL-GB04	TM 39080 76655	6.00	1	n/a	n/a

*mAOD = metres above ordnance datum

Table 3.1 summarises the gaugeboard water level readings taken between November 2020 and present. The water level at the three gaugeboard locations are continuously monitored and are downloaded on a monthly basis during spot gauging visit. Hydrographs of surface water levels are presented in Appendix C, and in combination with groundwater hydrographs in Appendix A (data are currently available to mid June 2021).

Table 3.2 Surface Water Levels (mAOD)

Date	HAL-GB01	HAL-GB02	HAL-GB03	HAL-GB04*
20/11/20	6.412	5.972	5.672	6.416
10/12/20	6.446	6.011	5.842	6.445
14/01/21	6.471	6.059	6.160	6.480

Date	HAL-GB01	HAL-GB02	HAL-GB03	HAL-GB04*
18/02/21	6.451	6.019	5.831	6.450
11/03/21	6.442	6.01	5.768	6.441
09/04/21	6.34	5.995	5.645	6.335
12/05/21	6.336	5.985	5.632	6.325
09/06/21	6.255	5.97	5.632	6.25

*Manual reading only (no datalogger).

4. Spot Flow Gauging

Monthly spot flow gauging of three gaugeboard locations (HAL-SF01, 02 & 03) commenced in November 2020. Results to date are shown in Table 4.1 below. Negative flow readings in Table 4.1 indicate static conditions where flow is not sufficiently high to be measurable.

Table 4.1 Spot Flow (m^3/s)

Date	HAL-SF01	HAL-SF02*	HAL-SF03
20/11/20	-0.0008	Channel too deep to wade with very soft bed. Water appeared Static.	0.0006
10/12/20	-0.0001	Channel too deep to wade with very soft bed. Water appeared Static.	-0.0016
14/01/21	0.0015	No suitable gauging location. Channel too deep to wade with very soft bed along entire length. Water appeared static with no obvious inflow/outflow.	Too deep to gauge after prolonged period of rain and severe local flooding.
18/02/21	0.0008	0.63463	0.0013
11/03/21	0.0002	0.0008	0.0013
09/04/21	-0.0006	0.0001	0.0002
12/05/21	0.0008	0.0001	0.0009
9/06/21	-0.0004	0.0	0.0005

5. Water Quality Monitoring

In-situ water quality readings are collected from all groundwater and surface water installations on a monthly basis. In-situ water quality results are presented in Table 5.1 below.

In addition to this, water quality samples have been collected quarterly at selected locations and sent for laboratory analysis. Quarterly sampling was undertaken in January 2021 (for groundwaters only) and April 2021 (both groundwater and surface water), with samples (both groundwater and surface water) collected in July 2021 being analysed. Available results for key water quality parameters indicative of nutrient enrichment, and its source (nitrate, phosphate and chloride), are presented in Table 5.2.

Table 5.1 In-situ Water Quality Results

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
20/11/20	HAL_2801_d	11.0	2.5	5969	12.63	-201.1	11.06
10/12/20	HAL_2801_d	8.5	38.7	387	12.22	-117.8	46.8
14/01/21	HAL_2801_d	6.7	22.5	1058	7.09	158.8	79.5
17/02/21	HAL_2801_d	7.6	21.7	1496	11.91	-160.5	25.2
11/03/21	HAL_2801_d	7.8	12	1169	11.59	172.3	16.98
28/04/21	HAL_2801_d	10.2	20.7	1258	11.13	-58.9	>1050
12/05/21	HAL_2801_d	20.0	31.1	597	11.08	-81.3	3.41
14/07/21	HAL_2801_d	14.9	199	465.3	10.88	-36.8	10.8
20/11/20	HAL_2801_s	10.5	4.9	16804	12.61	-169.5	5.6
10/12/20	HAL_2801_s	9.0	24.4	15101	12.32	-138.5	3.5
14/01/21	HAL_2801_s	6.3	21.8	1046	8.54	146.7	102.5
17/02/21	HAL_2801_s	7.5	36.9	1439	11.88	-119.9	6
11/03/21	HAL_2801_s	7.5	20.2	1437	11.59	172.7	1.8
28/04/21	HAL_2801_s	10.9	24.7	653	10.96	-37.5	26.1
12/05/21	HAL_2801_s	12.7	27.9	802	10.34	-58.4	4.52
14/07/21	HAL_2801_s	14.4	200.4	1183	9.29	-36.8	>1050
20/11/20	HAL_2802_d	10.7	10.8	1022	7.04	54.7	30.1
10/12/20	HAL_2802_d	9.0	22.5	1024	6.98	20.6	31.9
14/01/21	HAL_2802_d	6.2	12.6	1078	8.11	141.3	81.2
17/02/21	HAL_2802_d	8.0	36	1057	7.01	-1.5	3
11/03/21	HAL_2802_d	8.7	27.5	1061	7.09	30	60.28

Date	Ref.	Temp (ºC)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
28/04/21	HAL_2802_d	10.1	62	901	7.08	-23.3	95.8
12/05/21	HAL_2802_d	n/a	n/a	n/a	n/a	n/a	n/a
14/07/21	HAL_2802_d	12.6	234	1012	6.82	-18.6	26.7
14/07/21	HAL_2802_s	12.6	234	1012	6.82	-18.6	26.7
20/11/20	HAL_2802_s	10.6	11	1097	7.16	21.7	19.53
10/12/20	HAL_2802_s	8.4	36.2	979	6.91	9.3	27.2
14/01/21	HAL_2802_s	6.1	11.7	1025	7.05	139.3	>1050
17/02/21	HAL_2802_s	7.8	20.9	1128	6.92	-58.8	445
11/03/21	HAL_2802_s	8.1	19	988	6.79	29.4	108.5
28/04/21	HAL_2802_s	9.7	28.3	997	6.81	-33.3	365
12/05/21	HAL_2802_s	10.4	21.3	1043	7.14	-19	16.04
14/07/21	HAL_2802_s	12.0	147	957	6.44	-16.9	>1050
20/11/20	HAL_2803_d	10.8	5.6	1165	7.65	2.5	4.2
10/12/20	HAL_2803_d	8.2	30.1	1117	6.98	34.9	17.5
14/01/21	HAL_2803_d	6.1	35.1	2153	12.2	131.1	65.4
17/02/21	HAL_2803_d	7.4	47.5	1142	7.03	12.6	10.4
11/03/21	HAL_2803_d	8.0	11.9	1142	7.07	22.4	0.92
28/04/21	HAL_2803_d	10.7	27.5	103.9	7.3	-54.3	30.6
12/05/21	HAL_2803_d	11.5	39	1144	7.91	-0.5	0.92
14/07/21	HAL_2803_d	13.9	63.2	1127	6.76	-37	7.42
20/11/20	HAL_2803_s	10.9	14.4	2094	6.45	101.7	91.5
10/12/20	HAL_2803_s	8.4	33.4	2239	8.29	-22.6	75
14/01/21	HAL_2803_s	6.2	33.2	688	6.7	165.4	130
17/02/21	HAL_2803_s	6.0	33.8	1144	8.04	5.7	18.2
11/03/21	HAL_2803_s	7.1	54.3	1038	8.23	-24.8	7.08

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
12/05/21	HAL_2803_s	10.4	48.6	1014	7.05	23.4	2.64
20/11/20	HAL_2804_s	10.7	4	822	6.67	-77.3	78.5
10/12/20	HAL_2804_s	7.4	255.7	811	6.68	-4.5	446.9
14/01/21	HAL_2804_s	6.2	15.4	1417	6.14	159	305
17/02/21	HAL_2804_s	6.5	47.8	749	7.13	-79.2	48.1
11/03/21	HAL_2804_s	7.3	25.6	763	7.24	162	100.83
12/05/21	HAL_2804_s	10.1	16.1	853	6.86	-128.6	6.73
20/11/20	HAL-GB01	5.9	28.6	1187	7.28	-0.09	14.2
10/12/20	HAL-GB01	4.9	38.8	1155	6.99	123.3	10.4
17/02/21	HAL-GB01	7.0	78.5	1459	7.2	-38	74.6
11/03/21	HAL-GB01	7.3	75.5	13.1	7.28	41.8	136.88
12/05/21	HAL-GB01	14.8	68.6	1265	7.29	-90.6	10.2
20/11/20	HAL-GB02	6.0	9.3	1478	6.94	-71.4	24.32
10/12/20	HAL-GB02	6.4	22.9	1319	6.67	-45.3	15.5
17/02/21	HAL-GB02	7.8	46.9	1255	6.95	-45.4	14.4
11/03/21	HAL-GB02	7.3	48.2	11.25	7	-14.5	175.88
28/04/21	HAL-GB02	10.5	83	726	7.06	-28.1	13.6
12/05/21	HAL-GB02	11.8	53.9	1402	7.07	66.6	14.36
14/07/21	HAL-GB02	15.5	39.6	1405	6.82	-15.1	35.4
20/11/20	HAL-GB03	8.6	46	1067	7.08	19.6	1.96
10/12/20	HAL-GB03	7.3	33.9	1510	6.78	10.9	44.9
17/02/21	HAL-GB03	8.9	58.2	2120	6.82	-1.6	101.8
11/03/21	HAL-GB03	7.9	61.1	2162	7.06	-14.6	45.6
12/05/21	HAL-GB03	12.1	12.5	1037	7.08	-67.5	321.95
20/11/20	HAL-GB04	7.3	3.2	1420	7.02	-136.2	55.2

Date	Ref.	Temp (ºC)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
10/12/20	HAL-GB04	5.6	36.6	1190	6.94	-14.1	60.5
17/02/21	HAL-GB04	7.2	69.1	1639	6.99	-13.4	14.1
11/03/21	HAL-GB04	7.8	52	1324	7.1	103.6	441.55
28/04/21	HAL-GB04	13.8	92.4	207.4	7.91	-51.4	12.8
12/05/21	HAL-GB04	15.5	92.6	1316	7.4	14.4	19.87
14/07/21	HAL-GB04	18.2	126	1105	7.6	34.6	5.75
28/04/21	HAL-WAL	11.7	96.9	892	7.57	-33	30.4
14/07/21	HAL-WAL	15.8	364	885	7.39	-5.3	292

Table 5.2 Results for key water quality parameters

Location ID	Date	Chloride (mg/l)	Nitrate as NO3)mg/l)	Phosphate (Ortho as PO4 mg/l)
HAL-2801-D	14/01/2021	159	6.49	<0.05
HAL-2801-D	28/04/2021	168	0.698	<0.05
HAL-2801-S	14/01/2021	1180	<0.3	<0.05
HAL-2801-S	28/04/2021	32.9	<0.3	<0.05
HAL-2802-D	14/01/2021	105	<0.3	<0.05
HAL-2802-D	28/04/2021	81.5	<0.3	<0.05
HAL-2802-S	14/01/2021	71.6	<0.3	<0.05
HAL-2802-S	28/04/2021	116	<0.3	<0.05
HAL-2803-D	14/01/2021	51	0.384	<0.05
HAL-2803-D	28/04/2021	149	12.1	<0.05
HAL-GB2	28/04/2021	224	<0.3	<0.05
HAL-GB4	28/04/2021	191	0.975	<0.05
HAL-WAL	28/04/2021	63.3	2.54	<0.05

6. LIDAR Data

To aid interpretation of the data, two LIDAR plots have been added in Appendix D. The first (D1) illustrates available data on a graded scale and the second (D2) provides the data sub-divided into elevation bands. The graded scale enables fine topographic features to be discerned, whilst the figure with data sub-divided into height bands enables identification of areas at broadly similar elevations.

Issued by	Approved by
.....	.....
Jon Mainhagu	**Ellie Creer**

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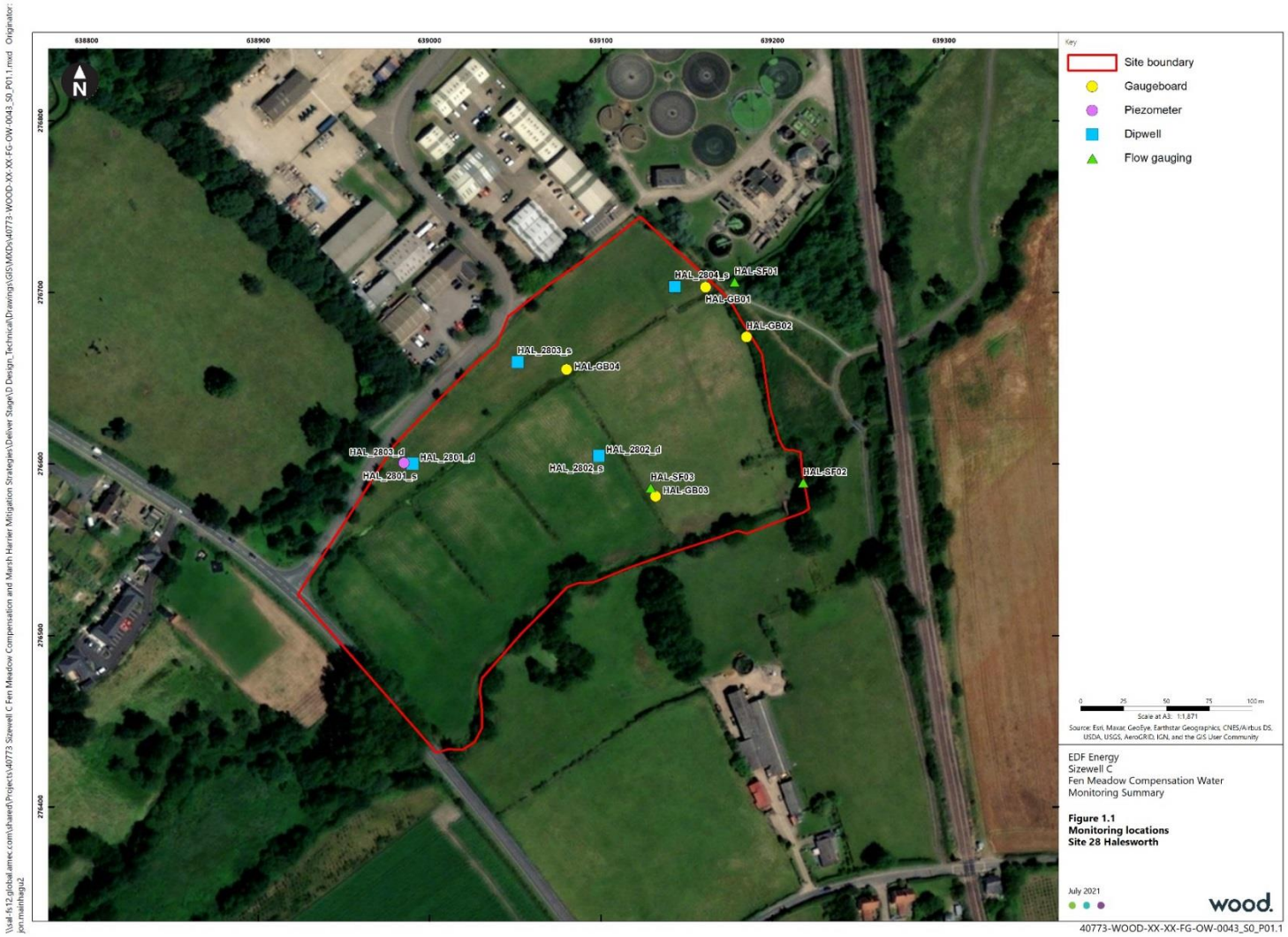
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Figure.

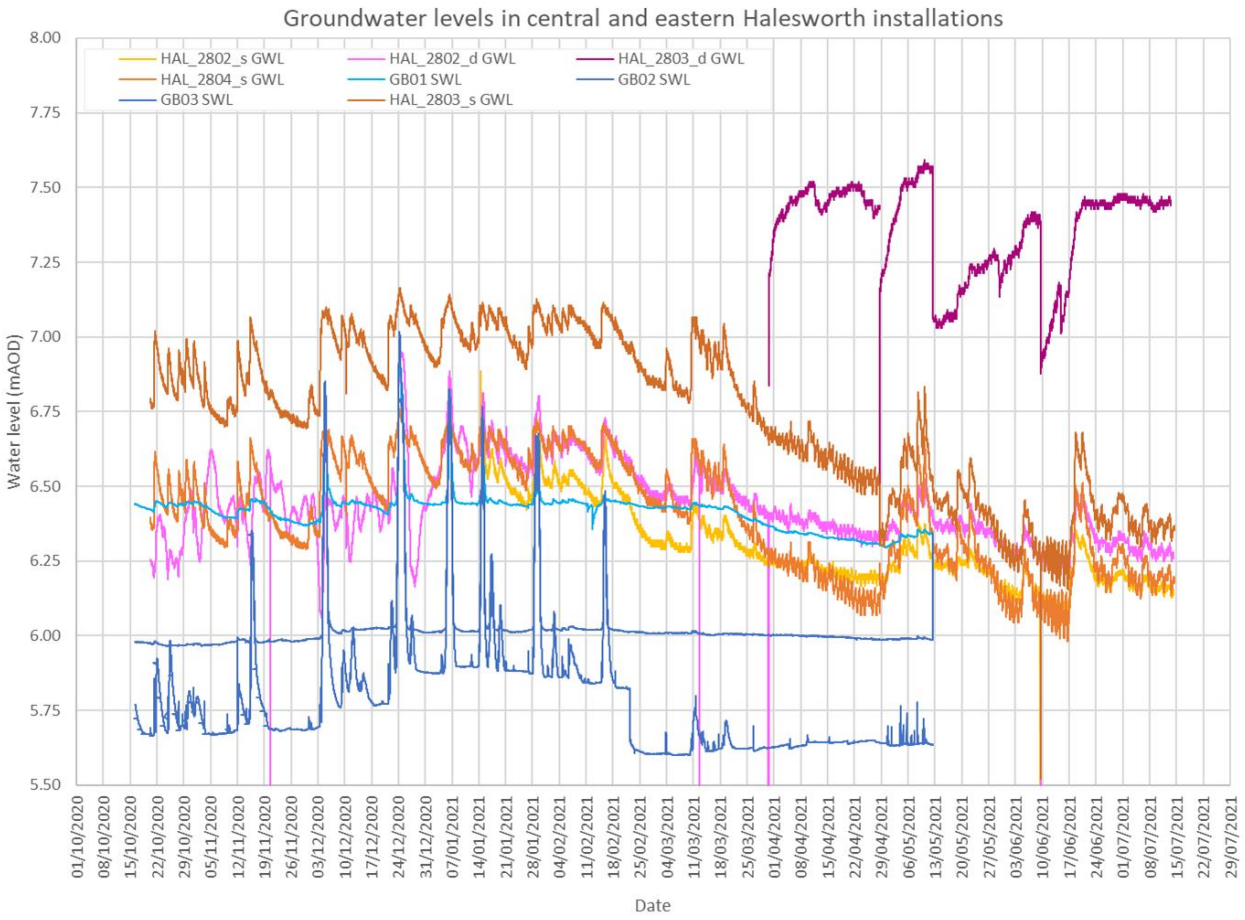


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Appendix A
Combined Hydrographs

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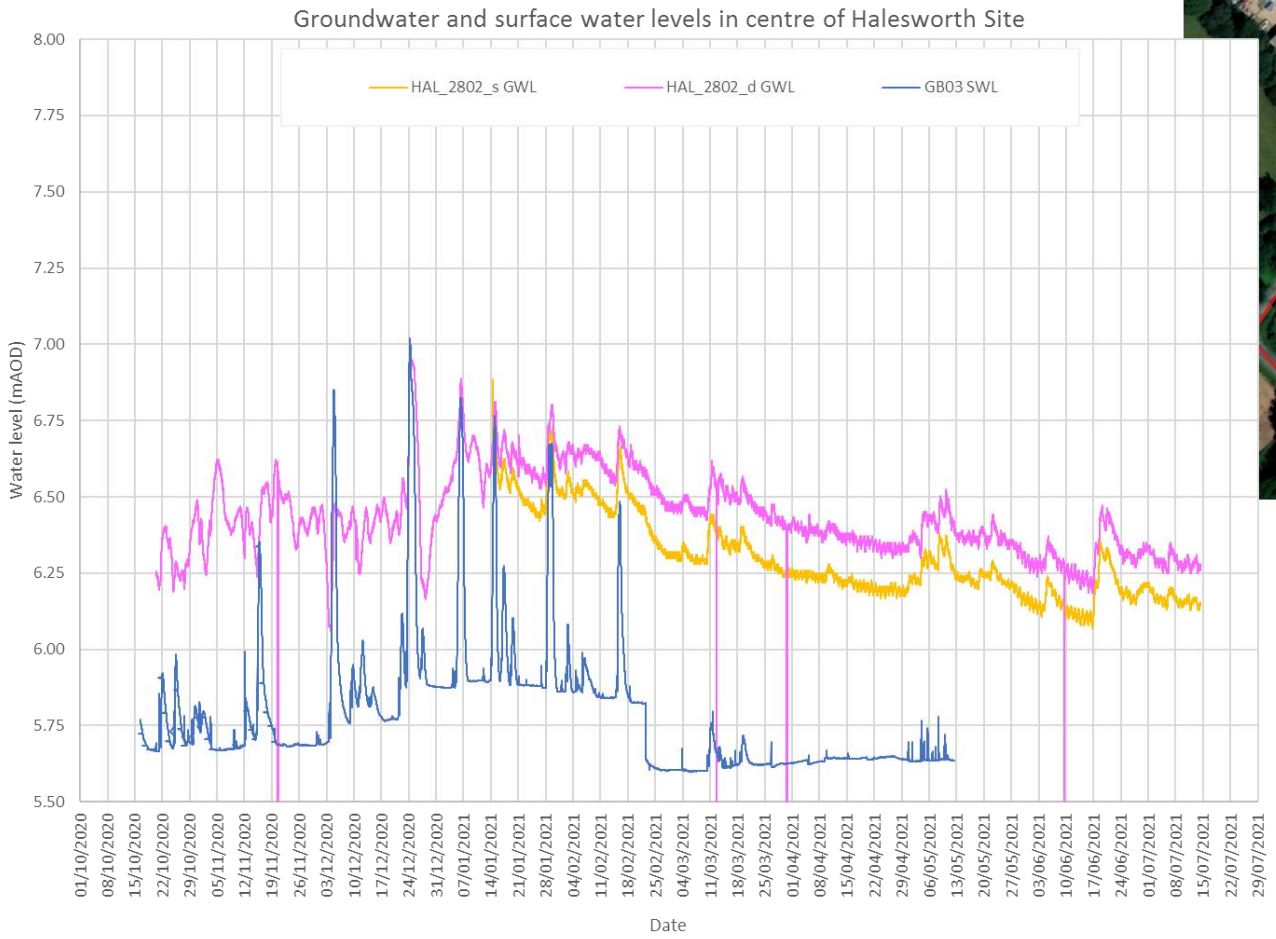
A1





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A2



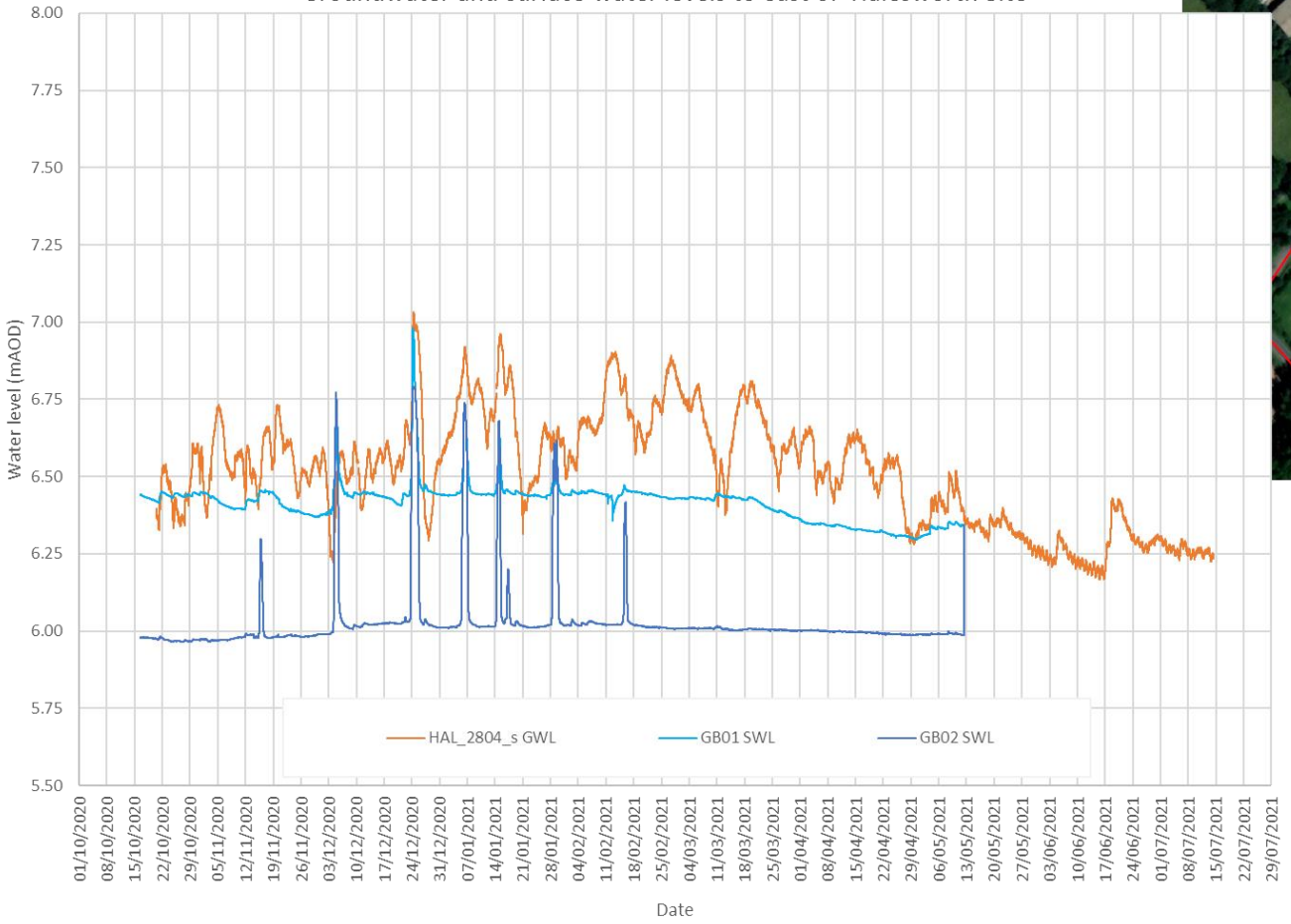


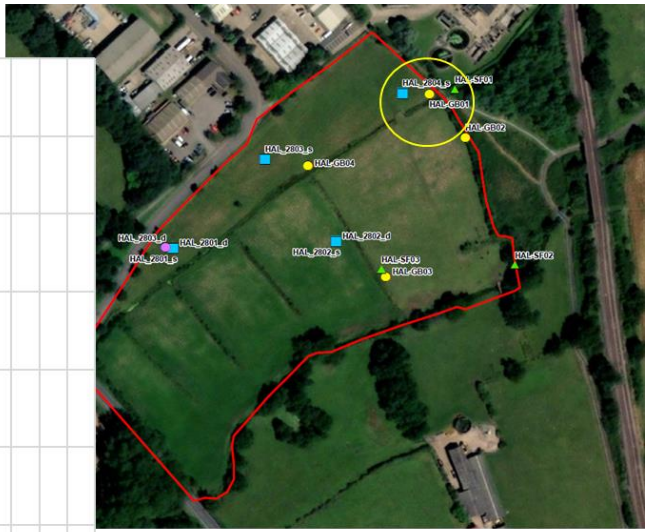
Groundwater levels to the north above those observed in the drainage ditch. Peaks in SW levels also seen in GWL.

Generally declining trend over the spring months matched with low SW levels.

A3

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Groundwater levels showing much larger fluctuations that the adjacent drainage ditches.

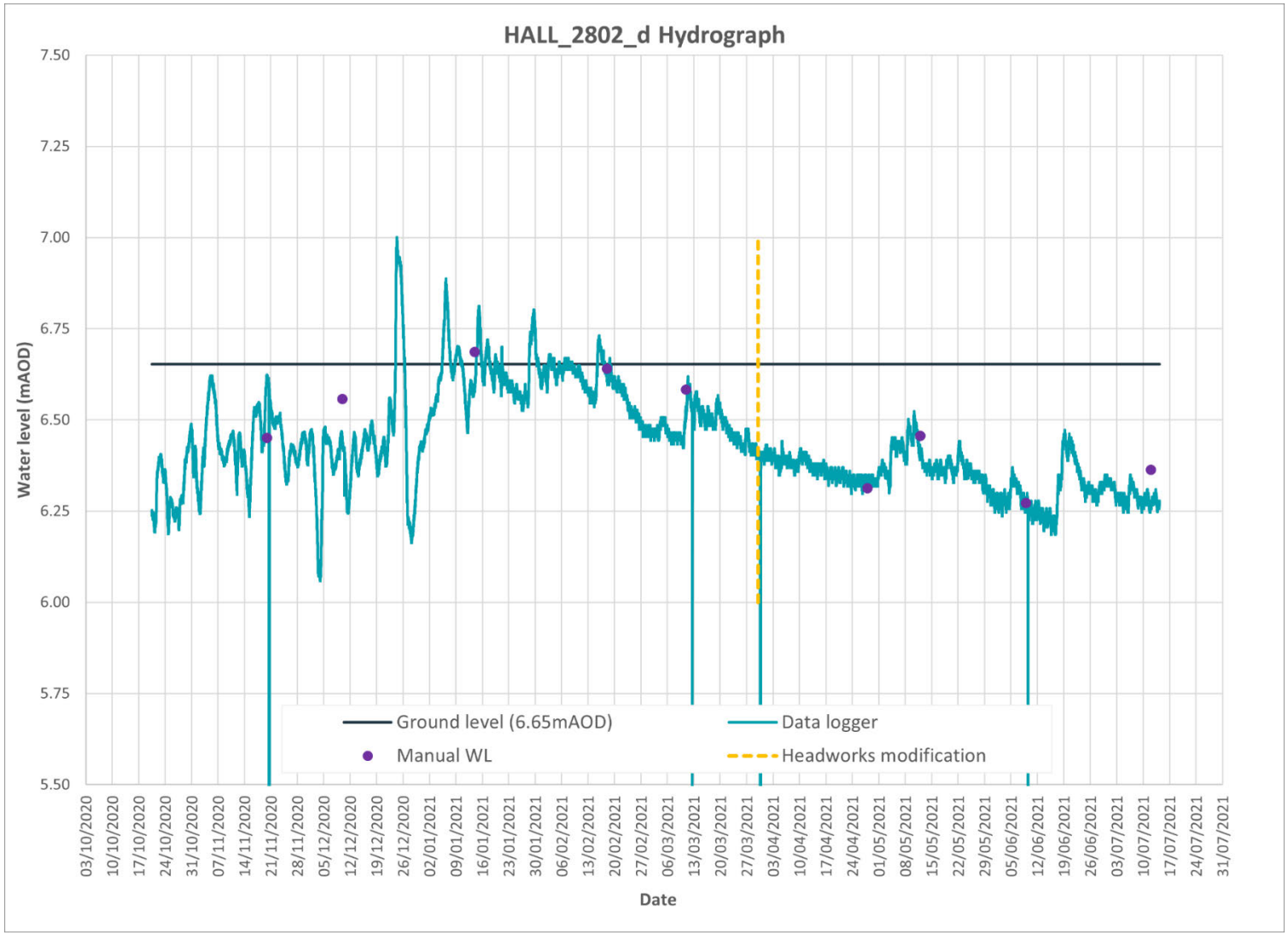
Clear spikes in SWL matched in GWL flow spikes

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Appendix B Groundwater Hydrographs

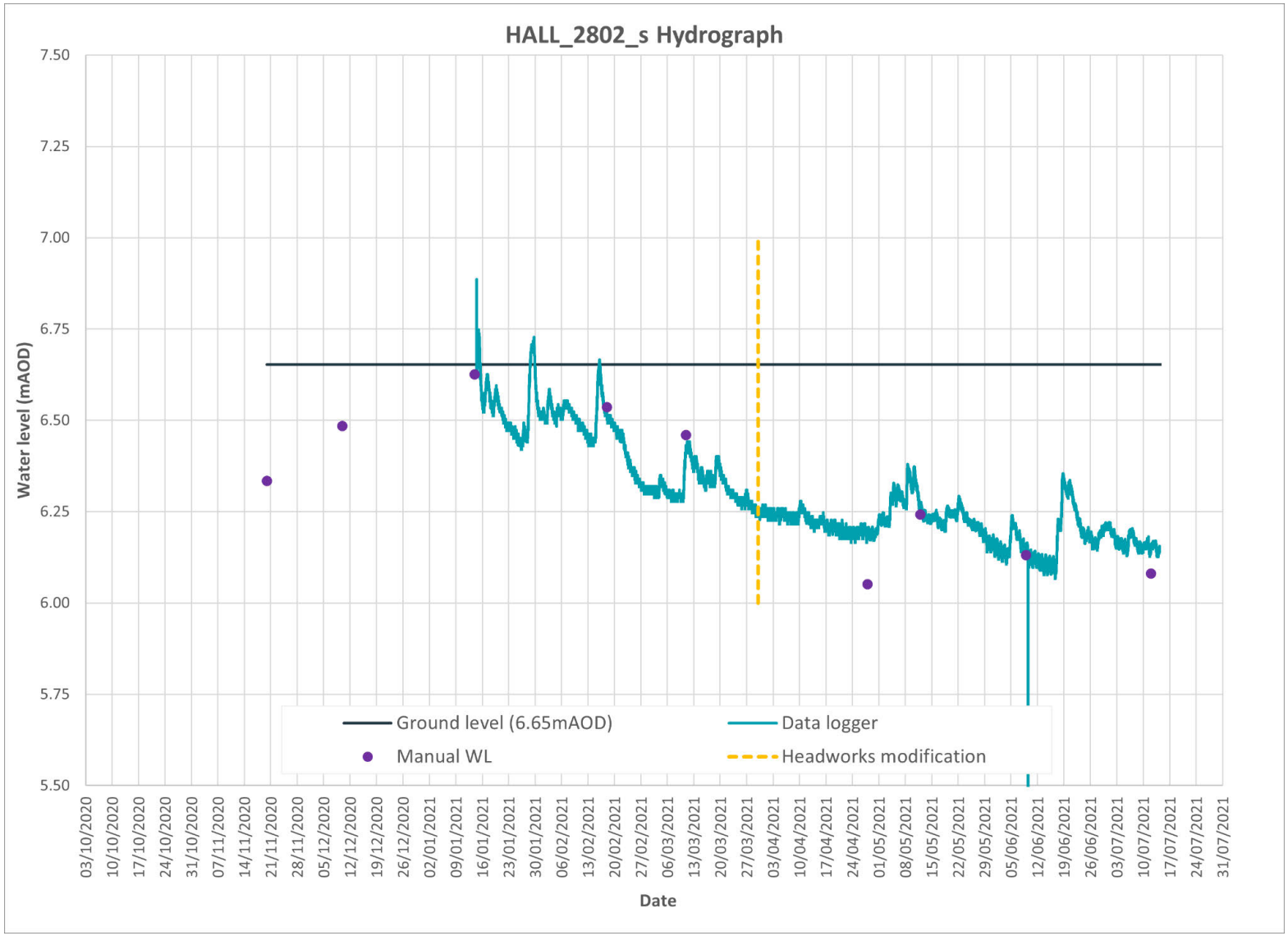
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B1



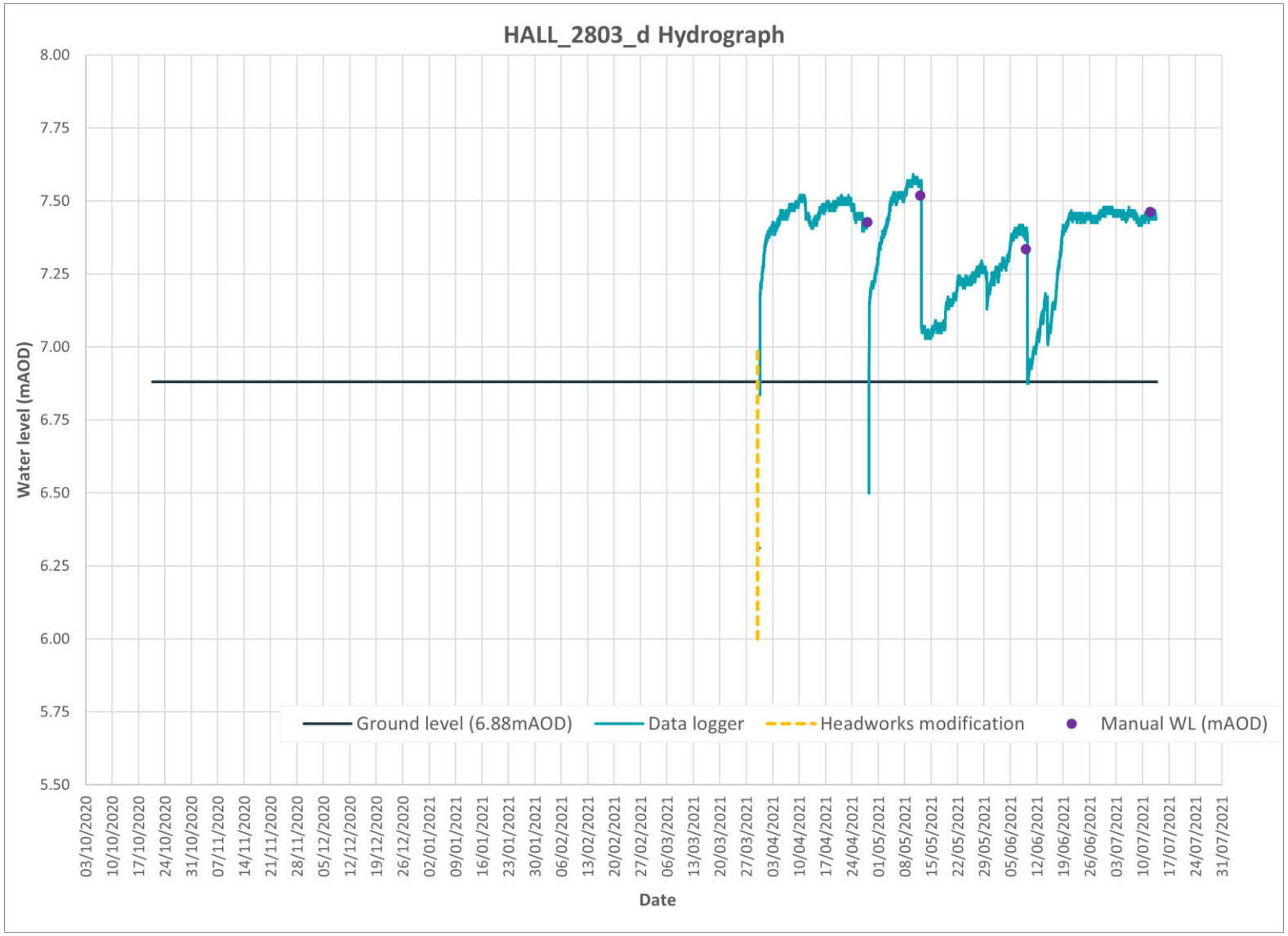
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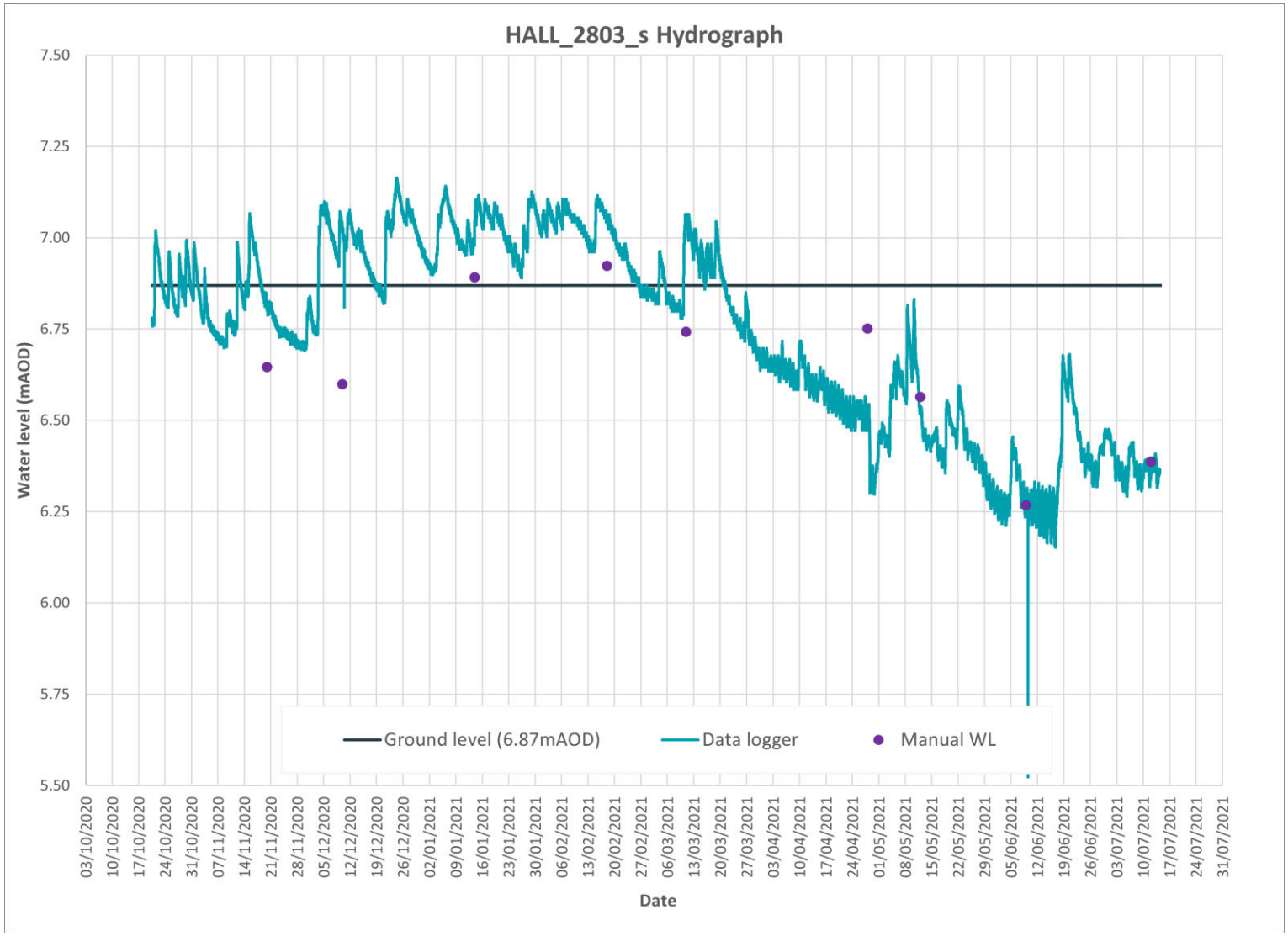
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B3



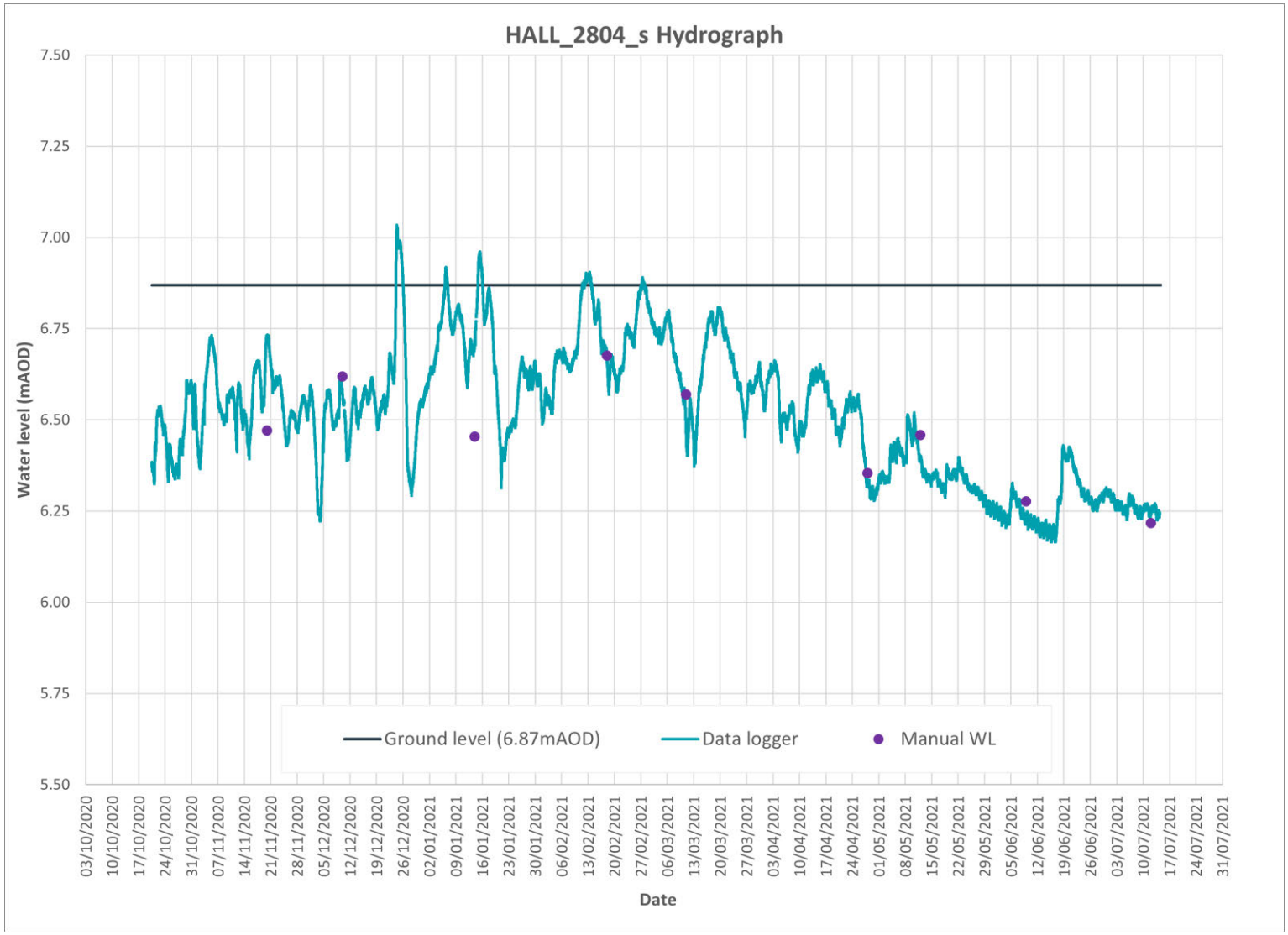
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B4



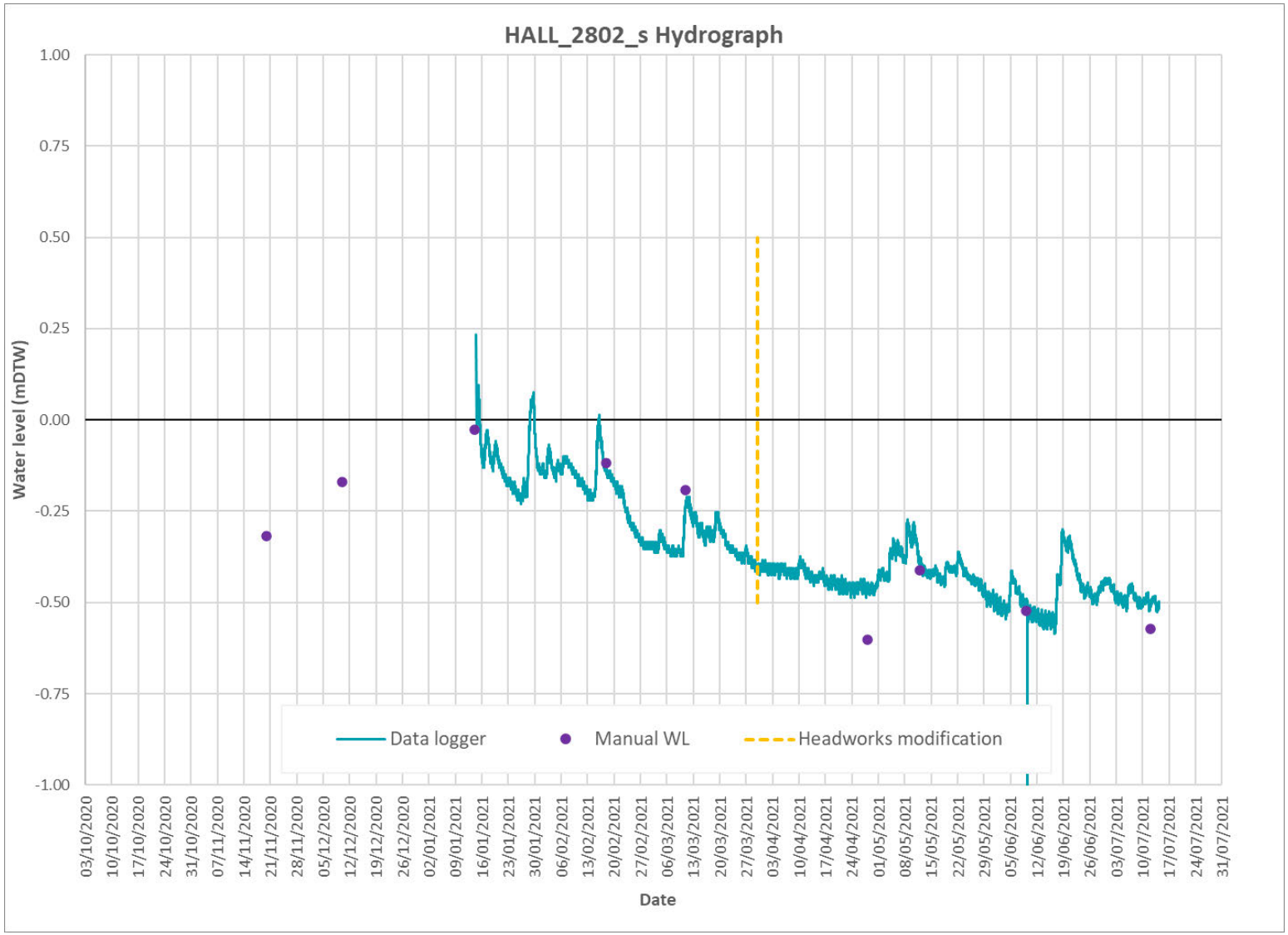
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B5



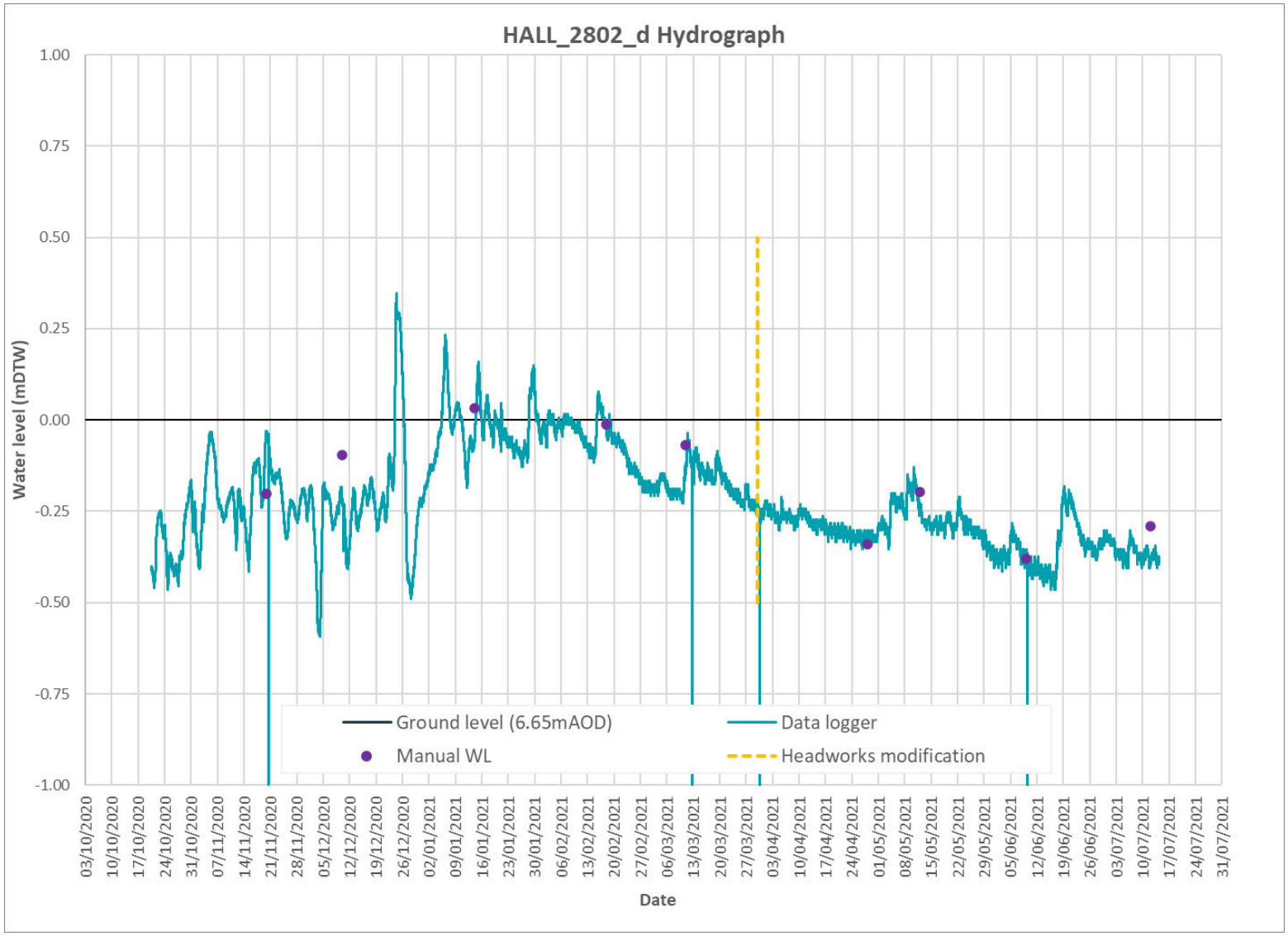
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B6



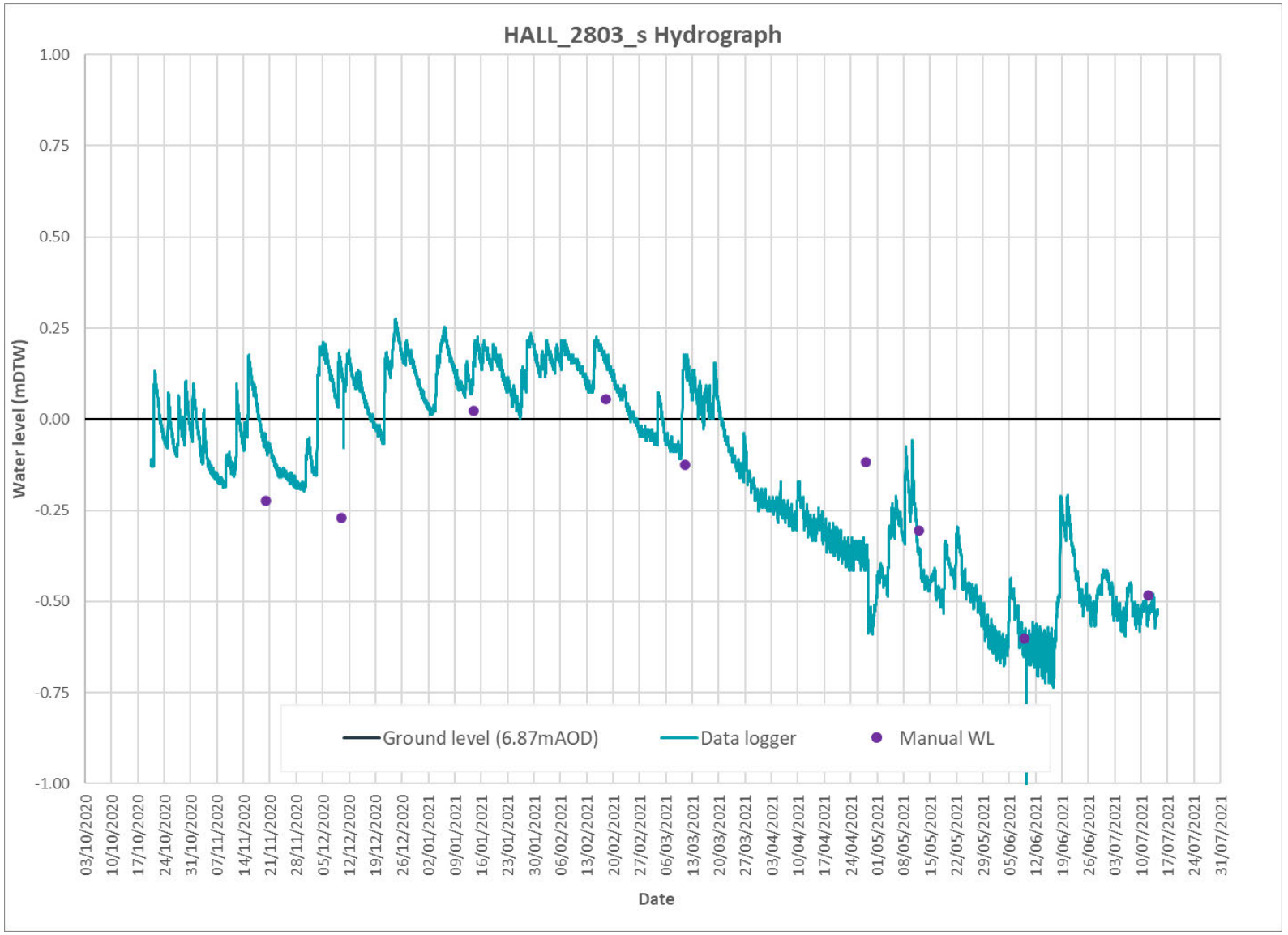
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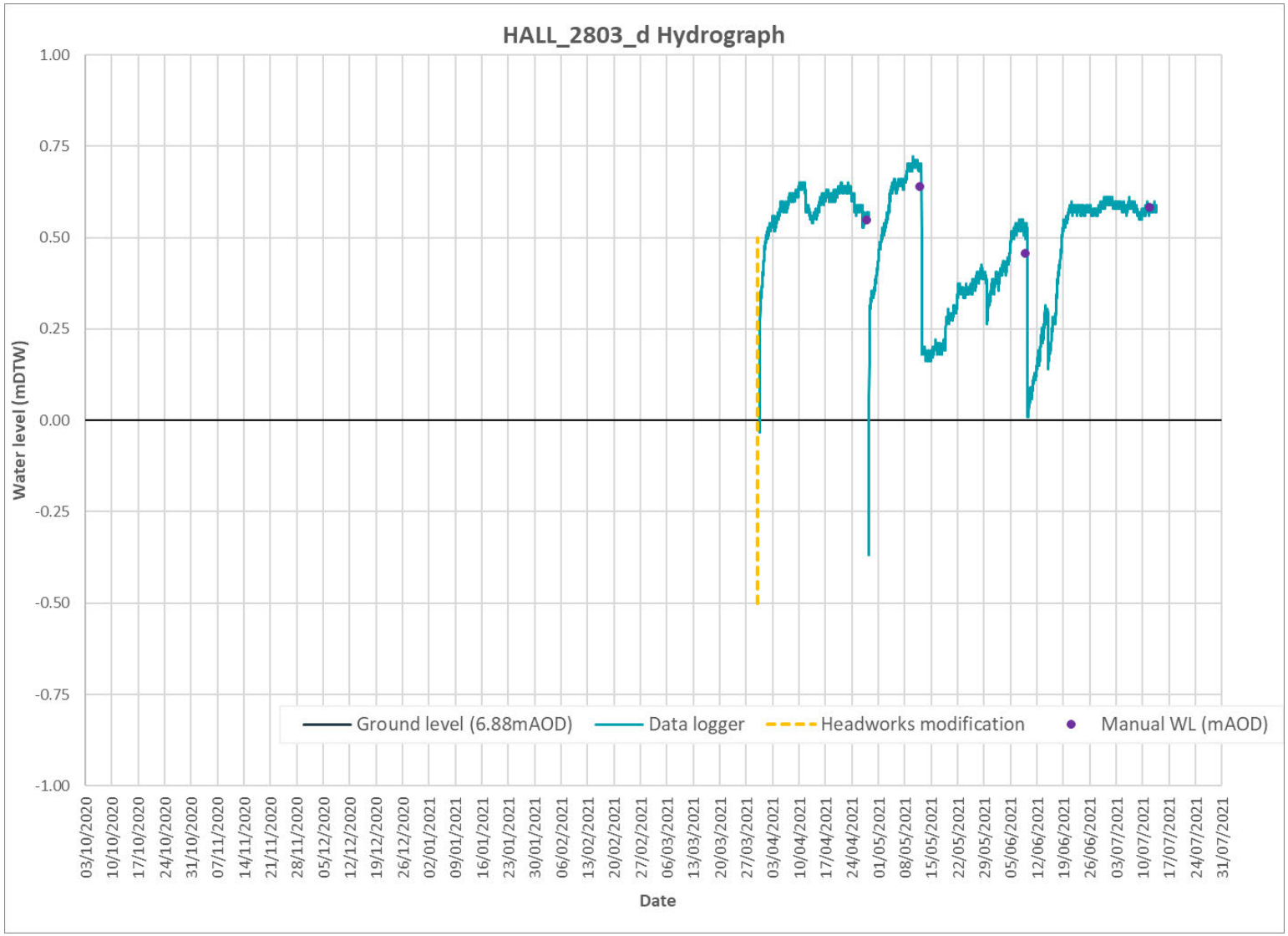
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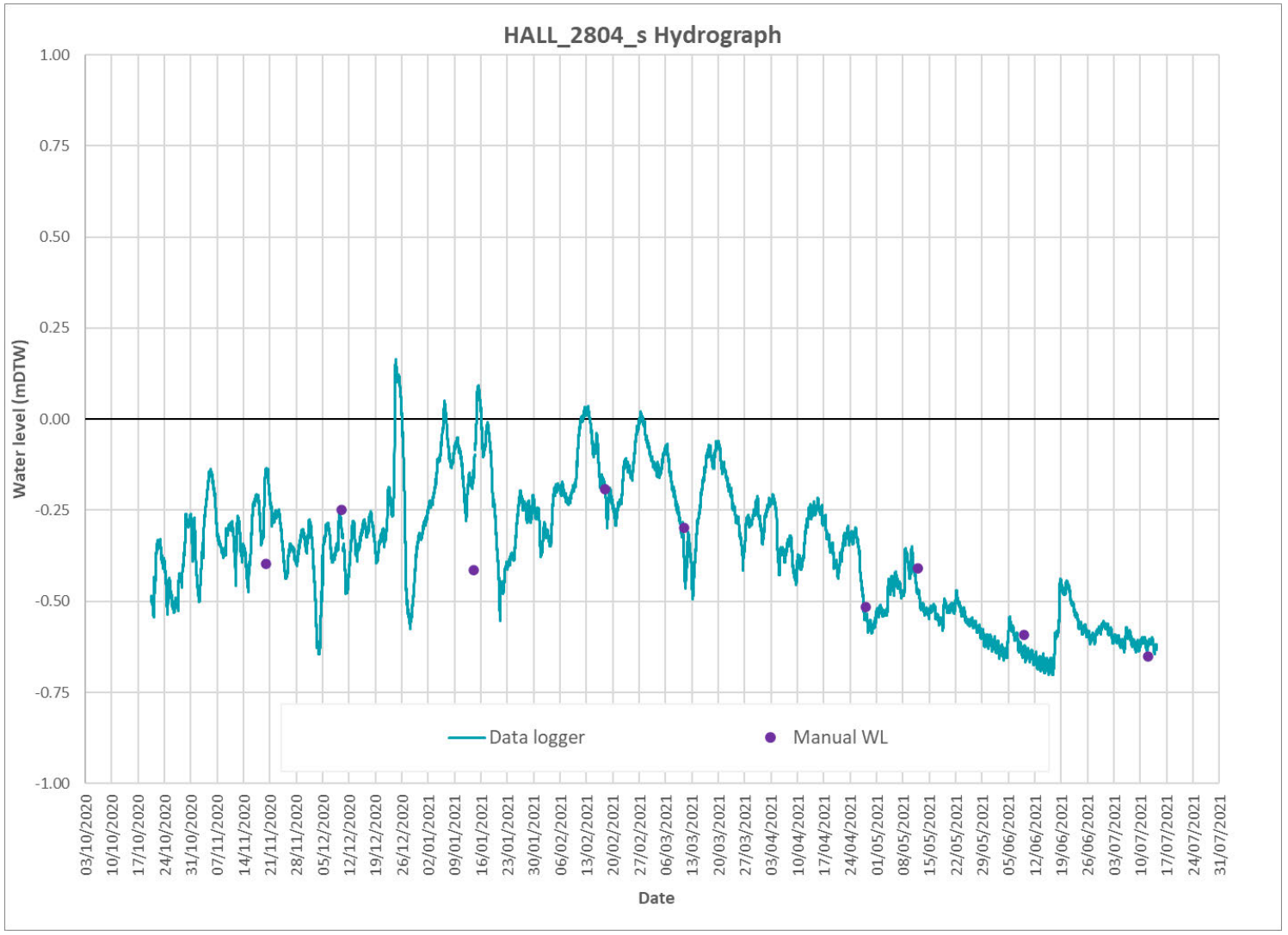
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B9



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B10

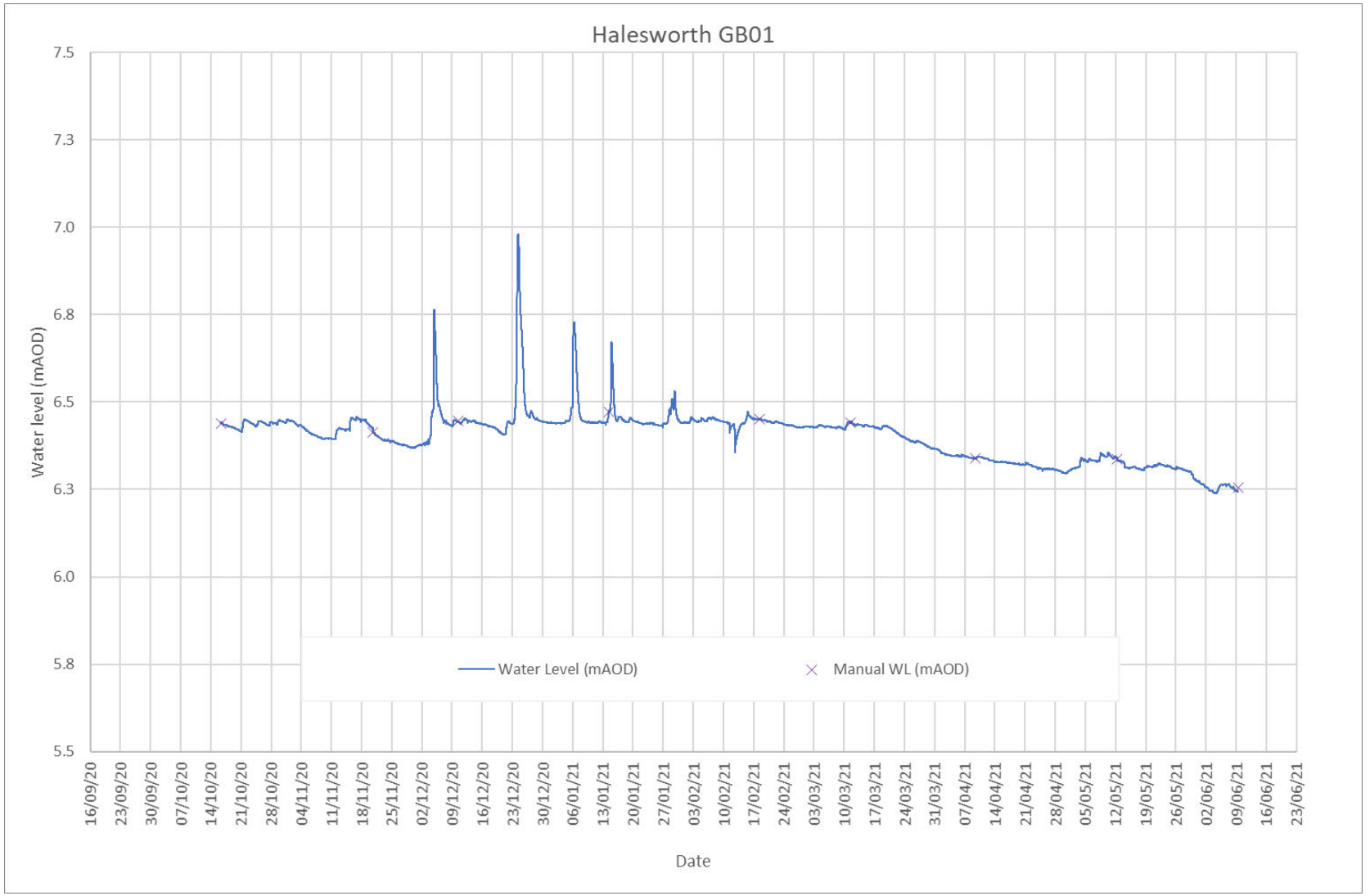


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Appendix C Surface water Hydrographs

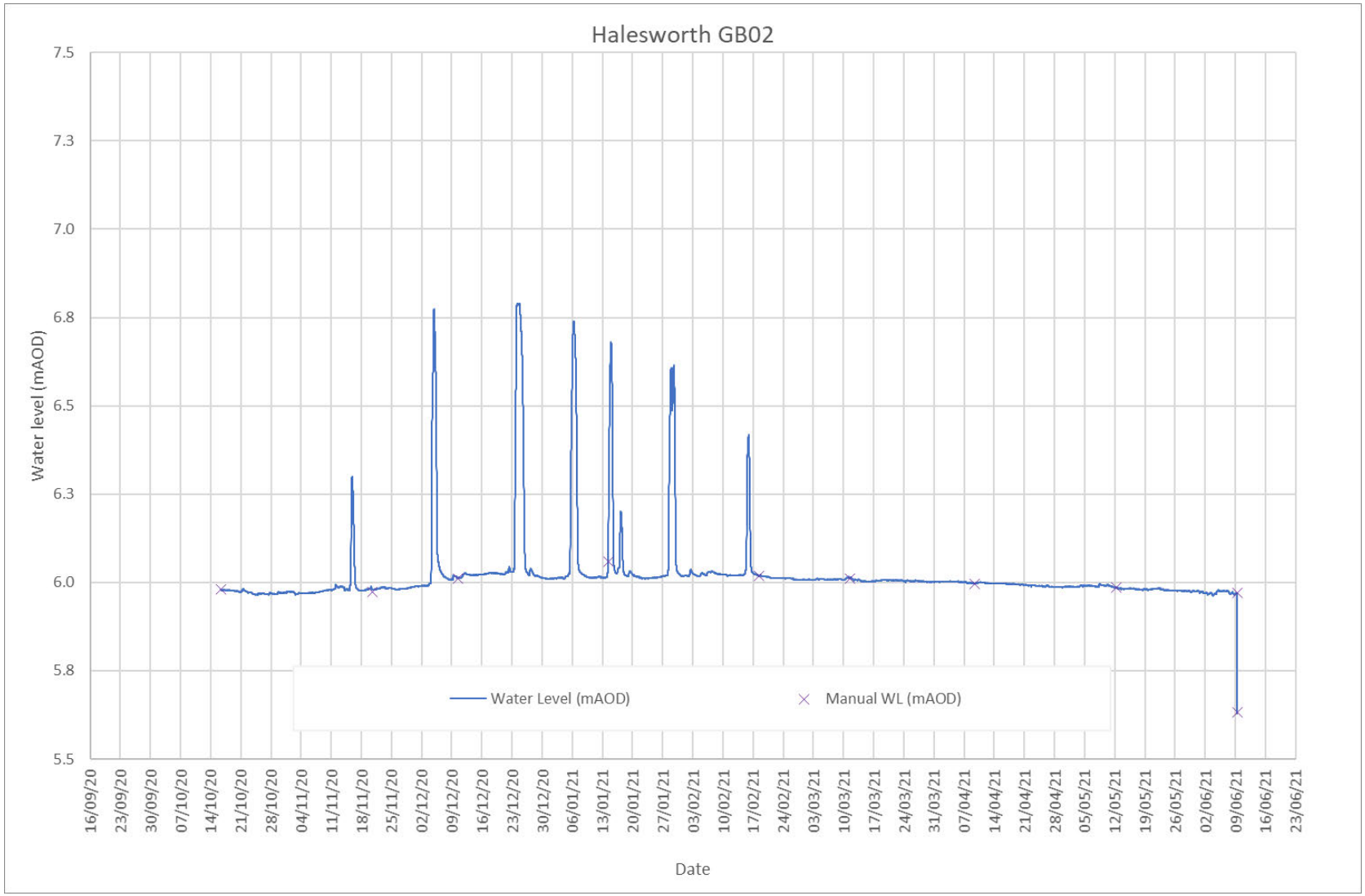
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C1



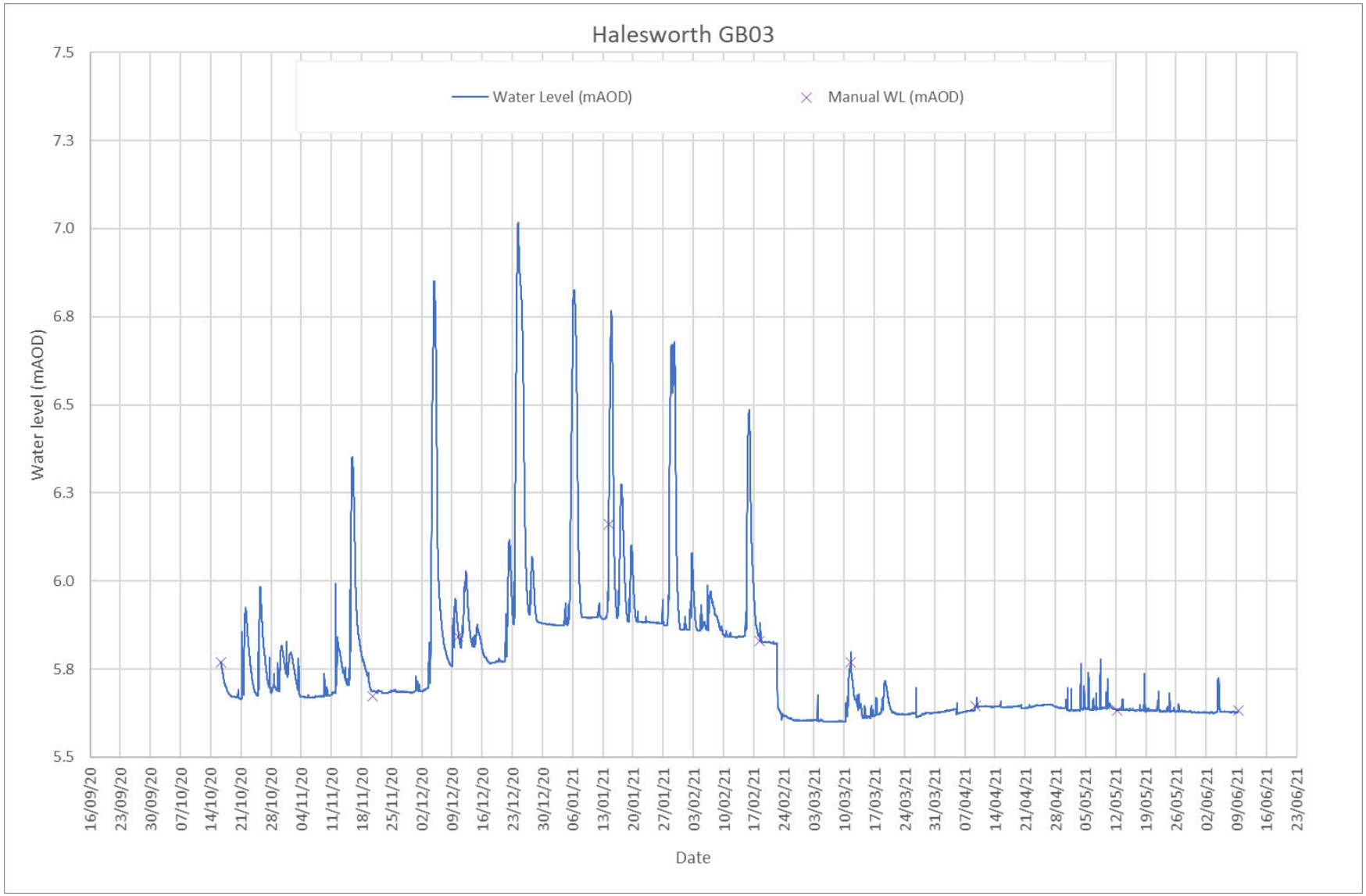
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C2



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C3



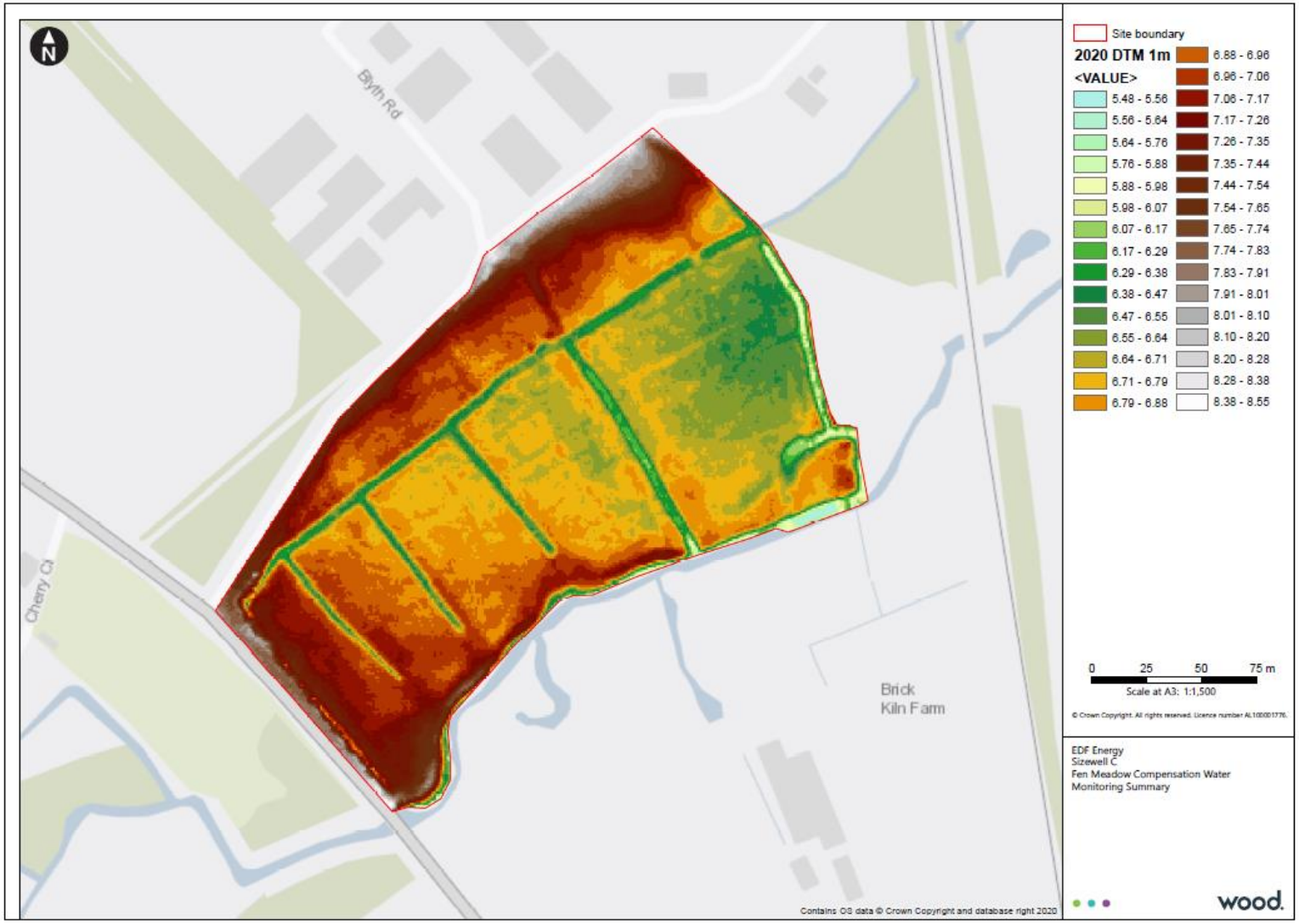
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Appendix D
LIDAR Plots for the Site

D1


N
Blyth Rd
Chery Ct
Brick
Kiln Farm
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Site boundary
2020 DTM 1m
High : 8.55
Low : 5.49
0 25 50 75 m
Scale at A3: 1:1,500
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EDF Energy
Sizewell C
Fen Meadow Compensation Water
Monitoring Summary
wood.

D2


Site boundary
2020 DTM 1m
<VALUE>
5.48 - 5.56
5.56 - 5.64
5.64 - 5.76
5.76 - 5.88
5.88 - 5.98
5.98 - 6.07
6.07 - 6.17
6.17 - 6.29
6.29 - 6.38
6.38 - 6.47
6.47 - 6.55
6.55 - 6.64
6.64 - 6.71
6.71 - 6.79
6.79 - 6.88
6.88 - 6.96
6.96 - 7.06
7.06 - 7.17
7.17 - 7.26
7.26 - 7.35
7.35 - 7.44
7.44 - 7.54
7.54 - 7.65
7.65 - 7.74
7.74 - 7.83
7.83 - 7.91
7.91 - 8.01
8.01 - 8.10
8.10 - 8.20
8.20 - 8.28
8.28 - 8.38
8.38 - 8.55
0 25 50 75 m
Scale at A3: 1:1,500
EDF Energy
Sizewell C
Fen Meadow Compensation Water
Monitoring Summary
Blyth Rd
Chery Ct
Brick
Kiln Farm
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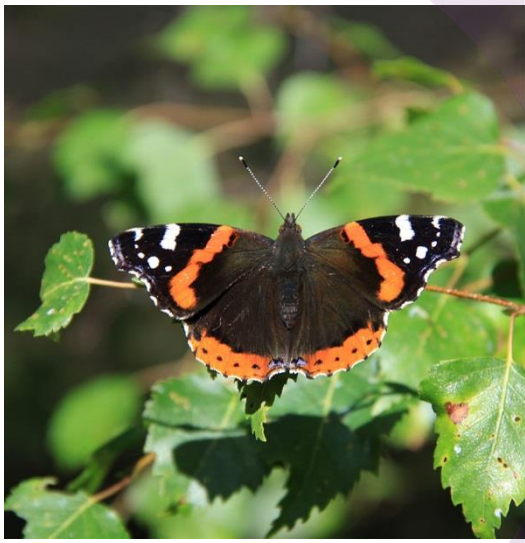
APPENDIX C: PAKENHAM SITE 54 ECOLOGY BASELINE REPORT (ADDENDUM) – REFER TO FEN MEADOW PLAN DRAFT 1 [REP6-026]

EDF Energy

Sizewell C

Fen Meadow Compensation Sites: Pakenham Site 54 Baseline Ecology Report







Wood Group UK Limited – June 2021

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EDF Energy
The Qube

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Doc Ref. 40773-WOOD-XX-XX-RP-OE-0001-S0-P01.1

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Document revisions

No.	Details	Date
1	Report of Work undertaken to date	10/06/21

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Appendix B Species Protection or Control Legislation

Appendix C Phase 1 Target Notes

1. Introduction

1.1 Background

The proposed development platform for Sizewell C will extend a short distance into the eastern margins of Sizewell Marshes Site of Special Scientific Interest. The toe of the batter of the proposed platform will define the extent of permanent land-take but, additional to that, ditch re-alignment is required which will take a limited amount of further land.

Based on National Vegetation Classification (NVC) survey data the main affected habitats are M22 *Juncus subnodulosus – Cirsium palustre* fen meadow, S26 *Phragmites australis - Urtica dioica* tall-herb fen, S4 *Phragmites australis* reedbed and some W5 *Alnus glutinosa – Carex paniculata* wet woodland.

Studies focussed on the provision of compensatory fen meadow habitat, particularly M22 *Juncus subnodulosus – Cirsium palustre* fen meadow, were reported in Wood (2018). Five sites were identified for further investigation, whilst 17 sites were put on hold subject to further assessment of the initial five sites. The five sites identified for further investigation (Wood (2018)) were:

- Site No. 10 – Aldecar Lane, Benhall;
- Site No. 11 – Watering Lane, Benhall;
- Site No. 28 – Halesworth;
- Site No. 33 – Stratford St Andrew; and
- Site No. 54 – Pakenham Fen.

Subsequently, one day site visits to Sites 10, 11, 28 and 54 were undertaken in April and May 2019. Site 33 was not visited as access had not been agreed at the time (Wood, 2019), however, following further consideration of the site characteristics and suitability for fen meadow creation, it was also concluded that the sites that were taken forward all provide greater potential for fen meadow creation than Site 33.

The one day site visits to Sites 10, 11, 28 and 54 comprised:

- A walkabout survey to identify areas where (1) the peat is currently influenced by groundwater or near-surface seepage; and (2) fen meadow species are present within or close to the site margins;
- A reconnaissance hand augering survey to identify general peat quality (substrate condition), sub-surface geological materials, presence of water table and areas of upwelling groundwater; and
- Consideration of broad options for water management and potential for changes to land management.

Findings were reported in Wood (2019). Sites 10, 28 and 54 were all identified as having potential for the development of fen meadow as follows:

- Site 10: primary locus 1.5ha, further area 0.7ha (Site 11 has relatively limited potential (primary locus of 0.5ha although part already supports fen meadow species, and further area of 1.2ha) but is close to Site 10, so warrants further consideration in that context);
- Site 28: primary locus 1.2ha, further area 1.3ha;
- Site 54 north: primary locus 3.2ha, further area 6.2ha; and

- Site 54 south: primary locus 1.7ha, further area: 4.3ha.

Subsequently EDF has progressed with detailed site conceptualisation and feasibility assessment work at Sites 10/11, 28 and 54.

The scope of the conceptualisation and feasibility assessment work can be summarised as follows:

- Ecological studies:
  - Desk based review of ecological data for the sites and surrounding area; and
  - Targeted ecological surveys.
- Hydrological studies:
  - Desk based review of available groundwater level data (including output from the Environment Agency model for high, low and average groundwater level conditions) and the seasonal variation in groundwater levels. Also, effects of groundwater abstraction on groundwater levels below the site;
  - Collection of topographic data;
  - Collection of surface water level and groundwater level data to determine the relationship between groundwater and surface water levels on site. Also detailed study of the existing and wider ditch network to determine potential for water management without risk to upstream receptors; and
  - Collection of hydrochemical data.

1.2 This report

The scope of the studies undertaken were defined following consideration of:

- The habitat types present on site defined from the one-day visit undertaken in the previous project phase;
- The types of ecological receptor that would be expected to occur in such habitats in Suffolk, based on professional judgement; and
- The potential activities and related impacts of creating fen meadow habitat, principally through raising water levels, on such sites.

The studies proposed comprise:

- A desk study;
- An extended Phase 1 habitat survey;
- A National Vegetation Classification (NVC) survey;
- A survey for signs of otter and water vole; and
- A survey of aquatic invertebrates of the ditches.

The desk study and extended Phase 1 habitat survey have been completed to date and are reported in this ecological baseline for Site 54 Pakenham (hereafter the 'Pakenham site' or 'the Site') (Figure 1.1). The results of the other studies will be reported when complete.

In this report, where possible, common species names are used in the text, though scientific names may also be used for clarity, particularly in naming the published community-types and in instances when the given

common names are not widely used. Common and scientific names of species referred to in this report are presented in Appendix A.

The structure of this report is as follows:

- Section 2 presents the methods and results of a desk study;
- Section 3 presents the methods and results of an extended Phase 1 habitat survey;

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jon.squire

591000 592000 593000 594000 595000 596000

271000 270000 269000 268000 267000 266000

N

Farmhouse
Chalet Bungalow
Heath Farm
Ixworth
A143
Woodstreet Farm
The Black Bourn
Stowlane
Kiln Farm
Mill Farm
Queach House
The Plains
Grimstone End
Lime Kiln Cottages
Old Hall Farm
A1088
Highfields Farm
Highfield Farm Cottages
Bridge Farm
Parkfield Cottage
Stowlangtoft
Beaumont House
Kartin House
Upper Town
Pakenham
Beaumont's Hall
Ixworth Road
Mere Farm
Bartonmere House
The Lodge
Nether Hall
Bella Vista House
Millfields Cottage
Grange Farm
The Bungalow
Little Haugh Hall
Stanton Street
The Old Rectory
Pakenham Stream
Pakenham
Great Green

Key

Site 54 boundary

River

0 250 500 750 1,000 m

Scale at A3: 1:20,000

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Fen Meadow Compensation Sites
Pakenham Site 54
Baseline Ecology report

Figure 1.1
Site location plan

June 2021

wood.

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2. Desk study

2.1 Method

A data-gathering exercise was undertaken in April 2021 to obtain information relating to statutory and non-statutory biodiversity sites (excluding sites designated for geological features of interest); species or habitats of principal importance for the conservation of biodiversity; legally protected and controlled species; and other conservation-notable habitats or species (see Boxes 2.1 and 2.2).

Box 2.1 – Designated Biodiversity Sites, and Priority Habitats and Species

Statutory Biodiversity Sites

- European sites: Important biodiversity sites designated under international law or treaties. European sites are any Special Area of Conservation (SAC) from the point at which the European Commission and the UK Government agree the site as a 'Site of Community Importance' (SCI); any classified Special Protection Area (SPA); any candidate SAC (cSAC); and (exceptionally) any other site or area that the Commission believes should be considered as an SAC but which has not been identified by the Government. This term is also commonly used when referring to potential SPAs (pSPAs), to which the provisions of Article 4(4) of Directive 2009/147/EC (the 'new wild birds directive') apply; and to possible SACs (pSACs) and listed Ramsar sites, to which the provisions of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* (the Habitats Regulations) are applied as a matter of Government policy (NPPF para 118) when considering development proposals that may affect them;
- Sites of Special Scientific Interest (SSSIs): Nationally important sites notified under the *Wildlife and Countryside Act 1981* (as amended) that provide the best examples of the UK's flora, fauna, or geological or physiographical features (note, this assessment focuses on those sites notified for their biodiversity interest);
- National Nature Reserves (NNRs): Nationally important sites notified under the *National Parks and Access to the Countryside Act 1949* and the *Wildlife and Countryside Act 1981*; in practice most NNRs are SSSIs also; and
- Local Nature Reserves (LNRs): statutory sites that are designated under the *National Parks and Access to the Countryside Act 1949* with the objective of encouraging their use for the study, research or enjoyment of nature. If an LNR has no other statutory or non-statutory designation it is treated as being of borough/district-level importance for biodiversity (although it may be of greater socio-economic value).

Non-statutory Biodiversity Sites

Non-statutory biodiversity sites in Suffolk are known as County Wildlife Sites (CWS) or Potential CWS (pCWS) or Candidate Local Wildlife Sites (cLWS).

Other important habitats or species

Species or habitats of "*principal importance for the conservation of biodiversity*" are those listed by Natural England (NE) pursuant to Section 41 of the *Natural Environment and Rural Communities Act 2006* (as amended). These include those UK Biodiversity Action Plan (UK BAP) priority habitats and species that occur in England. They are commonly referred to as 'Section 41' or 'S.41' habitats or species.

Other conservation-notable habitats and species would include:

- Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern 4 Red List (Eaton *et al.* 2015);
- Ancient woodland (i.e. areas that have been under continuous woodland cover since at least 1600) on the Ancient Woodland Inventory (AWI);
- Nationally Rare and Nationally Scarce species in the UK, which are species recorded from, respectively, 1-15 and 16-100 hectads (10x10km squares of the UK national grid);
- Populations of birds comprising at least 1% of the relevant British breeding/wintering population (where data are available).
- Priority habitats and species listed in the Suffolk Biodiversity Action Plan (LBAP);
- Other species or assemblages such as large populations of animals considered uncommon or threatened in a wider context; and
- Important hedgerows as defined using the habitat criteria in *The Hedgerows Regulations 1997*.

Box 2.2 – Legally Protected and Controlled Species

Legal Protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this report, legal protection refers to:

- Species included on Schedules 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding species that are only protected in relation to their sale (see section 9[5] and 13[2]);
- Species included on Schedules 2 and 5 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*; and
- Badgers, which are protected under the *Protection of Badgers Act 1992*.

Further detail on the legislative protection afforded to species and sites is provided in Appendix B.

Legal Control

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it is an offence to release or allow to escape into the wild (for example grey squirrel) and species of plant that it is an offence to plant or otherwise cause to grow in the wild (for example, Japanese knotweed).

Data were obtained for:

- Statutory designated sites within 2km of the Site boundary;
- Other statutory and non-statutory sites designated for their nature conservation interest within 1km;
- Habitats of principal importance for the conservation of biodiversity, or other conservation-notable habitats recorded within 1km; and
- Protected species, species of principal importance for the conservation of biodiversity, or other conservation-notable species recorded within 1km.

The geographical context of the Site was examined using the relevant Ordnance Survey 1:10,000 scale maps and freely-available aerial photographs, to identify key landscape features that may be important for protected or conservation-notable species, such as potential migration or dispersal routes, or any potential receptors of site-derived pollutants in the wider landscape.

The sources of desk study information were:

- MAGIC (the government environmental information partnership project)[redacted]
- Natural England [redacted]
- Joint Nature Conservation Committee (JNCC, [redacted]; and
- Suffolk Biodiversity Information Service [redacted].

2.2 Results

Designated Sites

There are no statutory designated sites present on Site but there is one statutory site within 2km. This is Pakenham Meadows SSSI which is located immediately to the east of the site, across the Pakenham Stream.

There are no non-statutory designated sites on-site but there are four non-statutory designated County Wildlife Sites within 1km.

The interest features of these sites are summarised in **Error! Reference source not found.** and the site l ocations are shown in Figures 2.1 and 2.2.

Table 2.1 Designated Sites and proximity to Pakenham Site 54

Designation	Distance from Site Boundary	Description
Statutory Designated Sites within 2km		
Pakenham Meadows SSSI	Immediately to the east.	The SSSI citation indicates that the meadow is unusually species rich, unimproved and poorly drained, and forms one of the best examples of its kind in the county. The small-scale complex mosaic of vegetation types present reflects the variation in soils from loam to peat. The meadow is also herb rich and contains a number of uncommon species, and the dykes provide a valuable additional habitat for invertebrates.
Non-Statutory Designated Sites within 1km		
Micklemere CWS	0.40 km north of the Site.	The CWS site consists of 10 riverside meadows, that lie underwater for much of the year. A sluice in the north west corner of the site is the only outlet but the river itself backs up into the ditches and floods the meadows. This constant flooding has created a large area of bare ground which when wet attracts large numbers of wetland birds. The remainder of the land, which does not flood, is rank grassland, which has been ungrazed for several years. The site supports good numbers of wetland birds throughout the year. Plant species at Micklemere are unexceptional.
Pakenham Fen Meadows CWS	0.10km south east of the Site.	The Site is divided into small fields, some of which have not been agriculturally improved and retain a diverse fen meadow flora, which is a Priority habitat. These areas support a good range of wetland plants and a number of uncommon Suffolk plants. The site also provides habitat opportunities for other wildlife, such as invertebrates.
Pakenham Wood CWS	0.60km south east of the Site.	The Site was at one time a Site of Special Scientific Interest (SSSI). However, in recent years much of the wood has been clear-felled and replanted with Corsican pine and larch affecting the wildlife value of the wood. Remnants of the rich woodland flora are confined to the wide woodland rides, which cross the wood.
Roadside Nature Reserve 133	0.65km north west of the Site.	Seeded in 1986 with meadow flowers and grasses.

Note: The site forms part of Nitrate Vulnerable Zones 2017 designations and SSSI Impact Risk Zones.

Priority Habitats

MAGIC indicates that four priority habitats are located within 1km of the Site, with three priority habitats identified as being present on-site (the nearest distance provided for each priority habitat):

- Coastal and floodplain grazing marsh (on Site);
- Deciduous woodland (on Site);
- Lowland meadows (immediately to the east); and
- Woodpasture and parkland (0.5km south).

Species Records

A summary of the key species records within 1km of the Site are presented in Table 2.2.

Table 2.2 Protected and conservation notable species within 1km[1] of Pakenham Site 54

Common Name	Distance of Record from Site (nearest)	Protection		Other Conservation Criteria (as identified on SBIS records)
		HR	WCA	
Mammals				
Brown Hare	0.2km north-west			✓ (S41)
Bat – brown long-eared	0.5km north-east	✓	✓	✓ (S41)
Bat – Pipistrelle	0.5km north-east	✓	✓	
Harvest Mouse	0.2km east			✓ (RL and S41)
Hedgehog	0.1km west			✓ (RL and S41)
Otter	0.4km east	✓	✓	✓ (RL and S41)
Water Vole	0.1km north-east		✓	✓ (RL and S41)
Birds				
Avocet +	0.4km north-east		✓*	✓ (RL)
Barn Owl	0.3km east		✓*	
Bewick's Swan +	0.4km north-east		✓*	
Black-tailed godwit	0.2km east			✓ (RL)
Black Tern +	0.4km north-east		✓*	
Black-winged Stilt	0.4km north-east		✓*	
Brambling +	0.1km south-east		✓*	
Bullfinch	0.1km south-east			✓ (S41)
Cuckoo	0.1km south-east			✓ (RL and S41)
Curlew	0.1km south-east			✓ (RL and S41)
Fieldfare +	0.5km south-west		✓*	✓ (RL)
Grasshopper Warbler	0.4km north-east			✓ (RL, S41)
Green Sandpiper +	0.4km north-east		✓*	
Greenshank +	0.4km north-east		✓*	
Grey Partridge	0.4km north-east			✓ (RL, S41)
Grey Wagtail	0.4km north-east			✓ (RL)
Hobby	0.1km south-east		✓*	

[1] Due to the differing levels of accuracy of location data provided (e.g. 2, 4, 6 and 10 figure grid references) and differences in location indicated by national grid reference relative to latitude and longitude, where necessary some interpretation of the likely location has been applied by additional reference to site name used.

Common Name	Distance of Record from Site (nearest)	Protection		Other Conservation Criteria (as identified on SBIS records)
		HR	WCA	
House Sparrow	On site (albeit only 4 figure grid reference provided)			✓ (RL, S41)
Kingfisher	0.3km east		✓*	
Lapwing	0.4km north-east			✓ (RL, S41)
Lesser Redpoll	0.4km north-east			✓ (RL, S41)
Linnet	0.4km north-east			✓ (RL S41)
Little Gull +	0.4km north-east		✓*	
Little Ringed Plover	0.4km north-east		✓*	
Marsh Harrier	0.1km south-east		✓*	
Marsh Tit	0.1km south-east			✓ (RL, S41)
Mediterranean Gull	0.4km north-east		✓*	
Merlin +	0.4km north-east		✓*	✓ (RL)
Mistle Thrush	0.4km north-east			✓ (RL)
Nightingale	0.4km north-east			✓ (RL)
Osprey +	0.4km north-east		✓*	
Peregrine	0.4km north-east		✓*	
Pintail	0.4km north-east		✓*	
Pochard	0.4km north-east			✓ (RL)
Red Kite	0.4km north-east		✓*	
Red-necked Phalarope +	0.4km north-east		✓*	✓ (RL)
Reed bunting	0.1km south-east			✓ (S41)
Redwing +	0.4km north-east		✓*	✓ (RL)
Ringed Plover	0.5km north-west			✓ (RL)
Ruff	0.4km north-east		✓*	✓ (RL)
Scaup +	0.4km north-east		✓*	✓ (RL, S41)
Skylark	0.1km south-east			✓ (RL and S41)
Song Thrush	0.5km south-west			✓ (RL)
Spotted Flycatcher	0.4km north-east			✓ (RL, S41)
Starling	0.4km north-east			✓ (RL S41)

Common Name	Distance of Record from Site (nearest)	Protection		Other Conservation Criteria (as identified on SBIS records)
		HR	WCA	
Temminck's Stint +	0.4km north-east		✓*	
Tree sparrow	0.3km south-west			✓ (RL, S41)
Turtle Dove	0.5km south-west			✓ (RL, S41)
Whimbrel	0.4km north-east		✓*	✓ (RL)
Whinchat	0.4km north-east			✓ (RL)
White-fronted Goose	0.4km north-east			✓ (RL)
White-tailed Eagle +	0.4km north-east		✓*	✓ (RL)
Woodcock	1km east			✓ (RL)
Woodlark	0.4km north-east		✓*	✓ (S41)
Wood Sandpiper +	0.4km north-east		✓*	
Yellow Wagtail	0.1km south-east			✓ (RL, S41)
Yellowhammer	0.1km south-east			✓ (RL, S41)
Herpetofauna				
Common Toad	0.3km north-east			✓(S41)
Great Crested Newt	0.3km west	✓	✓	✓ (S41)
Invertebrates				
Anaglyptus mysticus	0.6km south-west			✓ (NS)
Adonis ladybird	0.4km south-west			✓ (NS)
Cinnabar	0.5km north-west			✓ (S41)
Ptinus sexpunctatus	0.4km south-west			✓ (NS)
Red-tailed Mason Bee	0.5km north-west			✓ (NS)
Small heath	0.9km south			✓ (S41)
White admiral	0.7km south-east			✓ (RL, S41)
White-letter Hairstreak	0.1km north-east			✓ (RL, S41)
Vascular plants				
Dwarf spurge	0.8km south-east			✓ (RL)
Cornflower	1km north-east			✓ (S41)

* Schedule 1 (*Wildlife and Countryside Act 1981*)
+ Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) affords additional protection to species during the breeding period in particular providing protection at nest sites. The species highlighted with a + are species which occur as wintering and passage

migrants but have not been identified as a breeding species within the search area and are considered unlikely to occur as a breeding species.
The other principle protective legislation and conservation designations for individuals of a species in England are:
WCA – *Wildlife and Countryside Act 1981* (as amended)
HR – *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*
ER – *The Eels (England and Wales) Regulations 2009*
S41 – Section 41 species; see Box 2.1
RL – Red list species; see Box 2.1
NR – Nationally Rare; See Box 2.1
NS – Nationally Scarce; See Box 2.1

There is also a record of ash, classed as Ancient Veteran Trees, north-west of the Site at NGR TL93116868.

Non-native Species / Notifiable Weeds

There were no records for species listed in Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) found on-site. However, the following Schedule 9 species were found within 1km (with the nearest record to Site):

- American mink 0.1km east;
- Bar-headed goose 0.6km north-east;
- Barnacle goose 0.3km south-west (nearest);
- Canada goose 0.3km south-west (nearest);
- Canadian waterweed 1km north-east;
- Chinese muntjac 0.7km north-east;
- Egyptian goose 0.3km south-west (nearest);
- Grey squirrel 0.7km south (nearest);
- Nuttall's waterweed 0.3km north-east;
- Ruddy duck 0.7km north-east (nearest);
- Ruddy shelduck 0.6km north-east (nearest)
- Snow goose 0.3km north-east (nearest); and
- White-tailed eagle 0.1km west (although record suggests Micklemere which is 0.4km north-east at its nearest). .

Water bodies

Twenty seven water bodies have been identified from ordnance survey mapping within 500m of the Site boundary, including a single waterbody on site in woodland at the southern end. These are shown on Figure 2.3 and listed in Table 2.3. The Site also contains a network of drains that are not specifically listed in the table.

Pakenham Stream forms the eastern site boundary, with a network of drains present on-site and within the wider area. Great crested newts are not typically found in rivers, and the wettest drains on site are likely to support fish, which would make them sub-optimal for great crested newts.

However, the on site pond, and those located to the west of the Site are not separated by a barrier to great crested newt migration.

Table 2.3 Water bodies within 500m of Pakenham Site 54

Water body	NGR	Distance and direction from Site	Description
W1	TL 9338 6956	279m north	Large waterbody, may contain fish.
W2	TL 9373 6959	479m north	Waterbody likely to be connected to drainage network and may contain fish.
W3	TL 9369 8315	425m north-east	Pond
W4	TL 9369 7414	350m north-east	Pond.
W5	TL 9369 6714	290m north-east	Pond
W6	TL 9369 6107	195m north-east	Large waterbody may contain fish.
W7	TL 9369 6904	268m north-east	Large waterbody may contain fish.
W8	TL 9368 4675	52m east	Waterbody likely to be connected to drainage network and may contain fish.
W9	TL 9368 5553	8m east	Pond
W10	TL 9368 6423	283m east	Pond
W11	TL 9368 6112	299m east	Large waterbody may contain fish.
W12	TL 9368 7707	478m east	Pond
W13	TL 9367 6797	379m east	Large waterbody may contain fish.
W14	TL 9367 2789	121m south-east	Large waterbody may contain fish.
W15	TL 9367 3879	291m south-east	Detached waterbody.
W16	TL 9367 1779	153m south-east	Waterbody likely to be connected to drainage network and may contain fish.
W17	TL 9267 9752	375m south	Waterbody likely to be connected to drainage network and may contain fish.
W18	TL 9267 8992	155m south-west	Large waterbody may contain fish.
W19	TL 9268 8932	63m west	Pond
W20	TL 9268 8370	283m west	Large waterbody may contain fish.
W21	TL 9327 6821	79 m east	Pond
W22	TL 9268 7783	314m west	Large waterbody may contain fish.
W23	TL 9268 8587	260m west	Large waterbody may contain fish.
W24	TL 9268 8991	203m west	Pond
W25	TL 9268 8391	255m west	Pond
W26	TL 9369 0242	372m north-west	Pond
W27	TL 9322 6805	49m east	Pond

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590000 590500 591000 591500 592000 592500 593000 593500 594000 594500 595000 595500 596000

271500 271000 270500 270000 269500 269000 268500 268000 267500 267000 266500 266000

N

Abbey Farm
Allen's Farmhouse
Chalet Bungalow
Heath Farm
Heath Cottages
Puttocks Cottage
White Clouds
Puttockshill
Queach House
The Plains
Paltry Farm
Highfields Farm
Ashmore Farm
Highfield Farm Cottages
West View
Edgewood Cottage
Mere Farm
Bartonmere House
The Lodge
Green Lane Farm
Grange Farm
Millfields Cottage
Nether Hall
Bella Vista House
The Bungalow
Manor Farm
Great Green
Moat Farm
Norton
Upper Town
Pakenham
Old Hall Farm
Mill Farm
Grimstone End
Ixworth
Woodstreet Farm
Kiln Farm
Lime Kiln Cottages
Bridge Farm
Parkfield Cottage
Stowlangtoft
Beaumont House
Kartin House
Beaumont's Hall
Ixworth Road
Little Haugh Hall
Stanton Street
The Old Rectory
Amerhur House
Wyken Cot

A1088
A143
Stow Lane

Pakenham Meadows

Key

- Site 54 boundary
- 2km search area
- Site of Special Scientific Interest (SSSI)

0 250 500 750 1,000 1,250 m

Scale at A3: 1:22,000

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Fen Meadow Compensation Sites:
Pakenham Site 54
Baseline Ecology Report

Figure 2.1
Statutory designated sites within 2km of the Site

May 2021

wood.

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591000 591500 592000 592500 593000 593500 594000 594500 595000

270500 270000 269500 269000 268500 268000 267500 267000

N

Micklemere

RNR 133

Pakenham Fen Meadow

Pakenham Fen Meadow

Pakenham Fen Meadow

Pakenham Wood

Key

Site 54 boundary

1km search area

County Wildlife Site (CWS)

0 250 500 750 m

Scale at A3: 1:15,000

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Fen Meadow Compensation Sites:
Pakenham Site 54
Baseline Ecology Report

Figure 2.2
Non-statutory designated Sites within 1km of the site

May 2021

wood.

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591500 592000 592500 593000 593500 594000 594500

269500 269000 268500 268000 267500

N

A143 A1088

Great Queach
Cutter's La
Thieves La
The Plains
Nursery Plantation
Stow La
Baileypool La
Broadway
Grimstone End
The Black Bourn
Sandy La
Fen Rd
Broom Covert
Pakenham Fen
Bull R
Upper Town
Pakenham Rd
The Owell
Pakenham
The Meadows
The St
Beaumont Hall

W1 W2 W3 W4 W5 W6 W7 W8 W9 W10 W11 W12 W13 W14 W15 W16 W17 W18 W19 W20 W21 W22 W23 W24 W25 W26 W27

Key

- Site 54 boundary
- Site 54 boundary 500m buffer
- W1 Waterbody

0 100 200 300 400 500 600 m

Scale at A3: 1:10,000

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Fen Meadow Compensation Sites:
Pakenham Site 54
Baseline Ecology Report

Figure 2.3
Waterbodies located with 500m of the site

May 2021

wood.

3. Extended Phase 1 Habitat Survey

3.1 Method

Habitats

A Phase 1 habitat survey of the Site and, where possible, a 30m buffer, was completed by a Wood Ecologist on 6th May 2021. During the survey, distinct habitats were identified, and any features of interest recorded and included on a Phase 1 habitat map as a target note (TN), in accordance with JNCC (2010).

Protected and Notable Species

As the standard Phase 1 habitat survey methodology is mainly concerned with vegetation communities, the survey was extended, in general accordance with IEA (1995), to allow for the provision of information on other ecological features, including identification of the presence, or potential presence, of legally protected or conservation notable species.

The methodologies used to establish the presence or potential presence of species and / or species groups are summarised below. Species or biological taxa included in the surveys were targeted due to the desk study and / or habitat types indicating potential for presence on the Site.

Great crested newt

Great crested newt is legally protected and is also a Species of Principal Importance.

The Site was assessed for its potential to support a population of this species. This assessment considered the presence of suitable aquatic and terrestrial habitats on site (the latter including foraging habitat, hibernacula and refugia). All accessible waterbodies were subject to Habitat Suitability Index HSI assessment (Oldham *et al*., 2000), recording the context and features of them to generate a score relative to the likelihood of great crested newts using them

Reptiles

All species of British reptile are legally protected and are also Species of Principal Importance.

The Site was assessed for its potential to support populations of reptile species. This involved looking for potential foraging habitat, hibernacula, refugia and areas for basking (as described in Froglife, 1999).

Birds

All nesting birds are legally protected, some are afforded a higher level of protection when breeding, and many are also Species of Principal Importance.

The habitats on site were assessed for their potential to support important populations of breeding and wintering birds.

Badger

Badgers and their setts are legally protected.

The Site was searched for evidence of badger activity. This involved looking for setts, badger trails, snuffle holes, latrines and badger hairs. Furthermore, information was gathered about the suitability of habitats for

foraging badger on-Site and of suitable sett-digging habitat likely to be present within 30m of the Site (as described in Natural England, 2015).

Bats (all species)

All species of British bats and their roosts are legally protected and many are also Species of Principal Importance.

A general assessment was made for the potential of onsite trees to contain potential roost features for bats (e.g. rot and woodpecker holes, splits, cracks, and dense woody ivy on trees). Additionally, a general assessment was made as to whether habitats within and adjacent to the Site are likely to provide an important foraging resource and/or commuting route for bats (as described in Collins *et al*., 2016).

Dormouse

Dormouse is legally protected and is also a Species of Principal Importance.

The extent and quality of the habitats within and adjacent to the Site were assessed for their potential to support dormouse; in particular whether or not key food plants occurred and whether any of the habitats present are connected to large areas of suitable woodland (as described in Bright *et al*, 2006).

Otter

Otter is legally protected and is also a Species of Principal Importance.

The Site was assessed for its potential to provide habitat that could support otter. This involved considering the size and connectivity of any watercourse present on site (or within the vicinity) with regard to providing suitable foraging resources, as well as the presence of areas of woodland and other dense vegetation suitable for creation of holts, natal dens and/or laying-up areas (as described in Chanin, 2003).

Water vole

Water vole is legally protected and is also a Species of Principal Importance.

The Site was assessed for its potential to provide habitat that could support a population of water vole. This involved considering the size and connectivity of any watercourse present on site (or within the vicinity), as well as the potential presence of suitable foraging resources and burrowing substrate along the banks (as described in Strachan *et al*, 2011).

Invertebrates

A number of invertebrate species are legally protected and some are also Species of Principal Importance.

An assessment was made of the potential for habitats on site to support an assemblage of priority invertebrate species, by considering the provision of a mosaic of varied habitat and substrate types and nectar-rich flowering species.

Other priority faunal species

Drawing upon information that was collected during the desk study, an assessment was made of the potential for the Site to support any other legally protected and/or Species of Principal Importance.

Limitations

While every effort has been made to provide a comprehensive description of the Site, this survey does not constitute a full botanical survey. Nevertheless, it is considered that the survey is sufficient quality to capture the overall character of the Site and all of the major vegetation communities.

To determine presence or likely absence of protected species usually requires multiple visits at suitable times of the year. As a result, this survey focuses on assessing the potential of the Site to support habitats and species of note, which are considered to be of principal importance for the conservation of biodiversity with reference to those given protection under UK or European wildlife legislation. This survey therefore cannot be considered a comprehensive assessment of the ecological interest of the Site. However, it does provide an assessment of the ecological interest present on the day the Site was visited and highlights areas where further survey work may be required.

Due to the ground being waterlogged in places it was not possible to safely access all areas for survey. The greatest limitation was in the broadleaved woodland in the south-east (including WB18) and the grassland immediately to the north. Although this prevented a detailed species list being collected it did not prevent a general assessment of the habitat type, nor has it prevented an accurate assessment of further work required.

The data from this survey is generally considered valid for a maximum of two years. Therefore, if more than two years elapse prior to commencement of the works, a repeat survey might be required to ensure up-to-date information is available to inform decisions.

3.2 Results

Habitats

The habitats present on site comprise:

- Semi-natural broadleaved woodland;
- Parkland and scattered trees – broadleaved;
- Parkland and scattered trees – mixed;
- Semi-improved neutral grassland;
- Marsh/marshy grassland;
- Improved grassland;
- Swamp;
- Standing water;
- Running water;
- Intact hedge native species poor;
- Defunct hedge native species poor; and
- Bare ground.

Further details are provided below. Habitat distribution is illustrated on Figure 3.1, and target notes are presented in Appendix C.

Semi-natural broadleaved woodland

Wet broadleaved woodland, comprising a mixture of ages of tree, was well established in the south-east corner of the site. The soil was waterlogged (limiting the extent of the survey to the northern half where it could be safely accessed). Within the visible northern areas there was a limited understorey with a sparse ground flora, that included tufted hairgrass. To the south, although not accessible, the ground flora has a thin pond-sedge and tussock-sedge flora, with a thin reed cover. Tree species present in both areas were dominated by mature poplars, with occasional willow and alder, over patches of grey willow and with occasional hawthorn trees. A large pond was found in this area (see Standing water).

In the north of the woodland a fenced off area was used for a pheasant pen (Target Note 1, Figure 3.1). This area was cleared, and grasses had grown up in the space fenced off by Heras fencing.

Parkland and scattered trees broadleaved

Lines of semi-mature willow up to 4 m tall were present along some of the ditches. There were also several mature pedunculate oak trees in fields. These are estimated to be well over 100 years old, and had grown to around 15 m.

Parkland and scattered trees mixed

A short line (approximately 60 m) of mixed coniferous and broadleaved trees was present at the northern end of the site. This included Scots pine, willow species and Lombardy poplar.

Semi-improved neutral grassland

This habitat was found within the central portion of the site. It was dominated by hard rush and cock's-foot, which was quite tussocky in places. The fields are likely grazed but this does not appear to be limiting the rush growth, which had a sward height of up to 500 mm. Other species frequently found were dandelion, black thistle, meadow buttercup and more occasionally black sedge.

Marsh/marshy grassland

Marshy grassland was present on inundated soil in two locations: one towards the northern end and one in the south-west corner of the site. The habitat was dominated by sedges and rushes, including great wood-rush, black sedge, pendulous sedge, and hard rush. Grass species included sweet vernal grass and Yorkshire fog. Other species included water mint, marsh-marigold, meadowsweet, curled dock, sphagnum moss and cuckooflower. This grassland appeared relatively unmanaged at the time of the survey, in most areas, had grown to around 500 mm in height.

The northern patch graded into improved grassland with more dandelion, red dead-nettle, silverweed and fleabane present. There were patches of very boggy ground (Target Note 2, Figure 3.1), with other areas markedly drier (Target Note 3, Figure 3.1).

Improved grassland

This habitat covered much of the south-central area of the site, and it was also present at the very northern end. It was markedly drier than the marshy grassland and much of it appeared managed by grazing, and was no more than 100-250 mm tall. It was mostly dominated by annual meadow grass and cock's-foot with sections of abundant hard rush where the ground was damper and it graded into marsh/marshy grassland (e.g. Target Note 5, Figure 3.1) with meadow foxtail. In these areas the vegetation was up to 500 mm in height. Other species frequently found were spear thistle, dandelion, broad-leaved dock, purple dead-nettle, common mouse ear, daisy and meadow buttercup.

Swamp

To the north-east of the woodland was an area of sedge swamp (Target Note 4, Figure 3.1). Due to the ground conditions this could not be accessed at the time of the survey but during previous visits (January 2021) it consisted mainly of pond sedges with common reed colonising, and encroachment by grey willow.

Standing water

A network of ditches ran throughout the site. Some of these were completely open whilst others were partially covered by water mint. Water in most of the ditches was shallow, up to 250 mm deep. At the margins were water-loving herbs and trees including willow and black sedge. There was a culvert over one of the southern ditches to enable access to that end of the site (Target Note 6, Figure 3.1). At the southern end of the site, within the southern deciduous woodland block, was a large pond. This was largely open water, with some fringing common reed at the margins, and shading from overhanging trees.

Running water

The Pakenham Stream forms the eastern boundary of the site. It is maximum of 4-5 m wide and appears to be up to 1m deep.

Intact hedge, native species-poor

Functioning hedgerows were found along the boundary of the access tracks. These were dominated by hawthorn, itself supporting ivy, with occasional hornbeam and spindle. The hedges were more managed than those found on the main part of the site and have been maintained at around 2 m height.

Defunct hedge native species-poor

The majority of the hedgerows on the site appear unmanaged and the species within them (e.g. oak) have grown to their full height, creating gaps between the trees and shrubs. Each hedgerow had a fence running through or adjacent, to provide the boundary function that the hedge once would have. The hedgerows were hawthorn dominated with frequent bramble, hornbeam and oak. The hedges were generally around 3-4 m tall, though the mature trees had grown up to 15 m.

Bare ground

Bare ground was present on site, represented by the compacted earth tracks on the access routes and a cleared area in one of the fields (Target Note 7, Figure 3.1). Much of this was devoid of vegetation but the areas outside the wheel tracks (i.e. the centre and verges) was improved grassland with annual meadow grass, cock's-foot, common nettle and cow parsley.

Protected and notable species

Badger

No evidence of badgers was found during the survey, although they are likely to be present in the vicinity of the site, given its rural location, and they may use the site in future.

Bats (all species)

There were many mature oak and hornbeam trees in the hedgerows, woodland and individually in the fields, which were of sufficient age and size to support roosting bats. The habitats around these trees (hedgerows and linear water features) link them well to foraging areas increasing the likelihood bats roost in some of the trees.

The mixture of vegetation types and waterbodies is likely to support a large diversity and volume of invertebrates whether they roost on the site or offsite for example in nearby farm buildings. Hedgerows, ditches, lines of scattered trees and the stream adjacent to the site create good navigational aides for bats to commute along. Overall these features make up continuous high-quality habitats for bats to use and therefore the site is high suitability for foraging and commuting bats following the Bat Conservation Trust Guidance (Collins, 2016).

Nesting birds

There is general nesting bird potential in the woodland, the hedgerows and parkland and scattered trees, as well as the grassland that occur across the site. Cuckoo were heard calling throughout the site, and lapwing were seen in the grasslands at the northern end.

Great crested newt

The ditch network and single pond on site, and ponds off site, could potentially support breeding great crested newts. Great crested newts could use tree and hedgerow roots to hibernate. Potential refugia were present including two wood piles were found, one located in the pheasant pen (See Target Note 1, Figure 3.1) and one in the middle of the field (Target Note 8, Figure 3.1).

Reptiles

The habitats present on-site (grassland, hedgerows and water) provide foraging habitat, whilst the roots of trees and hedgerow along with the wood piles found at Target Notes 1 and 8 (Figure 3.1) provides suitable hibernation areas. Grass snake is often found in aquatic environments and the ditches provide a suitable foraging ground.

Hazel dormouse

There are no records of dormouse within 1 km of the site. The habitats on the site (woodland, some scattered trees and hedgerows) provide suitable foraging habitat albeit a limited diet given the lack of floral diversity noted.

Otter

The water bodies on and around the site provide habitats for otter to feed, and opportunities for them to build holts nearby. There is an otter record from near to the site indicating otter are likely in the area.

Water vole

The stream and ditches on and around the site provide a network of waterbodies where water voles could feed under cover and/or escape into the water as needed. Most of the banks had a steep profile such that water voles could access them without their burrows being regularly submerged. There is a water vole record from near to the site indicating they are likely in the area.

Other species – Terrestrial Invertebrates

The mix of habitats on-site including marshy grassland through to woodland provides a variety of niches for terrestrial invertebrates. A diverse community including notable species is possible.

Other species – Aquatic Invertebrates

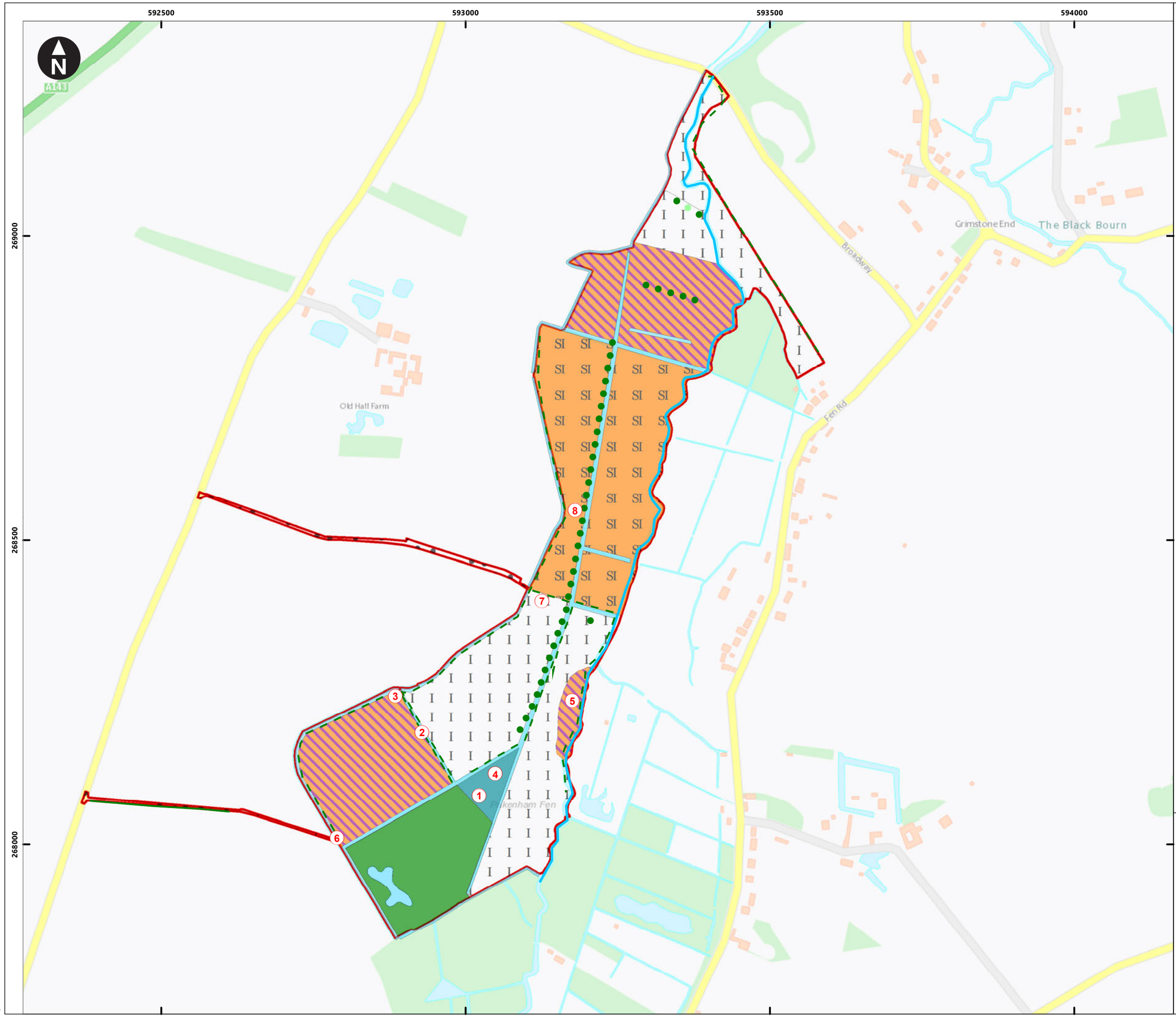
The waterbodies on site would be expected to support a range of aquatic invertebrate species, potentially including some notable species.

Other priority faunal species

During the survey several brown hares (priority species) were seen in the fields.

Controlled species

During the survey no controlled species were noted. However, the presence of legally controlled species cannot be ruled out on the basis of this survey alone.



Key

- Site 54 boundary
- Broadleaved woodland - semi-natural
- Neutral grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Swamp
- Standing water
- Bare ground
- Parkland and scattered trees - broad-leaved
- Parkland and scattered trees - mixed
- Running water
- Intact hedge native species poor
- Defunct hedge native species poor
- Parkland and scattered trees- broad-leaved
- Target note

0 100 200 300 m

Scale at A3: 1:6,000

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Fen Meadow Compensation Sites:
Pakenham Site 54

Figure 3.1
Phase 1 habitat Plan

June 2021

wood.

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Appendix A
Species Scientific Name

Table A1 Species Names

Common name	Scientific name
Plants	
Annual meadow grass	*Poa annua*
Broad leaved dock	*Rumex obtusifolius*
Canadian waterweed	*Elodea canadensis*
Cock's-foot	*Dactylis glomerata*
Common mouse ear	*Cerastium fontanum*
Common nettle	*Urtica dioica*
Common water-starwort	*Callitriche stagnalis*
Cornflower	*Centaurea cyanus*
Cow parsley	*Anthriscus sylvestris*
Cuckooflower	*Cardamine pratensis*
Curled dock	*Rumex crispus*
Daisy	*Bellis perennis*
Dandelion	*Taraxacum agg.*
Dwarf spurge	*Euphorbia exigua*
Fleabane	*Pulicaria sp.*
Great wood-rush	*Luzula sylvatica*
Hard rush	*Juncus erectus*
Hawthorn	*Crataegus monogyna*
Hornbeam	*Carpinus betulus*
Lombardy poplar	*Populus nigra italica*
Marsh-marigold	*Caltha palustris*
Meadow buttercup	*Trifolium dubium*
Meadow foxtail	*Alopecurus pratensis*
Meadowsweet	*Filipendula ulmaria*

Common name	Scientific name
Nuttall's waterweed	*Elodea nuttalli*
Pedunculate oak	*Quercus robur*
Pendulous sedge	*Carex pendula*
Red dead-nettle	*Lamium purpureum*
Scots pine	*Pinus sylvestris*
Silverweed	*Argentina anserina*
Soft brome	*Bromus hordeaceus*
Spear thistle	*Cirsium vulgare*
Sphagnum moss	*Sphagnum sp*
Spindle	*Euonymus europaeus*
Sweet vernal grass	*Anthoxanthum odoratum*
Water mint	*Mentha aquatica*
Willow	*Salix sp*
Yorkshire fog	*Holcus lanatus*
Mammals	
American mink	*Mustela vison*
Badger	*Meles meles*
Brown Hare	*Lepus europaeus*
Bat – brown long-eared	*Plecotus auritus*
Bat – Pipistrelle	*Pipistrellus pipistrellus*
Chinese muntjac	*Muntiacus reevesi*
Dormouse	*Muscardinus avellanarius*
Grey squirrel	*Sciurus carolinensis*
Harvest Mouse	*Micromys minutus*
Hedgehog	*Erinaceus europaeus*
Otter	*Lutra lutra*
Water Vole	*Arvicola amphibius*
Birds	
Avocet +	*Recurvirostra avosetta*

Common name	Scientific name
Bar-headed goose	*Anser indicus*
Barn Owl	*Tyto alba*
Barnacle goose	*Branta leucopsis*
Bewick's Swan +	*Cygnus columbianus*
Black Tern +	*Chlidonias niger*
Black-tailed godwit	*Limosa limosa*
Black-winged Stilt	*Himantopus himantopus*
Brambling +	*Fringilla montifringilla*
Bullfinch	*Pyrrhula pyrrhula*
Canada goose	*Branta canadensis*
Cuckoo	*Cuculus canorus*
Curlew	*Numenius arquata*
Egyptian goose	*Alopochen aegyptiaca*
Fieldfare +	*Turdus pilaris*
Grasshopper Warbler	*Locustella naevia*
Green Sandpiper +	*Tringa ochropus*
Greenshank +	*Tringa nebularia*
Grey Partridge	*Perdix perdix*
Grey Wagtail	*Motacilla cinereal*
Hobby	*Falco Subbuteo*
House Sparrow	*Passer domesticus*
Kingfisher	*Alcedo atthis*
Lapwing	*Vanellus vanellus*
Lesser Redpoll	*Acanthis cabaret*
Linnet	*Linaria cannabina*
Little Gull +	*Hydrocoloeus minutus*
Little Ringed Plover	*Charadrius dubius*
Marsh Harrier	*Circus aeruginosus*
Marsh Tit	*Poecile palustris*

Common name	Scientific name
Mediterranean Gull	*Ichthyaetus melanocephalus*
Merlin +	*Falco columbarius*
Mistle Thrush	*Turdus viscivorus*
Nightingale	*Luscinia megarhynchos*
Osprey +	*Pandion haliaetus*
Peregrine	*Falco peregrinus*
Pheasant	*Phasianus colchicus*
Pintail	*Anas acuta*
Pochard	*Aythya farina*
Red Kite	*Milvus milvus*
Red-necked Phalarope +	*Phalaropus lobatus*
Redwing +	*Turdus iliacus*
Reed bunting	*Emberiza schoeniclus*
Ringed Plover	*Charadrius hiaticula*
Ruddy duck	*Oxyura jamaicensis*
Ruddy shelduck	*Tadorna ferruginea*
Ruff	*Calidris pugnax*
Scaup +	*Aythya marila*
Skylark	*Alauda arvensis*
Snow goose	*Chen caerulescens*
Song Thrush	*Turdus philomelos*
Spotted Flycatcher	*Muscicapa striata*
Starling	*Sturnus vulgaris*
Temminck's Stint +	*Calidris temminckii*
Tree sparrow	*Passer montanus*
Turtle Dove	*Streptopelia turtur*
Whimbrel	*Numenius phaeopus*
Whinchat	*Saxicola rubetra*
White-fronted Goose	*Anser albifrons*

Common name	Scientific name
White-tailed Eagle +	*Haliaeetus albicilla*
Wood Sandpiper +	*Tringa glareola*
Woodcock	*Scolopax rusticola*
Woodlark	*Lullula arborea*
Yellow Wagtail	*Motacilla flava*
Yellowhammer	*Emberiza citrinella*
Herpetofauna	
Common Toad	*Bufo bufo*
Great Crested Newt	*Triturus cristatus*
Invertebrates	
Anaglyptus mysticus	*Anaglyptus mysticus*
Adonis ladybird	*Hippodamia variegata*
Cinnabar	*Tyria jacobaeae*
Ptinus sexpunctatus	*Ptinus sexpunctatus*
Red-tailed Mason Bee	*Osmia bicolor*
Small heath	*Coenonympha pamphilus*
White admiral	*Limenitis Camilla*
White-letter Hairstreak	*Satyrium w-album*

Appendix B
Species Protection or Control Legislation

Great crested newts, bats, otter, dormouse

These species / species groups are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. They are afforded full protection under Section 9(4) of the Act and Regulation 43 of the Regulations. These make it an offence, *inter alia*, to:

- Deliberately capture, injure or kill any such animal; and
- Deliberately disturb any such animal, including in particular any disturbance which is likely;
  - to impair its ability to survive, breed, or rear or nurture their young;
  - to impair its ability to hibernate or migrate; and
  - to affect significantly the local distribution or abundance of that species.
- Damage or destroy a breeding site or resting place of any such animal;
- Intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection (for bats this is taken to mean all bat roosts whether bats are present or not); or
- Intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

In addition, five British bat species are listed on Annex II of the Habitats Directive. These are:

- Greater horseshoe bat (*Rhinolophus ferrumequinum*);
- Lesser horseshoe bat (*Rhinolophus hipposideros*);
- Bechstein's bat (*Myotis bechsteinii*);
- Barbastelle (*Barbastella barbastellus*); and
- Greater mouse-eared bat (*Myotis myotis*).

In certain circumstances where these species are found the Directive requires the designation of Special Areas of Conservation (SACs) by EC member states to ensure that their populations are maintained at a favourable conservation status. Outside SACs, the level of legal protection that these species receive is the same as for other bat species.

Badger

The *Protection of Badgers Act 1992* consolidates previous legislation (including the *Badgers Acts 1973* and the *Badgers (Further Protection) Act 1991*). It makes it an offence to:

- Kill, injure or take a badger;
- Attempt to kill, injure or take a badger; and
- To damage or interfere with a sett.

The 1992 Act defines a badger sett as "any structure or place which displays signs indicating current use by a badger".

Nesting Birds

With certain exceptions, all wild birds, their nests and eggs are protected by Section 1 of the *Wildlife and Countryside Act 1981* (as amended). Therefore, it is an offence, inter alia, to:

- Intentionally kill, injure or take any wild bird;
- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
- Intentionally take or destroy the egg of any wild bird.

Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- Intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; and
- Intentionally or recklessly disturb the dependent young of any such bird.

Reptiles

The four widespread species of reptile that are native to Britain, namely common or viviparous lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*), adder (*Vipera berus*) and grass snake (*Natrix natrix*), are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence, inter alia, to:

- Intentionally kill or injure any of these species.

In addition sand lizard and smooth snake are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*: They are afforded full protection under Section 9(4) of the Act and Regulation 43 of the Regulations.

These make it an offence, inter alia, to:

- Deliberately capture, injure or kill any such animal;
- Deliberately disturb any such animal, in particular in such a way as to be likely to:
- Impair their ability to survive, breed or reproduce, or rear or nurture their young;
- Impair their ability to hibernate or migrate which could affect significantly the local distribution or abundance of that species;
- Damage or destroy a breeding site or resting place of any such animal;
- Intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- Intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

The legislation applies to all life stages of these species.

Notifiable / Controlled Species

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it is an offence to release or allow to escape into the wild (for example grey squirrel) and species of plant that it is an offence to plant or otherwise cause to grow in the wild (for example, Japanese knotweed).

Appendix C
Phase 1 Target Notes

Table C.1 Extended Phase 1 Survey Target Notes

Target Note no.	Ordnance Survey Grid Reference	Description
1	TL9301268057	Pheasant pen adjacent to woodland, ground flora is dominated by grasses and there is a pile of dead wood inside suitable for invertebrates, amphibians and reptiles.
2	TL9293768175	Patch of very boggy grassland which includes water mint and common water-starwort.
3	TL9289968238	Patch of drier grassland dominated by soft brome
4	TL9305468116	Area not accessed during this visit due to H&S concerns. However when accessed in January 2021, it was reported to consist of pond sedges with frequent common reed and occasional grey willow.
5	TL9315968194	Damp area of improved grassland grading into marsh/marshy grassland dominated by hard rush
6	TL9279168012	Concrete culvert over ditch
7	TL9311368395	Cleared area of bare ground at the end of an access track
8	TL9317868541	Pile of logs which has been burned but still offers a refugia for amphibians or reptiles.

APPENDIX D: WATER MONITORING SUMMARY – PAKENHAM SITE 54, APRIL 2021 – PRESENT (JULY 2021) – REFER TO FEN MEADOW PLAN DRAFT 1 [REP6-026]

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Technical note:
Sizewell C Fen Meadow Compensation
Water Monitoring Summary – Pakenham Site 54
April 2021 to July 2021

1. Introduction

The technical note summarises water monitoring data collected between April 2021 and July 2021 at the Pakenham Site (hereafter referred to as 'the Site') which has been identified as a potential fen meadow development area. This technical note is predominantly a factual presentation of the data rather than an interpretive report.

Figure 1.1 shows a map of the Site and the installations referred to in this technical note.

2. Groundwater Level Monitoring

Nine groundwater monitoring points were installed at the Site between 22nd and 26th March 2021. Seven shallow dipwells were installed to measure groundwater levels in the shallow superficial near surface deposits and three piezometers were installed to measure groundwater levels in the underlying sands and gravels. Two of the sands and gravels piezometers are nested (within the same borehole) with a dipwell. An installation summary is provided in Table 2.1 below.

Table 2.1 Summary of groundwater monitoring installations

Name	NGR	Datum: Metal Cover (mAOD)	Ground Level (mAOD)	Depth (m bgl*)	Diameter (mm)	Notes
PAK-BH-1	TL 93282 68982	32.986	31.871	5	19	
PAK-BH-2D	TL 93102 68394	33.652	32.222	33	19	Nested with BH-2S
PAK-BH-2S	TL 93102 68394	33.652	32.222	4	19	Nested with BH-2D
PAK-HA-1	TL 93319 68927	31.753	30.694	3	19	
PAK-HA-2	TL 93161 68834	31.656	30.654	3	19	
PAK-HA-3	TL 93262 68661	31.727	30.583	3	19	
PAK-HA-4A	TL 93168 68445	32.021	30.934	2	19	

Name	NGR	Datum: Metal Cover (mAOD)	Ground Level (mAOD)	Depth (m bgl*)	Diameter (mm)	Notes
PAK-HA-5	TL 92935 68197	31.859	30.905	2	19	
PAK-HA-6	TL 93075 68079	31.685	30.747	3	19	

*m bgl = metres below ground level

Each installation is fitted with a water level datalogger which will be downloaded on a quarterly basis. Table 2.2 and 2.3 summarises the data collected in April 2021. Hydrographs of groundwater levels are presented in Appendix A. Hydrographs, presenting both logger and manually collected data) for the installations are provided in Appendix A (Combined Hydrograph Figures A1 to A4), Appendix B (Individual Groundwater Hydrographs Figures B1-B18) and Appendix C (Individual Surface Water Hydrographs Figure C1 to C5). Note that in Appendix B there are a combination of hydrographs providing both absolute water levels and depth to water table.

Table 2.2 Site 54 Groundwater Levels (m bgl and mAOD)

Date	PAK-BH-1	PAK-BH-2D	PAK-BH-2S	PAK-HA-1	PAK-HA-2	PAK-HA-3	PAK-HA-4	PAK-HA-5	PAK-HA-6
m bgl									
28/04/21	2.24	0.61	3.23	2.14	2.1	1.05	1.58	2.14	1.1
14/05/21	2.605	0.8	2.553	1.115	1.12	1.114	1.58	1.405	1.134
11/06/21	2.72	1.03	0.735	1.432	1.359	1.262	1.802	1.543	1.258
12/07/21	2.335	1.22	3.67	2.2	2.21	1.22	1.745	2.17	1.095
mAOD*									
28/04/21	30.389	32.959	30.131	29.522	29.427	30.482	30.386	29.677	30.424
14/05/21	30.381	32.852	31.099	30.638	30.536	30.573	30.441	30.516	30.551
11/06/21	30.381	32.622	32.917	30.321	30.297	30.425	30.219	30.378	30.427
12/07/21	30.294	32.349	29.691	29.462	29.317	30.312	30.221	29.647	30.429

*m AOD = metres above ordnance datum
Note: negative m bgl value indicates positive hydrostatic pressure

3. Surface Water Level Monitoring

Five gaugeboards were installed between 22nd and 26th March 2021 to allow monitoring of surface water levels in site watercourses / drains. All gaugeboards included stilling wells and water level data loggers. An installation summary is given in Table 3.1 below.

Table 3.1 Summary of gaugeboard installations

Ref.	GPS Grid Ref.	Bottom of Gaugeboard Datum (mAOD*)	Gaugeboard Length (m)	Datalogger	Log Interval (minutes)
PAK-GB01	TL93239 68817	29.027	2	Yes (install in May 2021)	15
PAK-GB02	TL93064 68381	31.2	2	Yes (install in May 2021)	15
PAK-GB03	TL93175 68400	29.917	2	Yes (install in May 2021)	15
PAK-GB04	TL92873 67891	31.084	2	Yes (install in May 2021)	15

*mAOD = metres above ordnance datum

Table 3.2 summarises the gaugeboard water level readings taken between April 2021 and June 2021. The water level at all gaugeboard locations is continuously monitored and are downloaded on a monthly basis during spot gauging visit. Hydrographs of surface water levels are presented in Appendix C, and in combination with groundwater hydrographs in Appendix A (data are currently available to mid June 2021).

Table 3.2 Surface Water Levels (mAOD)

Date	PAK-GB01	PAK-GB02	PAK-GB03	PAK-GB04
14/04/21	30.372	31.475	29.917	31.084
14/05/21	27.695	31.452	30.382	31.955
11/06/21	27.783	31.4	30.32	31.908

*Manual reading from dip point (no gaugeboard or datalogger).

4. Spot Flow Gauging

Monthly spot flow gauging of six locations commenced in April 2021. Results to date are shown in Table 4.1 below.

Table 4.1 Spot Flow (m^3/s)

Date	PAK-SF01	PAK-SF02	PAK-SF03	PAK-SF04	PAK-SF05	PAK-SF06
14/04/21	0.0502	0.0003	0.0201	0.1602	0.0701	0.1102
14/05/21	-0.0286	0.0002	0.0164	0.1538	0.0540	0.1106
11/06/21	0.0376	0.0	0.0064	0.1208	0.0440	0.1008

5. Water Quality Monitoring

In-situ water quality readings are collected from all groundwater and surface water installations on a monthly basis. *In-situ* water quality results are presented in Table 5.1 below.

In addition to this, water quality samples have been collected quarterly at selected locations and sent for laboratory analysis. Quarterly sampling was undertaken in April 2021, with the next samples collected in July 2021 being analysed. Available results for key water quality parameters indicative of nutrient enrichment, and its source (nitrate, phosphate and chloride), are presented in Table 5.2.

Table 5.1 In-situ Water Quality Results

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
14/05/21	PAK_BH1	8.90	8.60	718.00	7.20	-85.20	12.00
11/06/21	PAK_BH1	11.40	19.40	705.00	7.14	-140.60	12.40
12/07/21	PAK_BH1	13.90	300.00	707.00	6.86	121.10	>1050
28/04/21	PAK_BH2_d	10.30	41.30	694.20	7.23	111.90	268.00
14/05/21	PAK_BH2_d	14.90	25.00	703.00	7.39	-84.00	5.43
11/06/21	PAK_BH2_d	19.30	44.30	675.00	7.45	-56.80	1.23
12/07/21	PAK_BH2_d	17.00	608.00	691.00	7.40	54.40	41.30
28/04/21	PAK_BH2_s	9.20	27.00	1154.00	6.98	92.50	>1050
14/05/21	PAK_BH2_s	9.80	13.90	1368.00	6.94	-44.00	51.61
11/06/21	PAK_BH2_s	19.80	88.10	4.30	7.51	-65.00	0.95
12/07/21	PAK_BH2_s	16.50	321.00	1440.00	6.83	86.90	>1050
28/04/21	PAK_HA1	10.60	13.70	682.00	7.12	59.40	>1050
14/05/21	PAK_HA1	12.30	49.80	678.00	7.37	-83.10	56.18
11/06/21	PAK_HA1	n/a	n/a	n/a	n/a	n/a	n/a
12/07/21	PAK_HA1	14.00	500.00	678.00	7.00	-59.80	>1050
28/04/21	PAK_HA2	10.60	19.80	766.00	6.74	-35.20	790.00
14/05/21	PAK_HA2	11.80	50.10	794.00	7.08	-114.20	128.70
11/06/21	PAK_HA2	15.50	40.80	797.00	6.90	-116.50	325.21

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Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
12/07/21	PAK_HA2	15.40	259.00	750.00	6.66	-122.60	>1050
14/05/21	PAK_HA3	12.50	42.40	568.00	7.48	-113.60	50.60
11/06/21	PAK_HA3	18.20	42.70	572.00	7.46	-105.10	95.14
12/07/21	PAK_HA3	15.10	274.00	573.30	7.31	-125.70	255.00
28/04/21	PAK_HA4	10.10	22.20	573.70	6.99	34.60	6.82
11/06/21	PAK_HA4	17.30	53.30	1537.00	7.15	-21.30	1778.23
12/07/21	PAK_HA4	14.90	424.00	1410.00	7.15	-96.40	>1050
28/04/21	PAK_HA5	9.20	36.10	778.00	7.21	68.60	>1050
14/05/21	PAK_HA5	12.80	58.00	845.00	7.32	99.30	80.13
11/06/21	PAK_HA5	16.80	60.10	925.00	7.17	-92.00	122.03
12/07/21	PAK_HA5	15.90	147.00	974.00	6.85	-90.90	>1050
14/05/21	PAK_HA6	12.80	53.00	661.00	7.60	-81.00	30.00
11/06/21	PAK_HA6	16.40	43.10	654.00	7.18	-104.00	55.49
28/04/21	PAK_STR	12.40	97.00	814.00	7.43	80.40	2.40
12/07/21	PAK_STR	16.60	83.80	872.00	7.40	-69.10	25.50
14/05/21	PAK-GB01	11.80	56.10	807.00	7.31	-136.70	0.59
11/06/21	PAK-GB01	16.20	27.60	756.00	7.29	3.10	-0.84
28/04/21	PAK-GB02	10.80	64.10	761.00	7.27	80.60	>1050
14/05/21	PAK-GB02	14.30	59.60	731.00	7.41	-35.80	223.00
12/07/21	PAK-GB02	Dry	Dry	Dry	Dry	Dry	Dry
28/04/21	PAK-GB03	11.50	106.70	689.00	7.43	81.00	12.20
14/05/21	PAK-GB03	11.10	65.10	754.00	7.38	56.60	1.32
11/06/21	PAK-GB03	14.20	31.00	705.00	7.22	-73.00	6.00
12/07/21	PAK-GB03	15.70	402.00	732.00	7.25	35.70	8.69

Date	Ref.	Temp (°C)	Diss. Oxygen (%)	Conductivity (SPC)	pH	Redox (ORP)	Turbidity (NTU)
14/05/21	PAK-GB04	13.30	87.40	565.00	7.67	-66.00	54.80
11/06/21	PAK-GB04	18.00	16.60	596.00	7.19	24.90	0.15

cns = could not sample. Insufficient water / blockage

Table 5.2 Results for key water quality parameters

Location ID	Date	Chloride (mg/l)	Nitrate as NO3)mg/l)	Phosphate (Ortho as PO4 mg/l)
PAK-BH2D	26/04/2021	26.4	33.7	<0.05
PAK-BH2S	26/04/2021	97.7	99.7	<0.05
PAK-HA-5	26/04/2021	22.7	0.334	<0.05
PAK-HA-1	26/04/2021	27.5	<0.3	<0.05
PAK-HA-2	26/04/2021	18.4	1.63	0.273
PAK-HA-4	26/04/2021	34	0.427	<0.05
PAK-GB-2	26/04/2021	31.4	<0.3	0.602
PAK - GB_3	26/04/2021	35.6	50.4	<0.05
PAK - STR	26/04/2021	63.1	36.4	0.958
PAK - GB_3_D	26/04/2021	35.5	50.8	<0.05

6. LIDAR Data

To aid interpretation of the data, two LIDAR plots have been added in Appendix D. The first (D1) illustrates available data on a graded scale and the second (D2) provides the data sub-divided into elevation bands. The graded scale enables fine topographic features to be discerned, whilst the figure with data sub-divided into height bands enables identification of areas at broadly similar elevations.

Issued by	Approved by
Jon Mainhagu	**Ellie Creer**

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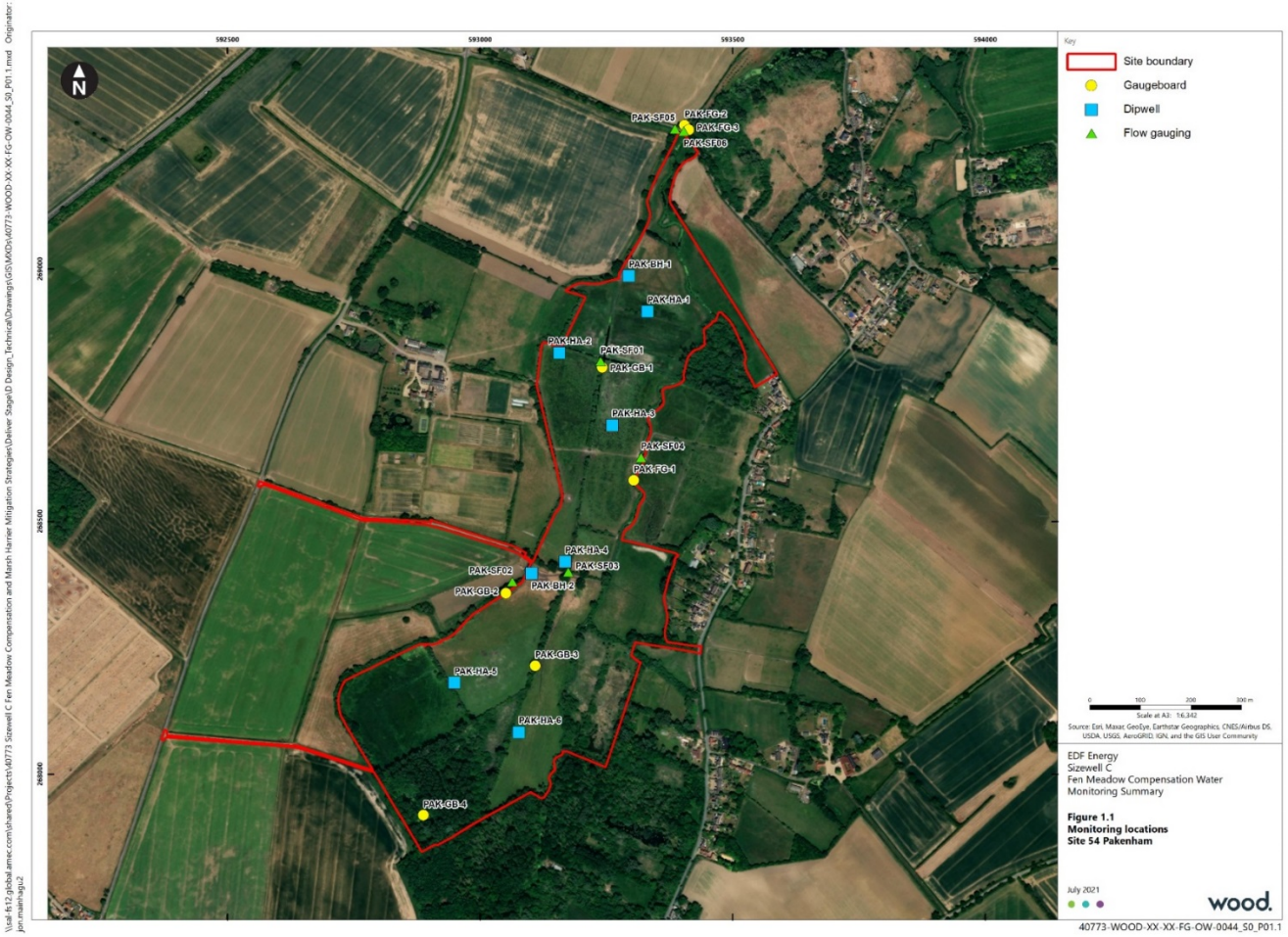
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Figure

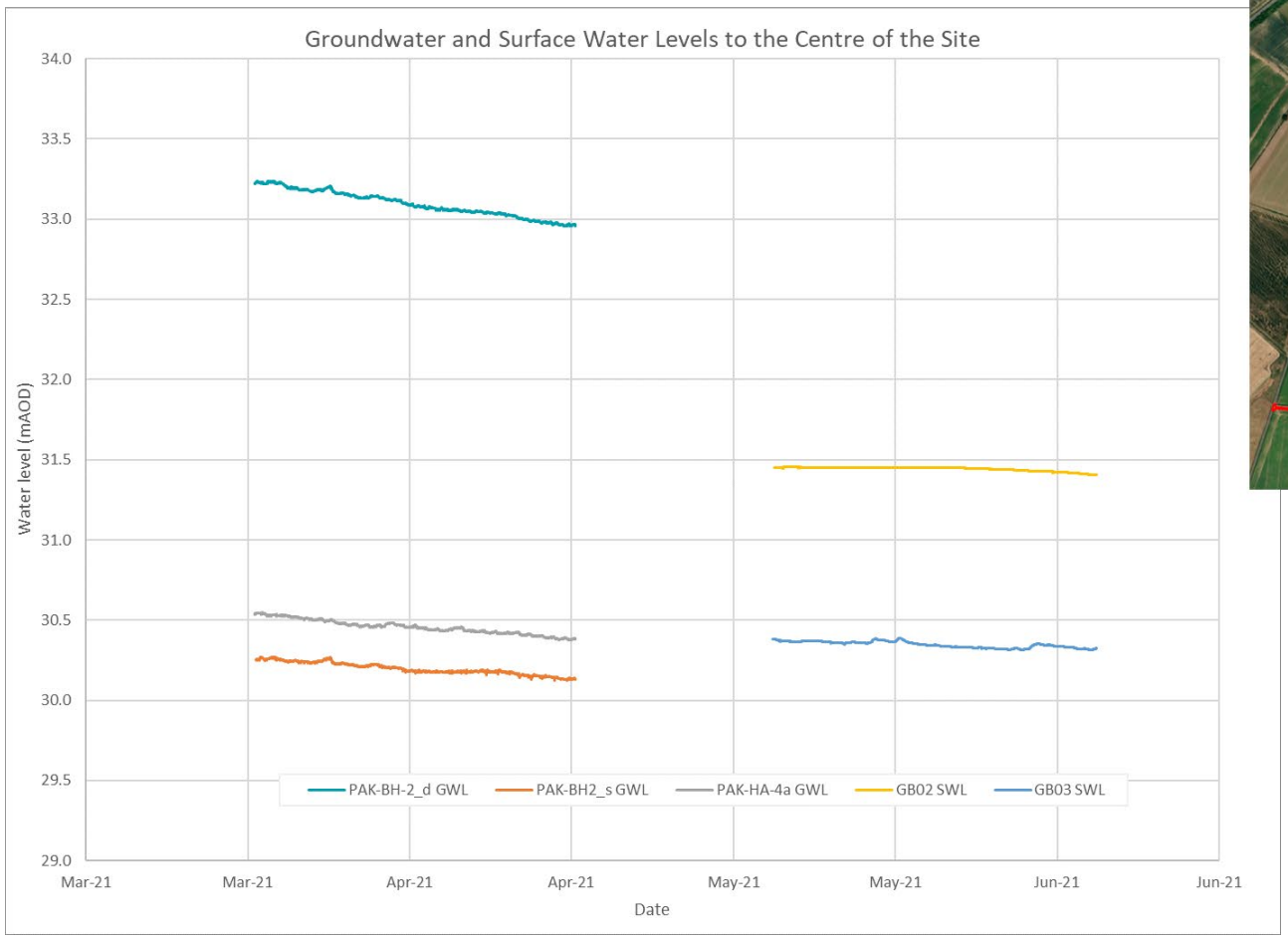


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Appendix A
Combined Hydrographs

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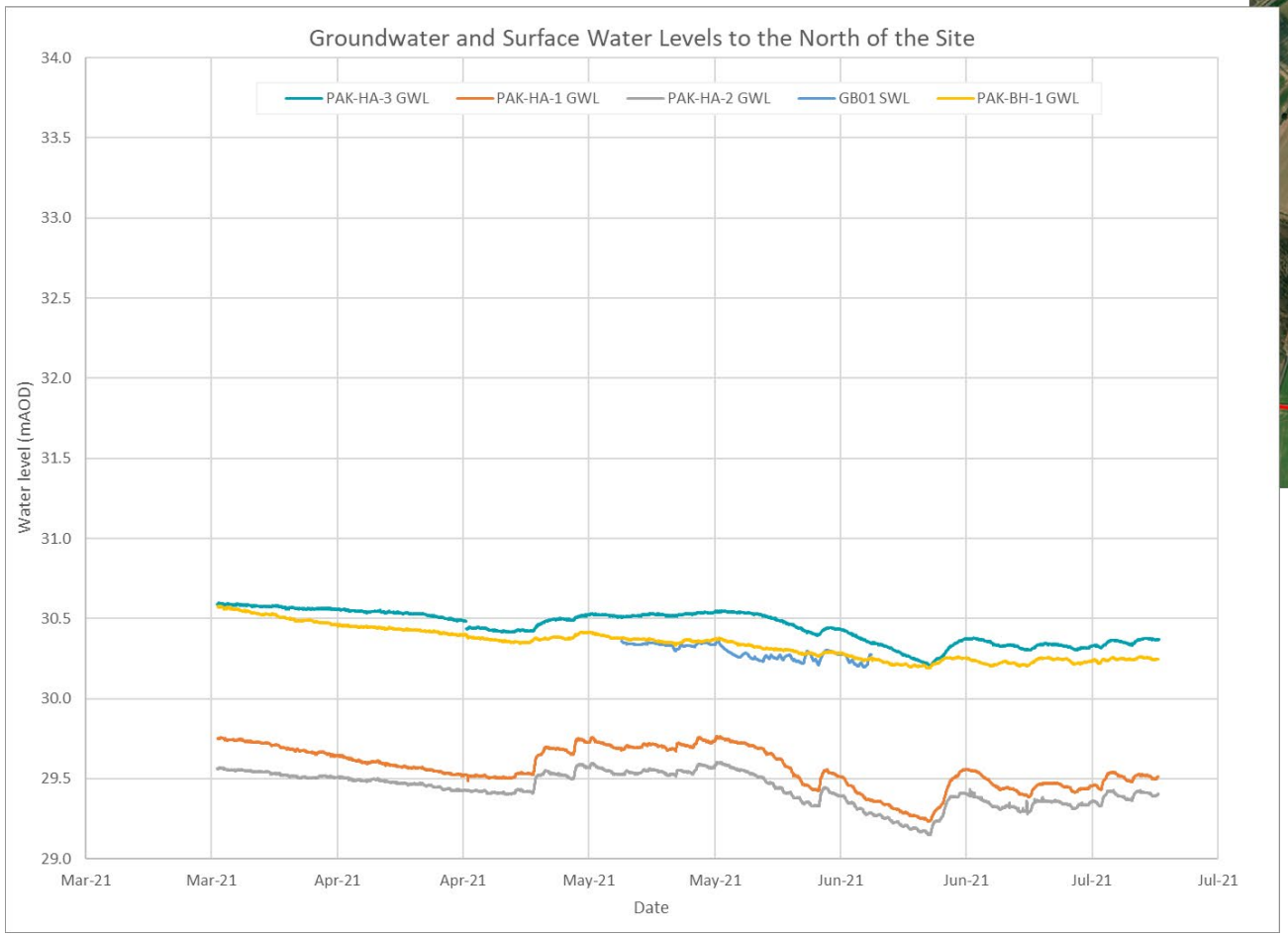
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A2

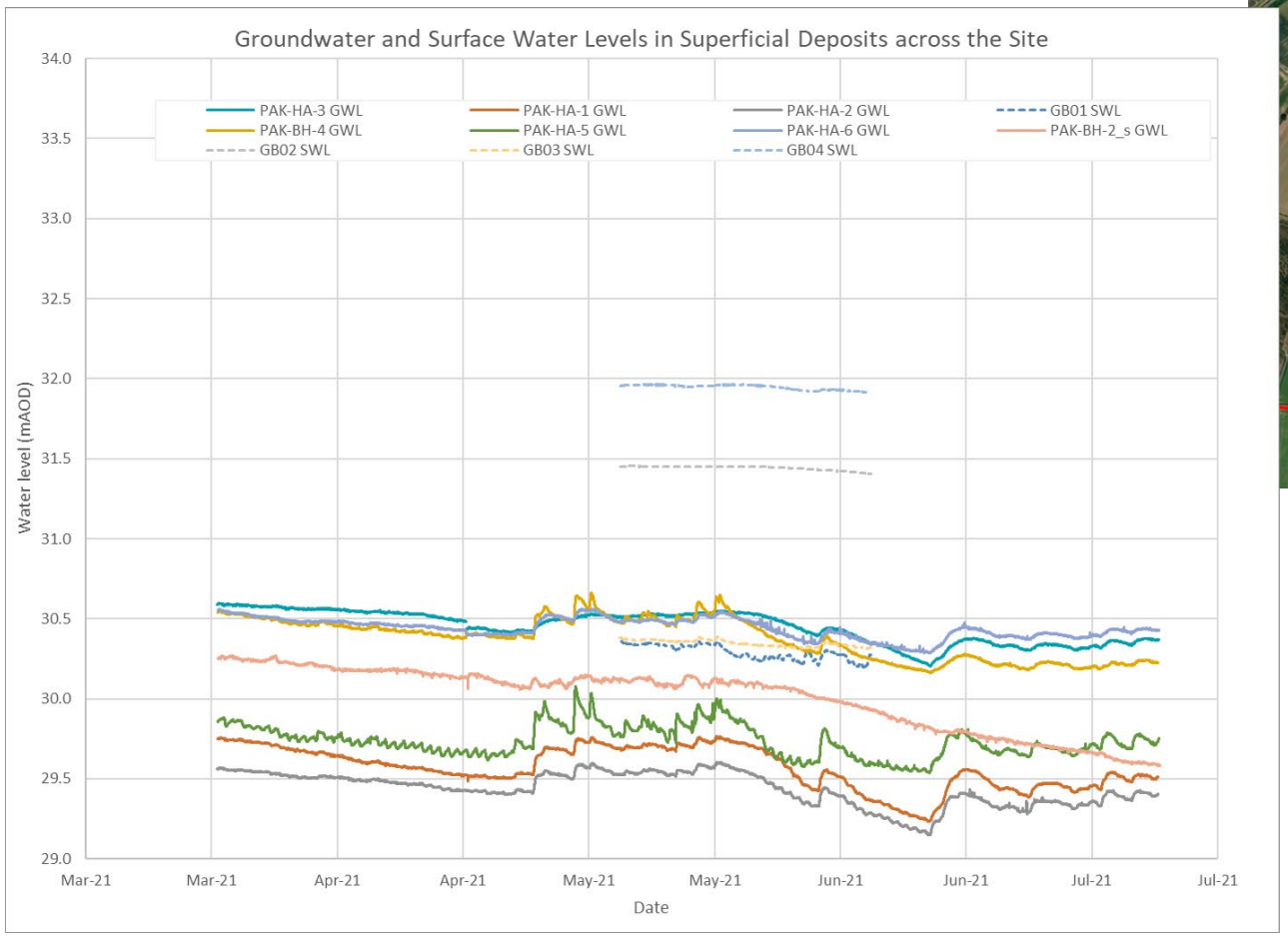




Portion of the site between HA3 and GB-1 was still saturated in water during April site visit, although overall weather was dry and hot

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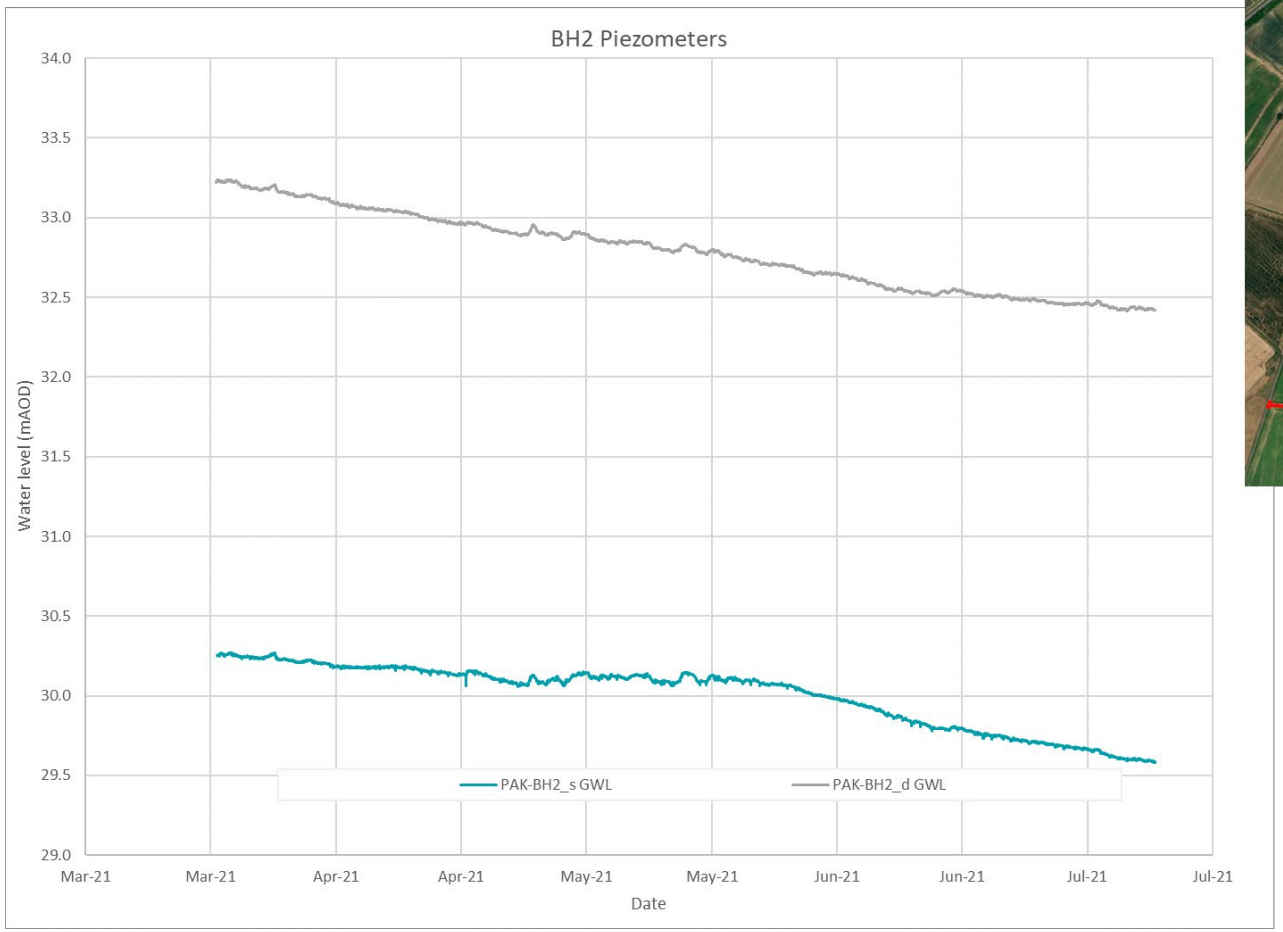
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A4



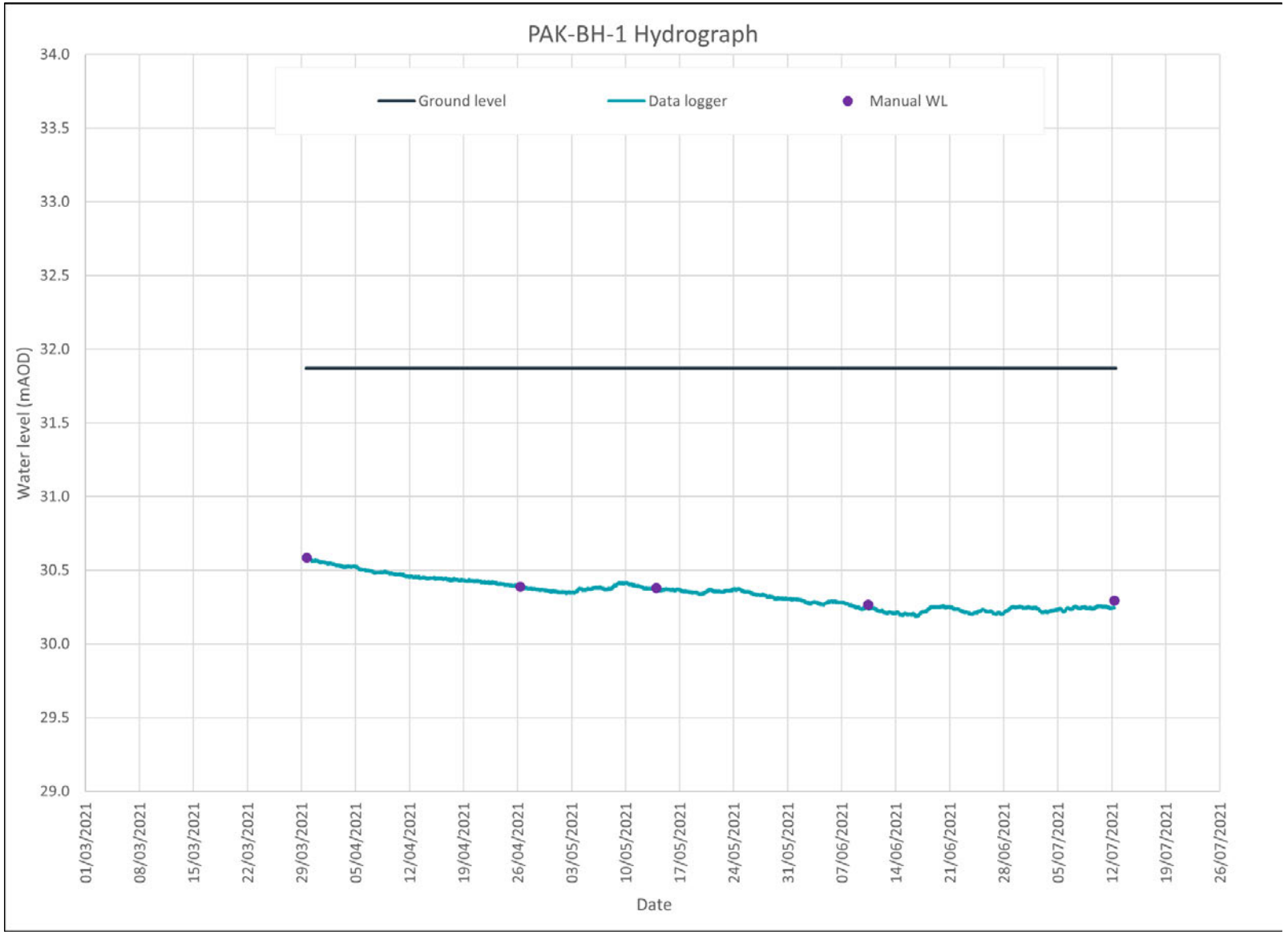


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Appendix B
Groundwater Hydrographs

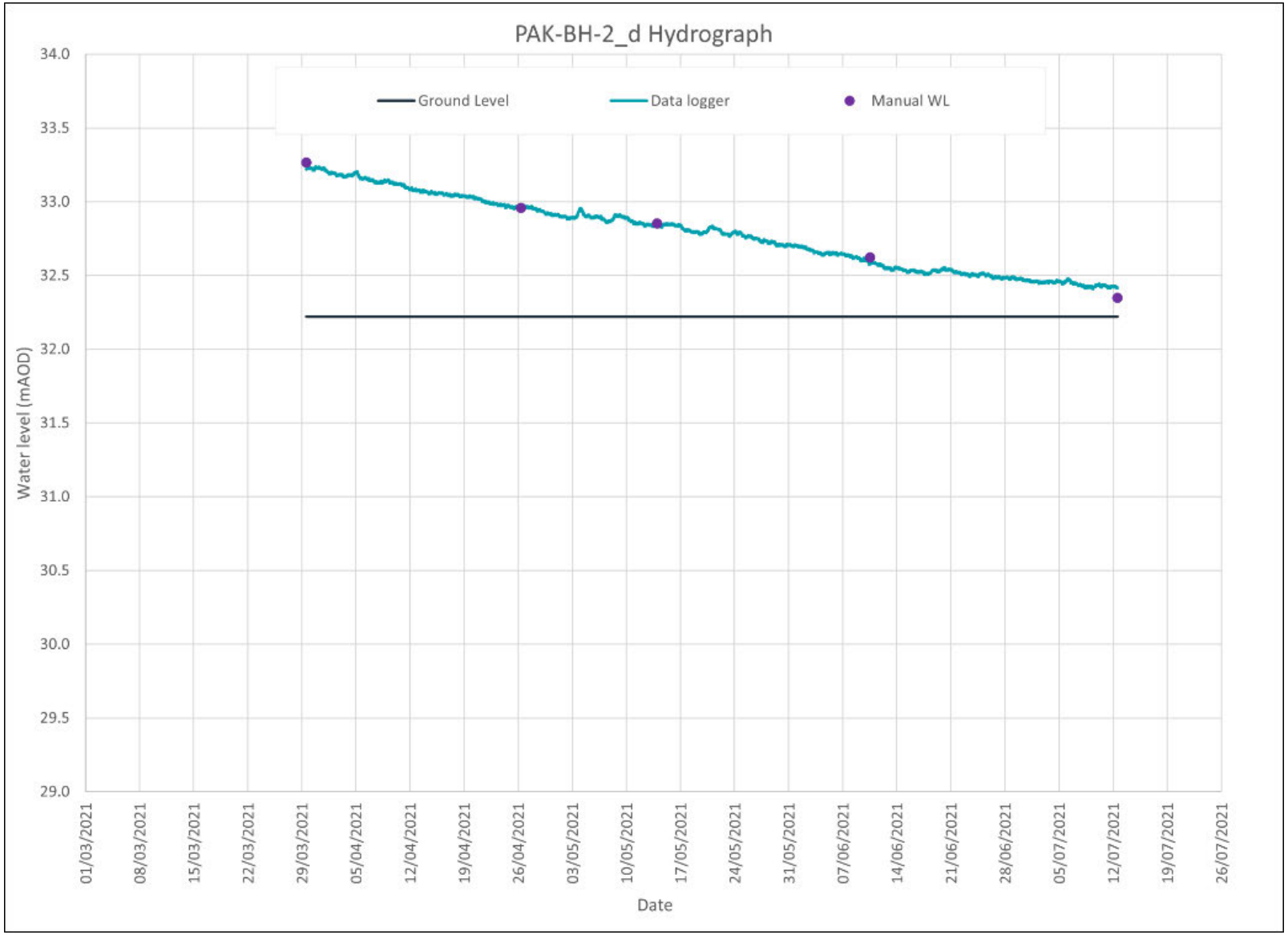
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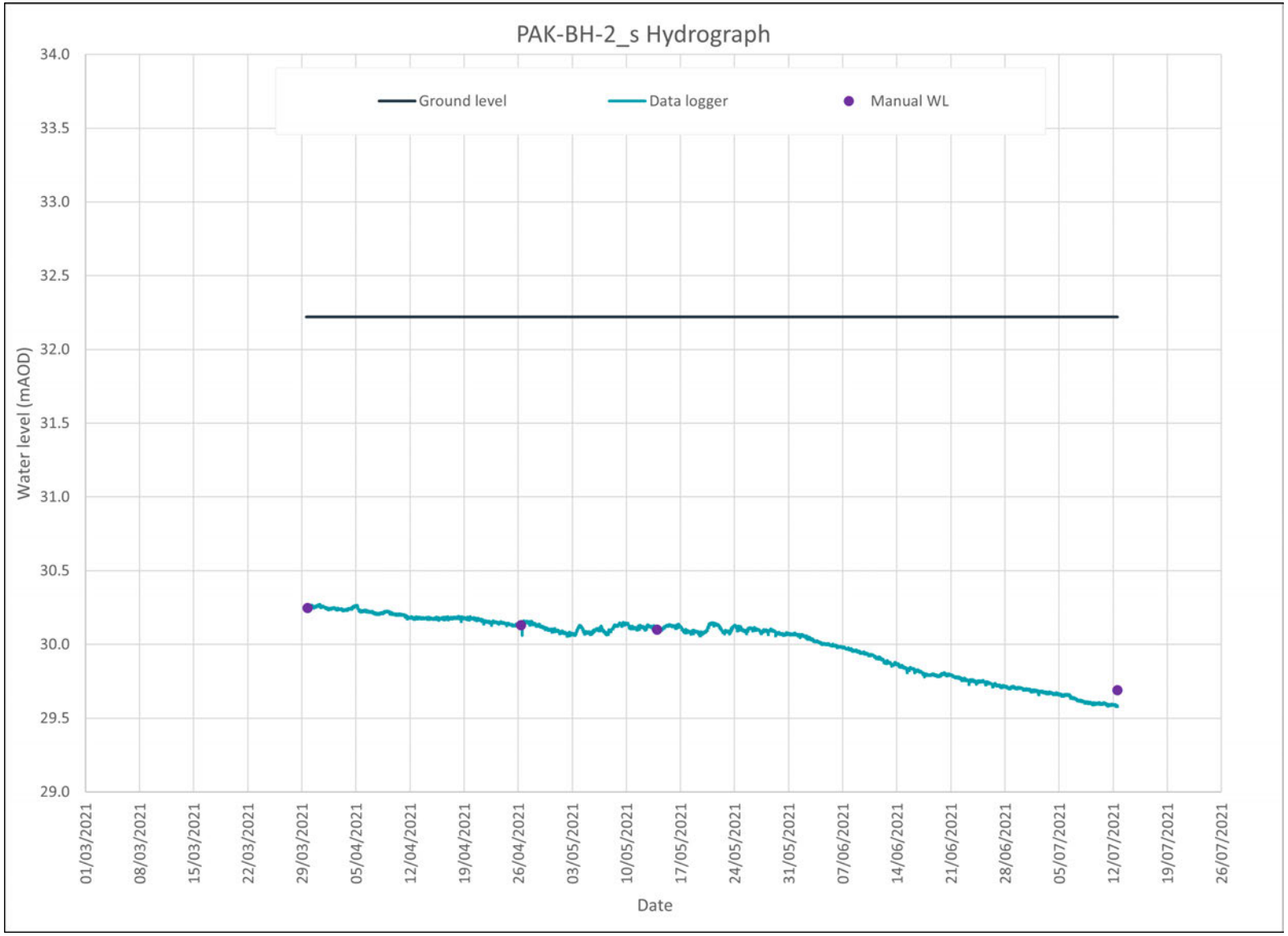
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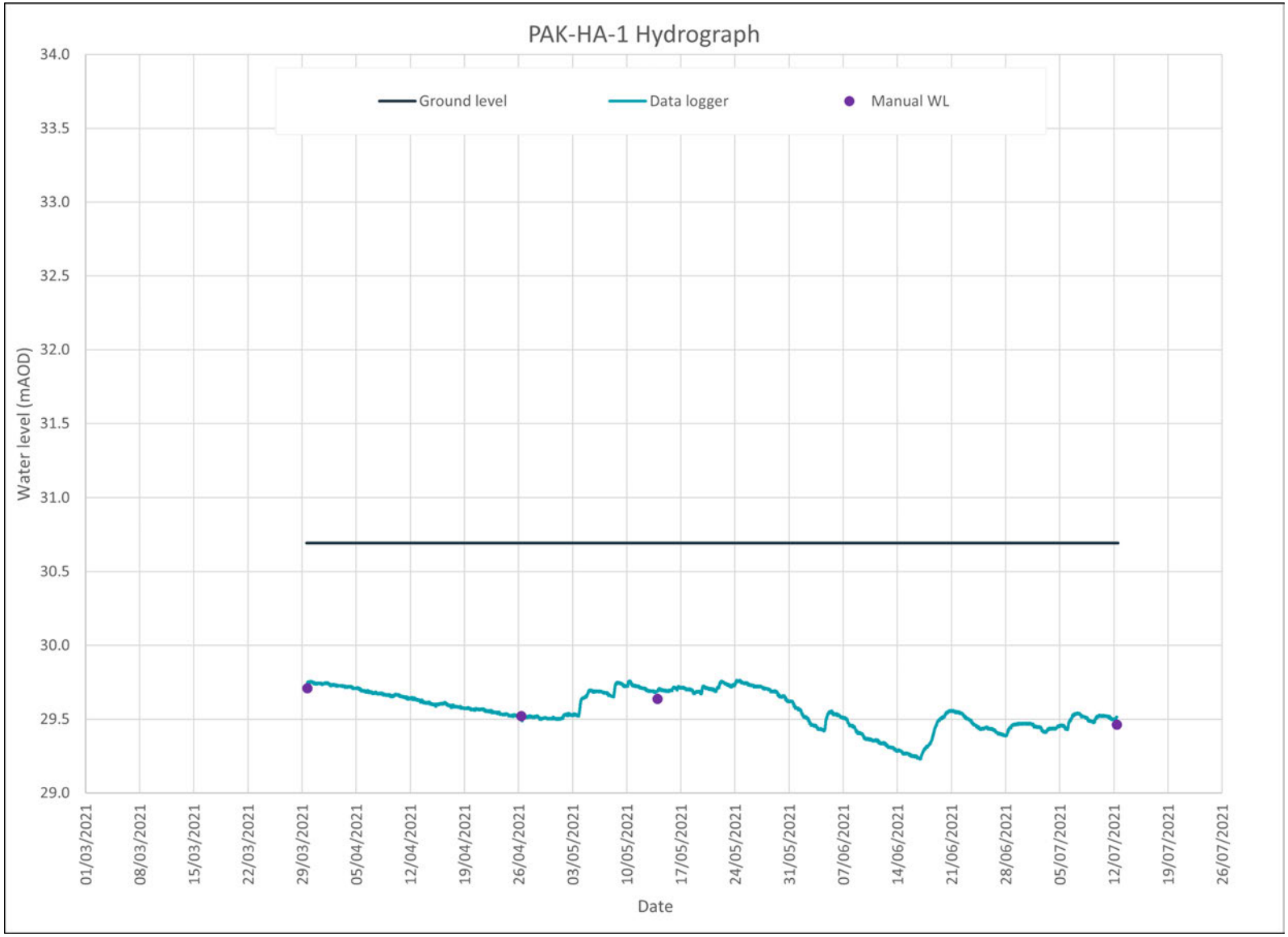
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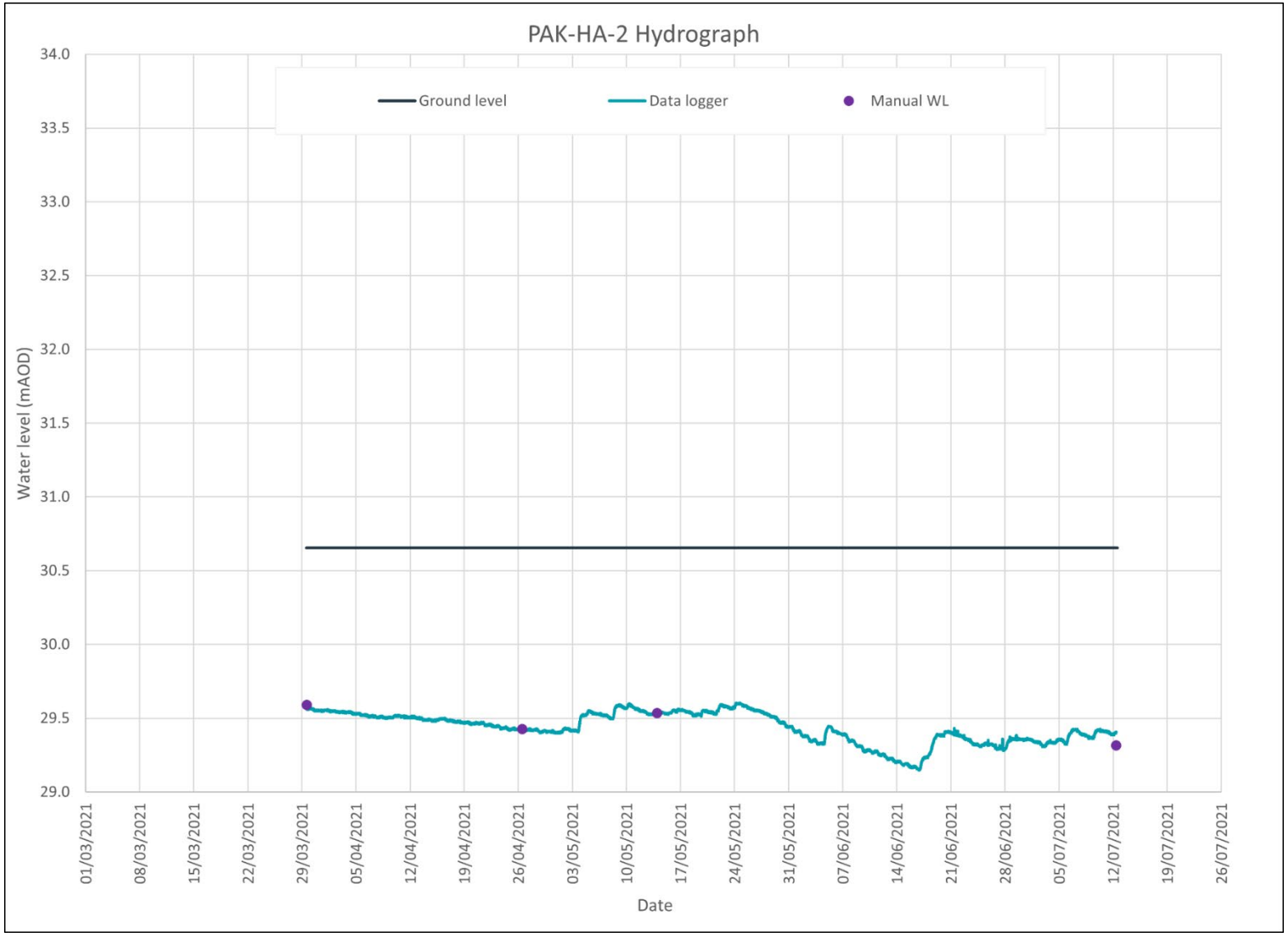
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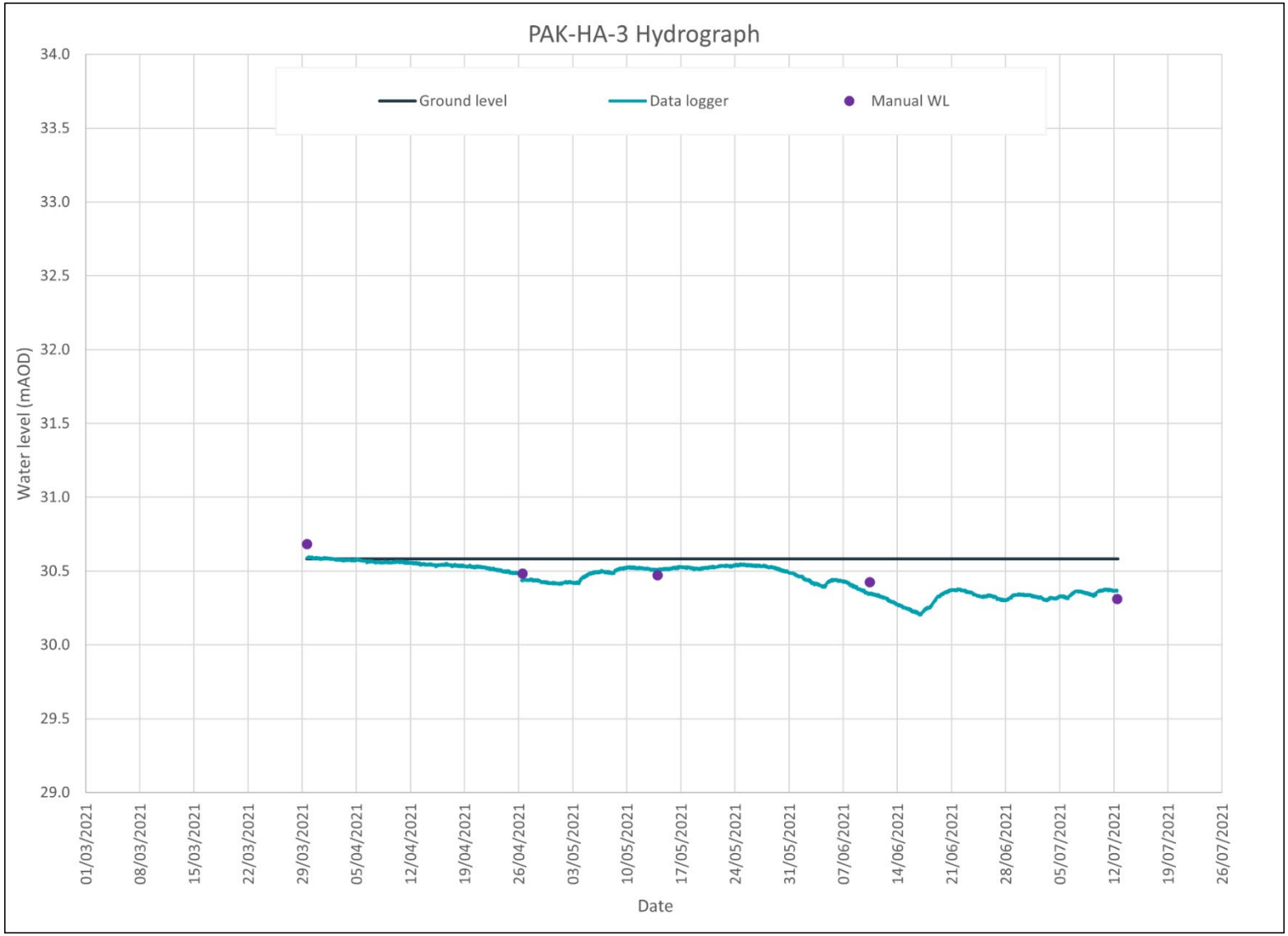
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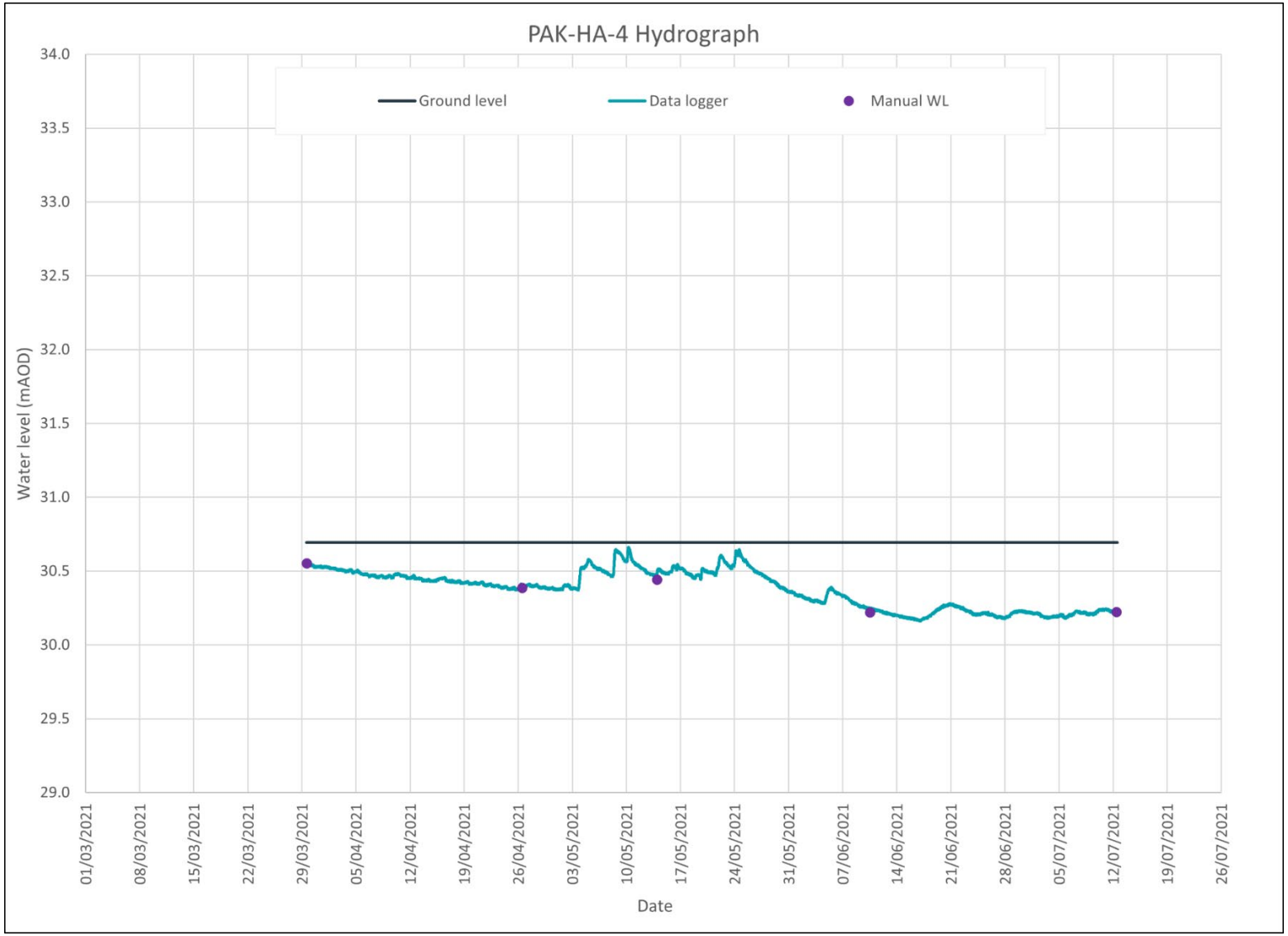
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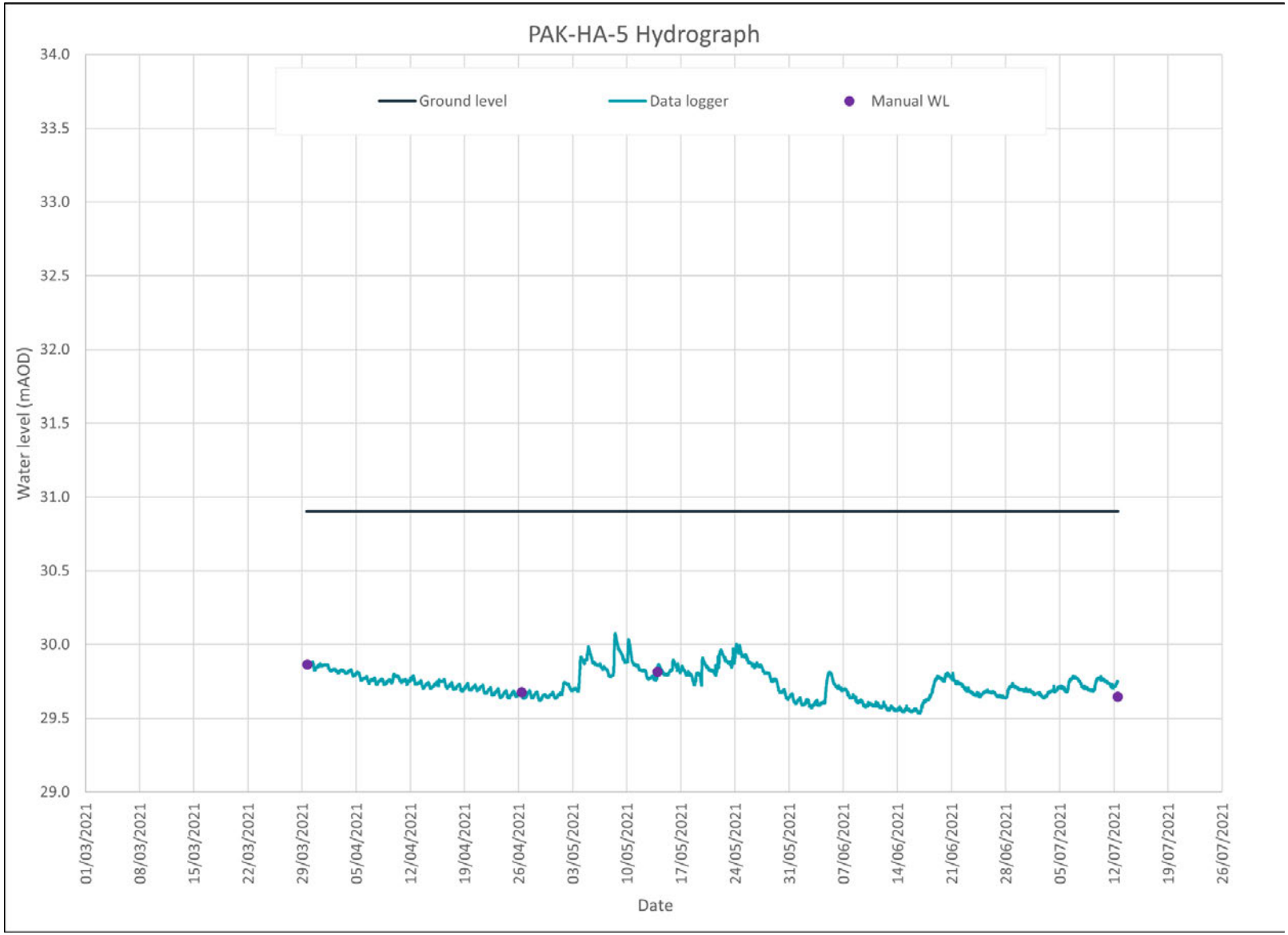
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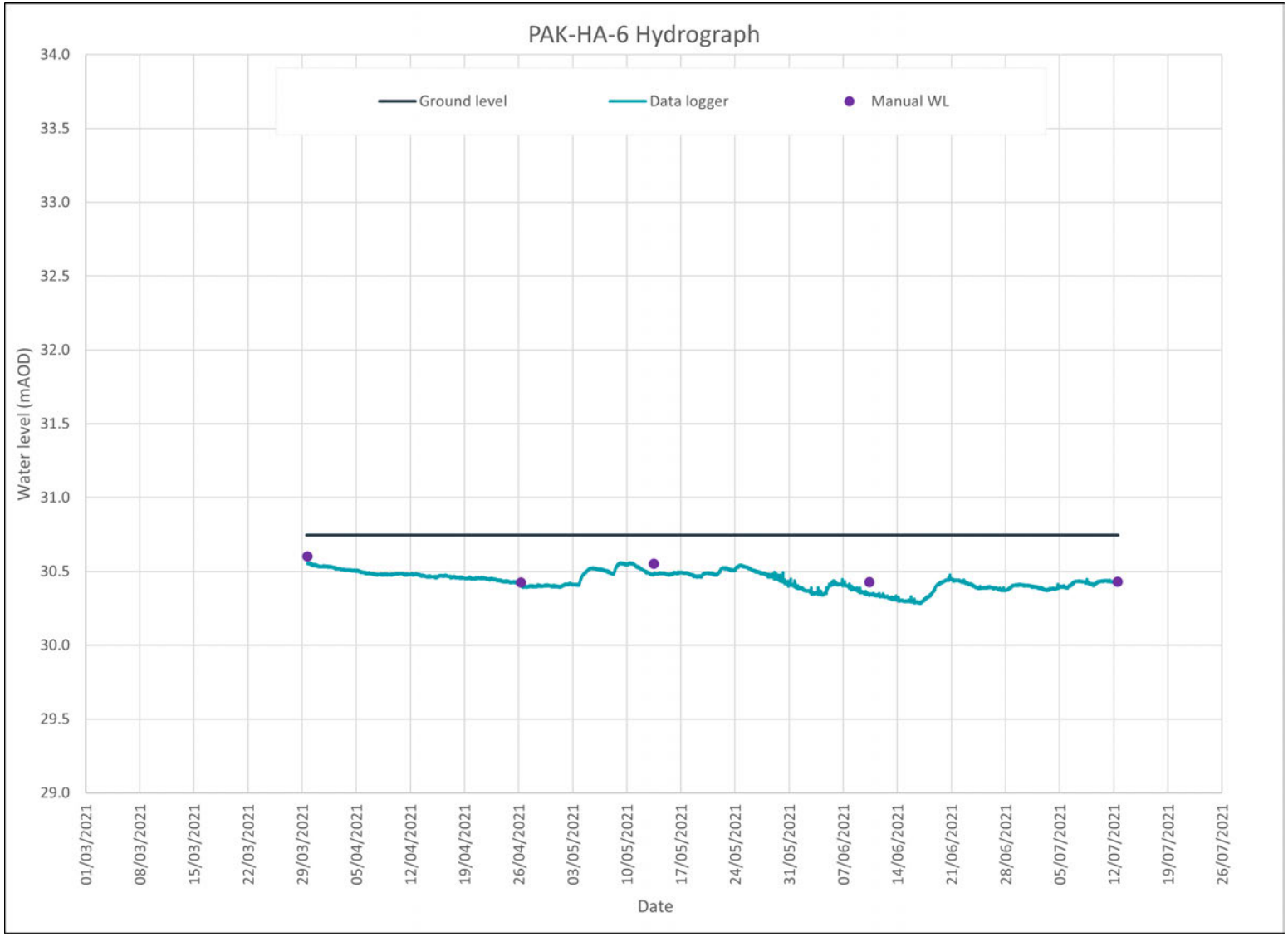
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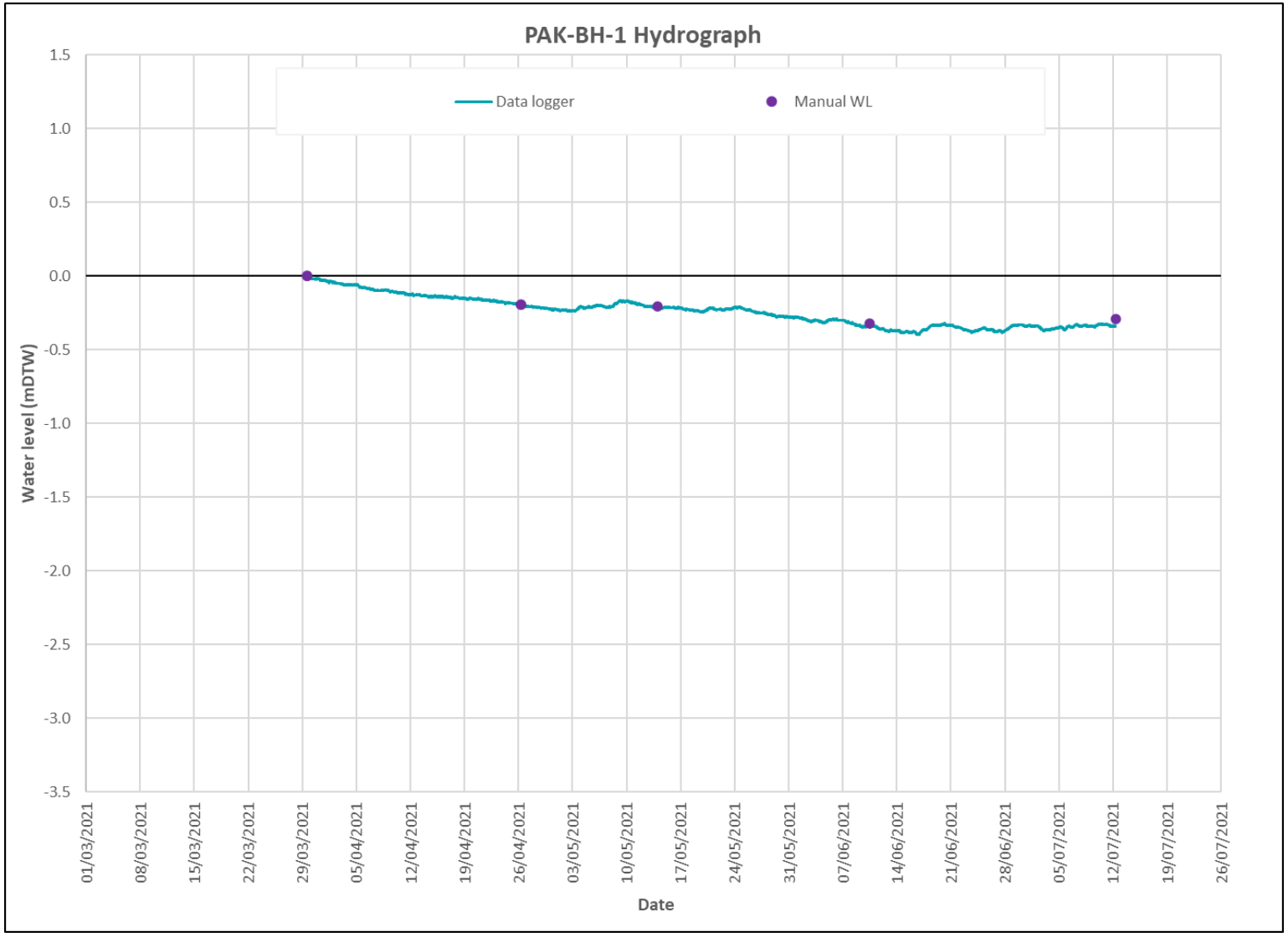
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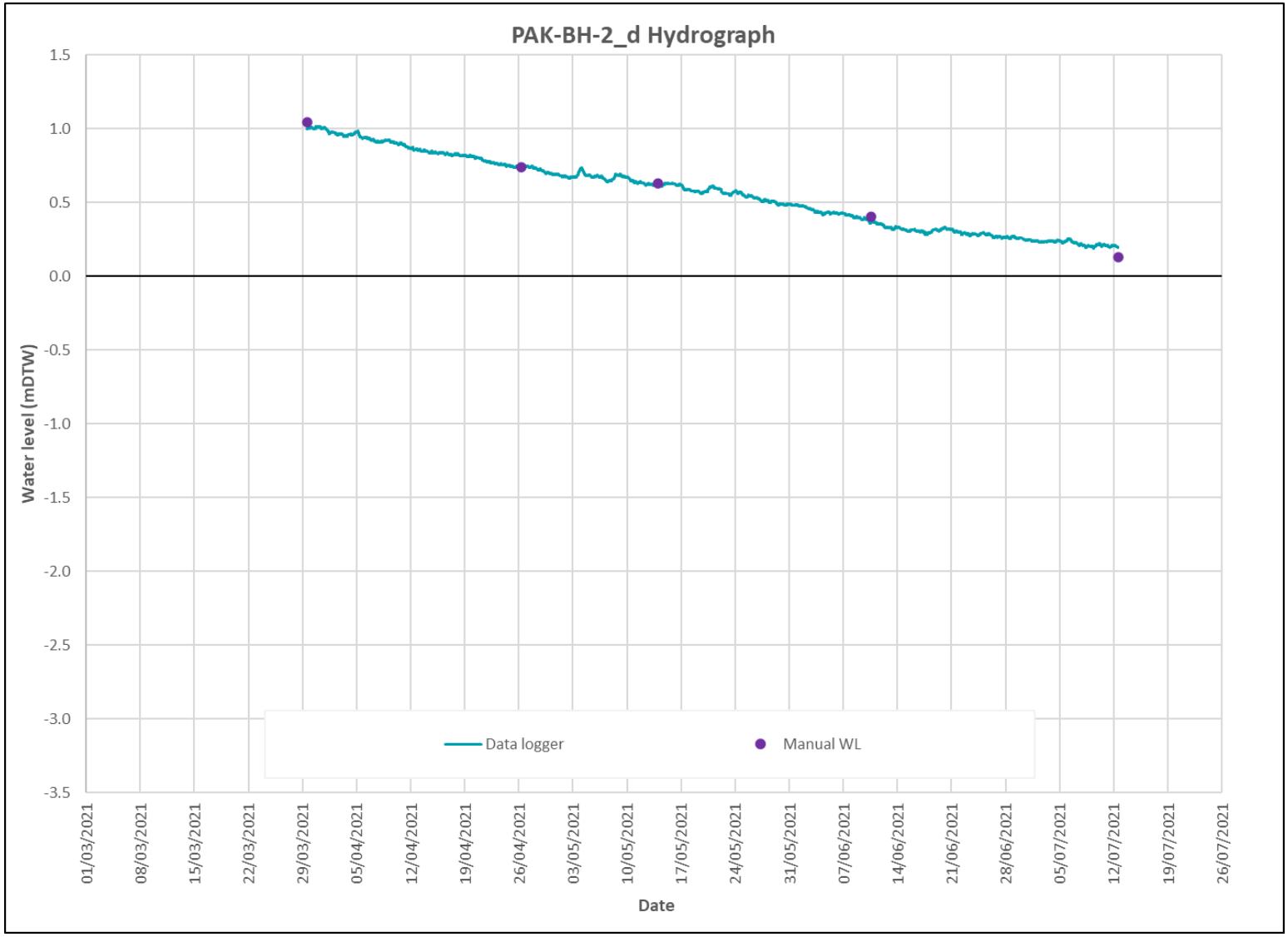
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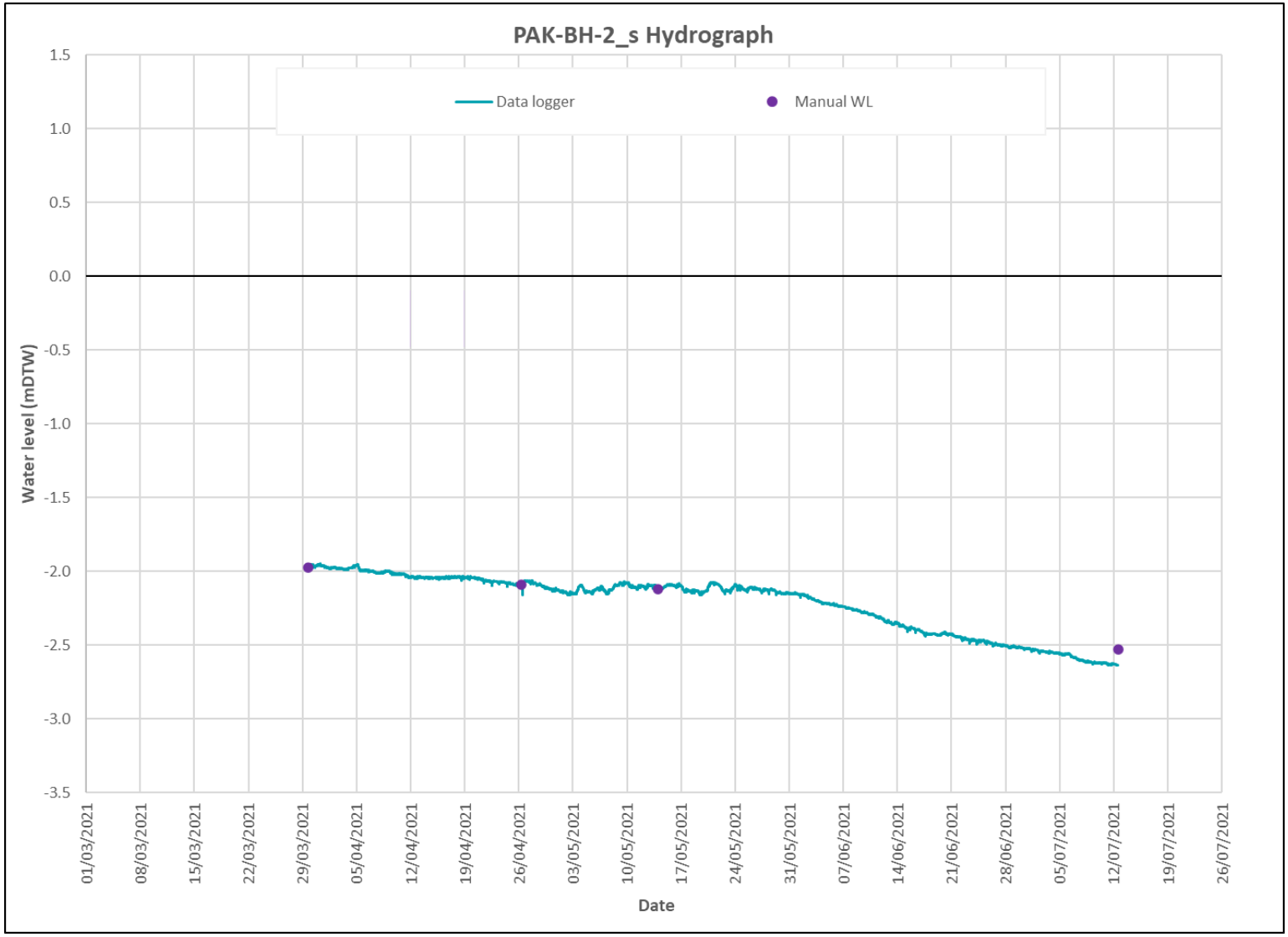
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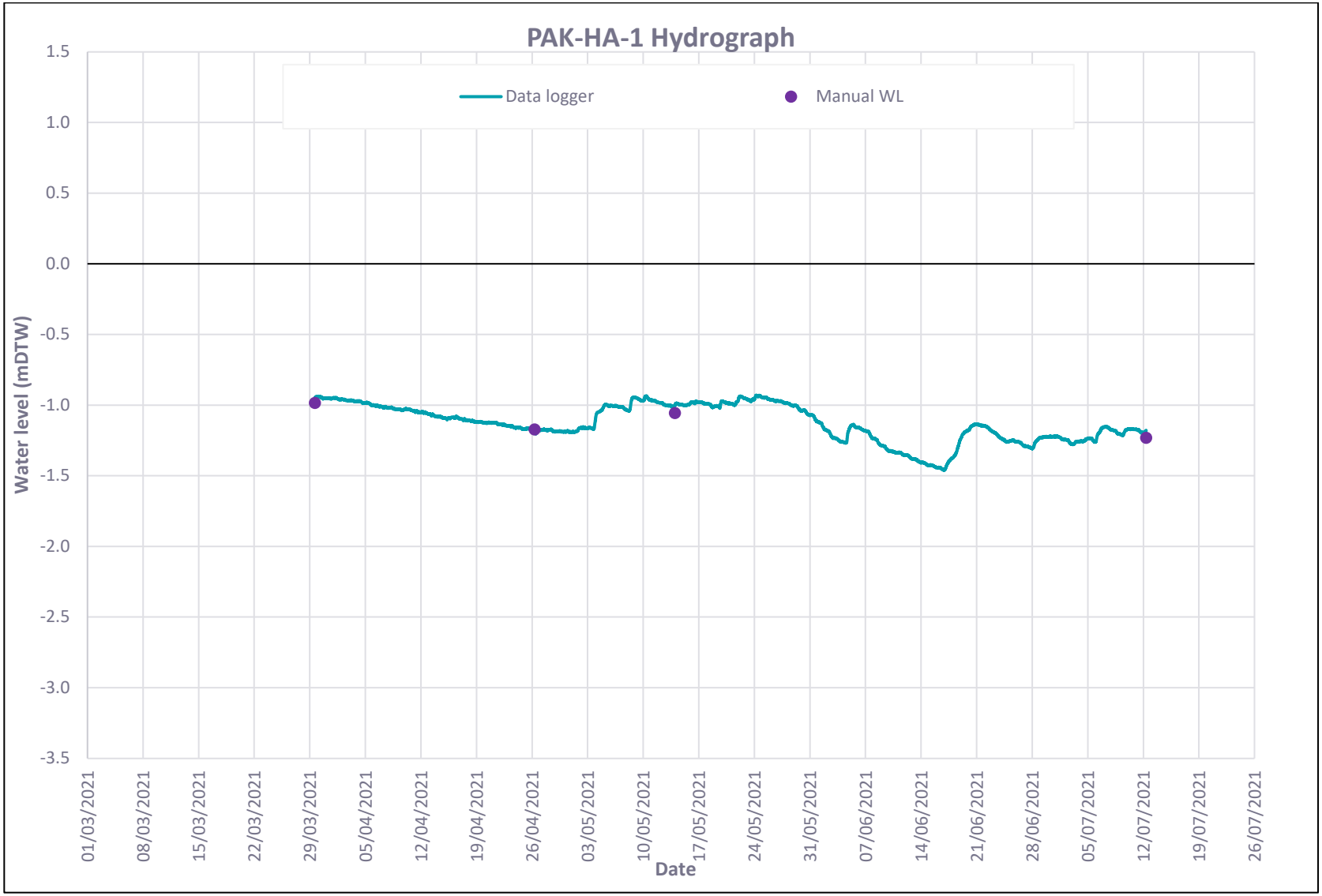
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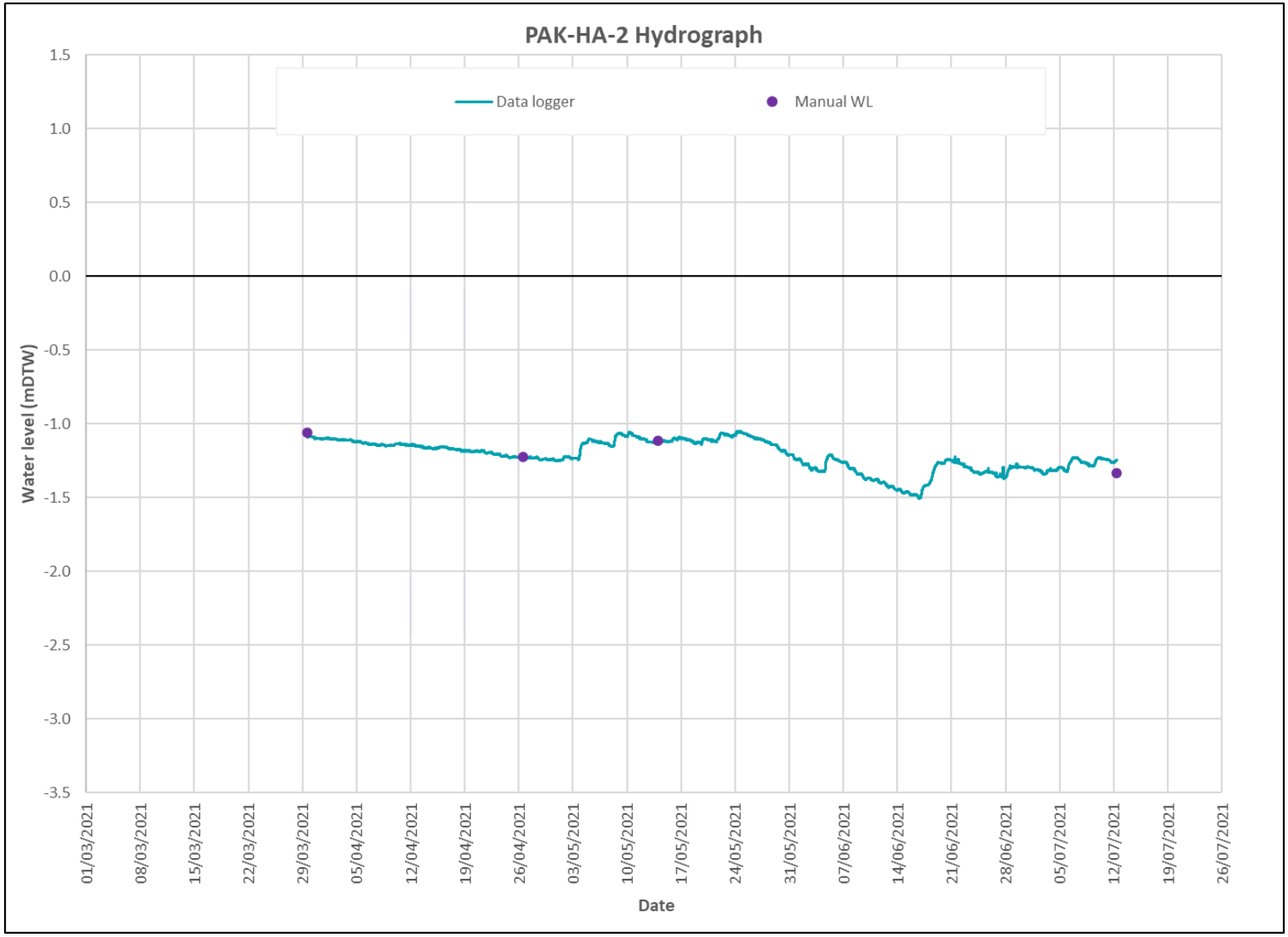
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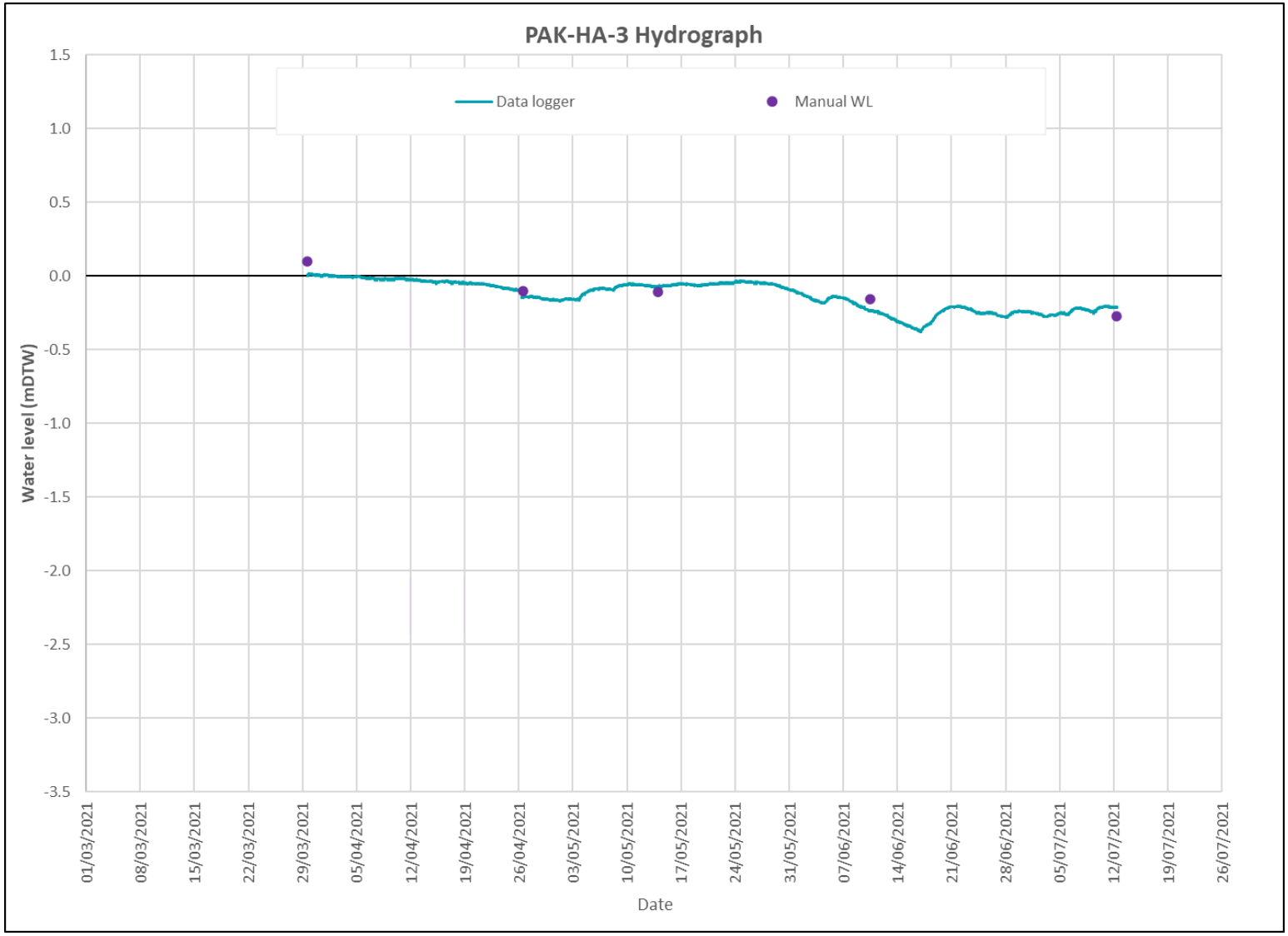
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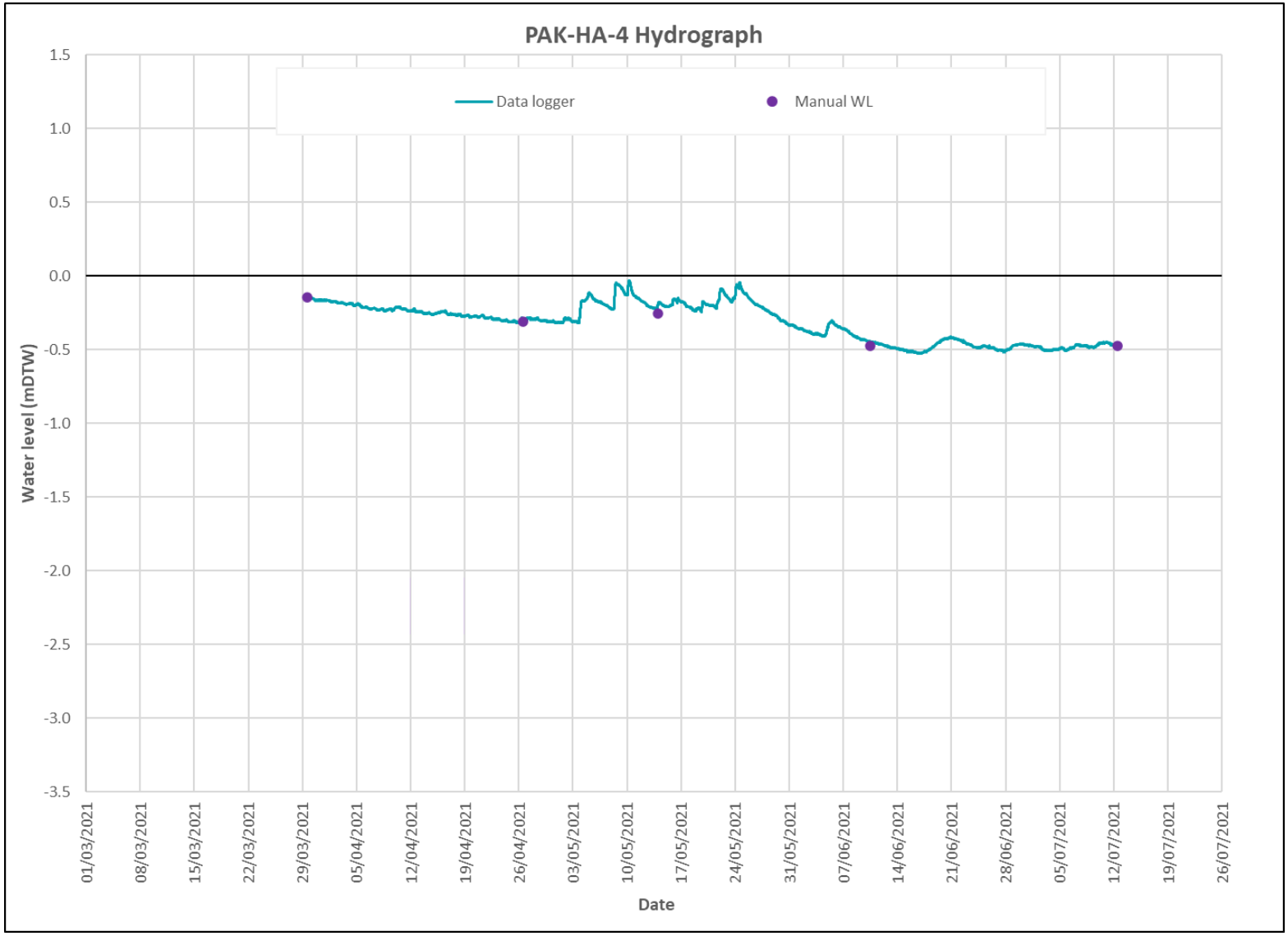
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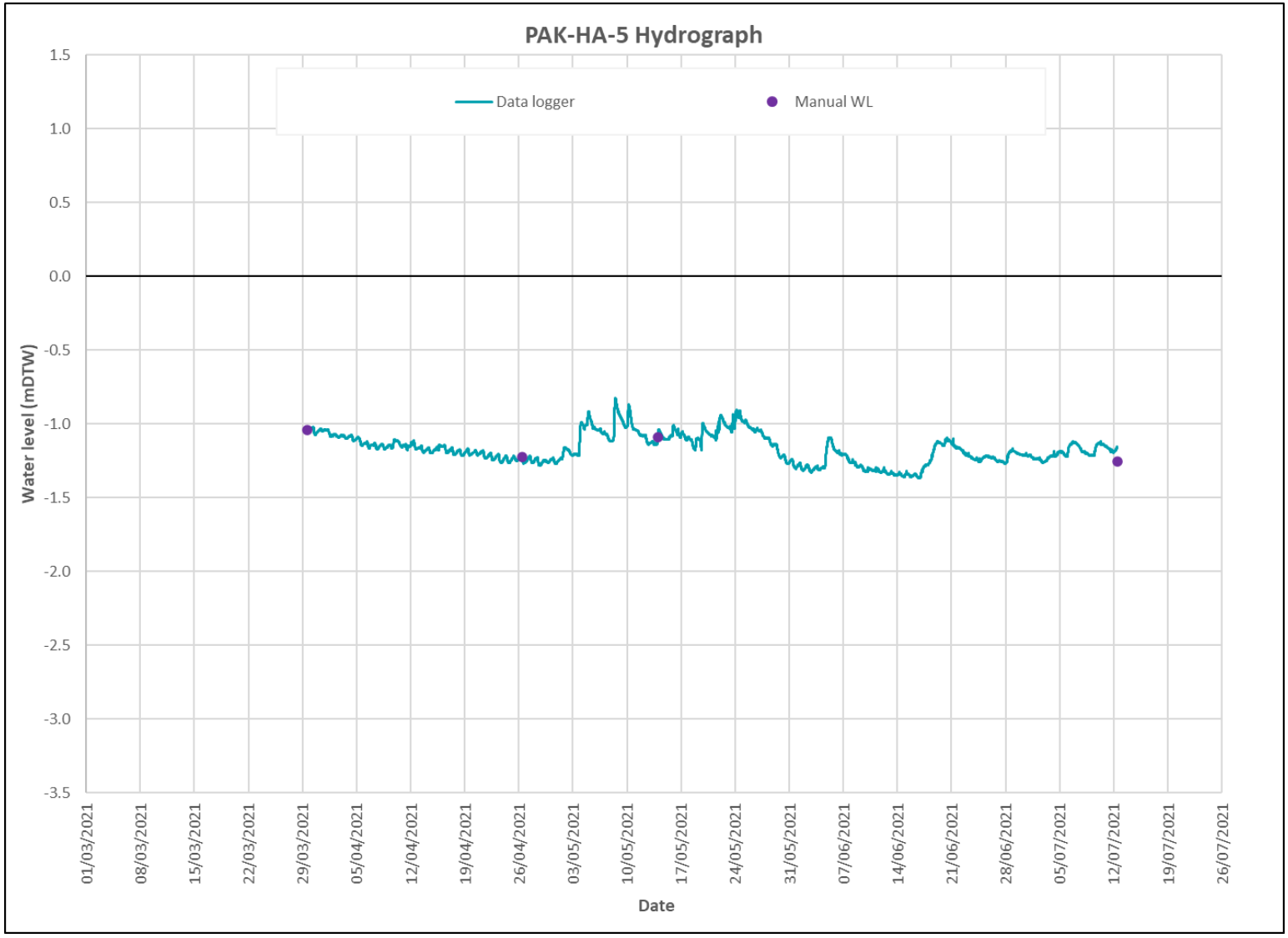
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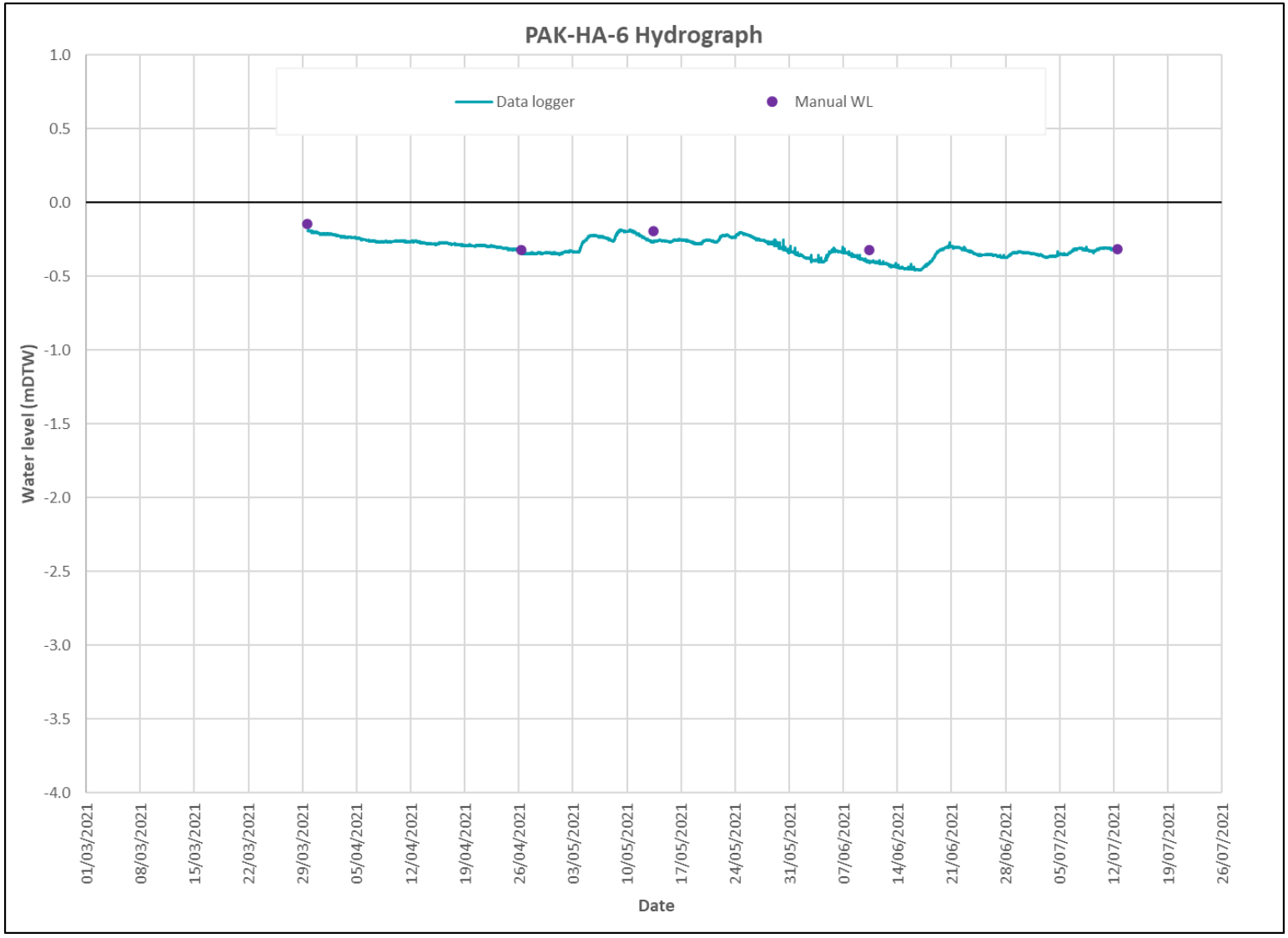
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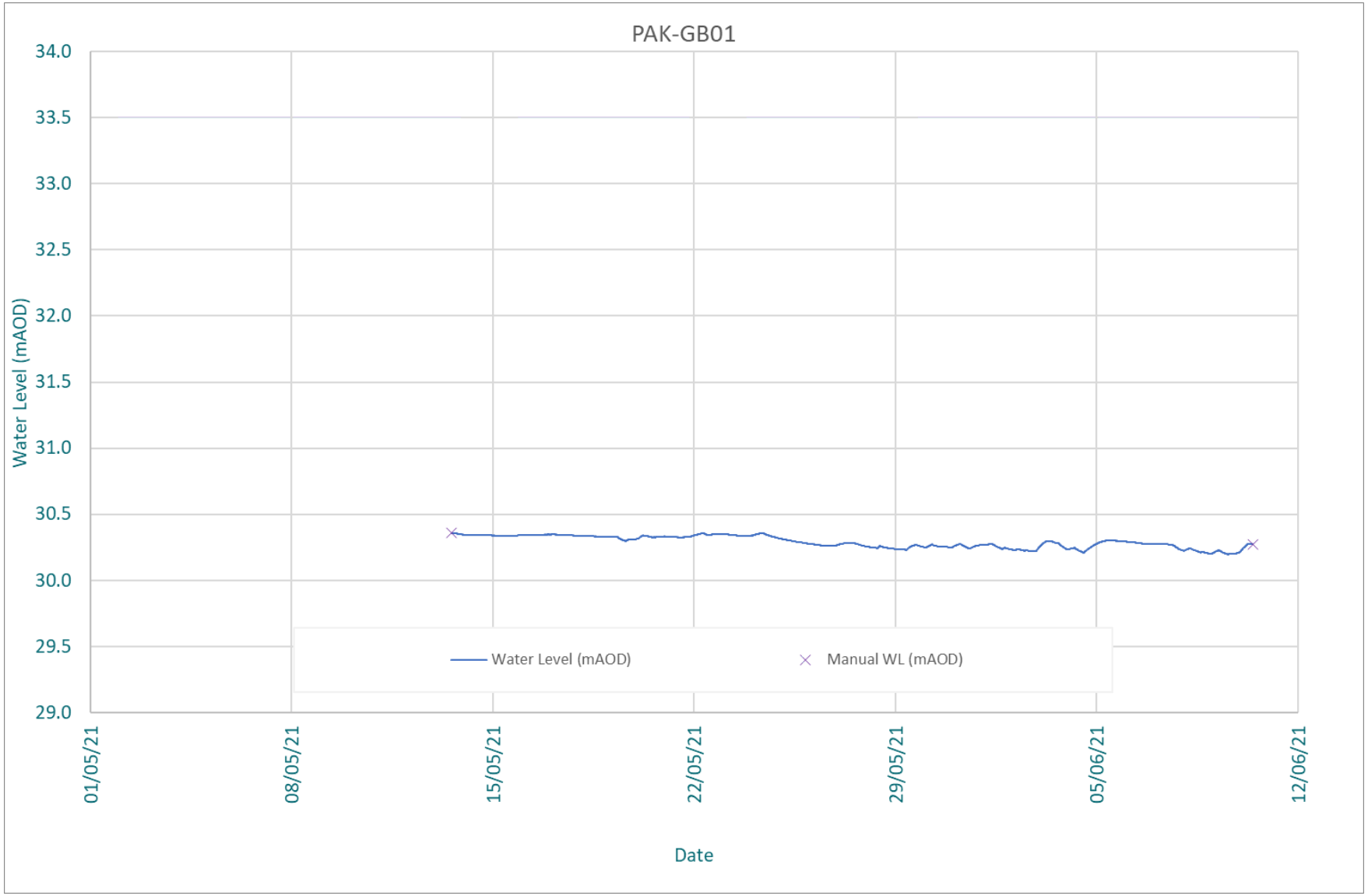


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Appendix C
Surface water Hydrographs

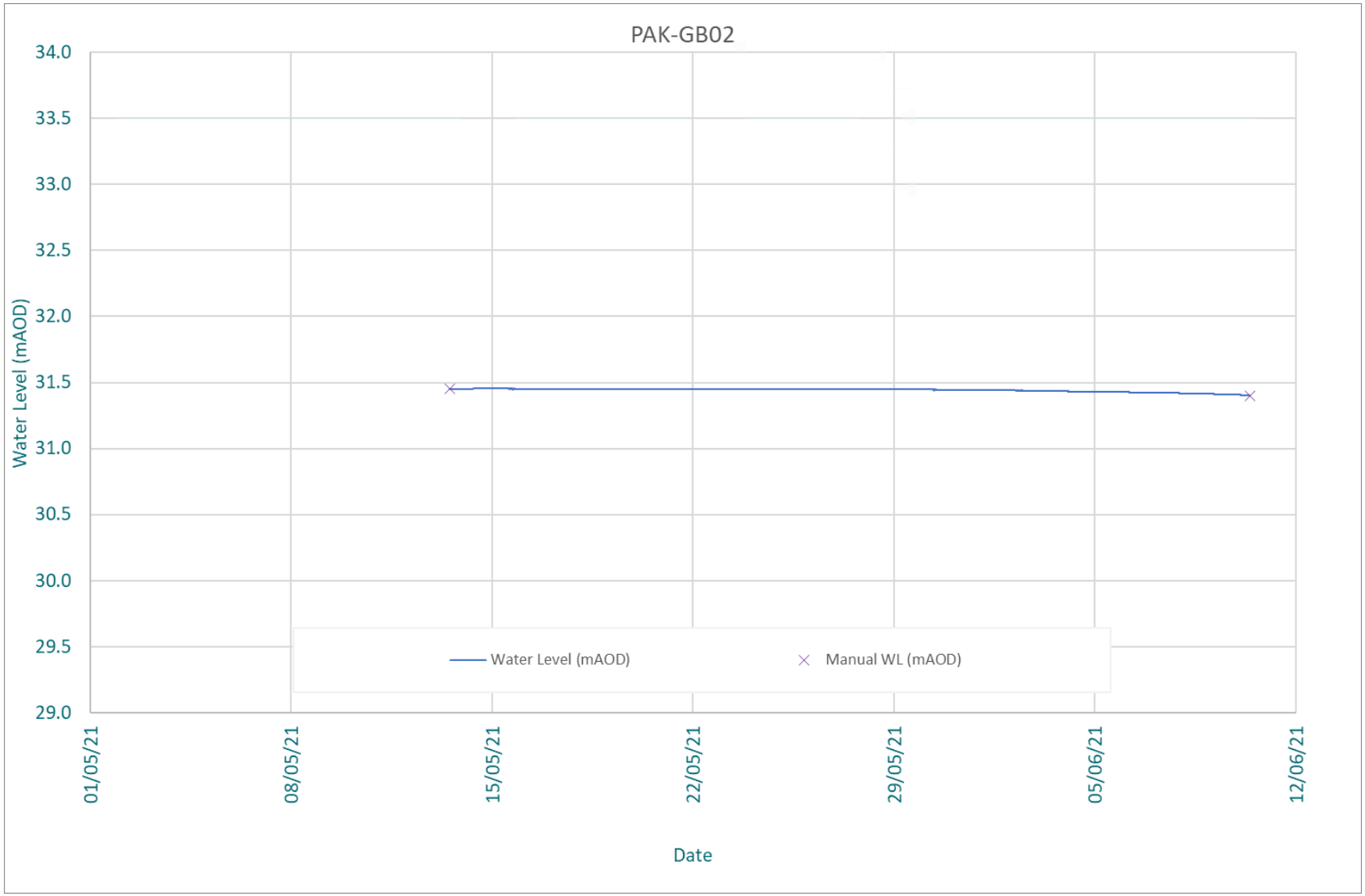
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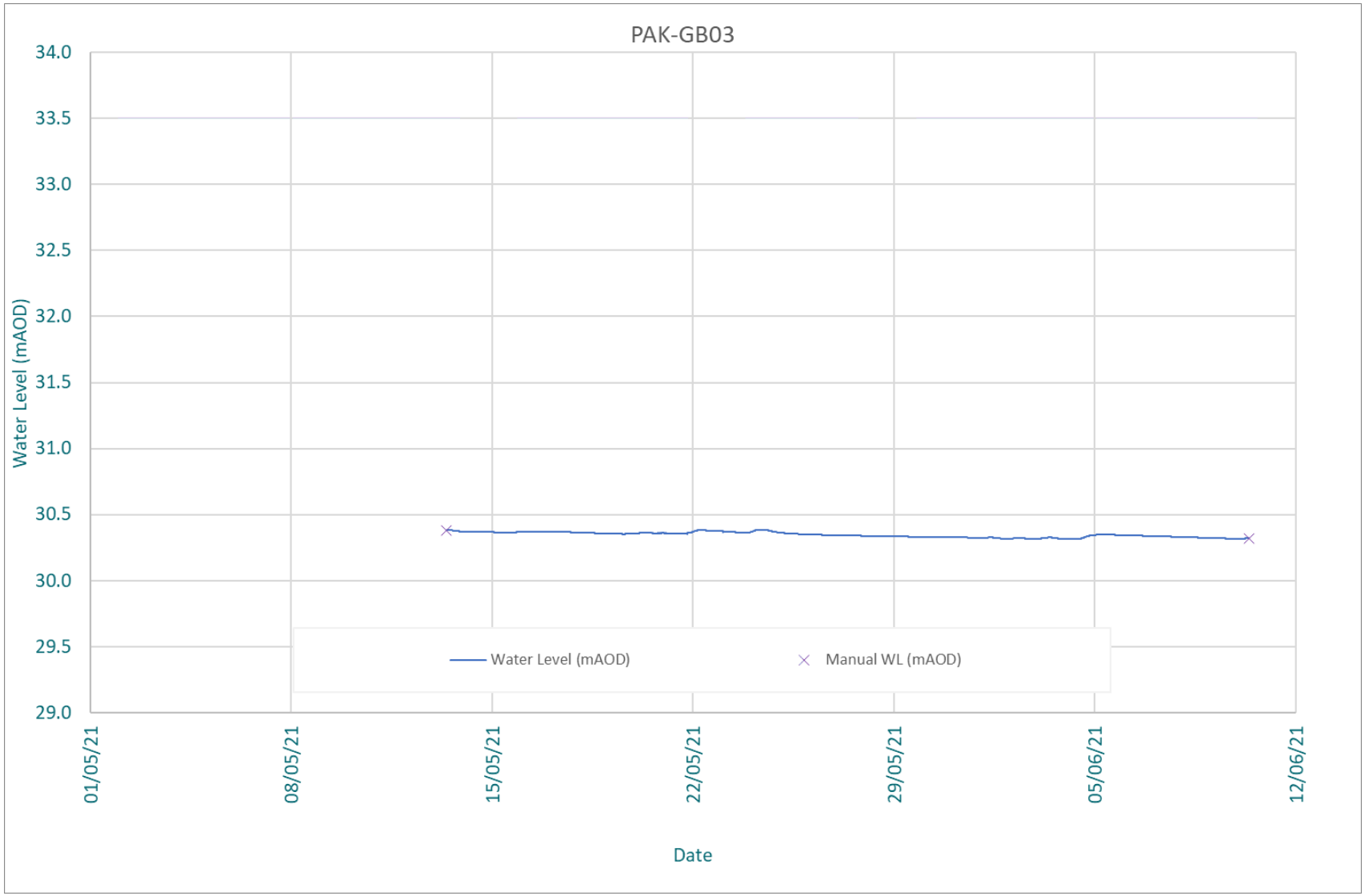
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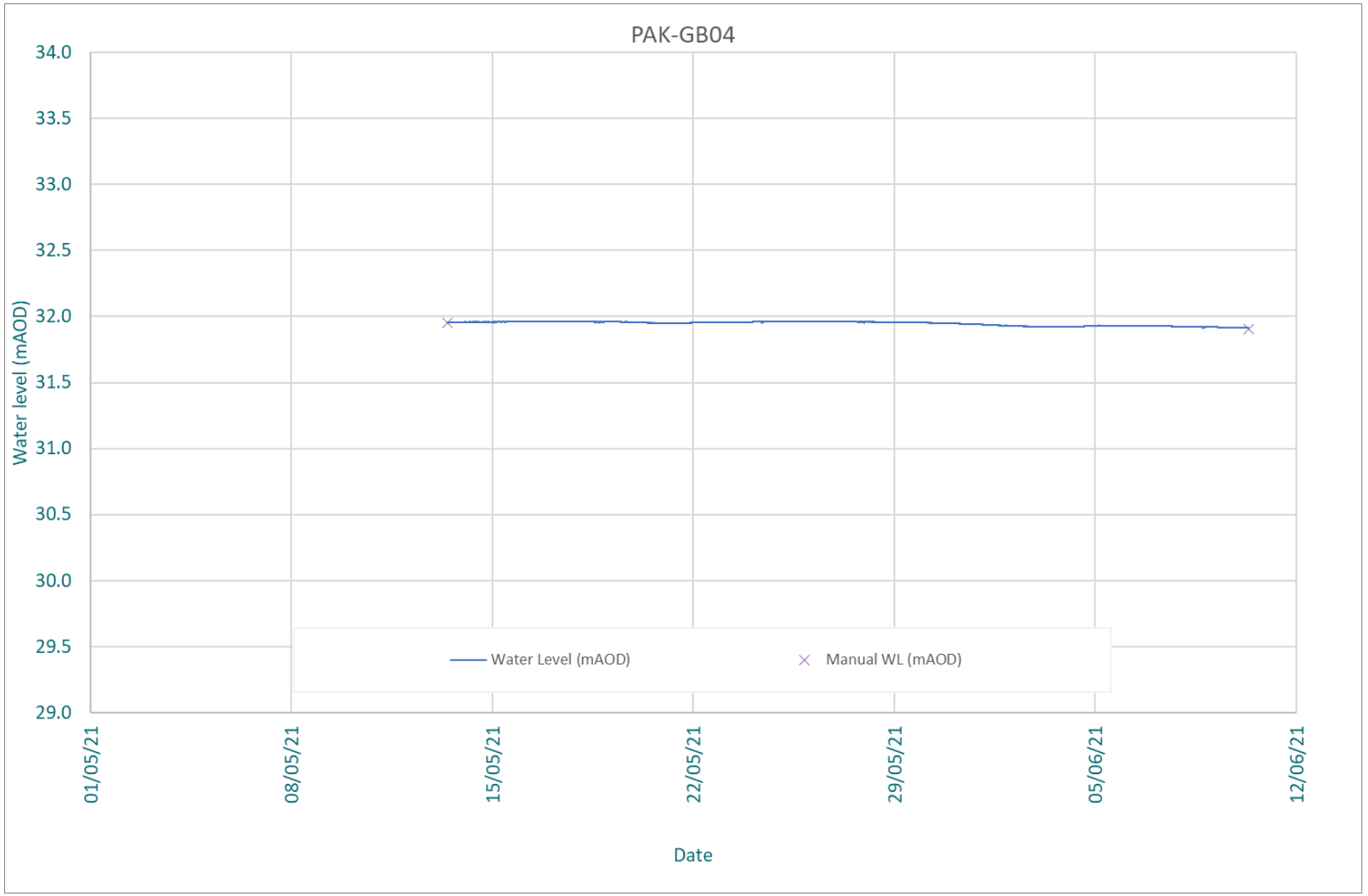
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Appendix D
LIDAR Plots for the Site

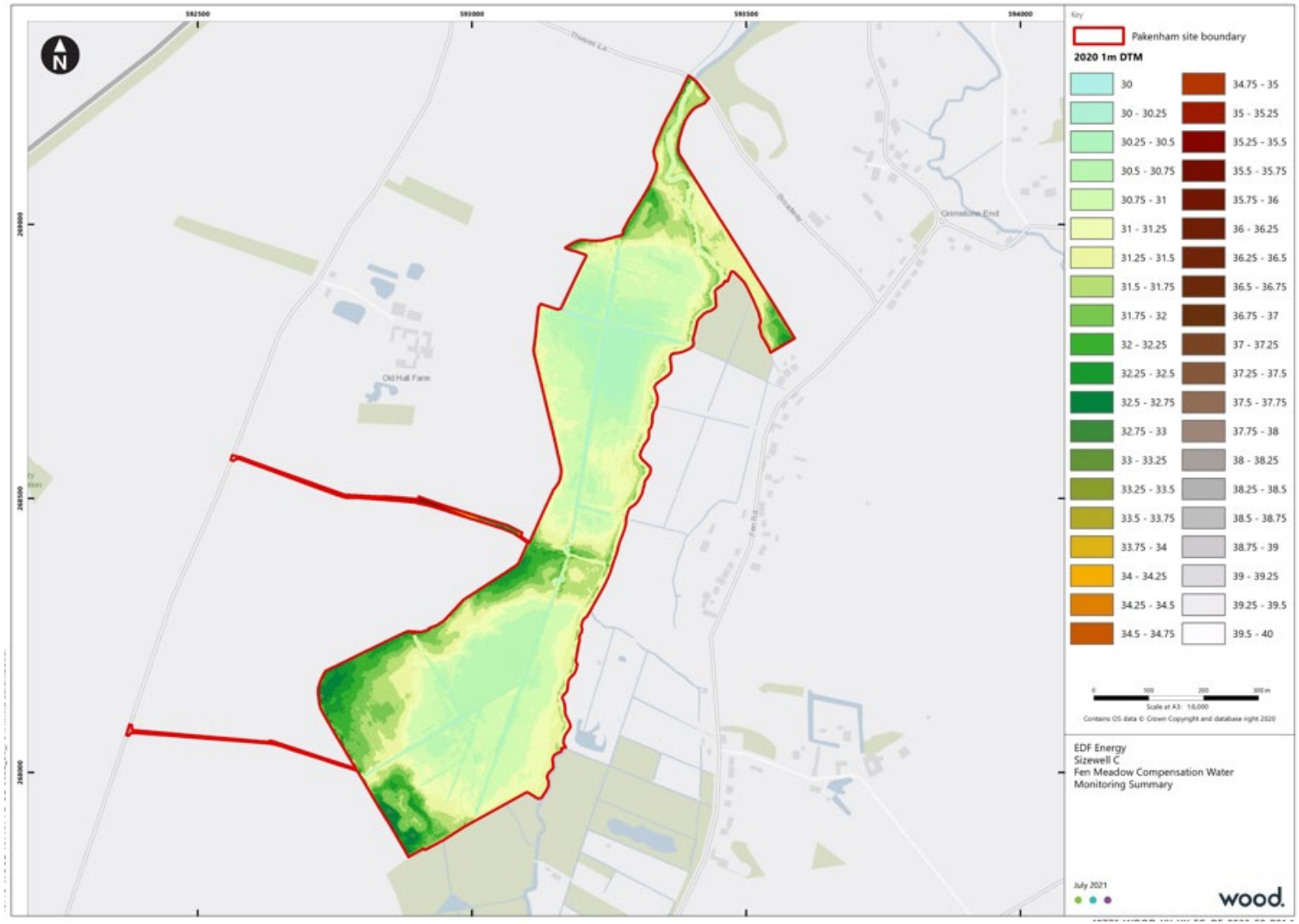
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D1

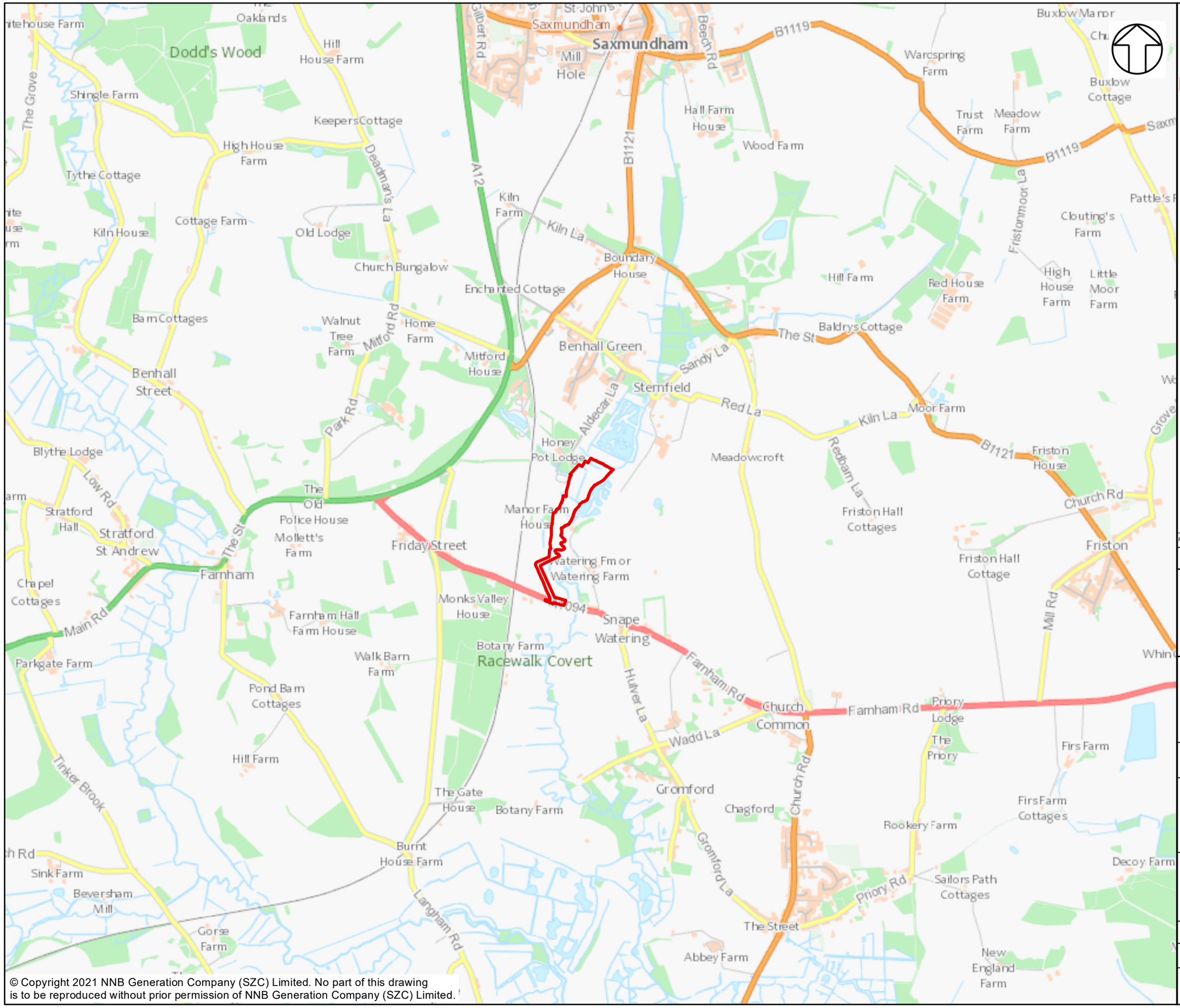


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D2



FIGURES



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NOTES

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Benhall site boundary

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FEN MEADOW COMPENSATION SITE AT BENHALL

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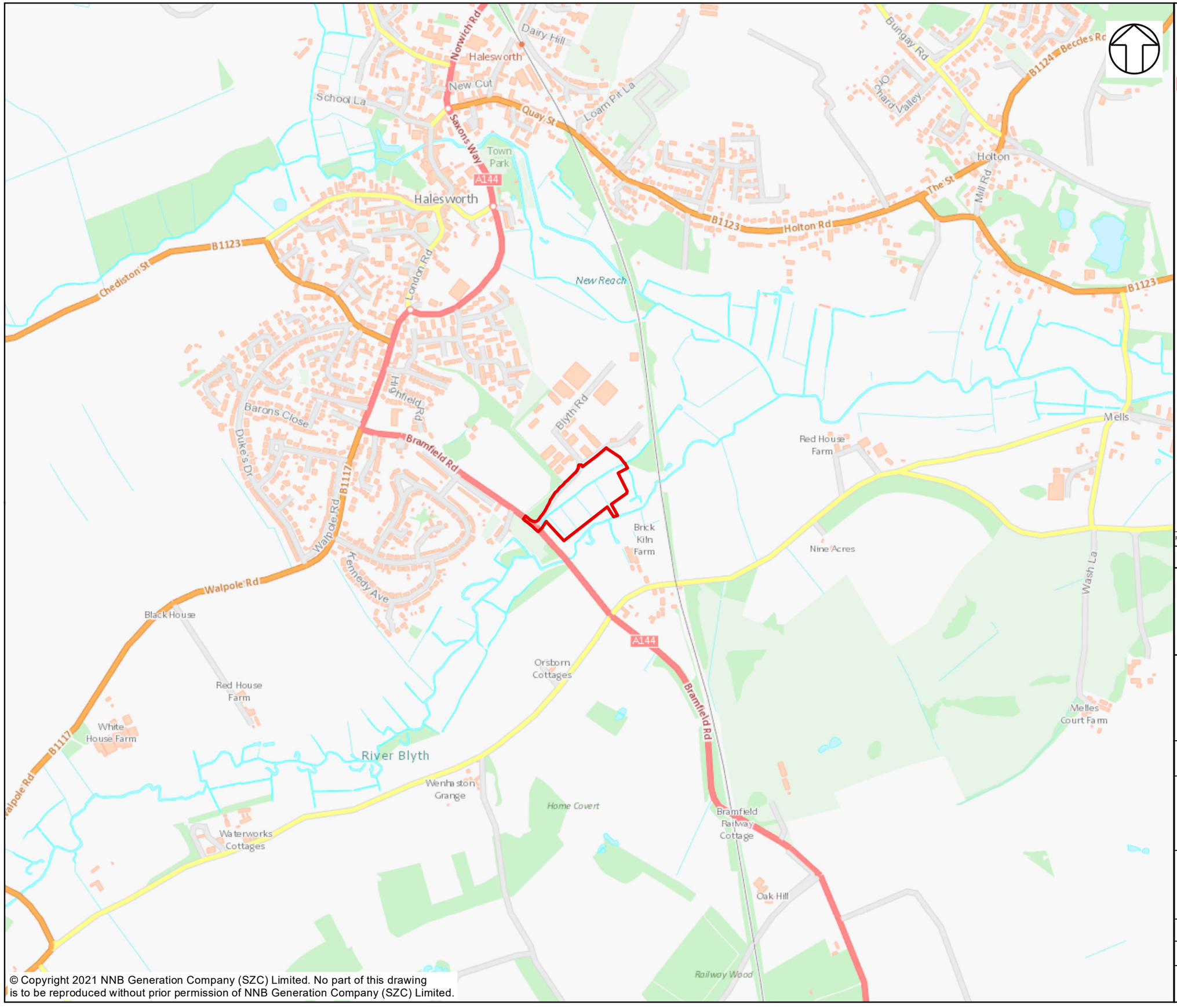
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FEN MEADOW COMPENSATION SITE AT HALESWORTH

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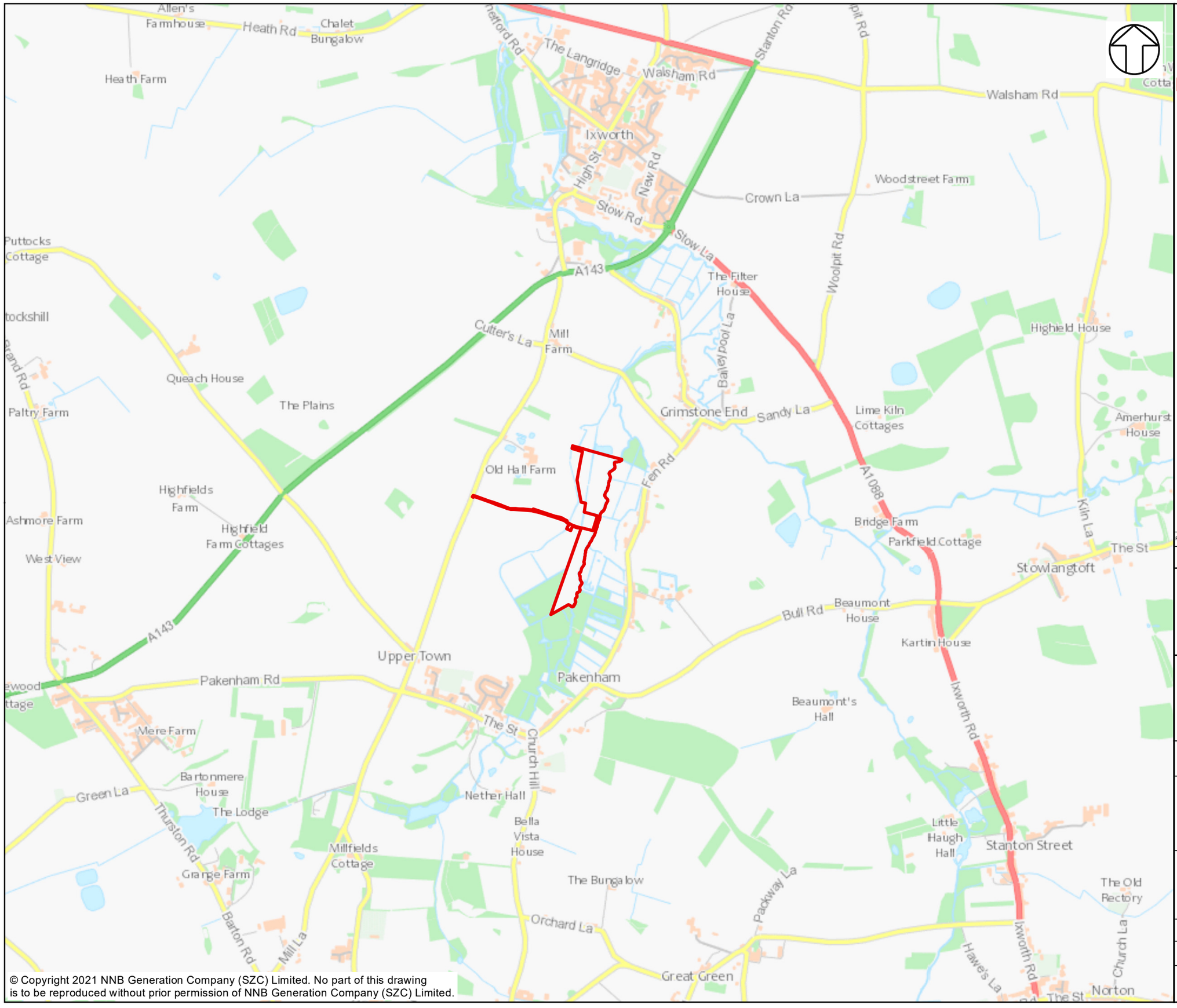
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Pakenham site boundary

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FEN MEADOW COMPENSATION SITE AT PAKENHAM

DRAWING NO: FIGURE 1.3

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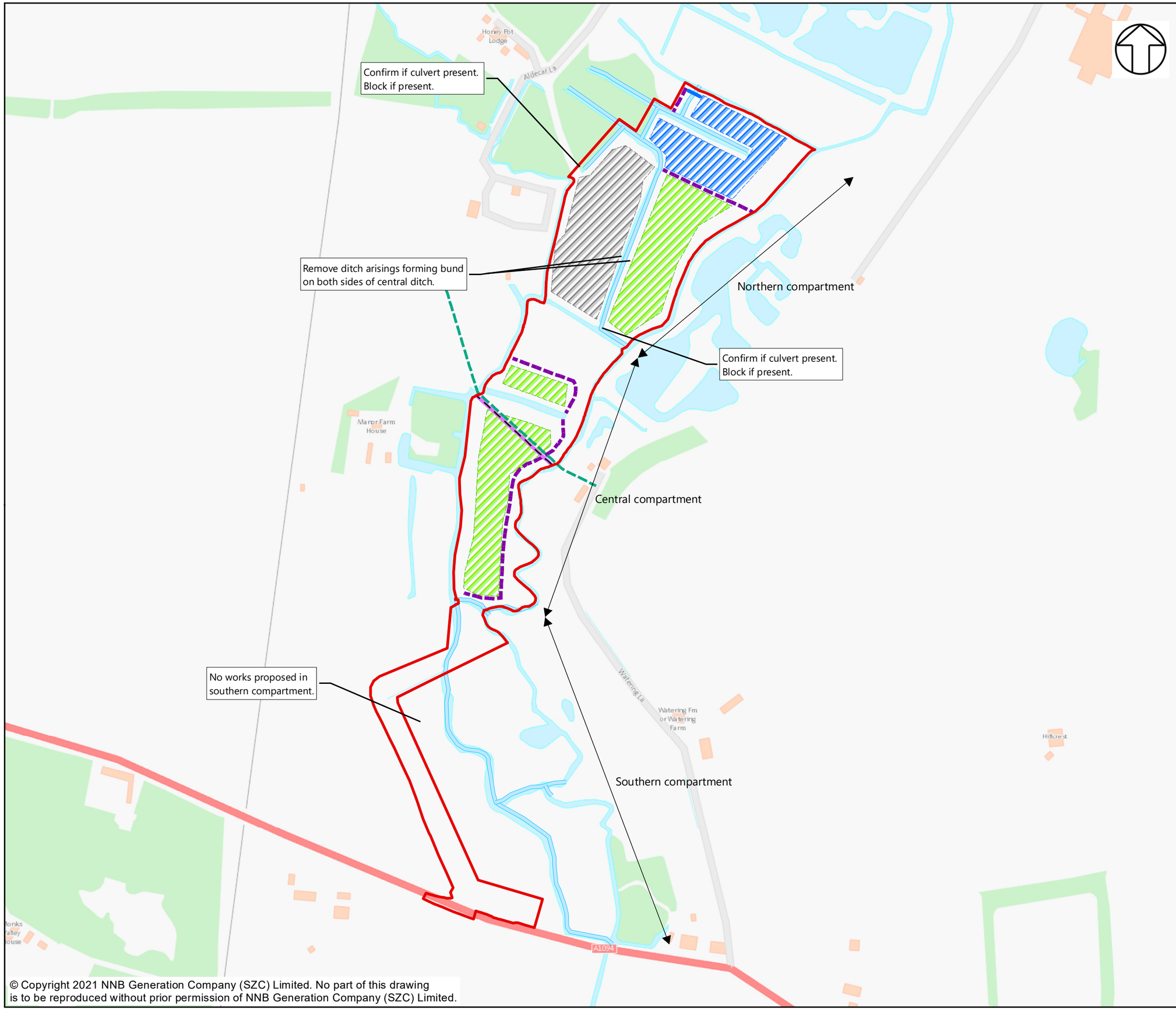
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NOTES

KEY

- Benhall site boundary
- River or drainage ditch
- Public footpath
- Footpath boardwalk
- Area for wet woodland
- Area of land sculpting to create habitat matrix
- Elevated groundwater levels only in this area
- Fenceline to manage stock access to/exclude stock from new habitat areas as appropriate
- Water control structure

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SITE PROPOSALS (BENHALL)

DRAWING NO: FIGURE 2.1

REVISION:

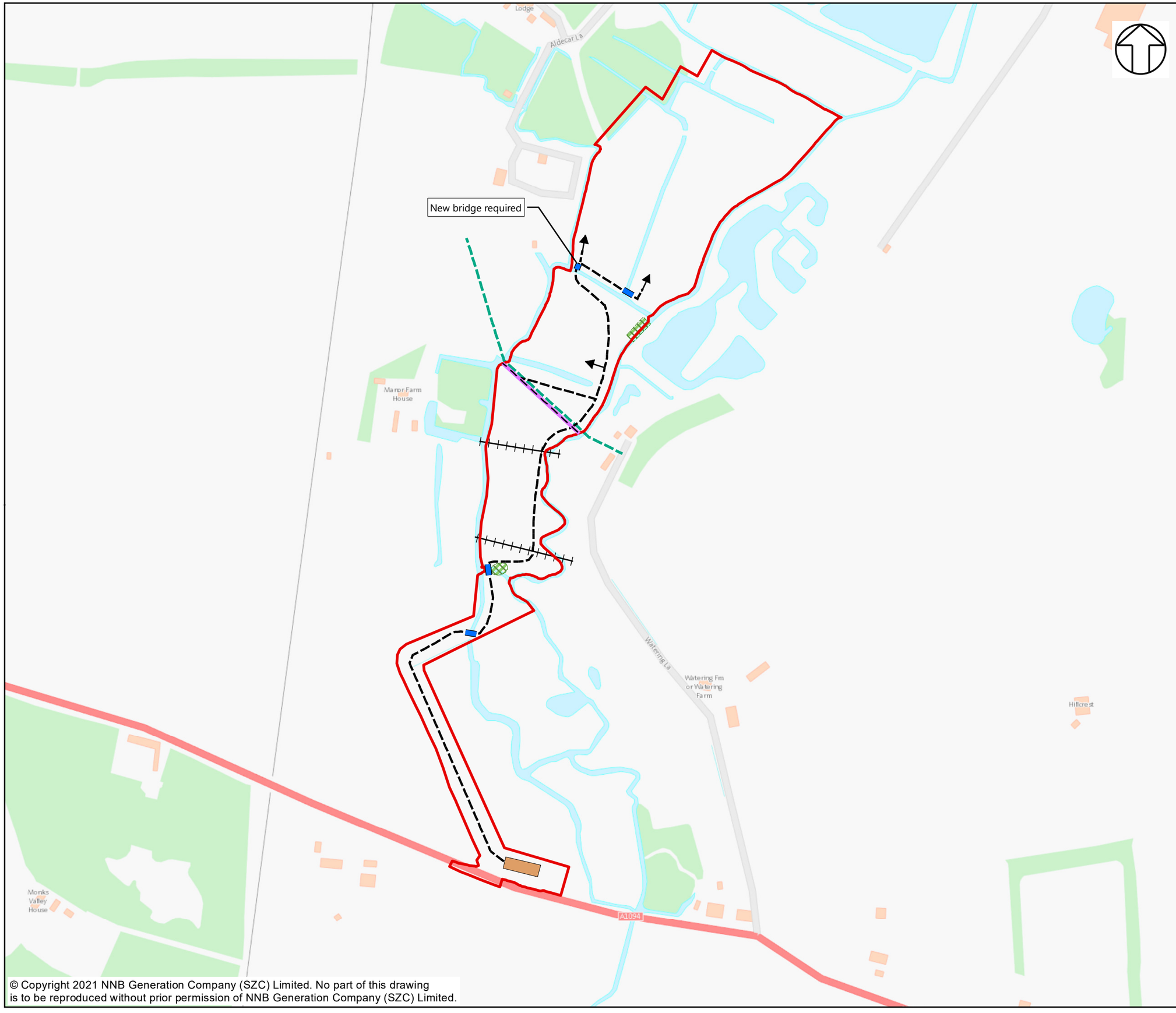
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NOTES

KEY

- Benhall site boundary
- River or drainage ditch
- Public footpath
- Bridge
- Indicative access route
- Footpath boardwalk
- Power line
- Site compound
- Turning area
- Hogweed

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DRAWING TITLE:
NOTES ON ACCESSIBILITY AND HAZARDS FOR HABITAT CREATION ACTIVITIES (BENHALL)

DRAWING NO:	REVISION:
FIGURE 2.2	

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Fill ditch and pipe drainage to the river. Add clay stanks to prevent continued drainage of groundwater.

Remove ditch arisings forming bund on northern side of catch-dyke.

Disrupt east-west oriented land drains to end of the ditches in these areas by breaking or blocking.

Blyth Rd

Brick Kiln Farm

NOTES

KEY

- Halesworth site boundary
- Area of land sculpting to create habitat matrix
- Fenceline to manage stock access to new fen meadow areas
- Water control structure
- Ditch arisings

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PROJECT:
SIZEWELL C

DOCUMENT:
FEN MEADOW PLAN

DRAWING TITLE:
SITE PROPOSALS (HALESWORTH)

DRAWING NO: FIGURE 3.1

REVISION:

DATE: SEPT. 2021

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NOTES

KEY

- Halesworth site boundary
- River or drainage ditch
- Indicative access route
- Power line
- Site compound
- Drainage pipe

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PROJECT:
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DRAWING TITLE:
NOTES ON ACCESSIBILITY AND HAZARDS FOR HABITAT CREATION ACTIVITIES (HALESWORTH)

DRAWING NO: FIGURE 3.2

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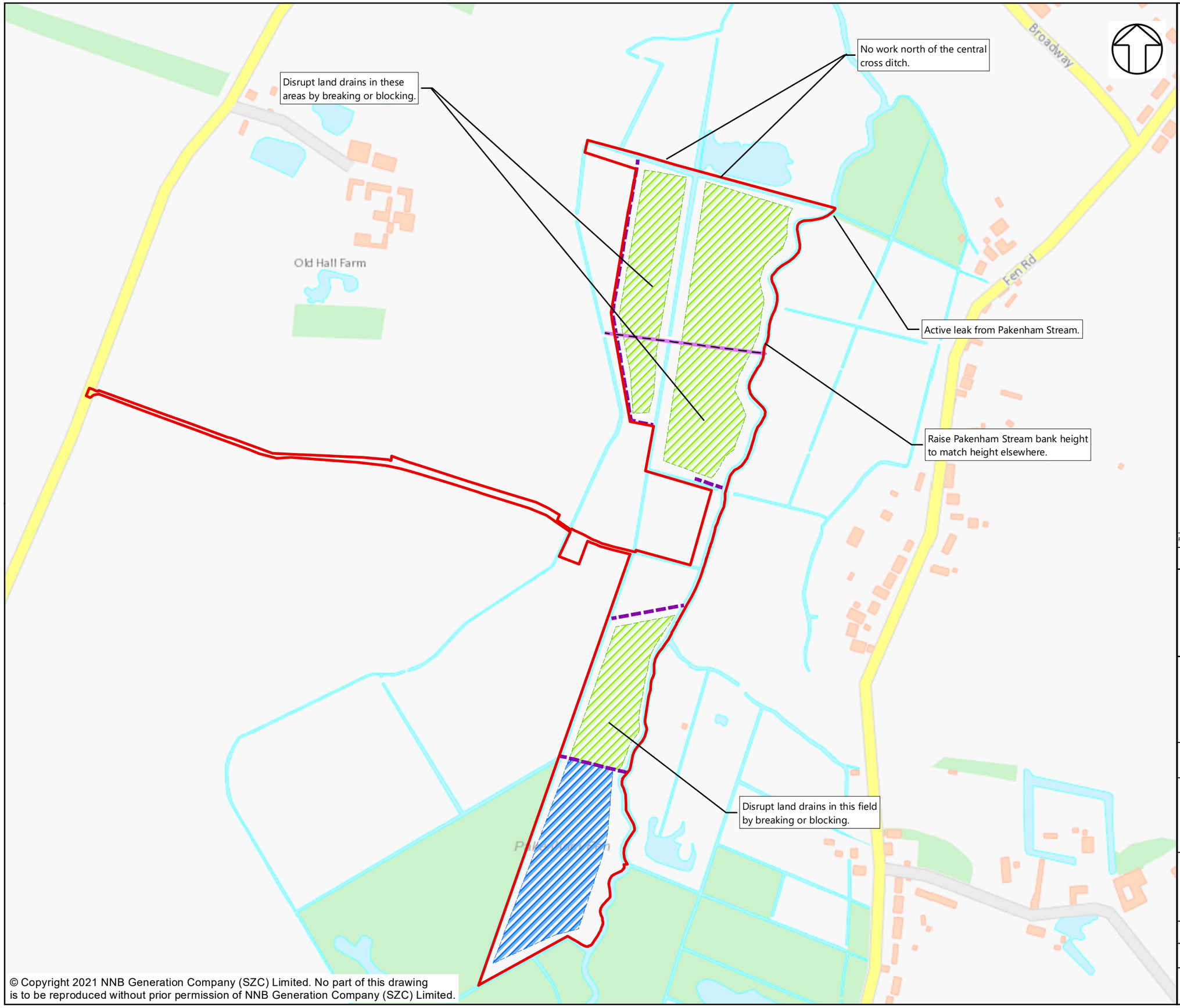
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NOTES

KEY

- Pakenham site boundary
- River or drainage ditch
- Area for wet woodland
- Area of land sculpting to create habitat matrix
- Fenceline to manage stock access to/exclude stock from new habitat areas as appropriate
- Footpath boardwalk

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DOCUMENT:
FEN MEADOW PLAN

DRAWING TITLE:
SITE PROPOSALS (PAKENHAM)

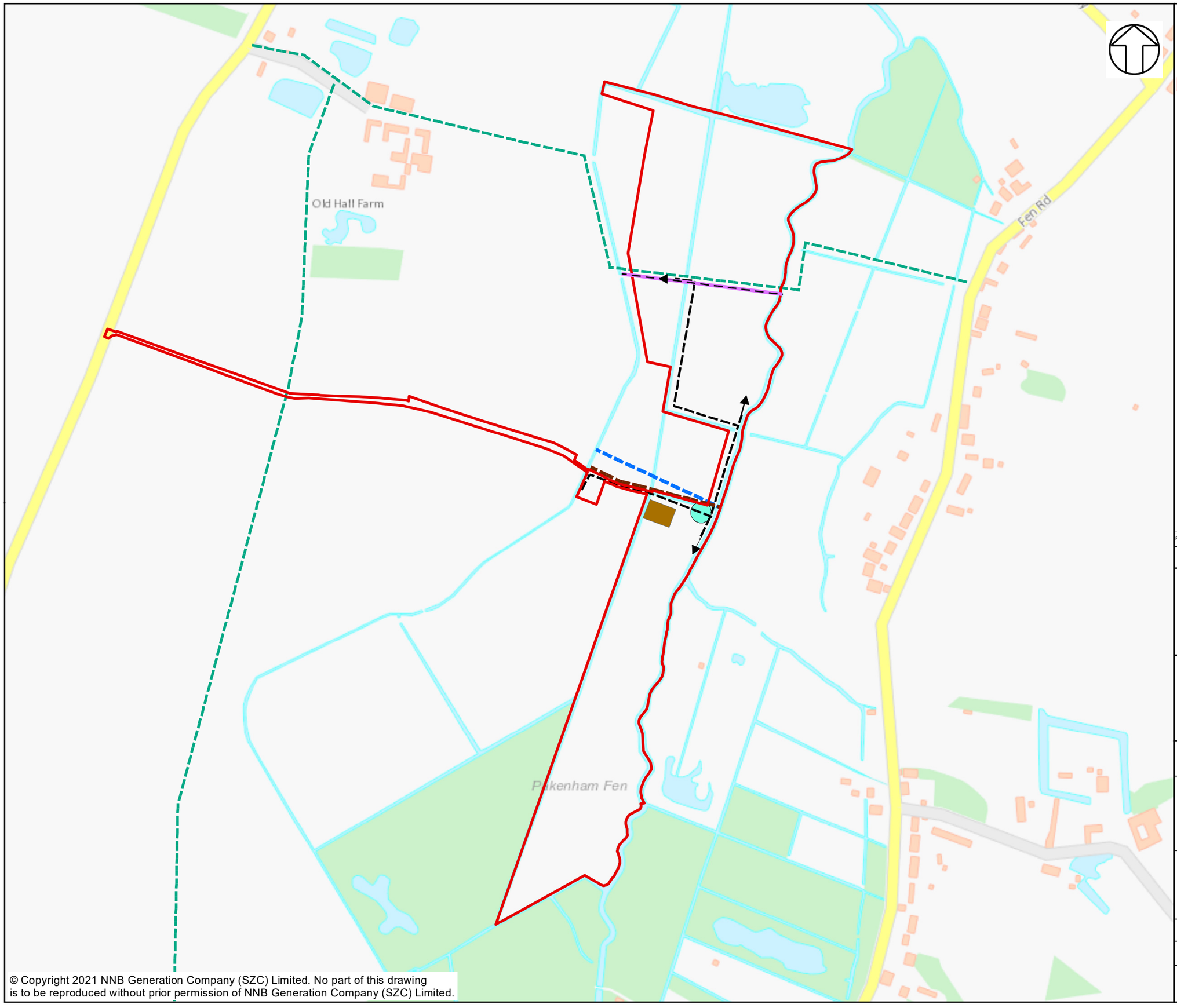
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NOTES

KEY

- Pakenham site boundary
- River or drainage ditch
- Public footpath
- Indicative access route
- Approximate line of underground pipe
- Landowner boundary
- Footpath boardwalk
- Site compound
- Biosecurity point

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DRAWING NO: FIGURE 4.2

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The Sizewell C Project

9.64/ 10.6 Draft Fen Meadow Plan - Tracked Changes Version

Book 9 Revision:	3.0
Book 10 Revision:	1.0
Applicable Regulation:	Regulation 5(2)(q)
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October 2021

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

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1 INTRODUCTION

1.1 Context

1.1.1 The Sizewell C (SZC) proposals would lead to the permanent loss of approximately 0.46ha of 'fen meadow' habitat from the Sizewell Marshes SSSI [**Section 2.9D** of AS-209]. This permanent loss arises from the size and location of the SZC main platform to the north of the existing Sizewell B station. The loss of this area of fen meadow is therefore unavoidable.

1.1.2 Sizewell Marshes SSSI is designated in part for its fen meadow habitats and the loss of the fen meadow habitat from the SSSI leads to a need to provide compensatory habitat for this loss.

1.1.3 The original compensatory habitat proposals included two sites but a third site (Pakenham) was added to the proposals in January 2021. This was to address a comment from Natural England at Stage 4 pre-application consultation (Ref. 1) which was:

"We advise that the extent of compensatory habitat required is 9x that which would be destroyed by the development; this is considered a suitable multiplier given the complexity of habitat type to be lost, the risk and uncertainty involved in the habitat restoration being successful and the time to fully functioning habitat…"

1.1.4 SZC Co. is therefore proposing to deliver 4.14 ha of compensatory fen meadow habitat. Natural England now considers the quantum proposed, based on the multiplier, to be sufficient as detailed in issue 49 of their written representation [REP2-153].

1.1.5 The application for development consent includes within the draft order limits, three sites identified for delivery of compensatory fen meadow habitat listed below and illustrated in **Figures 1.1-1.3**[1]:

- Fen Meadow compensation site at Benhall;
- Fen Meadow compensation site at Halesworth;
- Fen Meadow compensation site at Pakenham.

1.1.6 Requirement 14A in the **draft DCO** (Doc Ref. ~~3.1(I~~3.1(J)) prevents clearance of vegetation within the SSSI until ~~a~~ Fen Meadow ~~Plan has~~ Plans for all three sites have been submitted to and approved by the named local authority in consultation with Natural England. The Fen Meadow Plan(s) for

[1] Note that the order limits have recently been reduced at these three site and these figures reflect the updated limits.

Benhall and Halesworth must be approved by East Suffolk Council ~~in consultation with the relevant Statutory Conservation Body. The Plan~~ and the Fen Meadow Plan must be approved by Suffolk County Council. The Plans must be developed in general accordance with the **Fen Meadow Strategy** (Doc Ref. ~~6.14 2.9.D(A)~~10.16) and this **Draft Fen Meadow Plan** which have been prepared to define SZC Co's commitment to provide appropriate compensation measures for the loss of fen meadow habitat. This will be achieved through the creation of 4.14ha of compensatory fen meadow habitats, and the provision of a contingency fund which is secured through **Schedule 11** of the **DoO** (Doc~~.~~ Ref. ~~**8.17(G)**~~10.4).

1.1.7 The **Fen Meadow Strategy** (Doc Ref. ~~6.14 2.9.D(A)~~10.16) defines a series of three reports, which will lead to the establishment of the final Fen Meadow ~~Plan~~Plans, ~~that~~ which will further define the approaches to maximise the extent of fen meadow habitats at the three sites. Three reports are proposed:

- **Fen Meadow Plan Report 1**. This was submitted at Deadline 3 [REP3-051 and REP3-052] and provides the baseline reports for the sites and water data available to May 2021;

- **Draft Fen Meadow Plan**, This was submitted at Deadline 6 [REP6-026] providing further interim data and defining, in draft, the management interventions required to create fen meadow habitats. The measures seek to maximise the extent of the establishment of fen meadow at each site and the report describes interventions that may be required to ensure the successfully delivery of the habitats at each site. This is the second version of the Draft Fen Meadow Plan, and presents updates made in response to landowner and stakeholder consultation, with the main changes relating to amendments to the order limits and monitoring commitments.

~~1~~• **Draft Fen Meadow ~~Plan~~ Plans for Consultation** will provide the full scope of the plan after 12 months of water data collection at each site and will be provided for review by the Ecology Working Group. Upon finalisation it will become the Fen Meadow Plan which will be submitted to and approved by East Suffolk Council ~~for approval~~ and Suffolk County Council pursuant to Requirement 14A~~)~~ of the **dDCO**. The final Fen Meadow ~~Plan~~ Plans must be in general accordance with the **Fen Meadow Strategy** (Doc Ref. ~~6.14 2.9.D(A~~10.16) and this **Draft Fen Meadow Plan** ~~(Doc Ref. 9.64(A))~~

1.1.8 SZC Co. must implement the establishment of the fen meadow in accordance with the approach and implementation timetable set out in the Fen Meadow Plan approved pursuant to Requirement 14A.

1.2 Status of this Draft Fen Meadow Plan

1.2.1 This draft plan is considered to provide sufficient detail to inform the Examining Authority, the Secretary of State and the other stakeholders as to the proposals at each site.

1.2.2 The proposals presented herein have been informed by all data collected up to and including early July 2021. In relation to hydrology this means that a substantive portion of the data for summer period has informed the proposals. This is important as both groundwater and surface water levels are typically lowest in summer and these levels and related seasonal trends are likely to be amongst the most important variables in determining the potential for establishing new fen meadow on the three sites.

1.2.3 Level 1 control documents will either be certified under the DCO at grant or annexed to the Deed of Obligation (DoO). All are secured and legally enforceable. Some Level 1 documents are compliance documents and must be complied with when certain activities are carried out. Other Level 1 documents are strategies or draft plans which set the boundaries for a subsequent Level 2 document which is required to be approved by a body or governance group. The obligations in the DCO and DoO set out the status of each Level 1 document.

1.2.4 This **Draft Fen Meadow Plan** is a Level 1 document. Pursuant to Requirement 14A of the **dDCO**, prior to any vegetation clearance within the Sizewell Marshes SSSI, ~~a~~ Fen Meadow ~~Plan~~ Plans for each of the sites (a Level 2 document) ~~will~~ must be submitted for approval by East Suffolk Council and Suffolk County Council, in consultation with West Suffolk Council, and the relevant Statutory Conservation Body and such ~~plan~~ plans must be in general accordance with this ~~draft~~ **Draft Fen Meadow Plan**.

1.2.5 Where further documents or details require approval, this document states which body or governance group is responsible for the approval and/or must be consulted. Any approvals by East Suffolk Council, Suffolk County Council or the MMO will be carried out in accordance with the procedure in **Schedule 23** of the **dDCO**. The Deed of Obligation establishes the governance groups and sets out how these governance groups will run and, where appropriate, how decisions (including approvals) should be made. Any updates to these further documents or details must be approved by the same body or governance group and through the same consultation and procedure as the original document or details.

1.2.6 Where separate Level 1 or Level 2 control documents include measures that are relevant to the measures within this document, those measures have not been duplicated in this document, but cross-references have been included for context. Where separate legislation, consents, permits and

licences are described in this document they are set out in the Schedule of Other Consents, Licences and Agreements (Doc Ref. 5.11~~) [REP3-011]~~(C)).

1.2.7 For the purposes of this document the term 'SZC Co.' refers to NNB Nuclear Generation (SZC) Limited (or any other undertaker as defined by the dDCO), its appointed representatives and the appointed construction contractors.

1.3 Environmental Statement and Shadow Habitat Regulations Assessment

1.3.1 The proposals described for each of the three locations will create some small scale and local changes to hydrology within the sites and there will be a need to undertake some shallow excavations. Some protected species are present and other receptors are present nearby, including, in some cases, designated sites or features.

1.3.2 The impacts at the three sites related to the creation of fen meadow habitats were considered in **Volume 2**, **Chapter 14** of the **ES** [AS-033] and **Chapter 2** of the **ES addendum** [AS-181]. The impacts at the three sites were revisited in **Volume 1** of the **Fourth ES Addendum** [REP7-030] submitted at Deadline 7, following issue of the **Draft Fen Meadow Plan** ~~**Draft** [REP6-026].~~REP6-026]. However, no change to the significance of effects was predicted.

1.3.3 The fen meadow proposals described in this draft plan will have no adverse effects on integrity for any European Site and there are no consequences in the context of the Habitats Regulations. A note on the potential hydrological consequences on the Abbey Meadows compensation site at Snape of proposals at Benhall was submitted at Examination Deadline 5 in response to the Written Representation by the RSPB (**Appendix L** of [REP5-120]). This concluded that there would be no adverse effect on integrity given the extent of the catchment, the effect on availability of water to the Abbey Farm compensation site.

1.4 Recreation of Fen Meadow Habitats

1.4.1 Whilst the term fen meadow covers more than one botanical community in the National Vegetation Classification (NVC) (Wheeler, Shaw and Tanner, 2009, Ref. 2) the target community in the context of the loss at Sizewell Marshes is M22 *Juncus subnodulosus –Cirsium palustre* fen meadow.

1.4.2 To manipulate site conditions such that conditions are suitable for M22 development it is necessary to recognise the characteristics of the community including appropriate eco-hydrological conditions. The

characteristics of M22 have been described by Wheeler et al. (Chapter 18 in Ref. 2), including floristic composition, landscape situation and topography, substratum types, water supply and level required by M22 can be summarised as:

- Overall, M22 is a community that is botanically variable and can occur in a wide range of eco-hydrological situations. Nonetheless, the key conditions required to support M22 can be summarised as base-rich conditions, but relatively low fertility with limited nutrient concentrations (e.g. phosphate, nitrate); and
- Management, by mowing or grazing, which are crucial to the maintenance of M22.

1.4.3 There is an extensive literature on fen meadow restoration in Europe - notably from the Netherlands, Poland and Germany. Van Diggelen & Marrs (2003, Ref. 3) in particular have categorized four essential steps for conservation and restoration of fen meadow:

- establishing or re-establishing the necessary abiotic conditions;
- supplying (sufficient) propagules of constituent species of the target communities;
- creating and maintaining suitable conditions for the (re-) establishment of target species; and
- appropriate management to keep the conditions suitable.

1.4.4 The **Fen Meadow Strategy** (Doc Ref. ~~6.14 2.9.D(A)~~10.16) outlines the types of measure likely to be necessary to facilitate development of the compensatory habitat, as represented by the M22 *Juncus subnodulosus – Cirsium palustre* fen meadow community at appropriate sites. A review of the conditions required for recreating fen meadow was presented in response to Examination Question 'Biodiversity 1.86'. The development of the abiotic and biotic conditions for fen meadow referable to the M22 *Juncus subnodulosus – Cirsium palustre* fen meadow community are considered to have the highest chances of success if the following techniques are employed at the three fen meadow sites:

- **Topsoil removal.** Complete or partial topsoil removal will be undertaken within the context of sediment disposition, surface topography and valley flooding regimes, in order to reduce nutrient levels and increase the influence of groundwater on target species.

- **Creation of microtopography.** The ground surface will be sculpted within hydrologically significant tolerances to assist in the successful colonisation and regeneration of target groundwater-dependent species, particularly those with high light requirements, low competitive abilities and low tolerance of drought or flooding.

- **Rewetting from appropriate water sources**. Rewetting will be undertaken using groundwater-dominated sources to facilitate an appropriate hydrological regime for the target vegetation. Sufficient control is likely to be required to minimise the impact of extreme events leading to flooding by nutrient-rich waters and/or periods of drought, within acceptable limits.

- **Use of hay transfers.** The transfer of hay from suitable sites – or of turves from the FMS donor site – will be undertaken following established best practices. The conditions and timing of collection, transfer and introduction of plant propagules – and their initial establishment – will be carefully monitored to meet restoration requirements.

- **Habitat management.** An agreed annual programme of water and vegetation management will be established and undertaken at appropriate times. These operations – and their impact on the developing fen meadows – will be set with a framework of acceptable limits. Appropriate monitoring will be maintained to enable effective and timely management of the habitat management programme to meet target conditions for the restored fen meadow vegetation.

1.4.5 These techniques will be deployed as relevant in the detailed proposals for each of the three sites set out in this draft plan.

1.4.6 Additionally, in accordance with the **Wet Woodland Strategy** (~~–~~Doc Ref. ~~9.8(A)),~~ 10.31) areas at Benhall and Pakenham have been identified for the delivery of wet woodland. The required measures will be set out in a separate plan (the Wet Woodland Plan)**.** The Wet Woodland Plan must be in general accordance with the **Wet Woodland Strategy** (Doc Ref. ~~9.8(A)~~10.31) and the **Draft Wet Woodland Plan** (Doc Ref. ~~9.108~~10.13) and must be approved by East Suffolk Council prior to any vegetation clearance in the Sizewell Marshes SSSI being carried out (Requirement 14B). However~~–~~, given that the compensatory wet woodland will be co-located with fen meadow habitats, the wet woodland areas are also defined spatially in this plan.

1.4.7 The **Wet Woodland Strategy** (Doc Ref. ~~9.8(A)~~10.31) requires the delivery of a total of ~~2.36ha~~ 2.07 ha of wet woodland across the two fen meadow sites at Benhall and Pakenham. The principle of co-location of compensatory wet woodland and fen meadow habitats is supported by

Natural England, given that this replicates the situation at the Sizewell Marshes SSSI.

1.5 Fen Meadow Establishment Management Measures and Monitoring

a) Fen Meadow Establishment Management Measures

1.5.2 The detailed proposals provided in Sections 2 to 4 of this **Draft Fen Meadow Plan** are focussed on the establishment phase which will be undertaken in 'Year 1' of the works as outlined in the **Fen Meadow Strategy** (Doc Ref. ~~6.14 2.9.D(A)~~10.16). These primarily comprise physical measures to be implemented to create the ground conditions to support fen meadow species and the approach to introducing those species and will be set out in the final Fen Meadow ~~Plan~~ Plans submitted to East Suffolk Council and Suffolk County Council pursuant to Requirement 14A~~)~~.

1.5.3 In subsequent periods (years 2-5 and 6-10), measures outlined focus on continued introduction of species (as detailed in **Fen Meadow Strategy** (Doc Ref. ~~6.14 2.9.D(A))~~ 10.16) and on-going management approaches. These will need to remain flexible and be adjusted, annually if necessary, based on monitoring of habitat development. Progress will be reviewed annually and any adjustments to the habitat management approaches agreed with the Ecology Working Group. Any substantive changes of approach, which could ultimately impact the ability to deliver the quantum of the target habitat by Year 10, will need to be agreed by the Ecology Working Group.

b) Fen Meadow Monitoring

1.5.4 Given the expected extended periods likely required to establish fen meadow habitats, the **Fen Meadow Strategy** (~~[AS-209] as updated by~~ Doc Ref. ~~6.14 2.9.D(A)~~10.16), secured by Requirement 14A, provides that monitoring will extend into the operational period of the power station to ensure the habitats are becoming established and being maintained in accordance with the relevant habitat objectives.

1.5.5 The frequency of monitoring during the construction and operational phases is set out in the **Fen Meadow Strategy** (~~[AS-209] as updated by~~ Doc Ref. ~~6.14 2.9.D(A)),~~ 10.16) and monitoring recommendations are provided in each site section in this draft plan.

1.5.6 In the event that any water control structure that could impede fish and eel passage is introduced at the fen meadow sites, a suitable fish pass will be included in the design. Monitoring will be undertaken to ensure any such structures function as required and do not become a barrier to movement.

1.5.7 The final monitoring details for these sites would be agreed via the approval of the final Fen Meadow ~~**Plan**~~ Plans submitted to and approved by East Suffolk Council ~~fro approval~~ and Suffolk County Council following consultation with relevant Statutory Nature Conservation Body pursuant to Requirement 14A~~—~~.

1.6 Report structure

1.6.1 There is a separate plan for the creation and establishment of fen meadow habitat at each site. The report is structured as follows:

- Section 2 - Benhall;
- Section 3 – Halesworth;
- Section 4 – Pakenham;
- Section 5 – Summary.

2 BENHALL

2.1 Site Baseline

a) Summary of investigations

2.1.2 The investigations being undertaken at Benhall were summarised in the **Fen Meadow Plan Report 1**, with the study reports provided as appendices [REP3-051 and REP3-052]. The studies have mostly been completed, as detailed in Table 2.1 below.

Table 2.1: Status of studies as at July 2021

Site	Study	Status
Benhall	Ecology desk study	Completed in 2020
	Ecology field surveys	Phase 1 habitat survey NVC survey Water vole and otter survey Aquatic invertebrate survey of ditches All completed in 2020
	Hydrogeological desk study	Completed in 2021
	Installation of piezometers, dipwell, gaugeboards	Installed October 2020
	Topgraphic survey of site and installations	Completed 2020
	Water flow, level and quality monitoring	Commenced November 2020 for 1 year.

2.2 Environmental Setting

2.2.1 The **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052] summarised the findings of a series of baseline reports, provided as Appendices, that described the environmental setting of the Benhall site. The majority of the baseline information is not repeated in detail in this draft Fen Meadow Plan although a summary of the ecological setting is provided below and further hydrological monitoring data are now available so the Water Monitoring Summary – Benhall Site 10 & 11, November 2020 to April 2021, has been updated to July 2021 (**Appendix A**). The updated data have also been further interpreted to update the site conceptual model (**Section 2.3**).

2.2.2 Note that in 2019, two sites were identified, referred to as Site 10 (to the north) and Site 11 (to the south) and there was a gap between them. Subsequently, the site boundaries were revised to combine these sites and include the small parcel of land in between and the combined site was included in the application for development consent. Reference is now made to the northern, central and southern compartments (see **Figure 2.1**).

a) Summary of Ecological Setting from Benhall Ecology Baseline report [REP3-051]

2.2.3 There are no statutory designated sites of nature conservation value within the Benhall site boundary. However, a compartment of Manor Farm County Wildlife Site (CWS) is located within the red line, and a further compartment is located adjacent to the western Site boundary. This latter compartment supports fen meadow habitat.

2.2.4 Coastal and floodplain grazing marsh, deciduous woodland and lowland meadows priority habitats are mapped in MAGIC as occurring on Site.

2.2.5 The site comprises poor semi-improved grassland, inundation vegetation, broadleaved wet woodland, scattered trees, flowing water, with fields divided either by hedges or ditches.

2.2.6 The habitats present on site were broadly categorised, during the NVC survey, as Floodplain and toe slope grasslands (of which three communities, including two rush pasture communities, supported suites of groundwater influenced and typical floodplain species), dry valley side grassland and wet woodland.

2.2.7 Giant hogweed and Himalayan balsam were present along the banks of the River Fromus. A small patch of giant hogweed was also noted within the Site.

2.2.8 No sign of otter presence was recorded on site, although the river and some of the wet ditches provide suitable habitat, and there is an otter record nearby.

2.2.9 Four of the 18 transects surveyed provided optimal aquatic habitat for water voles, with a further two meeting most of the noted habitat requirements but holding less water, and eleven containing relatively shallow water. Water vole presence was confirmed on four transects (two ditches and two river transects).

2.2.10 The aquatic invertebrate fauna of the Benhall site comprises predominantly common and local species.

2.3 Site Conceptual Model

2.3.1 The initial site conceptual model is presented in the hydrogeological report (**Appendix D** of the **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052]). This section builds on the assessment provided in the conclusions of that report and all monitoring data collected and made available at the time of writing (July 2021). This section presents the findings on the relationship between ground level, groundwater levels, surface water levels and logged geological strata.

2.3.2 The Benhall site covers an area of 12.9 ha. The surface elevation across much of the northern compartment is relatively flat, generally between 3.8 and 4.0 mAOD (see LIDAR plots in **Appendix A**). At the margins of the site the land surface rises to 6.7 mAOD in the northwest near Aldecar Lane and to 5.2 mAOD in the southwest. The central and southern compartments have a more well-defined slope from west to east towards the River Fromus and contain a cut-off meander channel with a bed level of approximately 3.5 mAOD.

2.3.3 The River Fromus forms the eastern boundary of the Site and flows from north to south.

2.3.4 The bedrock geology at the site is Crag sands (c.10-20m thick) overlying London Clay of the Thames Group. The combined thickness of the Thames Group and Lambeth Group in this locality is thought be c. 25-30 metres in this locality. The Lambeth Group lies over the Chalk Group.

2.3.5 Alluvial deposits of clay, silt, sand and gravel directly overlie the Crag at the Benhall site and borehole logs indicate that they increase in thickness from around 7.7m in the south to >10m in the north of the Site. Head deposits of clay, silt, sand and gravel are mapped at the western edge of the Alluvium close to the boundary of the Site.

2.3.6 The Site is split in two at the boundary of the northern and central compartments by an ordinary watercourse named 'The Canal' which originates to the west of the A12 road. The Canal passes at right angle past two sides of the Benhall Sewage Treatment works before turning east again and discharging to the River Fromus. The Canal is the receiving watercourse for the Benhall Sewage Treatment Works (STW) discharge. The licensed discharge volume is 1.5 Ml/d.

2.3.7 On-site observations suggest that the Canal diverges to the north-east of the STW (downstream of the discharge point) and some water flows into the ditch network which flows northwards towards GB04.

2.3.8 The Benhall site contains a network of land drainage ditches which discharge to the River Fromus at three locations.

2.3.9 There is a licenced surface water abstraction from the River Fromus on the Site boundary (AN/035/0004/017), although this is toward the downstream end of the site away from the potential Fen Meadow areas.

2.3.10 Topographic surveys initially indicated that water levels coming on to the site from the west via the Canal are around 3.9 mAOD and on-site drainage ditches generally between 3.5 and 3.8 mAOD (November 2020). Ditch water levels are slightly lower in the southern half (Ditch W12 and W13) which do not appear to be well connected to other ditches or to the River Fromus.

2.3.11 The ditches in the northern compartment are monitored by GB03, 04 and 05 (**Figure 1.1** in **Appendix**). The STW discharge is upstream of GB03. A plot of the water levels at the three gaugeboards and the groundwater level in the superficial deposits (BHALL_1001_s) shows that the water level at GB03 (which is located on the higher ground to the north-west) appears to be sustained (**Figure C3** in **Appendix**), likely by discharges from the STW. A similar water level response is seen in the downstream gaugeboard at GB04 at the northern boundary of the Site showing the influence of the STW here. GB05 to the centre of the northern compartment, and the groundwater level monitoring well at BHALL_1001_s both show a similar seasonal response with reductions in water levels in mid-April and June and do not appear to be maintained by the discharge. On-site observations have confirmed that this central ditch in Site 10 is significantly drier with very little flow.

2.3.12 At the boundary of the southern and central compartments, the surface water levels are recorded by GB02. The water levels here show no decline in spring despite a drop in the nearby superficial deposits recorded in April and June (BHALL_1002_s and BHALL_1003_s). Again, this is likely to be the influence of the STW discharge to the Canal.

2.3.1 The monitored data available at GB01 suggests that water levels in this ditch are lower than the other watercourses on site. The levels are also lower than the surrounding groundwater levels (shown in the 1102 piezometer and 1104 dipwell), further reiterating earlier assumptions that this watercourse is not well connected to the other ditches on site. This ditch is linked to the River Fromus.

2.3.2 Development of peat has occurred in the northern and central compartments and peat is encountered between 0.4 and 2.5 m below ground surface. The borehole logs indicate a peat thickness of up to 4 m thick in places (Piezometer BHALL_1001_d) with a thickness of 1.1m at

borehole HAL_2803_d. Soil cores show that a silty clay layer is often present above the Peat which may hold a higher water level than that of the underlying sands and gravels. The basal part of the peat was more degraded than the upper part in some areas (Zone C Site 11) which may indicate that the groundwater level is fluctuating through the lower part, though it may rise through the peat during periods of heavier rainfall.

2.3.3 The soil core surveys carried out in April 2019 indicated that the initial water table was generally between 0.5m and 1m below ground level, rising to 0.4 and 0.1m below ground level at two locations after rest. The rising groundwater levels indicates that water in the peat and sands and gravels beneath the silty clay layer near the surface has a positive hydrostatic pressure in some locations. The October 2020 drilling programme recorded similar rest ground water levels (0.48 to 0.84m). General groundwater flow is thought to be towards the River Fromus (west to east) but collected data from the surveys suggest a relatively flat water table at the Benhall site.

2.3.4 The soil core surveys, drilling logs and topographic survey indicate that groundwater levels are in continuity with surface water levels in the on-site ditches. The River Fromus has a bed level of 2.8 mAOD and a water level of 3.51 mAOD at the northern end of the Benhall site and this gently decreases downstream to a bed level of 2.3 mAOD and a water level of 2.9 mAOD at the southern end of the Benhall site, indicating the potential for groundwater discharge to the river.

2.3.5 There is a groundwater abstraction at Ham Farm (7/35/04/*G/0095) which is relatively close to (0.2km), and upgradient of, the Site and has the potential to impact groundwater levels on the Site. The impact is likely to be minimal due to the relatively low abstraction quantities.

2.3.6 The groundwater level plots shown in the monitoring note in **Appendix A** show that the groundwater levels to the north (1001_s, 1002_s, 1003_s) and in the centre (1101_s and 1103_s) of the site in the superficial deposits present a similar pattern with a seasonal response to the dry April causing groundwater levels to decrease.

2.3.7 To the very south of the Site, there is less response to the dry April period in the superficial deposits (1102_s and 1104_s) with a flatter groundwater level hydrograph for these two locations (**Figure A3** in **Appendix A**).

2.3.8 Some of the superficial deposit groundwater levels are showing groundwater levels above the ground level. Notably:

- At 1002_s and 1003_s groundwater levels are above surface in winter (January and early February) but the groundwater level decreases into spring, dropping below ground level (**Figures B3 and B4** in

Appendix A). This results in a depth to water table at these two sites of up to 0.6 m below ground level in spring. Levels in these superficial deposits recovered into early summer.

- At 1104_s the groundwater level is above ground level periodically between November and February and declines to approximately 0.4 m below ground level into spring (**Figure B10** in **Appendix A**).

2.3.9 There is an artesian groundwater level response in two of the Crag boreholes. The groundwater levels at 1101_d is above ground level for most of the monitored data series and at 1102_d the groundwater level goes above ground level periodically (**Figure A4** in **Appendix A**).

2.3.10 The piezometer at 1001 (BHALL_1001_s for superficial deposits, BHALL_1001_d for Crag deposits) shows that the Crag groundwater levels increased slowly over the winter and have now remained static (~3.65 to 3.75 mAOD) since February **Figure A2** in **Appendix A**). Conversely, the superficial deposits are showing more of a seasonal response. It is likely that the Crag here is partly confined. Water levels in the superficial deposits will be supported by the head in the Crag but there may be limited upward flow. It is suspected that the increase of Crag groundwater levels from October to January results from a rebound effect after the cessation of nearby pumping.

2.3.11 It is evident in the 1102 piezometer in the shallow and deep wells (1102_s and 1102_d respectively) that the timing and amplitude of the groundwater fluctuations align very well between the two geological strata (**Figure A4** and **A5** in **Appendix A**). The Crag groundwater level is above that in the superficial deposits, so it is plausible that there is a degree of hydraulic continuity with the Crag in this location which is supporting the water level in the superficial deposits at this location.

2.3.12 Slightly further north at 1101_s and 1101_d the results for the shallow (superficial) and deep (Crag) boreholes respectively show that the magnitude and timing of the fluctuations align well (**Figure A4** and **A5** in **Appendix A**), with the levels marginally higher in the Crag than the superficial deposits, again supporting the theory that there may be some upward flow from the Crag here.

2.3.13 The lowest groundwater level and therefore maximum depth to water in the superficial deposits is listed in **Table 2.2**.

Table 2.2: Groundwater levels and depth to water table

Borehole ID	Ground level (mAOD)	Lowest observed groundwater level (mAOD)	Maximum depth to water table (m)	Highest observed groundwater level (mAOD)	Minimum depth to water table (m)*
BHALL_1001_d	3.91	2.28	1.63	3.98	-0.08
BHALL_1001_s	4.35	3.49	0.85	4.20	0.14
BHALL_1002_s	3.93	3.31	0.62	4.31	-0.38
BHALL_1003_s	3.88	3.29	0.59	4.14	-0.27
BHALL_1101_d	3.91	3.92	-0.01*	4.34	-0.44
BHALL_1101_s	3.91	3.83	0.08	4.24	-0.34
BHALL_1102_d	3.92	3.74	0.18	4.15	-0.23
BHALL_1102_s	3.92	3.50	0.42	4.01	-0.09
BHALL_1103_s	3.95	3.43	0.52	4.17	-0.21
BHALL_1104_s	3.92	3.60	0.32	4.19	-0.28

* negative depth to water table shows where groundwater levels are above ground level.

2.3.14 The groundwater and surface water data shows that the northern compartment of the Site demonstrate two slightly different hydrologic responses:

- In the northern compartment the superficial deposits fluctuate in response to seasonal climatic conditions. Surface water levels in The Canal, central east-west ditch and northern drainage outlet are maintained by the STW discharges. The same is not seen in the central Site 10 ditch which shows a decline in water levels due to its hydraulic continuity with the underlying deposits. The groundwater levels in the data available show that groundwater levels have been above ground level at times, but also extend to around 50-80cm below ground level during the spring and early summer. Further monitoring will be required to assess what happens over the rest of summer 2021 and into autumn. There appears to be limited connectivity with the River Fromus and the underlying Crag here. Groundwater levels in the superficial deposits have peaked at around 4.3 mAOD and have also dropped to around 3.3 mAOD.

- In central and southern compartments, there is a less pronounced impact to seasonal variations in the superficial deposits and it is likely that there is some upward flow from the Crag in the here. This is likely more pronounced at the southern end of the southern compartment.

2.3.15 There is some water quality data available for the Site, with more sampling planned over 2021. The data so far show the following:

- Nitrate concentrations are highest in the ditches to the south of the Site (GB1 and GB2 which measured 48.2 and 71.5 mg/l as NO3 respectively). The concentrations are either below the limit of detection or low in the superficial deposits and underlying Crag.

- The Site generally has very low phosphate concentrations as would be expected, with most samples not showing anything above the level of detection. GB1, GB2 and SP5 locations shows phosphate concentrations at 0.057 mg/l, 11.4 mg/l and 4.77 mg/l respectively whilst the only detected level in groundwater was at 1102_s at 0.053 mg/l.

2.4 Suitability of the site for fen meadow creation

2.4.1 The Benhall site is discussed as three compartments - north, central and south.

a) Northern Compartment

2.4.2 This compartment was identified in ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study** [APP-258]~~)~~ as containing a primary locus for fen meadow in the south-western third (1.5ha) in which it was considered that there was good potential for water management to provide the necessary water to support the habitat. This primary locus area was bordered by a potential additional area for fen meadow (0.7ha), within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies.

2.4.3 In 2021 the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits in the northern compartment are indicated to be maintained below ground level at the location of installation BHALL_1001_s. However, this is in an elevated location on a bund alongside the western ditch. Relative to

the majority of the compartment, water levels are at about ground level over winter falling to, at most, 30cm below a typical ground level of 3.8m AOD (June 2021).

- The presence of relict ditches suggests that the compartment was historically wetter, presumably prior to drainage and at which time fen meadow habitats, or at least groundwater dependent fen meadow species, may have been present.

- Water levels in the central ditch (indicated by GB05) are below, but appear to reflect, those of the shallow groundwater, indicating a hydrological link between the two – with the central ditch potentially limiting the groundwater level in this compartment.

- The compartment is bordered to the west and south by the Canal. The main discharge from the Canal is to the Fromus however there appears currently to be a minor link between the Canal and the ditches within the compartment. Whilst water levels in the Canal, and River Fromus would not be controlled as part of this work due to potential effects off site, it is considered that water levels in the ditch network that drains this compartment can be controlled without adversely affecting areas or receptors off site.

- Groundwater nitrate concentrations are either below the limit of detection or low in the superficial deposits and underlying Crag, and the same applies to the presence of phosphate.

- During high flow events the River Fromus floods the compartment and also backs up the Canal, which is noted as having elevated nitrate and phosphate levels which are likely the result of discharge from the Benhall STW. Whilst river water quality, and that in the Canal, is not considered optimal for fen meadow habitats, during high flow events, nitrate and phosphate concentrations will be diluted and, as indicated in Section 1.5, Wheeler, Shaw and Tanner (2009, Ref. 2) note that the community can accommodate considerable eutrophication without change to its basic composition provided that active management continues.

- Soil data indicates the presence of peat at each of the cored locations, albeit at 50cm+ depth (~~Wood, 2019, Ref. 4~~ **Fen Meadow Compensation Study** [APP-258]).

- A network of land drains is visible on LIDAR (see **Appendix A**). These will be reducing the groundwater levels and drying the fields. However, these can be blocked.

2.4.4 Based on the groundwater and surface water level data, and substrate type, it is concluded that it will be possible, by implementing measures detailed in Section 2.5, to provide groundwater influenced conditions in this northern area, potentially with a peaty or gley substrate, that have the potential to support fen meadow habitat.

2.4.5 Water levels in the Canal, and River Fromus to the east, would not be controlled to support these proposals. This is not required under the proposals and could lead to off-site impacts.

a) Central Area of the Site

2.4.6 The southern two thirds of this compartment were identified in ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study** [APP-258]~~)~~ as containing a primary locus for fen meadow (0.5ha) as the area adjacent to the western ditch already contained some fen meadow species. This primary locus area was bordered by a potential additional area for fen meadow (0.5ha), focussed on an area showing groundwater influence, within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies.

2.4.7 Note that the northern third of the compartment was not assessed in ~~Wood, 2019 (Ref 4.~~ the **Fen Meadow Compensation Study** [APP-258]~~)~~ and was included subsequently when the boundary was re-drafted.

2.4.8 In 2021 the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits at the northern boundary of this compartment (indicated by BHALL1003_s) are above surface in winter (January and early February) but decrease into spring by up to 0.6 m below ground level.

- Groundwater levels in the shallow deposits in the western central area of the site are indicated to be maintained at about ground level (BHALL_1101_s) over the monitoring period to late June 2021. An upward gradient from the deeper deposits is also maintained over the monitoring period. These installations are in a location that was marked by the presence of plant species indicating groundwater influence (phreatophytes), and was identified in ~~Wood, 2019 (Ref 4.~~ the **Fen Meadow Compensation Study** [APP-258]~~)~~ as a primary locus.

- East of installation BHALL_1101_s is BHALL_1103_s groundwater levels in the shallow deposits in the eastern central area of the site are indicated to be maintained at about ground level over the winter but fall from March onwards (to 50cm below ground level at the lowest point to date), and show a much more marked fluctuation than BHALL_1101_s. The vegetation at this location was also not suggestive of a groundwater influence at the surface.

- Groundwater levels in the shallow deposits are typically at, or above, the adjacent ditch levels suggesting there is potential for groundwater discharge to the adjacent ditches.

- The presence of relict ditches suggests that the compartment was historically wetter, presumably prior to drainage and at which time fen meadow habitats, or at least more groundwater dependent fen meadow species, may have been present.

- Groundwater nitrate concentrations are either below the limit of detection or low in the superficial deposits and underlying Crag, and the same applies to the presence of phosphate.

- Water quality data in the western boundary ditch, and the river, indicate elevated nitrate and phosphate levels, likely the result of discharge from the Benhall Sewage Treatment Works, and, possibly (not confirmed at present), septic tank discharge.

- Although a relict ditch remains, there are no active ditches crossing this central area of the site linking to the surface watercourses. The only interaction this area would have with surface water is therefore via periodic overtopping during high flow events in the River Fromus. Whilst river water quality is not optimal for fen meadow habitats, during high flow events, nitrate and phosphate concentrations will be diluted and, as indicated in **Section 1.5**, Wheeler, Shaw and Tanner (2009, Ref. 2) note that the community can accommodate considerable eutrophication without change to its basic composition provided that active management continues.

- Soil data indicates the presence of peat below surface at the northern end of this compartment [APP-258].

2.4.9 Based on the groundwater and surface water level data, and substrate type, it is concluded that it will be possible, by implementing measures detailed in Section 2.5, to provide groundwater influenced conditions in this central area, potentially with a peaty or gley substrate, that have the potential to support fen meadow habitat.

2.4.10 Water levels in the western boundary ditch, and River Fromus to the east, would not be controlled to support these proposals. This is not required under the proposals and could lead to off-site impacts.

c) Southern Compartment

2.4.11 This compartment was identified in ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study** [APP-258]~~)~~ as containing a potential additional area for fen meadow (0.7ha). The location of this area served to focus the detailed hydrological studies now on-going.

2.4.12 In 2021 the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits in this compartment are indicated (BHALL_1104_s) to be maintained at about ground level over the winter but fall below surface from March onwards (to 25cm below ground level at the lowest point to date).
- Whilst the vegetation present is a form of rush pasture, it lacks the key groundwater indicator species present to the north.
- Groundwater levels in the shallow deposits are typically at, or above, the ditch level (indicated by GB01) suggesting there is potential for groundwater discharge to the adjacent ditch.
- Groundwater nitrate concentrations are either below the limit of detection or low in the superficial deposits and underlying Crag, and the same applies to the presence of phosphate.
- Water quality data in the ditch at the northern end of this compartment, indicate elevated nitrate and phosphate levels, likely the result of discharge from the Benhall Sewage Works and, possibly (not confirmed at present), septic tank discharge.
- A small area of peat was identified at depth in this area during the site investigation. However other core samples taken in this compartment indicate an absence of peat.
- Water levels in the ditch that flows through the compartment, and River Fromus to the east, however would not be controlled as part of this work due to potential for effects off site. Additionally, this area is topographically lower than the central and northern compartments and as a result is likely to flood more frequently than these areas.

2.4.13 Based on review of the data available, it is concluded that the potential area that could be made suitable for fen meadow would be too restricted to be viable and fen meadow is not proposed in this compartment. It is, therefore, excluded from the fen meadow habitat creation proposals, although access through this area is still required for establishment and subsequent management of the fen meadow habitat in the northern and central compartments, as the only access to the Benhall site is from the A1094 at the southern end of the site.

2.5 Proposed layout and features

a) Proposed layout – Northern Compartment

2.5.2 For the northern compartment the key aim of the proposals is to exert control over the drainage ditch network, reducing drainage from the compartment and sculpt the ground to increase the groundwater influence at the surface.

2.5.3 Exerting control over the drainage ditch network will support groundwater levels in the shallow deposits such that they are maintained at, or just above, ground level (target approximately 3.85m AOD).

2.5.4 The ground surface to the east of the central (north-south oriented) drain will be sculpted to create a matrix of terrestrial, wetland and shallow open water habitat niches to maximise the potential for target species to colonise. It is anticipated that 20-30cm of the surface material will need to be removed to deliver the proposed matrix of habitats, subject to the results of focussed soil coring during the implementation stage.

2.5.5 Natural colonisation, from the nearby fen meadow habitat on the Manor Farm Meadows County Wildlife Site (CWS), will form a component of the habitat development. However, green hay transfer, from Sizewell Marshes SSSI, or another nearby fen meadow source, to the sculpted areas in mid-summer will assist with species introduction. Application to areas of bare earth is beneficial in respect of establishment of species with high light requirements and low competitive abilities, whilst creation of a matrix will maximise the potential for species that have low tolerance of drought or flooding, to find an appropriate niche. Application of green hay may be undertaken on more than one occasion.

2.5.6 M22 species introduction will also occur through translocation of turves from the area of M22 being lost at Sizewell Marshes to within the areas identified for creation of a habitat matrix. This approach has the added benefit of providing the appropriate substrate for the species introduced. Use of this approach is subject to programme considerations and will only be undertaken once.

2.5.7 An area for wet woodland creation (0.6ha) has also been identified at Benhall. The approach to creation of this habitat is set out in the **Wet Woodland Strategy** ([Doc Ref. ~~9.8(A)~~10.31).

2.5.8 Site proposals are indicated on **Figure 2.1**. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

i. Physical measures in northern compartment

2.5.9 Physical measures proposed to be implemented in the northern compartment are:

- Controlling water levels by installing a finely adjustable water control structure on the ditch linking to the watercourse that forms the northern compartment boundary. The water control structure will support levels in summer but will also enable any river flood waters getting onto the compartment in winter to escape. The water control structure will be set to around 3.85-3.90 m AOD initially. This could be adjusted up or down, if required, based on effectiveness indicated through monitoring of the levels and the conditions within the habitat creation areas;
- If confirmed that a culvert exists at the southern end of the central ditch, this will be blocked, as will a potential culvert, indicated on **Figure 2.1** on the south-eastern corner of the existing wet woodland;
- Sculpting of the land east of the central ditch, removing up to 20-30cm of soil;
- Blocking or breaking up land drains, where encountered, to reduce drainage from the compartment;
- Removal of a 3-4m wide bund of arisings from ditch clearance from both banks of the central ditch;
- Installation of stock proof fence to control stock access to areas of created habitat;
- Application of green hay to areas of bare earth; and
- Translocation of turves from the area of M22 being lost at Sizewell Marshes to the areas identified for creation of the habitat matrix in the northern compartment.

2.5.10 Additionally, there will be no more dredging of the site drains to allow them to gradually silt up thereby reducing their drainage potential.

b) Proposed layout – Central Compartment

2.5.11 The key aim of the proposals is to sculpt the ground surface to increase the groundwater influence at the surface and create a matrix of terrestrial, wetland and shallow open water habitat niches to maximise the potential for target species to colonise. It is anticipated that 30-40cm of the surface material will need to be removed to deliver the proposed matrix of habitats, subject to the results of focussed soil coring at the time.

2.5.12 Natural colonisation, from the nearby fen meadow habitat on the Manor Farm Meadows CWS, will form a component of the habitat development. However, green hay transfer, from Sizewell Marshes SSSI, or another nearby fen meadow source, to the sculpted areas in mid-summer will assist with species introduction. Application to areas of bare earth is beneficial in respect of establishment of species with high light requirements and low competitive abilities, whilst creation of a matrix will maximise the potential for species that have low tolerance of drought or flooding, to find an appropriate niche. Application of green hay may be undertaken on more than one occasion.

2.5.13 M22 species introduction will also occur through translocation of turves from the area of M22 being lost at Sizewell Marshes to within the areas identified for creation of a habitat matrix. This approach has the added benefit of providing the appropriate substrate for the species introduced. Use of this approach is subject to programme considerations and will only be undertaken once.

2.5.14 Site proposals are indicated on **Figure 2.1**.

i. Physical measures in central compartment

2.5.15 Physical measures proposed to be implemented in the central compartment are:

- Sculpting of the land to the south, and immediately north of the relict drain, removing up to 30-40cm of soil;
- Blocking or breaking up land drains, where encountered, to reduce drainage from the compartment;
- Provision of a boardwalk along the footpath in the central compartment to provide walkers a dry route;

- Installation of stock proof fence to control stock access to areas of created habitat;
- Application of green hay to areas of bare earth; and
- Translocation of turves from the area of M22 being lost at Sizewell Marshes to the areas identified for creation of the habitat matrix in the central compartment.

a) Habitat creation works

2.5.16 Any additional consents which become necessary will be sought for structures and works where they are located within, or fall within specified distances of, ordinary or Main watercourses.

2.5.17 A temporary site compound will be established and access routes marked for the habitat creation works. Indicative locations for site compound and access routes, and notes on accessibility, are provided in **Figure 2.2**. Of particular note is that a new bridge will be needed to cross the Canal to enable equipment to access the northern compartment. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

2.5.18 Arisings will be removed from the floodplain, off-site.

2.5.19 The establishment works described above will be undertaken in late spring/summer, avoiding periods with the highest risk of surface inundation and the highest water tables that result in soft ground.

2.5.20 Working areas will be subject to ecological walkovers to confirm and update ecological constraints. Works to ditch banks will be micro-sited to avoid effects on water voles. A Protected Species Licence will be sought from Natural England in the event that one is required, although, based on the reported ecological baseline [REP3-051 and REP3-052] it is considered that effects requiring licensing can be avoided.

2.5.21 Activities will also be controlled via measures in the **Code of Construction Practice** (Doc ~~Ref. 8.11(E))~~Ref.10.2)) (secured by Requirement 2 of the dDCO).

2.6 Conservation management

2.6.1 Management measures during the establishment period (Year 1) and in Years 2-5 and 6-10 are summarised below and will be confirmed in the Fen Meadow ~~Plan~~ Plans submitted to East Suffolk Council and Suffolk County Council for approval pursuant to Requirement 14A.

a) Management units

2.6.2 Stock proof fence will be used to control stock access to areas of created habitat in both the Northern and Central compartments, particularly during the sensitive establishment phase in Year 1, and during years 2-5, depending upon ground conditions. Proposed fence lines are indicated on **Figure 2.1**.

2.6.3 Management of areas outside the fen meadow creation areas/fence lines will comprise taking a hay crop, followed by aftermath grazing.

b) Fen Meadow Establishment period (Year 1)

2.6.4 Hay transfer will be achieved within a few hours of harvesting, with green hay spread thinly and evenly in the receptor areas on bare ground. Seed-drop from the strewn hay will be completed within 1-3 weeks. Seed will be pressed into the ground using stock (ideally cattle), if ground conditions allow, or a roller.

2.6.5 Where germination is sub-optimal, subsequent hay-transfer during August-September will be undertaken.

2.6.6 Following hay-transfer, colonization of the receptor areas by perennial weeds and/or slug populations will be monitored and, if required, treated appropriately to protect the new seedlings.

2.6.7 In the period after hay-transfer (July-November and again in the early part of the following growing season) germination will be favoured by maintaining a short sward.

2.6.8 During and following the first growing season, further introductions of green hay – or of collected propagules of target species – will be undertaken as appropriate, for example if insufficient vegetation establishment was achieved in the first growing season.

2.6.9 Subject to programme considerations, translocation of turves from the area of M22 being lost at Sizewell Marshes to the Benhall site will take place within a few hours to minimise the potential for drying prior to placement. The turves will be re-laid as a sward to retain the integrity of the turves and maximise the potential for survival of the translocated species.

2.6.10 The water control structure in the northern compartment will require adjustment as appropriate, based on monitoring, to deliver the target water level conditions for fen meadow habitat.

c) Fen Meadow Management – Years 2-5 and 6-10

2.6.11 In the first spring after initial hay transfer cutting, or grazing where ground conditions allow, may be required to avoid seedlings being shaded out.

2.6.12 Any perennial weeds that colonise will be controlled by spot treatment with herbicide and, as in Year 1, slug populations controlled as required.

2.6.13 From Year 3 onwards, the receptor areas will be managed as hay meadows and therefore cut late (for example, after mid July), with swath turning or tedding undertaken to assist seed shedding. The cutting date will be matched to that of the donor meadow, if possible. The use of livestock, particularly for aftermath grazing, is important, where ground conditions allow, because they create gaps in the sward and trample in the seed, which helps the introduced species to spread.

2.6.14 There will be no use of inorganic fertilisers or widespread application of herbicides.

2.6.15 The water control structure in the northern compartment will require adjustment as appropriate, based on monitoring, to deliver the target water level conditions for fen meadow habitat.

2.7 Monitoring

2.7.1 The effects on ground and surface water levels, and surface wetness, will be monitored for effectiveness using existing installations and observation.

2.7.2 An annual botanical assessment of the establishment of species in the area will be undertaken, including assessment of the presence of phreatophyte species characteristic of M22. Note that some of the introduced species may take several years to appear and so the success of the hay transfer should not be judged immediately but kept under review.

2.7.3 Monitoring to ensure fish passage is not impeded will also be undertaken.

2.7.4 Management of the water levels and habitats developing on site will be amended as required based on the monitoring results.

2.7.5 A monitoring report will be submitted to the Ecology Working Group on an annual basis to document works undertaken and the monitoring described above.

2.8 Area of Potential Fen Meadow

2.8.1 The initial primary loci and potential additional areas for fen meadow provided in ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study**

[APP-258] were used to focus the detailed hydrological studies. Based on the data now available it is considered that implementing the proposed measures in the northern and central compartments will result in elevated water levels and/or creation of a habitat matrix, creating the conditions for establishment of fen meadow habitat across 2.4 ha of the site. This figure supersedes the primary loci and potential additional areas for fen meadow provided in ~~Wood, 2019 (Ref. 4 [APP-258])~~the **Fen Meadow Compensation Study** [APP-258].

2.8.2 An additional area of 0.6ha has also been identified for inclusion of wet woodland in the northern compartment.

3 HALESWORTH

3.1 Site Baseline

a) Summary of investigations

3.1.2 The investigations being undertaken at Halesworth were summarised in the **Fen Meadow Plan Report 1**, with the study reports provided as appendices [REP3-051 and REP3-052]. The studies have mostly been completed, as detailed in **Table 3.1** below.

Table 3.1: Status of studies as at July 2021

Site	Study	Status
Halesworth	Ecology desk study	Completed in 2020
	Ecology field surveys	Phase 1 habitat survey NVC survey Water vole and otter survey Aquatic invertebrate survey of ditches All completed in 2020
	Hydrogeological desk study	Completed in 2021
	Installation of piezometers, dipwell, gaugeboards	Installed October 2020
	Topgraphic survey of site and installations	Completed 2020
	Water flow, level and quality monitoring	Commenced November 2020 for 1 year.

3.2 Environmental Setting

3.2.1 The **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052] summarised the findings of a series of baseline reports, provided as Appendices, that described the environmental setting of the Halesworth site. The majority of the baseline information is not repeated in detail in this Fen Meadow Plan Draft 1.1 although a summary of the ecological setting is provided below and further hydrological monitoring data are now available so the Water Monitoring Summary – Halesworth Site 28, November 2020 to April 2021, has been updated to July 2021 (**Appendix B**). The updated data have also been further interpreted to update the site conceptual model (**Section 3.3**).

a) Summary of Ecological Setting from Halesworth Ecology Baseline report [REP3-051]

3.2.2 There are no statutory, or non-statutory, designated sites of nature conservation value within the Site or immediately adjacent to it.

3.2.3 Coastal and floodplain grazing marsh priority habitats are mapped in MAGIC as occurring on Site. There are no areas of existing fen meadow habitat nearby.

3.2.4 The site comprises a mix of semi-improved neutral grassland (most of it marshy), with scrub, scattered broadleaved trees, a defunct species-poor hedge, flowing and standing water.

3.2.5 Four distinct grassland-types were recorded during the NVC survey. An area of rush pasture flanking the catch-dyke contained species indicating groundwater influence.

3.2.6 No sign of otter presence was recorded on site.

3.2.7 A number of ditches provided optimal water vole habitat and water vole presence was located on seven of the surveyed transects (3 different ditches) in the summer, although no presence was recorded in the autumn hen water levels were high.

3.2.8 The aquatic invertebrate fauna of the Halesworth site comprises predominantly common and local species.

3.3 Site Conceptual Model

3.3.1 The initial site conceptual model is presented in the hydrogeological report (**Appendix F** of the **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052]). This section builds on the assessment provided in the conclusions of that report and all monitoring data collected and made available at the time of writing (July 2021). This section outlines the findings on the relationship between ground level, groundwater levels, surface water levels and logged geological strata.

3.3.2 The surface elevation slopes gently from northwest to southeast towards the Walpole River, which is a main river that flows north-easterly. Ground elevations are highest in the northwest at 7.5-8.25 mAOD, flattening out to between 6.6-7 mAOD across much of the Site (see LIDAR plots in **Appendix B**). The Walpole River cuts a channel past the south-eastern boundary of the Site and has relatively steep banks, particularly to the south.

3.3.3 The site contains a network of land drainage ditches, most of which feed into a main catch-dyke.

3.3.4 Surface drainage from Blyth Road industrial estate is culverted beneath the catch-dyke but discharges to an open ditch and is conveyed along the lower part of the site before discharge to the Walpole River via a second culvert.

3.3.5 Topographic surveys initially indicate that water levels in the catch-dyke and attached drainage ditches are between 6.4 and 6.5 mAOD (November 2020). The Blyth Road drainage channel (W6) recorded a water level of 5.69 mAOD during the survey visit and Walpole River levels were 5.6 mAOD.

3.3.6 The bedrock geology at the site is Crag sands (c.21-26m thick) overlying London Clay. Although the Site is near the feather edge of the London Clay it is recorded to have a >10m thickness at the deeper on site borehole. The London Clay overlies the Chalk. Superficial deposits of Lowestoft Sands and Gravels overlie the Crag sands which are in turn overlaid by a combination of Alluvium (clay, silt, sand and gravel) and Head deposits.

3.3.7 Development of peat has occurred on the southern side of the catch-dyke and is encountered between 0.4 and 0.7 m bgl with a thickness of 1.1m at borehole HAL_2803_d. Soil cores show that a silty clay layer is often present above the Peat and is likely to impede movement of groundwater, rainwater and also flood water.

3.3.8 The soil core survey (~~Wood, 2019, Ref 3.~~ the **Fen Meadow Compensation Study** [APP-258]) indicated that groundwater levels were within the Peat (often below its upper surface) between 0.45 and 0.9 m bgl. The October 2020 drilling programme, which occurred during a relatively wet few weeks, showed a slightly higher rest groundwater level between 0.07 and 0.2 m, which indicates that the upper part of the peat may experience seasonal wetting and drying as the water table changes. Groundwater flow is generally toward the Walpole river in the southeast.

3.3.9 Groundwater in the deeper Crag sands is under positive hydrostatic pressure, resulting in slightly artesian conditions at piezometer HAL_2803_d (**Figure A1** in **Appendix B**). This indicates the presence of semi-confining clay layers within the Crag.

3.3.10 Groundwater levels at HAL-2802_s and HAL-2802_d show that the Crag and superficial deposits demonstrate the same magnitude and timing of fluctuations therefore in hydraulic continuity here (**Figure A2** in **Appendix B**). The peaks generally correlate with peaks to the surface water level GB03 (**Figure A2** in **Appendix B**) indicating a response to recharge from rainfall. There may be some upward flow from the Crag.

3.3.11 To the north-east, the superficial deposit groundwater levels exhibit a similar response in HAL-2802_s to those at the centre of the site (**Figure A2** in **Appendix B**). Whilst the surface water levels at GB01 on site decrease during the dry April, the same decrease in water level is not seen in GB02 which receives a discharge from the Blyth Road Industrial Estate which may provide additional support during this dry period.

3.3.12 Groundwater levels recorded in the monitoring installations in the superficial deposits drop to between 6 and 6.2 mAOD (**Figure A2** in **Appendix B**).

3.3.13 The soil core surveys, drilling logs and topographic survey indicate that groundwater levels are in continuity with surface water levels in the on-site ditches. The catch-dyke intercepts groundwater flow from the northwest. Beyond the catch-dyke to the southeast the water table flattens out and is higher than the Walpole River water level, indicating the potential for groundwater discharge to the river.

3.3.14 There are two significant groundwater abstractions licences for public water supply from six boreholes within 1.2km of the Halesworth site. These abstractions are sourced from the Chalk aquifer and their potential impact on near surface groundwater levels below the Site is likely to be small due to the presence of London Clay and semi-confining clay layers within the Crag. Nevertheless, the Site falls within Zone 3 of the groundwater protection zones for those sources.

3.3.15 The Halesworth STW discharges to the Walpole River approximately 50m downstream of the Site. The licensed discharge volume is 3.553 Ml/d. Flow is not gauged in the Walpole River. The closest permanent flow gauging station is located on the River Blyth approx. 2km downstream (east) of the Site at Holton (Ref No. 35013) which has an average flow of 0.46 m3/s (39.7 Ml/d).

3.3.16 The spot flow data for the site shows very limited surface water flows within the onsite drainage channels (**Table 4.1** in **Appendix B**).

3.3.17 There is some water quality data available for the site, with more sampling planned over 2021 and 2022. The data available to date shows the following:

- Nitrate concentrations are very low across the site. Where nitrate is present above the limit of detection it is in the deeper Crag deposits and Walpole River.
- Phosphate concentrations are below the level of detection across the site.

3.4 Suitability of the site for fen meadow creation

3.4.1 The site was identified in ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study** [APP-258]~~)~~ as containing a primary locus for fen meadow (1.2ha) spanning the catch-dyke (the west-east aligned ditch that is the main drainage pathway for the site) where the vegetation indicates groundwater influence near to the surface. This primary locus area was bordered by a potential additional area for fen meadow (1.3ha), within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies now on-going.

3.4.2 In 2021 the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits north of the catch-dyke are variable and show a general downward gradient to the deeper deposits. Winter levels in HALL_2803_s and HALL_2804_s fluctuate 15-30cm below ground level, but recess in the spring and early summer to 50-70cm below ground level.

- However, the groundwater levels in the shallow deposits north of the catch-dyke are, in general, above those of the catch-dyke, which has a typical level of between 6.3m AOD and 6.4m AOD (**Figure A1** in **Appendix B**). It is noted also that recorded levels in the catch-dyke at GB01 peaked over winter at about 6.98m AOD, with lesser peaks reaching 6.8m AOD (**Figure A1** in **Appendix B**). At these elevations, significant areas of the site south of the catch-dyke will have been under water, albeit the peaks are very short-lived. These peaks were likely the result of backing up of the catch-dyke as a result of high river levels downstream.

- South of the catch-dyke installations HALL 2802_s and _d show a similar pattern of fluctuation as those to the north but maintain an upward hydraulic gradient. In this area however, the adjacent ditch, that conveys the surface drainage from the nearby industrial estate, to the river is likely acting to drain the nearby surface deposits.

- Whilst not clearly apparent from the spring groundwater level data, the vegetation lying either side of the catch-dyke, represented in the National Vegetation Classification (NVC) survey reported in **Appendix B** of **Fen Meadow Plan Report 1** [REP3-051 and REP3-052], as MG10b *Holco-Juncetum effusi, Juncus inflexus* sub-

community (referred to as stand C2), contained species indicative of flushing with mildly calcareous groundwater.

- Soil data for the area north of the catch-dyke indicates an absence of peat; silty clay and sands forming the full depth of cores taken. To the south of the catch-dyke silty clay overlies peat encountered at around 40cm below ground (~~Wood, 2019, Ref. 4~~ **Fen Meadow Compensation Study** [APP-258]).

- Nitrate concentrations are very low across the site and phosphate concentrations are below the level of detection.

- Water quality data for the catch-dyke indicate a very low concentration of nitrate, and phosphate below detection limits, indicating that the Halesworth STW, is not influencing the ditch water quality.

- A network of land drains is visible on LIDAR (see **Appendix B**). These will be reducing the groundwater levels and drying the fields. However, these can be blocked.

3.4.3 Based on the groundwater and surface water level data, substrate type, and vegetation indicators it is concluded that it will be possible, by implementing measures detailed in Section 3.5, to provide groundwater influenced conditions in the area of the catch-dyke, potentially with a peaty substrate to the south of the dyke, that have the potential to support fen meadow habitats.

3.4.4 Water levels in the River Walpole will not be controlled to support these proposals. This is not required under the proposals and could lead to off-site impacts.

3.5 Proposed layout and features

3.5.1 The key aim of the proposals is to exert control over the drainage ditch network, with the effect of raising the base surface water level and supporting the groundwater levels in the shallow deposits, reducing drainage from the site and sculpting the ground to increase the groundwater influence at the surface.

3.5.2 The target catch dyke water level will be 6.6-6.7m AOD.

3.5.3 To the north of the catch dyke ground levels rise towards the northern site boundary (the northern bank level varying from 6.8-7.1m AOD and rising northwards). Therefore, whilst groundwater at the surface will be unlikely to occur, additional surface water level control will reduce leakage and support flushed situations in the immediate vicinity of the dyke.

3.5.4 Removal of a bund of recently placed arisings from the northern bank of the catch-dyke, will also facilitate a reduction in the ground level by a few centimetres to increase the potential for fen meadow species in this mildly flushed area.

3.5.5 Ground levels to the south of the dyke are lower (the southern bank level varying from 6.6 (at the extreme eastern end) - 6.8m AOD. Raising the dyke water level is expected to support shallow groundwater levels such that groundwater may occur at the surface in the vicinity of the dyke.

3.5.6 The ground surface to the south of the dyke, between the existing ditches, will be sculpted to create a matrix of terrestrial, wetland and shallow open water habitat niches to maximise the potential for target species to colonise. It is anticipated that 30-40cm of the surface material will need to be removed to deliver the proposed matrix of habitats, subject to the results of focussed soil coring during the implementation stage.

3.5.7 The three westernmost ditches on site are blind ended and hence retain water. However, the ditch that conveys the industrial estate drainage, and which is likely also draining the near surface deposits, will be infilled and the drainage discharge piped down the river. This will reduce the drainage from the shallow deposits in this area. No works are proposed to the ditch on the eastern site boundary as this will be downstream of the proposed water control structure.

3.5.8 There is no adjacent seed source for natural colonisation. Therefore, green hay transfer, from Sizewell Marshes SSSI, or another nearby fen meadow source, to the sculpted areas in mid-summer will assist with species introduction. Application to areas of bare earth is beneficial in respect of establishment of species with high light requirements and low competitive abilities, whilst creation of a matrix will maximise the potential for species, that have low tolerance of drought or flooding, to find an appropriate niche. Application of green hay may be undertaken on more than one occasion.

3.5.9 M22 species introduction will also occur through translocation of turves from the area of M22 being lost at Sizewell Marshes to within the areas identified for creation of a habitat matrix. This approach has the added benefit of providing the appropriate substrate for the species introduced. Use of this approach is subject to programme considerations and would only be undertaken once.

3.5.10 Site proposals are indicated on **Figure 3.1**. No wet woodland is proposed at this site. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

a) Physical measures

3.5.11 Physical measures proposed to be implemented on site are:

- Controlling water levels by installing a finely adjustable water control structure on the catch-dyke. The water control structure will support levels in summer but will also enable any river flood waters getting onto the site in winter to escape. As indicated above the target level will be 6.6-6.7m AOD, which dictates that it be located adjacent to the bridge crossing the catch-dyke. Much further east the land levels will be too low, and the dyke water could overtop the south bank;
- Setting the water control structure to around 6.7m AOD initially. This could be adjusted up or down, if required, based on effectiveness indicated through monitoring of the levels and conditions within the habitat creation areas;
- Piping the industrial estate drainage to the river and infilling the ditch that currently carries the drainage in an open channel;
- Preventing groundwater from following the path of the former ditch by including clay stanks at approximately 25m intervals;
- Sculpting land to the south of the catch-dyke, removing up to 30-40cm of soil. The sculpting works will extend approximately 60m from the catch-dyke towards the river, working within existing topographic features (e.g. avoiding works to elevated ground alongside the river);
- Removal of a 3-4m wide bund of recently placed arisings from the northern bank of the catch-dyke. This will also facilitate a reduction in the ground level by a few centimetres to increase the potential for fen meadow species in this mildly flushed area;
- Blocking or breaking up land drains, where encountered, to reduce drainage from the site;
- Installation of stock proof fence to control stock access to areas of created habitat;
- Application of green hay to areas of bare earth; and
- Translocation of turves from the area of M22 being lost at Sizewell Marshes to the areas identified for creation of the habitat matrix.

3.5.12 Additionally, there will be no more dredging of the Catch Drain, or other on site drains to allow them to gradually silt up thereby reducing their drainage potential.

b) Habitat creation works

3.5.13 Any additional consents which become necessary will be sought for structures and works where they are located within, or fall within specified distances of, ordinary or Main watercourses.

3.5.14 A temporary site compound will be established and access routes marked for the habitat creation works. Indicative locations for site compound and access routes, and notes on accessibility, are provided in **Figure 3.2**. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

3.5.15 Arisings will be used to infill the ditch and/or removed from the floodplain, off-site.

3.5.16 The establishment works described above will be undertaken in late spring/summer, avoiding periods with the highest risk of surface inundation and the highest water tables that result in soft ground.

3.5.17 Working areas will be subject to ecological walkovers to confirm and update ecological constraints. Works to ditch banks will be micro-sited to avoid effects on water voles. A Protected Species Licence will be sought from Natural England in the event that one is required, although, based on the reported ecological baseline [REP3-051 and REP3-052] it is considered that effects requiring licensing can be avoided.

3.5.18 Activities will be controlled via implementation of measures in the **Code of Construction Practice** (Doc Ref. ~~8.11(E~~10.2)) (secured by Requirement 2).

3.6 Conservation management

3.6.1 Management measures during the establishment period (Year 1) and in Years 2-5 and 6-10 are summarised below and will be set out in the final Fen Meadow ~~Plan~~ Plans approved by East Suffolk Council and Suffolk County Council pursuant to Requirement 14A.

a) Management units

3.6.2 Stock proof fence will be used to control stock access to areas of created habitat, particularly during the sensitive establishment phase in Year 1,

during years 2-5, depending upon ground conditions. Proposed fence lines are indicated on **Figure 3.1**.

3.6.3 Management of areas outside the fen meadow creation areas/fence lines will comprise taking a hay crop, followed by aftermath grazing.

b) Fen Meadow Establishment period (Year 1)

3.6.4 As described for Benhall.

c) Fen Meadow Management – Years 2-5 and 6-10

3.6.5 As described for Benhall.

3.7 Monitoring

3.7.1 The effects on ground and surface water levels, and surface wetness, will be monitored for effectiveness using existing installations and observation.

3.7.2 An annual botanical assessment of the establishment of species in the area will be undertaken, including assessment of the presence of phreatophyte species characteristic of M22. Note however that some of the introduced species may take several years to appear and so the success of the hay transfer will not be judged immediately but kept under review.

3.7.3 Monitoring to ensure fish passage is not impeded will also be undertaken.

3.7.4 Management of the water levels and habitats developing on site will be amended as required based on the monitoring results.

3.7.5 A monitoring report will be submitted to the Ecology Working Group on an annual basis to document works undertaken and the monitoring described above.

3.8 Area of Potential Fen Meadow

3.8.1 The initial primary loci and potential additional areas for fen meadow provided in ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study** [APP-258] were used to focus the detailed hydrological studies. Based on the data now available it is considered that implementing the proposed measures on site will result in elevated water levels and/or creation of a habitat matrix, creating the conditions for establishment of fen meadow habitat across 1.0 ha of the site. This figure supersedes the primary loci and potential additional areas for fen meadow provided in ~~Wood, 2019 (Ref. 4 [APP-258])~~the **Fen Meadow Compensation Study** [APP-258].

4 PAKENHAM

4.1 Site Baseline

a) Summary of investigations

4.1.2 The investigations being undertaken at Pakenham were summarised in **Fen Meadow Plan Report 1**, with the study reports available at the time provided as appendices [REP3-051 and REP3-052]. Since the **Fen Meadow Plan Report 1** [REP3-051 and REP3-052] was produced, the NVC survey and spring water vole and otter survey have been completed and therefore studies are now mainly complete, as detailed in **Table 4.1**.

Table 4.1: Status of studies as at July 2021

Site	Study	Status
Pakenham	Ecology desk study	Completed in 2021
	Ecology field surveys	Phase 1 habitat survey completed May 2021 NVC survey completed June 2021 Spring water vole and otter survey completed May 2021 Aquatic invertebrate survey undertaken late June 2021
	Hydrogeological desk study	Completed in 2021
	Installation of piezometers, dipwell, gaugeboards	Completed March 2021
	Topgraphic survey of site and installations	Undertaken March 2021
	Water flow, level and quality monitoring	Commenced April 2021 for 1 year

4.2 Environmental Setting

4.2.1 The **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052] summarised the findings of a series of baseline reports, provided as Appendices, that described the environmental setting of the Pakenham site. The majority of the baseline information is not repeated in detail in this **Draft Fen Meadow Plan** ~~(Doc. Ref. 9.64(A))~~ although a summary of the ecological setting is provided below, accompanied by a summary of the

results of the NVC and water vole/otter surveys, which are also are provided in:

- Pakenham Site 54 Ecology Baseline (NVC and water vole/otter survey) in **Appendix C**;

4.2.2 Further hydrological monitoring data are also now available and the Water Monitoring Summary – Pakenham Site 54, April 2021, has been updated with data to July 2021 (**Appendix D**). The updated data have also been further interpreted to update the site conceptual model (**Section 4.3**).

a) Summary of Ecological Setting from Pakenham Ecology Baseline report [REP3-051]

4.2.3 There are no statutory, or non-statutory, designated sites of nature conservation value within the Site. However, Pakenham Meadows SSSI is located adjacent to the Site, to the east of Pakenham Stream, and Pakenham Fen Meadows County Wildlife Site is also located to the east of Pakenham Stream. Both of these designated sites contain fen meadow habitat.

4.2.4 Coastal and floodplain grazing marsh and deciduous woodland priority habitats are mapped in MAGIC as occurring on Site.

4.2.5 The site comprises a mix of grassland (some of it marshy), semi-improved and improved grassland, broadleaved wet woodland, swamp, standing water and running water, with fields divided either by hedges or ditches.

b) Pakenham Site 54 Ecology Baseline (NVC and water vole/otter survey) (Appendix C)

i. National Vegetation Classification (NVC) survey

4.2.6 The NVC survey identified vegetation-types from six phytosociological groups within and on the margin of the floodplain. These vegetation types are assigned to the following NVC communities:

Fen meadow

- M22b *Juncus subnodulosus-Cirsium palustre* fen meadow, *Briza media-Trifolium* spp. sub-community; and
- M22a *Juncus subnodulosus-Cirsium palustre* fen meadow, Typical sub-community.

Rush pasture

- MG10b *Holcus lanatus-Juncus effusus* rush pasture, *Juncus inflexus* sub-community; and
- MG10b/S22c *Holcus lanatus-Juncus effusus* rush pasture, *Juncus inflexus* sub-community, grading to *Glyceria fluitans* water-margin vegetation, *Alopecurus geniculatus* sub-community.

Inundation grassland

- MG13 *Agrostis stolonifera-Alopecurus geniculatus* grassland.

Floodplain grassland

- MG7b/MG10b *Lolium perenne-Poa trivialis* ley grading to *Holcus lanatus-Juncus effusus* rush pasture, *Juncus inflexus* sub-community;
- MG7b *Lolium perenne-Poa trivialis* leys ; and
- MG7c *Lolium perenne-Alopecurus pratensis-Festuca pratensis* grassland.

Valley footslope grasslands

- MG7d *Lolium perenne-Alopecurus pratensis* grassland;
- MG7a *Lolium perenne-Trifolium repens* leys;
- MG1e *Arrhenatherum elatius* grassland, *Centaurea nigra* sub-community; and
- MG1a *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community.

Fertile reed-fen

- S25a *Phragmites australis-Eupatorium cannabinum* tall-herb fen, *Phragmites australis* sub-community.

Poplar woodland

- W6b *Alnus glutinosa-Urtica dioica* woodland, *Salix fragilis* sub-community.

4.2.7 The grassland habitats present qualify as coastal and floodplain grazing marsh, whilst the woodland qualifies as deciduous woodland, both of which are habitats of principal importance listed under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006.

ii. Otter and water vole survey

4.2.8 The Site contains suitable habitat and conditions to support both water vole and otter.

4.2.9 During the presence/absence survey, two water vole latrines were located (one on each of two ditches), as were two feeding stations (both on the same ditch) and small mammal runs on four ditches. No water vole burrows were identified however it is noted that due to unseasonably wet conditions encountered in spring 2021, some of the potential field signs identified during the survey may have been diluted or hidden by rising water levels etc. and hence water vole may make more use of the site than was recorded in May.

4.2.10 A number of otter spraints were recorded, all from the Pakenham Stream. No signs of otter presence were recorded from ditches on site.

4.3 Site Conceptual Model

4.3.1 The initial site conceptual model is presented in the hydrogeological report (**Appendix H** of the **Fen Meadow Plan Report 1 Baseline Report** [REP3-051 and REP3-052]). This section builds on the assessment provided in the conclusions of that report and all monitoring data collected and made available at the time of writing (July 2021). This section presents the findings on the relationship between ground level, groundwater levels, surface water levels and logged geological strata.

4.3.2 The Pakenham Site covers the valley floor of the Pakenham Stream. The bedrock geology underlying the Site is Chalk. The chalk is overlain by superficial deposits of varying thicknesses; the most dominant is Peat, but there are also river terrace sands and gravels and Head deposits which thin towards the western margin. The boundary to the west is the upland toeslope. The margin of this upland is composed of sands and gravels. The upland also has a pronounced sandy terrace toe-slope occupying much of the northern part of this site. To the east, the site is bounded by the Pakenham Stream. There is a buried valley running roughly south of the course of the River Sapiston (Black Bourn) and another which dissects the site which is filled with Glacial Till/ Boulder Clay.

4.3.3 Development of peat has occurred at the site and is encountered between 0.1 and 0.6 m bgl with a thickness of up to 2.9 m at borehole PAK-HA-2. Soil cores show that where present the peat is between 30 and 110 cm thick. Most cores exhibited the deposition of peat over sand, with chalky boulder clay or ‘putty’ chalk proved in cores in the centre of the survey or the south west corner, respectively

4.3.4 The highest ground is to the west of the Site with elevations to over 32.5 mAOD. The catchment topography generally slopes towards the Pakenham Stream to the east, however, LiDAR data for the site shows that the central ditch which bisects the site is the low point at around 30 mAOD (see **Appendix D**). The Pakenham Stream to the east of the site is the main drainage channel for the wider catchment and there is a bund on the left bank which is at about 31.5 mAOD, although a low point is indicated by the LIDAR data (see **Appendix D**) immediately to the north of the footpath, where cattle gather to drink and have eroded the bank. Although not recorded in the available data, during initial visits this area of the site was noted to be under water, arising from flooding from the Stream. Generally, over the main central Pakenham Site the ground levels are between 30.5 and 31 mAOD.

4.3.5 The Pakenham site contains a network of land drainage ditches. The main ditch across the site runs from south to north parallel with the Pakenham Stream. This central ditch is bisected by a second west-east primary ditch; both ditches appear to be carriers for near-surface groundwater. There are several small boundary drains which appear to drain along the upland margin and run to the main central drain.

4.3.6 Data obtained from the topographic surveys initially indicate that water level in the Pakenham Stream is around 31.1 mAOD. The lowest elevation of the channel bed on the short Pakenham Stream reach accessible during the topographic survey (water levels were very high in March 2021) was 29.9 mAOD. The Pakenham Stream is at a higher elevation than the central ditch, although there is still likely continuity between the Pakenham Stream and groundwater levels.

4.3.7 Site visits have identified a breach in the Pakenham Stream bank where the stream crosses over the west-east ditch, which is culverted at this location. The flow, from east to west, in to the site in this ditch, and subsequently in to the central ditch, is being supported by flow from Pakenham Stream via this breach.

4.3.8 The topographic survey indicated initially that water level in the central ditch is around 30.4 mAOD. The lowest channel elevation recorded in the topographic survey was 28.6 mAOD. Groundwater levels across the site recorded at between around 29.5 mAOD and 30.6 mAOD for the same day.

4.3.9 Regionally, groundwater flow in the chalk is towards the Little Ouse but is considered to deflect towards the Pakenham Stream locally and to the north-east regionally. Chalk groundwater levels are generally considered to be at between 32 mAOD and 36 mAOD in the regional groundwater model produced by the Environment Agency.

4.3.10 The water levels in the chalk borehole monitored on Site (BH-2_d,) shows that the piezometric surface of the Chalk is higher than ground level at between 33.25 mAOD in early spring (29th March 2021) and 32.4 mAOD by summer 2021 (12th July 2021). Ground level at BH2 is 32.22 mAOD. The groundwater level data at BH-2_d demonstrates that there has been a generally declining trend over the spring and early summer of 2021 (**Figure A4** in **Appendix D**). BH-2_s which measures the water level in the superficial deposits at the same location shows a clear declining trend over the same period which aligns with that seen in BH-2_d (**Figure A4** in **Appendix D**) indicating some hydraulic continuity of the near surface deposits with the underlying chalk. Groundwater levels are below ground level at 30.25 mAOD in early spring (29th March 2021) and 29.59 mAOD by summer 2021 (12th July 2021).

4.3.11 In the centre of the site, the central ditch has a water level around 30.4 mAOD (as monitored by GB01 and GB03, **Figure A3** in **Appendix D**). There are no significant fluctuations in the observed data. The land to the east of the central ditch is mostly flat between 30.35 and 30.5 mAOD and very similar to the water levels in the ditch.

4.3.12 The ditch to the north-west of the central ditch has a higher water level (GB02) at 31.4 mAOD, most likely a function of the higher topography to the west of the site. The base of the ditch at GB02 is approximately 1.3 mAOD above the base of the central ditch.

4.3.13 The water levels in the near surface dipwells (PAK-HA-1 to PAK-HA-6) all show a similar hydrogeologic response (**Figure A3** in **Appendix D**).

4.3.14 It is noted that the groundwater levels observed are generally similar between the central ditch (GB01 and GB03) and the surrounding boreholes closest to the ditch (HA-3, HA-4 and HA-6) and that groundwater levels here are close to ground level (**Figure A3** in **Appendix D**).

4.3.15 Groundwater levels in PAK-HA-2 are significantly below ground level (~1-1.5m) (**Figure B14** in **Appendix D**) and this is repeated in the soil core sample (Core 1) which shows no obvious water table to 1.25m bgl. Similar depth to water, and corresponding lower absolute water levels (in mAOD), are seen at PAK-HA-1 and PAK-HA-5, reflecting local variability in behaviour of the superficial deposits.

4.3.16 To the north of the Site, the water levels in PAK-HA-1, PAK-HA-2 and PAK-HA-3 show a similar water level trend (**Figure A3** in **Appendix D**). PAK-HA-3 has a higher absolute level than the other two boreholes.

4.3.17 The surface water levels in the GB02 and GB04 are higher than the main central ditch, which is in part a function of the topography which is higher at

these two locations. Water will therefore drain towards the central ditch and ultimately flow northwards.

4.3.18 The groundwater level response in PAK-BH-1 shows less pronounced fluctuations in the groundwater levels. BH-1 measures the groundwater conditions in the buried valley, and close to the surface water abstraction. BH1 is not considered to be in hydraulic continuity with the rest of the superficial deposits at the site.

4.3.19 The lowest groundwater level and therefore maximum depth to water in the superficial deposits is listed in **Table 4.2** below.

Table 4.2: Groundwater levels and depth to water table

Borehole ID	Ground level (mAOD)	Lowest observed groundwater level (mAOD)	Maximum depth to water table (m)	Highest observed groundwater level (mAOD)	Minimum depth to water table (m)*
PAK-BH-1	31.9	30.2	1.7	30.6	1.3
PAK-BH-2_d	32.2	32.4	-0.2*	33.2	-1.0*
PAK-BH-2_s	32.2	29.6	2.6	30.3	2.0
PAK-HA-1	30.7	29.2	1.5	29.8	0.9
PAK-HA-2	30.7	29.1	1.5	29.6	1.0
PAK-HA-3	30.6	30.2	0.4	30.6	0.0
PAK-HA-4	30.7	30.2	0.5	30.7	0.0
PAK-HA-5	30.9	29.5	1.4	30.1	0.8
PAK-HA-6	30.7	30.3	0.5	30.6	0.2

* negative depth to water table shows where groundwater levels are above ground level.

4.3.20 Anecdotal evidence suggests that the ground around HA-1 (current Fen Meadow) is damp underfoot. The groundwater data do not show this, which implies that there is locally perched water table here which is currently not being measured, potentially due to layering in the peat. There is also potential for this area to be supported by winter flooding from Pakenham Stream and the on-site ditches.

4.3.21 Two surface water abstraction points, from one abstraction licence, are located on the ditches on site. One further abstraction, which abstracts during the winter, is located on the Pakenham Stream adjacent to the site and piped to the west under the site.

4.3.22 The soil cores also showed little in terms of water. It is likely that the historical water table relates to the zones of sapric peat or, in Core 9, where manganiferous streaks were proved. It is also evident that where peat is at the ground surface, it is in poor condition, and recorded as earthy peat. The reduction of the water table from the ground surface is clearly long-standing.

4.3.23 The water quality data available to date shows the following:

- Nitrate concentrations are highest at BH2_S in the superficial deposits at 99.7 mg/l as NO3. Concentrations are lower in the underlying chalk (BH2_D) which monitored nitrate at 33.7 mg/l as NO3. Elsewhere concentrations are high at the nearby surface water monitoring point at GB03 (50.8 mg/l as NO3) but low across the main central Pakenham dipwells (<2 mg/l as NO3). The Pakenham Stream nitrate concentrations are at 36.4 mg/l as NO3.

- The site generally has very low phosphate concentrations as would be expected, with most samples below detection limits. The Pakenham Stream shows phosphate concentrations at 0.958 mg/l, and elsewhere there are low concentrations at HA-2 (0.273 mg/l) and GB02 (0.602 mg/l).

4.4 Suitability of the site for fen meadow creation

4.4.1 The Pakenham site is discussed as two compartments, north and south.

a) Northern Compartment

4.4.2 This compartment was identified in ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study** [APP-258]~~)~~ as containing two areas of primary locus for fen meadow (totalling 3.2ha), one incorporating the western slope of the site to the west of the central drain, and the other around the north side of an area of existing fen meadow habitat. The western primary locus area was bordered by a potential additional area for fen meadow to the east of the central drain (4ha), within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies.

4.4.3 However, in 2021, the NVC survey identified that the northern primary locus, which sits to the north of existing fen meadow vegetation, is also fen meadow. Therefore~~,~~ no measures to create fen meadow are required in this part of the compartment. Nonetheless, the potential for fen meadow creation in the remainder of this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the

necessary conditions for fen meadow, assessed based on the points presented below:

- Groundwater levels in the shallow deposits in the primary locus area to the west of the central ditch fall significantly below ground level (up to 1.5m in PAK-HA-2), which is also 1m below the ditch water level (around 30.4m AOD). This depth to water reflects the results of a soil core from a similar area reported in ~~Wood, 2019 (Ref. 4 [APP-258])~~the **Fen Meadow Compensation Study** [APP-258], which did not strike water in a depth of 125cm.

- However, to the east of the central ditch shallow water levels remain within 25cm of the ground surface (PAK-HA-3), a similar elevation as the stream water level. It is noted, although not confirmed, that the groundwater levels may be supported by occasional overtopping from the Stream. A soil core in the same area recorded water at 60cm depth.

- Although not recorded in the available data, during initial visits this area of the site was noted to be under water, arising from flooding from the Stream. The lowest point in the bank appears, from LIDAR data (**Appendix D**), to be located immediately adjacent to the north of the footpath crossing the Stream.

- The rush pasture communities present either side of the central ditch at its northern end (MG10b and MG10b/S22c, see NVC report in **Appendix C**), contain a combination of obligate and non-obligate phreatophytes, suggesting that the near surface deposits are, or have been, influenced by groundwater.

- Substrate both sides of the central ditch was found to be peat over marl, and so substrate is appropriate for fen meadow.

- There are some instances of elevated nitrate concentrations in groundwater, although concentrations in most groundwater monitoring installations are low, with phosphate below the level of detection.

- Elevated nitrate concentrations have been recorded from surface water samples, which likely reflects surrounding, arable, land uses. Phosphate above the level of detection was also recorded from Pakenham Stream, indicating the presence of a sewage treatment works discharge upstream.

- The drainage system is complex and there are a number of factors to consider in respect of supporting water levels on site:

- Due to its linkage with Pakenham Meadows SSSI to the east of Pakenham Stream, it is not possible to raise the levels in the system, without potentially also affecting levels in the SSSI.
- Levels in the system at this end of the site may be being supported by the leak from the Pakenham Stream.
- There is a spring/summer abstraction from the ditches on the western site margin that will depress the ditch water levels, although currently these are being supported by the leak from the Pakenham Stream bank.

- LIDAR data suggests the presence of land drains running parallel north-south between the central ditch and Pakenham Stream, presumably draining to the cross ditches. It is possible, although they are not visible on LIDAR, that similar drains are present in the western compartment. These will be reducing groundwater levels and drying the field surface. However, these can be blocked.

4.4.4 Based on the data available, the substrate type is appropriate and, with implementation of the measures detailed in Section 4.5, it is considered that it will be possible to deliver groundwater influenced surface conditions in this compartment, particularly to the east of the central ditch, and potentially also to the eastern side of the western area alongside the central ditch.

b) Southern Compartment

4.4.5 This compartment was identified in ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study** [APP-258]~~)~~ as containing an arrow shaped area of primary locus for fen meadow bordering the wet woodland at the southern end of the site (1.7ha). An area of fen meadow habitat is located immediately adjacent to the south-west of the primary locus to the north of the woodland as indicated (see ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study** [APP-258]). The area of primary locus was flanked by a more extensive potential additional area for fen meadow (4.3ha) within which it was considered that more substantial intervention would likely be required to enable the development of fen meadow. The locations of these areas served to focus the detailed hydrological studies now on-going.

4.4.6 In 2021, the potential for fen meadow creation in this compartment has been reviewed based on the available results of the detailed studies, and the measures to deliver the necessary conditions for fen meadow, assessed based on the points presented below:

4.4.7 In respect of the suitability for fen meadow in the area to the north and upslope of the woodland:

- Groundwater levels in the shallow deposits upslope of the primary locus area to the north of the woodland (and its boundary ditch that joins the main central ditch to the north of the woodland/reed fen area) fall significantly below ground level (almost 1.4m in PAK-HA-5), approaching 1m below the ditch water level (around 30.4m AOD). This depth to water reflects the results of Core 14 from a similar elevation reported in ~~Wood, 2019 (Ref 3. [APP-258])~~the **Fen Meadow Compensation Study** [APP-258], which did not strike water in a depth of 125cm. However, downslope of PAK-HA-5 Core 17 struck water at a depth of 63cm.

- The botanical community present in the field north of the woodland is a floodplain grassland, MG7b, which contains no obligate phreatophytes and only low numbers of non-obligate phreatophytes, suggesting that there is little groundwater influence at the surface.

- Upslope to the north of the woodland, substrate was found to be sand to 60cm in Core 14, and predominantly sands and gravels in the PAK-HA-5, however Core 17 downslope was found to be peat. To the east of the woodland Core 16 was earthy peat over marl and then peat. Substrate appears to be more appropriate for fen meadow on the lower margins of this field.

- There are some instances of elevated nitrate concentrations in groundwater at the northern end of the Pakenham site, although concentrations in most groundwater monitoring installations are low, with phosphate below the level of detection.

- Elevated nitrate concentrations have however been recorded from surface water samples, which likely reflects surrounding arable land uses. Phosphate above the level of detection was also recorded from Pakenham Stream, indicating the presence of a sewage treatment works discharge upstream.

- As indicated for the northern compartment, the drainage system is complex and in general it is not possible to manipulate the levels. However, it is considered that:

  - The ditch separating the fen meadow from the floodplain grassland could be managed without affecting off-site receptors. Although not currently monitored, field observations suggest that it receives run-off, originating as groundwater, from the fen meadow compartment. As such it is expected that water quality would be good.

  - The ditch along the northern edge of the woodland could be controlled without affecting off-site receptors provided that this control occurred before it's confluence with the central ditch. This would reduce drainage from the area, at least from the south-western end of the field.

- No field drains are evident in this field on LIDAR data (**Appendix D**) in this field, although there is a suggestion of presence in the fen meadow field (running north-west to south-east), perhaps evidence of historic efforts to drain the area.

4.4.8 In respect of the suitability for fen meadow in the area to the east of the woodland:

- To the east of the woodland and the central ditch shallow water levels (PAK-HA-6) remain within 45cm of the ground surface, a similar elevation as the stream water level. Core 16 in the area struck water at 80cm below ground level. Core 15 in the same field, but to the north, struck water at 50cm below ground level.

- To the east of the woodland, the floodplain grassland is transitional rush pasture (MG7b/MG10b). This contains a very low number of obligate phreatophytes and a greater number of non-obligate phreatophytes, suggesting a greater current, or historic, groundwater influence at the surface.

- To the east of the woodland Core 16 was earthy peat over marl and then peat, whilst Core 15 was earthy peat over peat. Substrate appears to be appropriate for fen meadow in this field.

- This field is bordered by the central ditch to the west, and Pakenham Stream to the east. No water level control on these watercourses is considered possible without affecting off site receptors.

- There are some instances of elevated nitrate concentrations in groundwater at the northern end of the Pakenham site, although concentrations in most groundwater monitoring installations are low, with phosphate below the level of detection.

- Elevated nitrate concentrations have however been recorded from surface water samples, which likely reflects surrounding, arable, land uses. Phosphate above the level of detection was also recorded from Pakenham Stream, indicating the presence of a sewage treatment works discharge upstream.

- LIDAR data suggests the presence of land drains running parallel north-south between the central ditch and Pakenham Stream (**Appendix D**). It is likely, although they are not visible on LIDAR, that similar drains are present in the western compartment. These will be reducing groundwater levels and drying the field surface. However, these can be blocked.

4.4.9 As for the northern compartment, based on the data available, the substrate type is appropriate and, with implementation of the measures detailed in Section 4.5, it is considered that it will be possible to deliver groundwater influenced surface conditions to the east of the woodland. However, it is concluded that the potential area that could be made suitable for fen meadow to the north of the woodland would be too restricted to be viable. This conclusion is based on the requirement for significant on-going management of water level control structures and any shallow water distribution channels and the very small area in the south-western corner of this field over which conditions for fen meadow habitat could be provided. Fen meadow is therefore not proposed in this area of the southern compartment and it is therefore excluded from the proposals.

4.5 Proposed layout and features

a) Proposed layout (Northern compartment)

4.5.2 The key aim is to achieve groundwater influence at the surface by lowering the surface and reducing the contribution from surface water in the area between the central ditch and Pakenham Stream, and also to the west of the central ditch.

4.5.3 There will be no control of surface water levels in the drainage ditch network. However, the final fen meadow plan will consider the detailed interaction of the proposals with Pakenham Water Mill.

4.5.4 The ground surface between the central ditch and the Pakenham Stream, and also immediately to the west of the central ditch, will be sculpted to create a matrix of terrestrial, wetland and shallow open water habitat niches to maximise the potential for target species to colonise. It is anticipated that 30-40cm of the surface material will need to be removed to deliver the proposed matrix of habitats, subject to the results of focussed soil coring at the time.

4.5.5 There is a nearby seed source from adjacent areas of non-designated fen meadow habitats within the wider site which will support natural colonisation. However, to assist the colonisation process, green hay from on site or, with permission from the owner and Natural England, from Pakenham Meadows SSSI, will be applied to the sculpted areas in mid-

summer. Application to areas of bare earth is beneficial in respect of establishment of species with high light requirements and low competitive abilities, whilst creation of a matrix will maximise the potential for species that have low tolerance of drought or flooding to find an appropriate niche. Application of green hay may be undertaken on more than one occasion.

4.5.6 Site proposals are indicated on **Figure 4.1**. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

i. Physical measures

4.5.7 Physical measures proposed to be implemented in the northern compartment are:

- Sculpting of the land between the central ditch and the Pakenham Stream, and also immediately to the west of the central ditch, removing up to 30-40cm of soil;
- Blocking or breaking up of land drains, where encountered, to reduce drainage from the compartment;
- Raising the western bank of Pakenham Stream immediately to the north of the footpath crossing to the same level as elsewhere on site (level to be determined by further topographic survey) to reduce the potential for site flooding, without affecting the floodplain function of the area. An Environmental Permit will be required from the Environment Agency to enable this work to take place as set out in the **Schedule of Other Consents, Licences and Agreements** (Doc. Ref. ~~5.11(B~~5.11(C))
- Application of green hay to areas of bare earth; and
- Provision of a boardwalk along the footpath to provide walkers a dry route.

4.5.8 Although not physical measures it is noted that:

- Continued operation of the summer surface water abstraction presents a significant risk to the successful provision of appropriate conditions for fen meadow because it suppresses ditch water levels in the summer, which results in a greater drainage effect on the adjacent land, and hence reduced groundwater levels in the northern compartment. Additionally, as the drain from which the abstraction takes place is a continuation of the drain that is culverted under

Pakenham Stream and forms the northern boundary drain of Pakenham Meadows SSSI, the abstraction also has the potential to reduce water levels in the SSSI. However, the full effects of the abstraction on ditch, and adjacent groundwater, levels are currently buffered by the leak from Pakenham Stream (see below), so the level of effect on the ditch, and groundwater, levels is not apparent in the monitoring data. The level of risk to the creation of conditions for fen meadow is therefore not quantifiable at this stage. To maximise potential for fen meadow habitat in this location, and to reduce risks to existing areas of fen meadow, the strong preference is that this abstraction should cease; and

- Retention of the leak from Pakenham Stream supports, and is therefore beneficial to, ditch water levels on site, and also those in Pakenham Meadows SSSI, as it is supporting levels in the ditch forming the northern boundary of the SSSI.

b) Proposed layout (Southern compartment)

4.5.9 The key aim is to achieve groundwater influence at the surface by lowering the surface, sculpting the land to create a habitat matrix. Given the presence of marl in this area to the east in particular it is proposed that the matrix removes a greater depth than proposed elsewhere, up to 45cm, to create areas of calcareous standing water, as well as adjacent wetland habitats, including fen meadow, subject to the results of focussed soil coring at the time during the implementation stage.

4.5.10 The approach to establishing fen meadow species in sculpted areas will be the same in the southern compartment as in the northern compartment.

4.5.11 An area for wet woodland creation (~~1.76~~ 1.47 ha) has also been identified at Pakenham in this compartment. The approach to creation of this habitat is set out in the **Wet Woodland Strategy** Doc Ref. ~~9.8(A)~~10.31) secured pursuant to Requirement 14B).

4.5.12 Site proposals are indicated on **Figure 4.1**.

i. Physical measures

4.5.13 Physical measures proposed to be implemented in the southern compartment are:

- Sculpting the land between the central ditch and the Pakenham Stream to the east of the woodland, removing up to 45cm of soil.
- Blocking or breaking up of land drains, where encountered, to reduce drainage from the compartment to the east of the woodland; and.

- Application of green hay to areas of bare earth.

c) Habitat creation works

4.5.14 Appropriate consents will be sought for works where they fall within specified distances of, ordinary or Main watercourses.

4.5.15 A temporary site compound will be established and access routes marked for the habitat creation works. Indicative locations for site compound and access routes, and notes on accessibility, are provided in **Figure 4.2**. Note that the proposed order limits have been reduced such that they are now focussed on areas in which works will be undertaken whilst also allowing access for construction and future management and monitoring.

4.5.16 Arisings will be removed from the floodplain, off-site.

4.5.17 Works will take place in late spring/summer, avoiding periods with the highest risk of surface inundation and the highest water tables that result in soft ground.

4.5.18 Working areas will be subject to ecological walkovers to confirm and update ecological constraints. Works to ditch banks will be micro-sited to avoid effects on water voles and otters. A Protected Species Licence will be sought from Natural England in the event that one is required, although, based on the reported ecological baseline [REP3-051 and REP3-052] it is considered that effects requiring licensing can be avoided.

4.5.19 Activities will be controlled via implementation of measures in the **Code of Construction Practice** (Doc Ref. ~~8.11(E)~~10.2) secured pursuant to Requirement 2.

4.6 Conservation management

4.6.1 Management measures during the establishment period (Year 1) and in Years 2-5 and 6-10 are summarised below and will be set out in the final Fen Meadow ~~Plan~~ Plans submitted to East Suffolk Council and Suffolk County Council for approval pursuant to Requirement 14A.

a) Management units

4.6.2 Stock proof fence will be used to control stock access to areas of created habitat, particularly during the sensitive establishment phase in Year 1, and during years 2-5, depending upon ground conditions. Proposed fence lines are indicated on **Figure 4.1**.

4.6.3 Management of areas outside the fen meadow creation areas / fence lines will comprise taking a hay crop, followed by aftermath grazing.

b) Fen Meadow Establishment period (Year 1)

4.6.4 Hay transfer will be achieved within a few hours of harvesting, with green hay spread thinly and evenly in the receptor areas on bare ground. Seed-drop from the strewn hay will be completed within 1-3 weeks. Seed will be pressed into the ground using stock (ideally cattle), if ground conditions allow, or a roller.

4.6.5 Where germination is sub-optimal, subsequent hay-transfer during August-September will be undertaken.

4.6.6 Following hay-transfer, colonization of the receptor areas by perennial weeds and/or slug populations will be monitored and, if there is a risk of adverse impacts on the seedlings, treated appropriately to protect the new seedlings.

4.6.7 In the period after hay-transfer (July-November and again in the early part of the following growing season) germination will be favoured by maintaining a short sward.

4.6.8 During and following the first growing season, further introductions of green hay – or of collected propagules of target species – will be undertaken.

c) Fen Meadow Management – Years 2-5 and 6-10

4.6.9 In the first spring after initial hay transfer cutting and where ground conditions allow, grazing may be required to avoid seedlings being shaded out.

4.6.10 Any perennial weeds that colonise will be controlled by spot treatment with herbicide and, as in Year 1, slug populations controlled.

4.6.11 From Year 3 onwards, the receptor areas will be managed as hay meadows and therefore will be cut late (for example, after mid July), with swath turning or tedding undertaken to assist seed shedding. The cutting date will be matched to that of the donor meadow, if possible. The use of livestock, particularly for aftermath grazing, is important, where ground conditions allow, because they create gaps in the sward and trample in the seed, which helps the introduced species to spread.

4.6.12 There will be no use of inorganic fertilisers or widespread application of herbicides.

4.7 Monitoring

4.7.1 The effects on ground and surface water levels, and surface wetness, will be monitored for effectiveness using existing installations and observation.

4.7.2 An annual botanical assessment of the establishment of species in the area will be undertaken, including assessment of the presence of phreatophyte species characteristic of M22. Note however that some of the introduced species may take several years to appear and so the success of the hay transfer will not be judged immediately but kept under review.

4.7.3 Management of the water levels and habitats developing on site will be amended as required based on the monitoring results.

4.7.4 A monitoring report will be submitted to the Ecology Working Group on an annual basis to document works undertaken and the monitoring described above.

4.8 Area of Potential Fen Meadow

4.8.1 The initial primary loci and potential additional areas for fen meadow provided in ~~Wood, 2019 (Ref. 4~~ the **Fen Meadow Compensation Study** [APP-258] were used to focus the detailed hydrological studies. Based on the data now available it is considered that implementing the proposed measures on site will result in elevated water levels and/or creation of a habitat matrix, creating the conditions for establishment of fen meadow habitat across 4.73 ha of the site. This figure supersedes the primary loci and potential additional areas for fen meadow provided in ~~Wood, 2019 (Ref. 4 [APP-258])~~the **Fen Meadow Compensation Study** [APP-258].

4.8.2 An additional area of ~~1.76~~ 1.47 ha has also been identified for inclusion of wet woodland in the southern compartment.

5 SUMMARY

5.1.1 Implementation of proposals in this **Draft Fen Meadow Plan** are expected to deliver conditions to support fen meadow species on each of the three sites.

5.1.2 The proposals are intended to result in elevated water levels and/or creation of a habitat matrix, creating the conditions for establishment of fen meadow habitat.

5.1.3 The proposals are therefore anticipated to deliver conditions suitable to support fen meadow habitat across the site areas summarised below:

- Benhall – 2.4 ha of fen meadow, 0.6 ha of wet woodland;
- Halesworth – 1.0 ha of fen meadow; and
- Pakenham: 4.73 ha of fen meadow, ~~1.76~~ 1.47 ha of wet woodland.

5.1.4 In total therefore the plan could deliver up to **8.13 ha** of fen meadow and ~~**2.36**~~ **2.07 ha** of wet woodland.

5.1.5 Within any of the sites, it is not possible to set a single ground level that will deliver appropriate conditions for fen meadow year round allowing for a smaller area to be identified for fen meadow delivery, because of the uncertainties in groundwater level fluctuation with a limited ability to control these on these sites, and uncertainties in the precise development of the habitat in any one particular location within the site. Instead, the sculpting approach proposed, results in a variable micro-topography that will support a range of hydrological conditions, varying from shallow open water through to more terrestrial habitat. This maximises the provision of areas with appropriate hydrology, and hence potentially suitable area for fen meadow, whilst allowing for the uncertainties in groundwater level fluctuation and limited ability to control these.

5.1.6 The proposals in this draft plan have been prepared with reference to the data available to the beginning of July 2021 (**The Fen Meadow Plan Report 1 – Baseline Report** [REP3-051 and REP3-052], provides a summary of data available until May 2021) and data collection is on-going at each site. ~~A final~~ Final Fen Meadow ~~Plan~~ Plans in general accordance with the **Fen Meadow Strategy** (Doc ~~Ref. 6.14 2.9.D(A)~~Ref.10.16) and this **Draft Fen Meadow Plan** (Doc ~~Ref. 9.64(A)~~Ref.10.6) must be submitted to and approved by East Suffolk Council ~~for approval~~ and Suffolk County Council prior to any vegetation clearance in the Sizewell Marshes SSSI being carried out. The Fen Meadow ~~Plan~~ Plans must be implemented as approved.

REFERENCES

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3. van Diggelen R. & Marrs R.H. (2003). Restoring plant communities – Introduction. Appl. Veg. Sci. 6: pp. 105-110.

4. Wood (2019). Fen Meadow Compensation Study – Report of Visits to Target Sites 2019. Report to EDF Energy.

APPENDIX A: WATER MONITORING SUMMARY – BENHALL SITE 10 & 11, NOVEMBER 2020 TO PRESENT (JULY 2021) – REFER TO FEN MEADOW PLAN DRAFT 1 [REP6-026]

APPENDIX B: WATER MONITORING SUMMARY – HALESWORTH SITE 28, NOVEMBER 2020 TO PRESENT (JULY 2021) – REFER TO FEN MEADOW PLAN DRAFT 1 [REP6-026]

APPENDIX C: PAKENHAM SITE 54 ECOLOGY BASELINE REPORT (ADDENDUM) – REFER TO FEN MEADOW PLAN DRAFT 1 [REP6-026]

APPENDIX D: WATER MONITORING SUMMARY – PAKENHAM SITE 54, APRIL 2021 – PRESENT (JULY 2021) – REFER TO FEN MEADOW PLAN DRAFT 1 [REP6-026]

FIGURES



The Sizewell C Project

9.8/ 10.31 Wet Woodland Strategy - Clean Version

Book 9 Revision:	3.0
Book 10 Revision:	1.0
Applicable Regulation:	Regulation 5(2)(q)
PINS Reference Number:	EN010012

October 2021

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

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1 EXECUTIVE SUMMARY

1.1.1 The Sizewell C (SZC) proposals would lead to the permanent loss of approximately 2.77ha of 'wet woodland' habitat from the Sizewell Marshes SSSI. This document has been prepared to define SZC Co's commitment to provide appropriate compensation measures for the loss of wet woodland habitat through the creation of compensatory wet woodland habitats.

1.1.2 Although wet woodland in the SSSI is of value in its own right, it is the importance of the wet woodland as part of the habitat mosaic for invertebrates which is regarded as of being of greater importance. It is for this reason that this strategy proposes delivering the majority of the wet woodland habitats at the fen meadow habitat compensation sites at Benhall and / or Pakenham. A total of 2.77ha of wet woodland will be created with 0.7ha being created on the Estate and 2.07ha being created between the Benhall and Pakenham sites.

1.1.3 The strategy sets out a series of actions, which include the creation of the wet woodland plan and a series of management actions, designed to create developing the offsite 2.07ha of wet woodland within in ten year period. The strategy also describes the role of the Environment Review Group in relation to the strategy.

1.1.4 In the unlikely event that there is a shortfall in the 2.07ha which is to be delivered between the Benhall and Pakenham sites after a ten year period, the balance of wet woodland would be delivered on newly created wetland areas on the Estate although this is not the preferred approach.

1.1.5 The strategy also includes some measures within the retained wet woodland in the Sizewell Marshes SSSI which will be used to enhance the age profile of the woodland to support invertebrate populations until the new wet woodlands are established.

1.1.6 Level 1 control documents will either be certified under the DCO at grant or annexed to the Deed of Obligation (DoO). All are secured and legally enforceable. Some Level 1 documents are compliance documents and must be complied with when certain activities are carried out. Other Level 1 documents are strategies or draft plans which set the boundaries for a subsequent Level 2 document which is required to be approved by a body or governance group. The obligations in the DCO and DoO set out the status of each Level 1 document.

1.1.7 This strategy is a Level 1 document. Pursuant to Requirement 14B of the dDCO, prior to any vegetation clearance within the Sizewell Marshes SSSI, a Wet Woodland Plan (a Level 2 document) will be submitted for approval by

East Suffolk Council, in consultation with the relevant Statutory Conservation Body and such plan must be in general accordance with this draft strategy and the **draft Wet Woodland Plan** (Doc Ref. 10.13)).

1.1.8 Where further documents or details require approval, this document states which body or governance group is responsible for the approval and/or must be consulted. Any approvals by East Suffolk Council, Suffolk County Council or the MMO will be carried out in accordance with the procedure in Schedule 23 of the dDCO. The Deed of Obligation establishes the governance groups and sets out how these governance groups will run and, where appropriate, how decisions (including approvals) should be made. Any updates to these further documents or details must be approved by the same body or governance group and through the same consultation and procedure as the original document or details.

1.1.9 Where separate Level 1 or Level 2 control documents include measures that are relevant to the measures within this document, those measures have not been duplicated in this document, but cross-references have been included for context. Where separate legislation, consents, permits and licences are described in this document they are set out in the **Schedule of Other Consents, Licences and Agreements** (Doc Ref. 5.11(C))

1.1.10 For the purposes of this document the term 'SZC Co.' refers to NNB Nuclear Generation (SZC) Limited (or any other undertaker as defined by the dDCO), its appointed representatives and the appointed construction contractors.

2 BACKGROUND

2.1.1 The Sizewell C proposals would lead to the permanent loss of approximately 2.77ha of 'wet woodland' habitat from the Sizewell Marshes SSSI. This permanent loss arises from the size and location of the SZC main platform to the north of the existing Sizewell B station.

2.1.2 The Sizewell Marshes SSSI citation sheet (Ref. 1) describes Sizewell Marshes as being *'important for their large area of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates and breeding birds'*, and also that '*In addition, several areas of reedbed dominated by Common Reed Phragmites and alder carr occur*.' In relation to the extensive ditch system, the citation notes that '*the variety of ditch depths and widths, together with their fringing vegetation provide an important contribution to the site's habitat value for invertebrates and birdlife'* and more generally '*Sizewell Marshes are of exceptional interest for their invertebrate fauna, supporting a wide range of taxa and many nationally rare or scarce species.*'

2.1.3 Whilst wet woodland is not a habitat for which the SSSI is specifically designated, the *'exceptional ... invertebrate fauna'* is likely to be at least partly dependent on wet woodland habitats. Similarly, the combination of habitats including the open ditches, the unimproved fen meadows and the wet woodland, all present in close proximity is likely to be important in supporting the invertebrate interest. In **Table 14.9** of **Volume 2**, **Chapter 14** of the **Environmental Statement** (**ES**) [AS-033], wet woodland is noted as being nationally scarce habitat listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act (Ref. 2) and the Suffolk Biodiversity Action Plan (BAP) (Ref. 3).

2.1.4 It should also be noted that coppicing of mature alder (*Alnus glutinosa*) trees within the wetlands is regularly undertaken as part of the ongoing management of the Sizewell Marshes SSSI, under the existing site management arrangements agreed with Natural England. This is undertaken to increase light levels to ditch habitats of importance to invertebrates and some plant species. The key point in the context of this wet woodland strategy is that whilst individual alders are unlikely to be of importance in their own right, the presence of a mix of age classes of trees, including coppice regrowth, is of importance.

2.1.5 The DCO application submitted in May 2020 included an area of proposed wet woodland habitat in a new wetland area in the north-east of the main development site. This area of compensatory habitat provision will comprise 0.7ha of wet woodland and when successfully established will reduce the net

loss of wet woodland habitat to approximately 2.07ha, for which no compensatory habitat was identified in the submitted application. Compensation for this residual net loss of 2.07ha of wet woodland habitat is the focus of this strategy and together with the on-site 0.7ha provision, this will ensure a total of at least 2.77ha of compensatory wet woodland habitats are provided.

2.1.6 This document has been prepared to define SZC Co's commitment to provide appropriate compensation measures for the loss of wet woodland habitat through the creation of compensatory wet woodland habitats. SZC Co. has prepared the **draft Wet Woodland Plan** (Doc Ref. 10.13)), which in its final form, will be submitted to East Suffolk Council for approval pursuant to Requirement 14B before any vegetation clearance works within the Sizewell Marshes SSSI can be carried out.

3 SCOPE

3.1.1 This document addresses the compensatory habitats required for the permanent loss of wet woodland habitats from the Sizewell Marshes SSSI, associated with the construction of the Sizewell C nuclear power station. This impact is assessed in **Section 14.7** of **Volume 2**, **Chapter 14** of the **ES** [AS-033] and **Section 2.9 h) iii) a) a)** of the **Volume 1**, **Chapter 2** of the **First ES Addendum** [AS-181]**.**

3.1.2 This document does not address other potential impacts on the wet woodland habitats which are included in the **ES** and subsequent **ES Addenda**, as relevant. These other impacts, on wet woodland or the SSSI as a whole, are assessed in **Volume 2, Chapter 14** of the **ES** [AS-033], as identified in **Table 2.1** below.

Table 3-1: References to wet woodland impacts in Volume 2, Chapter 14 of the Environmental Statement

Impact	Paragraph references
Temporary 'land take' or other use of land associated with installation of replacement overhead lines	14.3.34, 14.4.16, 14.7.125, 14.7.130-131
Air Quality impacts	14,7,149-160
Hydrological impacts	14.7.139-148

3.1.3 **Section 2.9 h) iii) a) a)** of the **Volume 1**, **Chapter 2** of the **First ES Addendum** [AS-181] provides an updated assessment (and revised land take calculations) to reflect the changes to the SSSI crossing design and concludes, in paragraph 2.9.65 that the effects of habitat loss would remain as described in the **Volume 2, Chapter 14** of the **ES** [AS-033].

3.1.4 Mitigation measures for these impacts are defined within the ES as relevant and secured within the **Code of Construction Practice (CoCP)** (Doc Ref. 10.2) (secured by Requirement 2 of the dDCO) and are not considered further.

3.1.5 This document is concerned only with the strategy for the provision of compensatory habitats in response to the proposed permanent loss of wet woodland habitats from the Sizewell Marshes SSSI. It does not assess the loss which is addressed in **Volume 2, Chapter 14** of the **ES** [AS-033] and **Section 2.9 h) iii) a) a)** of the **Volume 1**, **Chapter 2** of the **First ES Addendum** [AS-181]**.**

4 THE NEED FOR COMPENSATORY WET WOODLAND HABITAT

4.1.1 The overarching National Policy Statement (NPS) for Energy (EN-1) (Ref. 4) and NPS for Nuclear Power Generation (EN-6) (Ref. 5) provide the primary policy framework within which the application for development consent will be considered. Several paragraphs within NPS EN-1 are directed towards the issue of impacts on biodiversity interests and, specifically, land take from SSSIs. Two paragraphs within the Annex to NPS EN-6 are of particular relevance to the issue of land take from the Sizewell Marshes SSSI, as follows:

Table 4-1: NPS EN-1 and NPS EN-6

Ref.	NPS topic requirement
EN-1 5.3.7	*'As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives []; where significant harm cannot be avoided, then appropriate compensation measures should be sought.'*
EN-1 5.3.11	*'Where a proposed development on land within or outside an SSSI is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), development consent should not normally be granted.* *Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made where the benefits (including need) of the development at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs. The [IPC] should use requirements and/or planning obligations to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site's biodiversity or geological interest.'*
EN-6 C.8.60	*'Some responses focused on designated sites including Sizewell Marshes Site of Special Scientific Interest (SSSI) and Leiston-Aldeburgh SSSI, and potential effects on Minsmere-Walberswick Heaths and Marshes SSSI, from which the site boundary includes some land-take. Some responses questioned how direct land take could be mitigated.'*

Ref.	NPS topic requirement
EN-6 C.8.63	*'The Appraisal of Sustainability identified the potential for the mitigation of biodiversity effects on sites of UK wide conservation importance (Sizewell Marshes SSSI), including the creation of replacement habitat. The Appraisal of Sustainability notes that developers could avoid or minimise losses and disturbance to protected species through careful site layout, design, routing, location of the development, associated infrastructure, and construction management and timings. The Appraisal of Sustainability finds that there is potential for habitat creation within the wider area in order to replace lost "wet meadows" habitats of the Sizewell Marshes SSSI, but also finds that it may not be possible to fully compensate for losses of this habitat. The applicant will need to develop an ecological mitigation and management plan to minimise the impacts.'*

4.1.2 The provision of compensatory wet woodland habitats using the approach outlined in this strategy responds to the requirement for compensation set out in EN-1 5.3.7 and aligns with the direction to '*develop an ecological mitigation and management plan to minimise the impacts'*. This strategy and documents which are developed in response to it form one element of such a plan.

4.1.3 The **Fen Meadow Strategy** (Doc Ref. 10.16) and **Draft Fen Meadow Plan** (Doc Ref. 10.6) (secured by Requirement 14A) addresses the specific direction in EN-6 C.8.63 to develop *'an ecological mitigation and management plan'* to replace the '*lost "wet meadows"*'. There is no similar direction in EN-6 to provide a plan for wet woodland.

4.1.4 SZC Co. is proposing areas of compensatory habitat at three off-site locations. These locations have been selected and sized to deliver fen meadow habitats but two of these sites also have the potential to support the creation of wet woodland. The conclusion reached in the **Section 14.7** of **Volume 2, Chapter 14** of the **ES** [AS-033] and **Volume 1, Chapter 2, Section 2.9 h) iii) a) a)** of the **ES Addendum** [AS-181], in relation to land take of wet woodland from the SSSI, is that there would be no significant residual effect provided that a wet woodland strategy, which is successfully implemented, delivers compensatory wet woodland habitats.

4.1.5 Although wet woodland is of value in its own right, it is the importance of the wet woodland as part of the habitat mosaic for invertebrates which is regarded as of being of greater importance. It is for this reason that delivering wet woodland alongside other habitats such as fen meadow is preferable to delivering them at entirely separate sites (see Section 4). The **ES** includes

detailed assessments of the impacts on invertebrates of habitat loss in **Section 14.8** of **Volume 2**, **Chapter 14** [AS-033] and, as follows:

- Paragraphs 14.8.2, 14.8.25, 14.8.38, 14.8.58, 14.8.78, 14.8.98
- Tables 14.14, 14.15, 14.16

4.1.6 **Volume 2**, **Chapter 2, Section 2.9 h) iii) a) b)** of the **ES Addendum** [AS-181] identifies that whilst the changes to the application (accepted as part of the Sizewell C Project on 21 April 2021 [PD-013] and described in the **Change Notification Report** [AS-005]) will slightly reduce permanent land take of wet woodland and reduce the potential for fragmentation, the significance of the assessed likely effects are unchanged.

4.1.7 Based on National Vegetation Classification (NVC, Rodwell 1991 Ref. 6) survey data the wet woodland habitat within the Sizewell Marshes SSSI which will be lost to permanent land take can be placed primarily within the W5 woodland category (see **National Vegetation Classification Surveys 2020** [AS-021] for further details). The defining characteristic, in what can be a habitat of relatively low floral diversity, is the presence of alder and this species is used as an indicator of wet woodland establishment within this strategy (**Section 6** of this document).

4.1.8 W5 *Alnus glutinosa – Carex paniculata* woodland is described as *'A community of base-rich, moderately eutrophic, wet to waterlogged organic soils on topogenous or soligenous mires. It is associated with fen peats in open water transitions, flood-plain mires and basin mires where there is strong influence from base-rich ground waters'* (Ref. 7).

4.1.9 In order to compensate for the loss of wet woodland habitats from the SSSI, SZC Co. has considered those sites where the development of compensatory wet woodland habitats would be possible. This is discussed in the **Section 4** of this document.

4.1.10 SZC Co. is confident that it will be able to create the appropriate quantum of compensatory wet woodland habitats, given the suitability of the sites defined in **Section 4.** However, in order to provide further confidence that the loss will be adequately compensated for and to recognise the risks which might arise outside of SZC Co.'s control, contingency provisions, based on alternative delivery of these habitats on the Estate, are defined in **Section 7** of this document.

5 STUDIES TO DATE

c) Off-site compensatory habitats – Fen meadow sites

5.1.2 Three sites are included in the Sizewell C proposals, as defined in the **Fen Meadow Strategy** (Doc Ref. 10.16) and **Draft Fen Meadow Plan** (10.6), to develop compensatory fen meadow habitats as follows:

- Work no.6: Fen Meadow habitat at Halesworth.
- Work no.7: Fen Meadow habitat at Benhall.
- Work no. 18: Fen Meadow compensation site at Pakenham.

5.1.3 As defined within the **Fen Meadow Strategy** (Doc Ref. 10.16), the focus at each site will be the creation of fen meadow habitats to ensure the delivery of 4.14ha of compensatory fen meadow habitats at each site. However, at each of the three sites there are areas over and above the quantum required to deliver 4.14ha of fen meadow which could be used to develop wet woodlands. In general, the same ground conditions which are favourable to the creation of fen meadow are also favourable to the creation of wet woodland.

5.1.4 A further consideration in relation to wet woodland is the proximity to other existing wet woodlands in the vicinity as this provides the opportunity for natural habitat linkages and natural colonisation by plants and invertebrates. The Halesworth site is more remote from existing wet woodland, but both Benhall and Pakenham have wet alder woodlands within the site boundary.

5.1.5 The focus of this wet woodland strategy is, therefore, on the creation of at least 2.07ha of new wet woodland at the two fen meadow sites of Benhall and Pakenham, whilst still delivering 4.14ha of fen meadow at those two locations. The creation of wet woodlands at these sites will create more diverse habitat mosaics at those locations which will, in the long term, be of greater value to invertebrates than if entirely new sites or locations had been identified. In discussion with ecology stakeholders, this integrated approach of co-locating habitats at the fen meadow compensatory habitat sites has been broadly supported.

5.1.6 Detailed site investigations are underway at these sites to monitor ground and surface water level flows and determine the management actions which will be described in the **Draft Fen Meadow Plan** (Doc Ref. 10.6). These investigations and the measures subsequently set out in the **Draft Fen Meadow Plan** (Doc Ref. 10.6) seek to maximise the extent of the establishment of fen meadow at each site and have informed the preparation

of the **Draft Wet Woodland Plan** (Doc Ref. 10.13). These site investigations are outlined in the **Fen Meadow Strategy** ([AS-210] as updated by Doc Ref. 10.16) and are not repeated here.

b) Enhancement of Sizewell Marshes SSSI wet woodlands

5.1.7 In addition to the creation of new wet woodlands at the two sites detailed above, further mitigation will be undertaken in the remaining wet woodlands at Sizewell Marshes SSSI, to enhance the aged communities of wet woodland, while the off-site wet woodland habitats develop. This will enhance the value of the retained habitats to invertebrates and minimise the risk to species populations that may be dependent on particular age classes of trees. The approach will comprise:

- veteranisation of selected trees to accelerate the creation of standing dead wood;
- pollarding or coppicing of selected trees, with dead wood retained in the vicinity, variously stacked or loose; and
- any individual trees or tree groups managed as above will be agreed with Natural England under the SSSI assent process, under Section 28H(1) of the Wildlife and Countryside Act 1981 (as amended and inserted by section 75 and Schedule 9 of the Countryside and Rights of Way Act 2000).

c) Potential for on-site compensatory habitats

5.1.8 In addition, there are other opportunities to create additional wet woodland on-site. These are explained below and **Section 7** of this document explains that governance process that will determine where these additional opportunities will be taken.

5.1.9 Where habitats are lost, it is normally preferable to create compensatory habitats as close to the lost habitats as possible. This has been the approach used to create compensatory open water and reedbed wetland habitats at the Aldhurst Farm habitat creation site adjacent to Sizewell Marshes SSSI. However in 2015, it was concluded that there were no suitable areas within the Estate immediately adjacent to the SSSI which could be used to create fen meadow habitats (see **Fen Meadow Strategy** Doc Ref. 10.16). This is predominantly a function of the topography and soil types and that there are no low-lying areas within the small Leiston drain catchment, but outside the SSSI, which might be suitable for such a habitat creation approach. The same is broadly true of wet woodland habitats, albeit that newly created open

water and reedbed areas, such as part of the Aldhurst Farm wetlands, could be transitioned to wet woodland (see below).

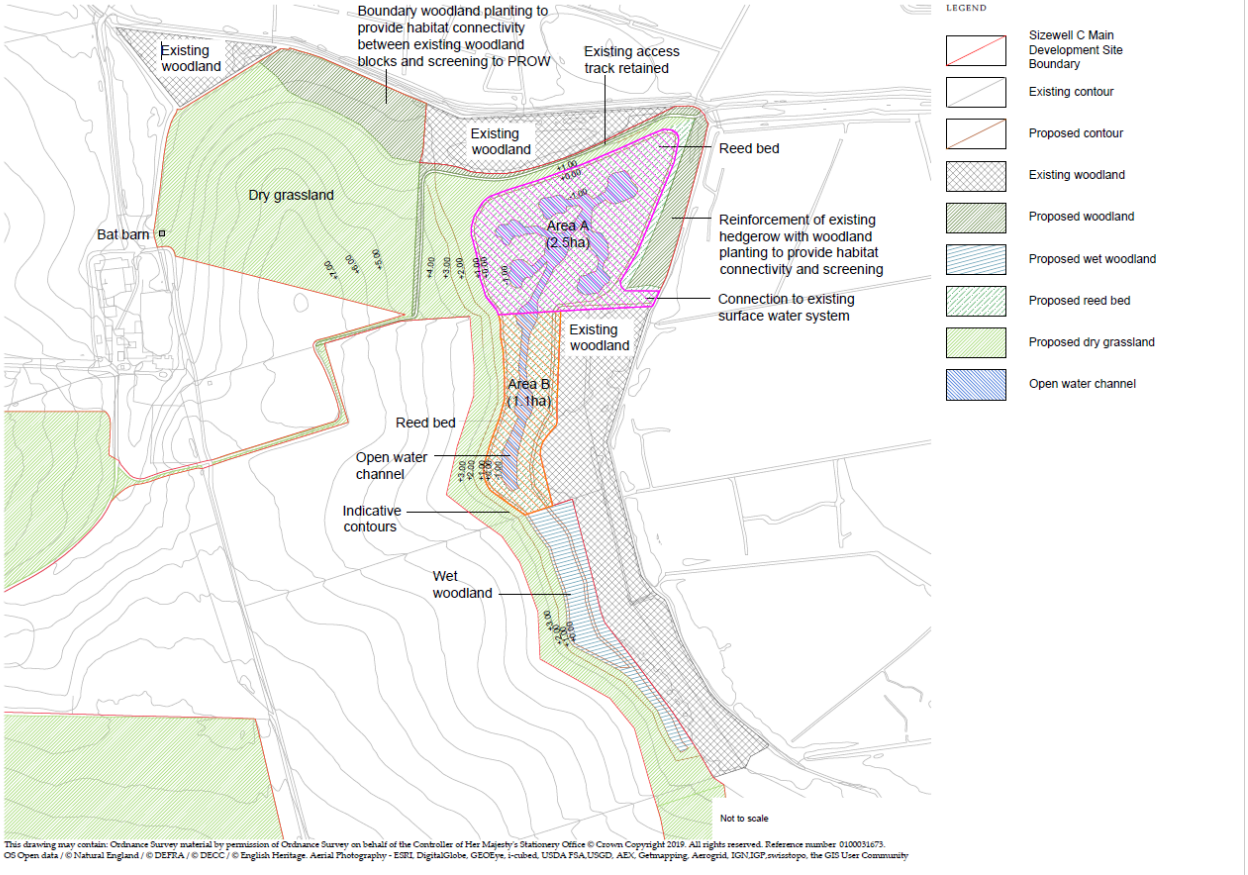
5.1.10 A proposal to create wet woodland habitat in a new wetland corridor in the northeast of the Estate, within the marsh harrier habitat improvement area , is included within the Application. This will involve the reprofiling of existing landforms, primarily through excavation, to create a wetland corridor at the same level as the Minsmere South Levels to the east. This area would provide 0.7ha of wet woodland and 1ha of reedbed (see Plate 1 below).

5.1.11 In the original Application, a temporary water storage area was included to the north of the wetland corridor. However further design work has identified that the water storage area can now be temporarily located elsewhere on the construction site (see **Volume 2**, **Figure 2.2.13** of the **ES Addendum** [AS-191]). SZC Co. now will use the storage area's original proposed location to instead provide additional, permanent, fluvial flood mitigation using excavation of the existing topography. Wetland habitat will also be created in this area, comprising open water channels and wet reedbeds to provide high quality foraging habitats for marsh harriers and other species during the construction of Sizewell C. This area will be directly linked to the proposed permanent wetland habitat corridor immediately to the south, described above, to create a single integrated wetland feature, as illustrated in **Volume 2**, **Figure 2.2.14 of** the **ES Addendum** [AS-191] and in **Plate 1** below.

5.1.12 The flood mitigation area and wetland habitats will be constructed during winter in the first two years of the construction phase to ensure that there is no ongoing construction disturbance to foraging marsh harriers during the summer.

5.1.13 This area has longer term potential as wet woodland. Once the construction of Sizewell C is complete and compensatory marsh harrier foraging habitats are no longer required, the open water and wet reedbed habitats (Area A and Area B, 3.6ha in total) (**Plate 1**) could theoretically be transitioned, in large part, to provide additional wet woodland habitats, either through natural successional processes or through planting. Using at least 2.07ha of this new wetland in addition to the 0.7ha to the south (see Plate 1) will compensate for the loss of 2.77ha of wet woodland from the Sizewell Marshes SSSI. This could not be started until the end of the construction phase of Sizewell C.

Plate 1: Location of new wetlands



5.1.14 Ecological stakeholders, including Natural England, have indicated that the retention of these new open water and reedbed habitats as open water and reedbed habitats should be a priority rather than transitioning them to wet woodland habitat. This option would not provide the wet woodlands in close proximity to fen meadow habitats is therefore retained as a contingency provision only (see **Section 7**).

d) Aldhurst Farm

5.1.15 It would be theoretically possible to create an area of wet woodland habitat at Aldhurst Farm although this would be at the expense of an area of existing reedbed. However, the extent of existing reedbed which has been created in the new wetlands at Aldhurst Farm already greatly exceeds the extent of reedbed that will be lost from the SSSI. The Aldhurst Farm wetland includes approximately 5 ha of reedbed which has been successfully established,

compared with 2.93ha[1] of reedbed which would be lost to provide the Sizewell C platform. It is therefore considered that there is an 'over-provision' of approximately 2ha reedbed habitat at Aldhurst Farm, which could be repurposed to provide up to 2ha of wet woodland.

5.1.16 The potential for creation of wet woodland as part of the Aldhurst Farm wetlands has previously been discussed with Natural England. Delivery of wet woodland at Aldhurst Farm, if progressed, would be aligned with the creation of compensatory habitat in close proximity to the SSSI. However recent consultation with ecological stakeholders, including Natural England indicates a clear preference for retaining the newly created open water and reedbed habitats at Aldhurst Farm and in addition, would not provide the wet woodlands in close proximity to fen meadow habitats. For these reasons, this strategy focusses on delivery at off-site locations, albeit the option of delivery at Aldhurst Farm, as described above, is held for contingency provision (see **Section 7**).

e) Wet Woodland Plan

5.1.17 The **draft Wet Woodland Plan**, submitted at Examination Deadline 8 (Doc Ref. 10.13), defines the management interventions required to create wet woodland habitats on the Benhall and Pakenham sites. The measures will include monitoring and any remedial interventions that may be required to ensure the successfully delivery of wet woodland of SSSI quality at relevant sites. The **draft Wet Woodland Plan** includes local groundworks to provide a range of topographic levels to enable the establishment of wet woodland. The **draft Wet Woodland Plan** defines further management measures including both fallen and standing deadwood which will be provided to represent the variety of niches available to the invertebrate communities in the woodlands at Sizewell Marshes SSSI. The final Wet Woodland Plan will be submitted to East Suffolk Council for approval in consultation with the relevant Statutory Nature Conservation Body pursuant to the dDCO Requirement 14B.

5.1.18 SZC Co. must implement the Wet Woodland Plan as approved, under the direction of the Environment Review Group (see below). Further details of the proposed approach are provided in **Section 6**.

[1] based on current and NVC mapping data, see **Volume 1**, **Chapter 2** of the **ES Addendum**, Table 2.19 [AS-182]

6 ESTABLISHING NEW WET WOODLAND HABITATS

6.1.1 This section outlines the approach for delivering compensatory wet woodland habitats, the interfaces with stakeholders and the monitoring and remedial actions which will be deployed to maximise the chances of successfully establishing the habitat.

6.1.2 Wet woodland establishment is likely to be a long-term endeavour and a ten-year programme of works is outlined below.

a) Ecology Working Group

6.1.3 An Ecology Working Group is to be established under the terms of Schedule 11 of the **Deed of Obligation** (Doc Ref. 10.4) and will be responsible for overseeing the establishment of the compensatory habitat works including the delivery of the final Wet Woodland Plan as approved by East Suffolk Council pursuant to Requirement 14B.

6.1.4 Further details of the role of the Ecology Working Group are included in Schedule 11 of the **Deed of Obligation** (Doc Ref. 10.4) and the role of the Group will include:

- reviewing a draft final Wet Woodland Plan to enable it to be finalised for approval by ESC pursuant to Requirement 14B;
- approving or amending the actions required for the capital works in the first year of the habitat creation at the relevant sites;
- on an annual basis, reviewing progress against the success criteria outlined below; and
- in the event of failure to meet the success criteria, to advise SZC Co. how the contingency measures are then deployed.

c) Site Establishment

6.1.5 The Wet Woodland Plan (in general accordance with this strategy and the **Draft Wet Woodland Plan** (Doc Ref. 10.13) secured pursuant to Requirement 14B) will define the precise works to be undertaken by SZC Co. within 12 months of commencement of development under the DCO (the 'Year 1 works').

6.1.6 The Year 1 works will include, but not be limited to, the works listed below and will be aligned as relevant with the works required pursuant to the Fen Meadow Plan approved pursuant to Requirement 14A:

- Any further ecological surveys required[2] to further inform final design proposals and or protected species mitigation or monitoring requirements.
- Site acquisition and establishment of any required access or works compound.
- Any required ground works, such as reworking of ground levels, removal of field drains or re-alignment of surface drains or ditches, preparation of substrate if required. Natural England consider the following points to be fundamental to the success and acceptability of the proposed compensation and they will therefore be accounted for in developing the Wet Woodland Plan:
  - high quality wet woodland will develop in the same situations as high quality fen meadow (i.e. the absence of elevated nutrients and permanently high water table albeit without cutting or grazing). Consequently, many of the same activities are likely to be required including topsoil removal if enriched; and
  - it is noted that the re-establishment of natural hydrological regimes will provide the greatest likelihood of success and resilience in the establishment of wet woodland. Minimal water level controls will aid the restoration of natural flows and are likely to form an important part of the approach.
- Any required installation of monitoring equipment, such as boreholes or gauge boards.
- Establishment of target water levels.
- Installation of fencing / gates as required to define the subsequent management units and in accordance with any land agreements.
- The preferred approach to creating wet woodlands, as defined in the Wet Woodland Plan, will be via natural regeneration of woodland in suitable areas by extending adjacent wet woodlands into the chosen sites. Natural regeneration and expansion of wet woodland is likely to be more resilient and have greater biodiversity than a planted woodland. Initially this regeneration would include development of wet scrub and species such as grey willow (*Salix cinerea*) and alder are then be expected to colonise

[2] Noting that ecological surveys have been or are being undertaken in the period 2019-2021 at each site in any event to inform the Draft **Wet Woodland Plan** (Doc Ref. 9.108(A))

once the willows are established. Planting of wet woodland species will only be undertaken in agreement with the Ecology Working Group and only if it is apparent that natural regeneration of wet woodland has not been successful.

d) Management – Years 2-5

6.1.7 The Year 2-5 works, at the relevant sites will include, but not be limited to, the following and will be aligned as relevant with the works required pursuant to the final Fen Meadow Plan:

- Monitoring and remedial works to any of the infrastructure installed in year 1 and any ongoing required management actions identified to optimise the water levels and ground conditions for the establishment of the target habitat, aligned as relevant with the Fen Meadow Plan (approved pursuant to Requirement 14A).
- Habitat monitoring.

e) Management – Years 6-10

6.1.8 Year 6-10 works at the relevant sites, will include, but not be limited to the following and will be aligned as relevant with the works required pursuant to the final Fen Meadow Plan:

- Any ongoing required management actions identified to optimise the water levels and ground conditions for the establishment of the target habitat.
- Habitat monitoring.

6.1.9 Success at any given site will be determined in Year 10[3] or sooner, as follows, for each site:

- Completion of works defined above for Years 1-10.
- Establishment of the target water levels, in accordance with the Wet Woodland Plan (approved pursuant to Requirement 14B), aligned as relevant with the Fen Meadow Plan (approved pursuant to Requirement 14A).
- Establishment of developing wet woodland habitat, as determined by quadrat survey, at the relevant site.

[3] Year 10 defined in the Deed of Obligation as 'the 12 months following the tenth (10th) anniversary of commencement of Work No. 1A in Schedule 1 to the Development Consent Order'

- Establishment of a long-term management plan which will be agree with the Ecology Working Group to maintain the newly established and developing wet woodland habitat for the operational lifetime of the Sizewell C Project. Fen meadow habitats are proposed at each site and the long-term management plan will therefore be integrated across both target habitat types. The long term management plans will target the establishment of the vegetation establishment and also the establishment of a diverse community of wet woodland invertebrates.

6.1.10 These criteria will determine whether habitats are successfully establishing at the relevant site, such that in the longer term, the establishment of mature wet woodland is considered apparent. The spatial extent of establishment will be mapped and the area of developing wet woodland habitat calculated.

f) Management – Year 10 onwards

6.1.11 Year 10 and onwards works at each of the relevant sites will comprise management in accordance with the long-term management plan agreed with the Ecology Working Group**.**

7 THE TEST OF SUCCESS

7.1.1 The critical metric is the establishment, by Year 10, of at least 2.77ha of developing wet woodland[4] habitat within the onsite wetland corridor (0.7ha) and across the fen meadow sites at Benhall and Pakenham (at least 2.07ha). It is acknowledged in this strategy that trees will not be fully mature by Year 10 and the wet woodland will not be mature by that stage.

7.1.2 Provided that 2.77ha of developing wet woodland has been established by Year 10, with the long term management plan agreed with the Ecology Working Group in place to secure this compensatory habitat for the operational lifetime of the Sizewell C Project, then the Wet Woodland Plan (as approved pursuant to Requirement 14B) will have been successful in the context of vegetation establishment.

7.1.3 By or before Year 10, relevant information will be submitted to the Ecology Working Group for the Group to determine whether the target quantum of 2.77ha of developing wet woodland has been achieved in accordance with the criteria set out at paragraph 5.1.11 above.

7.1.4 If 2.77ha of developing wet woodland habitat has not been established, or is not demonstrably in progress towards this end state, via the process of habitat succession, by this time, the contingency approach detailed in **Section 8** will be triggered, subject to the decision of the Ecology Working Group to pursue this course of action. The Ecology Working Group has the option to defer this course of action, to enable further progress towards establishment of the wet woodland habitat.

7.1.5 In Year 10, or in a later year, as determined by the Ecology Working Group, the Group will also review and endorse as relevant the long-term management plan for each site where developing wet woodland habitat has been successfully established.

The establishment of a diverse insect assemblage characteristic of wet woodlands, in the newly created wet woodland habitats, will inevitably be a long-term process, extending beyond Year 10. The monitoring approach and success criteria for the establishment of the invertebrate assemblage will be set out in the final Wet Woodland Plan and also included in the long-term management plan.

[4] Developing wet woodland is here defined as 'wet woodland which meets the definition of W5 within the NVC in respect of tree and shrub components'. Herbaceous species are only likely to achieve frequencies associated with W5 once the trees are more mature and canopy gaps enable colonisation and so are excluded from this definition and the relevant test.

8 CONTINGENCY APPROACH

8.1.1 SZC Co. will provide 2.77 ha of new wet woodland habitats of which it is proposed that 0.7ha of wet woodland will be on site at the Estate and 2.07ha will be on the two fen meadow locations at Benhall / Pakenham.

8.1.2 In the event of failure to deliver all or part of the required 2.07 ha across the Benhall and Pakenham sites, SZC Co. will, from Year 10 onwards and with the agreement of the Ecology Working Group and subject to the approach set out in Section 7 above, deliver any shortfall to meet the total of 2.77ha on the Estate at either Aldhurst Farm or on the new wetlands which will have been established on the marsh harrier compensatory habitat area in the north-east of the Estate.

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The Sizewell C Project

9.8/ 10.31 Wet Woodland Strategy - Tracked Changes Version

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1 EXECUTIVE SUMMARY

1.1.1 The Sizewell C (SZC) proposals would lead to the permanent loss of approximately ~~3.06ha~~ 2.77ha of 'wet woodland' habitat from the Sizewell Marshes SSSI. This document has been prepared to define SZC Co's commitment to provide appropriate compensation measures for the loss of wet woodland habitat through the creation of compensatory wet woodland habitats.

1.1.2 Although wet woodland in the SSSI is of value in its own right, it is the importance of the wet woodland as part of the habitat mosaic for invertebrates which is regarded as of being of greater importance. It is for this reason that this strategy proposes delivering the majority of the wet woodland habitats at the fen meadow habitat compensation sites at Benhall and / or Pakenham. A total of ~~3.06ha~~ 2.77ha of wet woodland will be created with 0.7ha being created on the Estate and ~~2.36ha~~ 2.07ha being created between the Benhall and Pakenham sites.

1.1.3 The strategy sets out a series of actions, which include the creation of the wet woodland plan and a series of management actions, designed to create developing the offsite ~~2.36ha~~ 2.07ha of wet woodland within in ten year period. The strategy also describes the role of the Environment Review Group in relation to the strategy.

1.1.4 In the unlikely event that there is a shortfall in the ~~2.36ha~~ 2.07ha which is to be delivered between the Benhall and Pakenham sites after a ten year period, the balance of wet woodland would be delivered on newly created wetland areas on the Estate although this is not the preferred approach.

1.1.5 The strategy also includes some measures within the retained wet woodland in the Sizewell Marshes SSSI which will be used to enhance the age profile of the woodland to support invertebrate populations until the new wet woodlands are established.

1.1.6 Level 1 control documents will either be certified under the DCO at grant or annexed to the Deed of Obligation (DoO). All are secured and legally enforceable. Some Level 1 documents are compliance documents and must be complied with when certain activities are carried out. Other Level 1 documents are strategies or draft plans which set the boundaries for a subsequent Level 2 document which is required to be approved by a body or governance group. The obligations in the DCO and DoO set out the status of each Level 1 document.

1.1.7 This strategy is a Level 1 document. Pursuant to Requirement 14B of the dDCO, prior to any vegetation clearance within the Sizewell Marshes SSSI,

a Wet Woodland Plan (a Level 2 document) will be submitted for approval by East Suffolk Council, in consultation with the relevant Statutory Conservation Body and such plan must be in general accordance with this draft strategy and the **draft Wet Woodland Plan** (Doc Ref. ~~9.108~~10.13)).

1.1.8 Where further documents or details require approval, this document states which body or governance group is responsible for the approval and/or must be consulted. Any approvals by East Suffolk Council, Suffolk County Council or the MMO will be carried out in accordance with the procedure in Schedule 23 of the dDCO. The Deed of Obligation establishes the governance groups and sets out how these governance groups will run and, where appropriate, how decisions (including approvals) should be made. Any updates to these further documents or details must be approved by the same body or governance group and through the same consultation and procedure as the original document or details.

1.1.9 Where separate Level 1 or Level 2 control documents include measures that are relevant to the measures within this document, those measures have not been duplicated in this document, but cross-references have been included for context. Where separate legislation, consents, permits and licences are described in this document they are set out in the **Schedule of Other Consents, Licences and Agreements** (Doc Ref. ~~5.11(B~~5.11(C))

1.1.10 For the purposes of this document the term 'SZC Co.' refers to NNB Nuclear Generation (SZC) Limited (or any other undertaker as defined by the dDCO), its appointed representatives and the appointed construction contractors.

2 BACKGROUND

2.1.1 The Sizewell C proposals would lead to the permanent loss of approximately ~~3.06ha~~ 2.77ha of 'wet woodland' habitat from the Sizewell Marshes SSSI. This permanent loss arises from the size and location of the SZC main platform to the north of the existing Sizewell B station.

2.1.2 The Sizewell Marshes SSSI citation sheet (Ref. 1) describes Sizewell Marshes as being *'important for their large area of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates and breeding birds'*, and also that '*In addition, several areas of reedbed dominated by Common Reed Phragmites and alder carr occur*.' In relation to the extensive ditch system, the citation notes that '*the variety of ditch depths and widths, together with their fringing vegetation provide an important contribution to the site's habitat value for invertebrates and birdlife'* and more generally '*Sizewell Marshes are of exceptional interest for their invertebrate fauna, supporting a wide range of taxa and many nationally rare or scarce species.*'

2.1.3 Whilst wet woodland is not a habitat for which the SSSI is specifically designated, the *'exceptional ... invertebrate fauna'* is likely to be at least partly dependent on wet woodland habitats. Similarly, the combination of habitats including the open ditches, the unimproved fen meadows and the wet woodland, all present in close proximity is likely to be important in supporting the invertebrate interest. In **Table 14.9** of **Volume 2**, **Chapter 14** of the **Environmental Statement** (**ES**) [AS-033], wet woodland is noted as being nationally scarce habitat listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act (Ref. 2) and the Suffolk Biodiversity Action Plan (BAP) (Ref. 3).

2.1.4 It should also be noted that coppicing of mature alder (*Alnus glutinosa*) trees within the wetlands is regularly undertaken as part of the ongoing management of the Sizewell Marshes SSSI, under the existing site management arrangements agreed with Natural England. This is undertaken to increase light levels to ditch habitats of importance to invertebrates and some plant species. The key point in the context of this wet woodland strategy is that whilst individual alders are unlikely to be of importance in their own right, the presence of a mix of age classes of trees, including coppice regrowth, is of importance.

2.1.5 The DCO application submitted in May 2020 included an area of proposed wet woodland habitat in a new wetland area in the north-east of the main development site. This area of compensatory habitat provision will comprise 0.7ha of wet woodland and when successfully established will reduce the net

loss of wet woodland habitat to approximately ~~2.36ha~~2.07ha, for which no compensatory habitat was identified in the submitted application. Compensation for this residual net loss of ~~2.36ha~~ 2.07ha of wet woodland habitat is the focus of this strategy and together with the on-site 0.7ha provision, this will ensure a total of at least ~~3.06ha~~ 2.77ha of compensatory wet woodland habitats are provided.

2.1.6 This document has been prepared to define SZC Co's commitment to provide appropriate compensation measures for the loss of wet woodland habitat through the creation of compensatory wet woodland habitats. SZC Co. has prepared the **draft Wet Woodland Plan** (Doc Ref. ~~9.108~~10.13)), which in its final form, will be submitted to East Suffolk Council for approval pursuant to Requirement 14B before any vegetation clearance works within the Sizewell Marshes SSSI can be carried out.

3 SCOPE

3.1.1 This document addresses the compensatory habitats required for the permanent loss of wet woodland habitats from the Sizewell Marshes SSSI, associated with the construction of the Sizewell C nuclear power station. This impact is assessed in **Section 14.7** of **Volume 2**, **Chapter 14** of the **ES** [AS-033] and **Section 2.9 h) iii) a) a)** of the **Volume 1**, **Chapter 2** of the **First ES Addendum** [AS-181]**.**

3.1.2 This document does not address other potential impacts on the wet woodland habitats which are included in the **ES** and subsequent **ES Addenda**, as relevant. These other impacts, on wet woodland or the SSSI as a whole, are assessed in **Volume 2, Chapter 14** of the **ES** [AS-033], as identified in **Table 2.1** below.

Table 3-1: References to wet woodland impacts in Volume 2, Chapter 14 of the Environmental Statement

Impact	Paragraph references
Temporary 'land take' or other use of land associated with installation of replacement overhead lines	14.3.34, 14.4.16, 14.7.125, 14.7.130-131
Air Quality impacts	14,7,149-160
Hydrological impacts	14.7.139-148

3.1.3 **Section 2.9 h) iii) a) a)** of the **Volume 1**, **Chapter 2** of the **First ES Addendum** [AS-181] provides an updated assessment (and revised land take calculations) to reflect the changes to the SSSI crossing design and concludes, in paragraph 2.9.65 that the effects of habitat loss would remain as described in the **Volume 2, Chapter 14** of the **ES** [AS-033].

3.1.4 Mitigation measures for these impacts are defined within the ES as relevant and secured within the **Code of Construction Practice (CoCP)** (Doc Ref. ~~8.11(E)~~10.2) (secured by Requirement 2 of the dDCO) and are not considered further.

3.1.5 This document is concerned only with the strategy for the provision of compensatory habitats in response to the proposed permanent loss of wet woodland habitats from the Sizewell Marshes SSSI. It does not assess the loss which is addressed in **Volume 2, Chapter 14** of the **ES** [AS-033] and **Section 2.9 h) iii) a) a)** of the **Volume 1**, **Chapter 2** of the **First ES Addendum** [AS-181]**.**

4 THE NEED FOR COMPENSATORY WET WOODLAND HABITAT

4.1.1 The overarching National Policy Statement (NPS) for Energy (EN-1) (Ref. 4) and NPS for Nuclear Power Generation (EN-6) (Ref. 5) provide the primary policy framework within which the application for development consent will be considered. Several paragraphs within NPS EN-1 are directed towards the issue of impacts on biodiversity interests and, specifically, land take from SSSIs. Two paragraphs within the Annex to NPS EN-6 are of particular relevance to the issue of land take from the Sizewell Marshes SSSI, as follows:

Table 4-1: NPS EN-1 and NPS EN-6

Ref.	NPS topic requirement
EN-1 5.3.7	*'As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives []; where significant harm cannot be avoided, then appropriate compensation measures should be sought.'*
EN-1 5.3.11	*'Where a proposed development on land within or outside an SSSI is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), development consent should not normally be granted.* *Where an adverse effect, after mitigation, on the site's notified special interest features is likely, an exception should only be made where the benefits (including need) of the development at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of SSSIs. The [IPC] should use requirements and/or planning obligations to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site's biodiversity or geological interest.'*
EN-6 C.8.60	*'Some responses focused on designated sites including Sizewell Marshes Site of Special Scientific Interest (SSSI) and Leiston-Aldeburgh SSSI, and potential effects on Minsmere-Walberswick Heaths and Marshes SSSI, from which the site boundary includes some land-take. Some responses questioned how direct land take could be mitigated.'*

Ref.	NPS topic requirement
EN-6 C.8.63	*'The Appraisal of Sustainability identified the potential for the mitigation of biodiversity effects on sites of UK wide conservation importance (Sizewell Marshes SSSI), including the creation of replacement habitat. The Appraisal of Sustainability notes that developers could avoid or minimise losses and disturbance to protected species through careful site layout, design, routing, location of the development, associated infrastructure, and construction management and timings. The Appraisal of Sustainability finds that there is potential for habitat creation within the wider area in order to replace lost "wet meadows" habitats of the Sizewell Marshes SSSI, but also finds that it may not be possible to fully compensate for losses of this habitat. The applicant will need to develop an ecological mitigation and management plan to minimise the impacts.'*

4.1.2 The provision of compensatory wet woodland habitats using the approach outlined in this strategy responds to the requirement for compensation set out in EN-1 5.3.7 and aligns with the direction to '*develop an ecological mitigation and management plan to minimise the impacts'*. This strategy and documents which are developed in response to it form one element of such a plan.

4.1.3 The **Fen Meadow Strategy** ([Doc Ref. ~~6.14 2.9.D(A)~~10.16) and **Draft Fen Meadow Plan** (Doc Ref. ~~9.64(A)~~10.6) (secured by Requirement 14A) addresses the specific direction in EN-6 C.8.63 to develop *'an ecological mitigation and management plan'* to replace the '*lost "wet meadows"*'. There is no similar direction in EN-6 to provide a plan for wet woodland.

4.1.4 SZC Co. is proposing areas of compensatory habitat at three off-site locations. These locations have been selected and sized to deliver fen meadow habitats but two of these sites also have the potential to support the creation of wet woodland. The conclusion reached in the **Section 14.7** of **Volume 2, Chapter 14** of the **ES** [AS-033] and **Volume 1, Chapter 2, Section 2.9 h) iii) a) a)** of the **ES Addendum** [AS-181], in relation to land take of wet woodland from the SSSI, is that there would be no significant residual effect provided that a wet woodland strategy, which is successfully implemented, delivers compensatory wet woodland habitats.

4.1.5 Although wet woodland is of value in its own right, it is the importance of the wet woodland as part of the habitat mosaic for invertebrates which is regarded as of being of greater importance. It is for this reason that delivering wet woodland alongside other habitats such as fen meadow is preferable to delivering them at entirely separate sites (see Section 4). The **ES** includes

detailed assessments of the impacts on invertebrates of habitat loss in **Section 14.8** of **Volume 2**, **Chapter 14** [AS-033] and, as follows:

- Paragraphs 14.8.2, 14.8.25, 14.8.38, 14.8.58, 14.8.78, 14.8.98
- Tables 14.14, 14.15, 14.16

4.1.6 **Volume 2**, **Chapter 2, Section 2.9 h) iii) a) b)** of the **ES Addendum** [AS-181] identifies that whilst the changes to the application (accepted as part of the Sizewell C Project on 21 April 2021 [PD-013] and described in the **Change Notification Report** [AS-005]) will slightly reduce permanent land take of wet woodland and reduce the potential for fragmentation, the significance of the assessed likely effects are unchanged.

4.1.7 Based on National Vegetation Classification (NVC, Rodwell 1991 Ref. 6) survey data the wet woodland habitat within the Sizewell Marshes SSSI which will be lost to permanent land take can be placed primarily within the W5 woodland category (see **National Vegetation Classification Surveys 2020** [AS-021] for further details). The defining characteristic, in what can be a habitat of relatively low floral diversity, is the presence of alder and this species is used as an indicator of wet woodland establishment within this strategy (**Section 6** of this document).

4.1.8 W5 *Alnus glutinosa – Carex paniculata* woodland is described as *'A community of base-rich, moderately eutrophic, wet to waterlogged organic soils on topogenous or soligenous mires. It is associated with fen peats in open water transitions, flood-plain mires and basin mires where there is strong influence from base-rich ground waters'* (Ref. 7).

4.1.9 In order to compensate for the loss of wet woodland habitats from the SSSI, SZC Co. has considered those sites where the development of compensatory wet woodland habitats would be possible. This is discussed in the **Section 4** of this document.

4.1.10 SZC Co. is confident that it will be able to create the appropriate quantum of compensatory wet woodland habitats, given the suitability of the sites defined in **Section 4.** However, in order to provide further confidence that the loss will be adequately compensated for and to recognise the risks which might arise outside of SZC Co.'s control, contingency provisions, based on alternative delivery of these habitats on the Estate, are defined in **Section 7** of this document.

5 STUDIES TO DATE

c) Off-site compensatory habitats – Fen meadow sites

5.1.2 Three sites are included in the Sizewell C proposals, as defined in the **Fen Meadow Strategy** (Doc Ref. ~~6.14 2.9.D(A)~~10.16) and **Draft Fen Meadow Plan** (~~Doc Ref. 9.64(A)~~10.6), to develop compensatory fen meadow habitats as follows:

- Work no.6: Fen Meadow habitat at Halesworth.
- Work no.7: Fen Meadow habitat at Benhall.
- Work no. 18: Fen Meadow compensation site at Pakenham.

5.1.3 As defined within the **Fen Meadow Strategy** (Doc Ref. ~~6.14 2.9.D(A)~~10.16), the focus at each site will be the creation of fen meadow habitats to ensure the delivery of 4.14ha of compensatory fen meadow habitats at each site. However, at each of the three sites there are areas over and above the quantum required to deliver 4.14ha of fen meadow which could be used to develop wet woodlands. In general, the same ground conditions which are favourable to the creation of fen meadow are also favourable to the creation of wet woodland.

5.1.4 A further consideration in relation to wet woodland is the proximity to other existing wet woodlands in the vicinity as this provides the opportunity for natural habitat linkages and natural colonisation by plants and invertebrates. The Halesworth site is more remote from existing wet woodland, but both Benhall and Pakenham have wet alder woodlands within the site boundary.

5.1.5 The focus of this wet woodland strategy is, therefore, on the creation of at least ~~2.36ha~~ 2.07ha of new wet woodland at the two fen meadow sites of Benhall and Pakenham, whilst still delivering 4.14ha of fen meadow at those two locations. The creation of wet woodlands at these sites will create more diverse habitat mosaics at those locations which will, in the long term, be of greater value to invertebrates than if entirely new sites or locations had been identified. In discussion with ecology stakeholders, this integrated approach of co-locating habitats at the fen meadow compensatory habitat sites has been broadly supported.

5.1.6 Detailed site investigations are underway at these sites to monitor ground and surface water level flows and determine the management actions which will be described in the **Draft Fen Meadow Plan** (Doc Ref. ~~9.64(A)~~10.6). These investigations and the measures subsequently set out in the **Draft Fen Meadow Plan** (Doc Ref. ~~9.64(A)~~10.6) seek to maximise the extent of the

establishment of fen meadow at each site and have informed the preparation of the **Draft Wet Woodland Plan** (Doc Ref. ~~9.108~~10.13). These site investigations are outlined in the **Fen Meadow Strategy** ([AS-210] as updated by Doc Ref. ~~6.14 2.9.D(A)~~10.16) and are not repeated here.

b) Enhancement of Sizewell Marshes SSSI wet woodlands

5.1.7 In addition to the creation of new wet woodlands at the two sites detailed above, further mitigation will be undertaken in the remaining wet woodlands at Sizewell Marshes SSSI, to enhance the aged communities of wet woodland, while the off-site wet woodland habitats develop. This will enhance the value of the retained habitats to invertebrates and minimise the risk to species populations that may be dependent on particular age classes of trees. The approach will comprise:

- veteranisation of selected trees to accelerate the creation of standing dead wood;
- pollarding or coppicing of selected trees, with dead wood retained in the vicinity, variously stacked or loose; and
- any individual trees or tree groups managed as above will be agreed with Natural England under the SSSI assent process, under Section 28H(1) of the Wildlife and Countryside Act 1981 (as amended and inserted by section 75 and Schedule 9 of the Countryside and Rights of Way Act 2000).

c) Potential for on-site compensatory habitats

5.1.8 In addition, there are other opportunities to create additional wet woodland on-site. These are explained below and **Section 7** of this document explains that governance process that will determine where these additional opportunities will be taken.

5.1.9 Where habitats are lost, it is normally preferable to create compensatory habitats as close to the lost habitats as possible. This has been the approach used to create compensatory open water and reedbed wetland habitats at the Aldhurst Farm habitat creation site adjacent to Sizewell Marshes SSSI. However in 2015, it was concluded that there were no suitable areas within the Estate immediately adjacent to the SSSI which could be used to create fen meadow habitats (see **Fen Meadow Strategy** Doc Ref. ~~6.14 2.9.D(A)~~10.16). This is predominantly a function of the topography and soil types and that there are no low-lying areas within the small Leiston drain catchment, but outside the SSSI, which might be suitable for such a habitat

creation approach. The same is broadly true of wet woodland habitats, albeit that newly created open water and reedbed areas, such as part of the Aldhurst Farm wetlands, could be transitioned to wet woodland (see below).

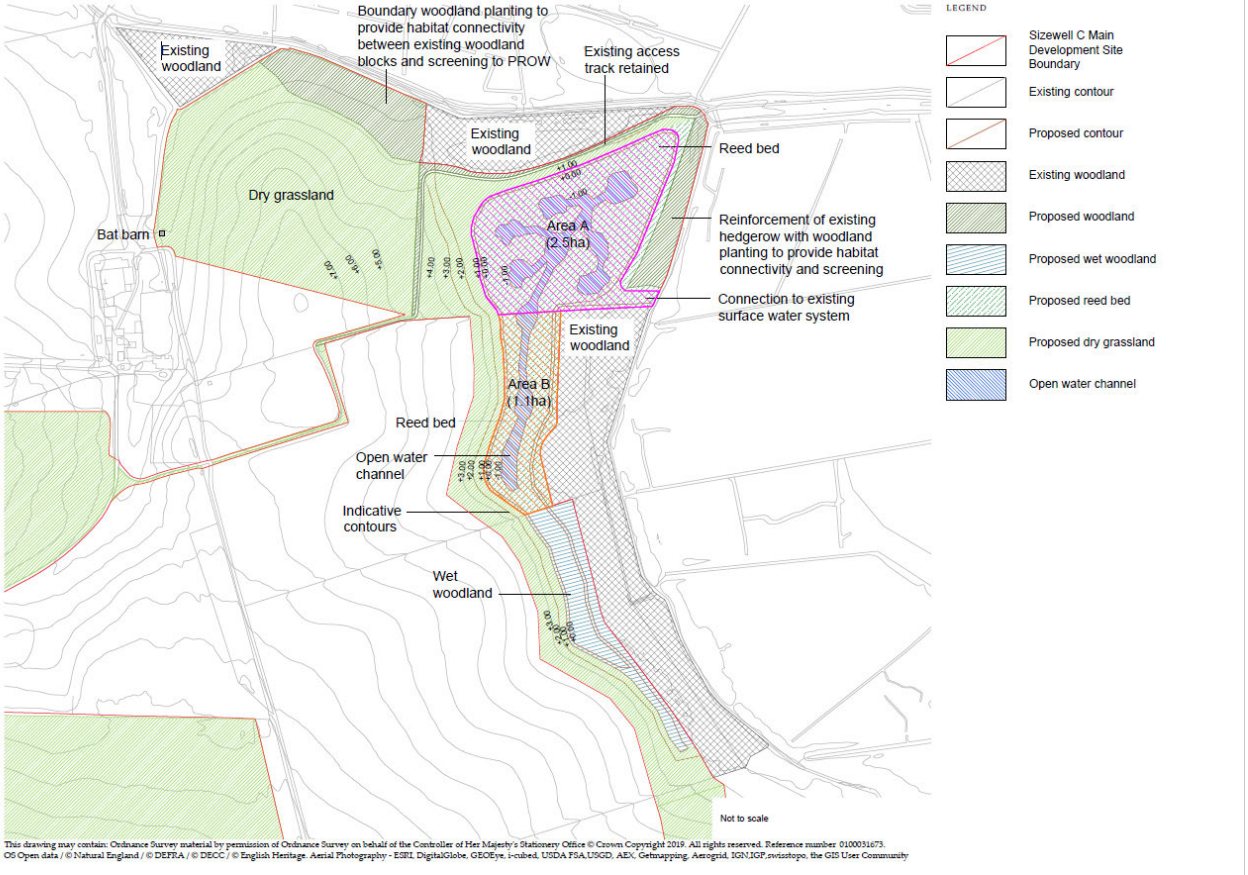
5.1.10 A proposal to create wet woodland habitat in a new wetland corridor in the northeast of the Estate~~-~~, within the marsh harrier habitat improvement area , is included within the Application. This will involve the reprofiling of existing landforms, primarily through excavation, to create a wetland corridor at the same level as the Minsmere South Levels to the east. This area would provide 0.7ha of wet woodland and 1ha of reedbed (see Plate 1 below).

5.1.11 In the original Application, a temporary water storage area was included to the north of the wetland corridor. However further design work has identified that the water storage area can now be temporarily located elsewhere on the construction site (see **Volume 2**, **Figure 2.2.13** of the **ES Addendum** [AS-191]). SZC Co. now will use the storage area's original proposed location to instead provide additional, permanent, fluvial flood mitigation using excavation of the existing topography. Wetland habitat will also be created in this area, comprising open water channels and wet reedbeds to provide high quality foraging habitats for marsh harriers and other species during the construction of Sizewell C. This area will be directly linked to the proposed permanent wetland habitat corridor immediately to the south, described above, to create a single integrated wetland feature, as illustrated in **Volume 2**, **Figure 2.2.14 of** the **ES Addendum** [AS-191] and in **Plate 1** below.

5.1.12 The flood mitigation area and wetland habitats will be constructed during winter in the first two years of the construction phase to ensure that there is no ongoing construction disturbance to foraging marsh harriers during the summer.

5.1.13 This area has longer term potential as wet woodland. Once the construction of Sizewell C is complete and compensatory marsh harrier foraging habitats are no longer required, the open water and wet reedbed habitats (Area A and Area B, 3.6ha in total) (**Plate 1**) could theoretically be transitioned, in large part, to provide additional wet woodland habitats, either through natural successional processes or through planting. Using at least ~~2.36ha~~ 2.07ha of this new wetland in addition to the 0.7ha to the south (see Plate 1) will compensate for the loss of ~~3.06ha~~ 2.77ha of wet woodland from the Sizewell Marshes SSSI. This could not be started until the end of the construction phase of Sizewell C.

Plate 1: Location of new wetlands



5.1.14 Ecological stakeholders, including Natural England, have indicated that the retention of these new open water and reedbed habitats as open water and reedbed habitats should be a priority rather than transitioning them to wet woodland habitat. This option would not provide the wet woodlands in close proximity to fen meadow habitats is therefore retained as a contingency provision only (see **Section 7**).

d) Aldhurst Farm

5.1.15 It would be theoretically possible to create an area of wet woodland habitat at Aldhurst Farm although this would be at the expense of an area of existing reedbed. However, the extent of existing reedbed which has been created in the new wetlands at Aldhurst Farm already greatly exceeds the extent of reedbed that will be lost from the SSSI. The Aldhurst Farm wetland includes approximately 5 ha of reedbed which has been successfully established,

compared with 2.93ha[1] of reedbed which would be lost to provide the Sizewell C platform. It is therefore considered that there is an 'over-provision' of approximately 2ha reedbed habitat at Aldhurst Farm, which could be repurposed to provide up to 2ha of wet woodland.

5.1.16 The potential for creation of wet woodland as part of the Aldhurst Farm wetlands has previously been discussed with Natural England. Delivery of wet woodland at Aldhurst Farm, if progressed, would be aligned with the creation of compensatory habitat in close proximity to the SSSI. However recent consultation with ecological stakeholders, including Natural England indicates a clear preference for retaining the newly created open water and reedbed habitats at Aldhurst Farm and in addition, would not provide the wet woodlands in close proximity to fen meadow habitats. For these reasons, this strategy focusses on delivery at off-site locations, albeit the option of delivery at Aldhurst Farm, as described above, is held for contingency provision (see **Section 7**).

e) Wet Woodland Plan

5.1.17 The **draft Wet Woodland Plan**, submitted at Examination Deadline 8 (Doc Ref. ~~9.108~~10.13), defines the management interventions required to create wet woodland habitats on the Benhall and Pakenham sites. The measures will include monitoring and any remedial interventions that may be required to ensure the successfully delivery of wet woodland of SSSI quality at relevant sites. The **draft Wet Woodland Plan** includes local groundworks to provide a range of topographic levels to enable the establishment of wet woodland. The **draft Wet Woodland Plan** defines further management measures including both fallen and standing deadwood which will be provided to represent the variety of niches available to the invertebrate communities in the woodlands at Sizewell Marshes SSSI. The final Wet Woodland Plan will be submitted to East Suffolk Council for approval in consultation with the relevant Statutory Nature Conservation Body pursuant to the dDCO Requirement 14B.

5.1.18 SZC Co. must implement the Wet Woodland Plan as approved, under the direction of the Environment Review Group (see below). Further details of the proposed approach are provided in **Section 6**.

[1] based on current and NVC mapping data, see **Volume 1**, **Chapter 2** of the **ES Addendum**, Table 2.19 [AS-182]

6 ESTABLISHING NEW WET WOODLAND HABITATS

6.1.1 This section outlines the approach for delivering compensatory wet woodland habitats, the interfaces with stakeholders and the monitoring and remedial actions which will be deployed to maximise the chances of successfully establishing the habitat.

6.1.2 Wet woodland establishment is likely to be a long-term endeavour and a ten-year programme of works is outlined below.

a) Ecology Working Group

6.1.3 An Ecology Working Group is to be established under the terms of Schedule 11 of the **Deed of Obligation** (Doc Ref. ~~8.17(G)~~10.4) and will be responsible for overseeing the establishment of the compensatory habitat works including the delivery of the final Wet Woodland Plan as approved by East Suffolk Council pursuant to Requirement 14B.

6.1.4 Further details of the role of the Ecology Working Group are included in Schedule 11 of the **Deed of Obligation** (Doc Ref. ~~8.17(G)~~10.4) and the role of the Group will include:

- reviewing a draft final Wet Woodland Plan to enable it to be finalised for approval by ESC pursuant to Requirement 14B;
- approving or amending the actions required for the capital works in the first year of the habitat creation at the relevant sites;
- on an annual basis, reviewing progress against the success criteria outlined below; and
- in the event of failure to meet the success criteria, to advise SZC Co. how the contingency measures are then deployed.

c) Site Establishment

6.1.5 The Wet Woodland Plan (in general accordance with this strategy and the **Draft Wet Woodland Plan** (Doc Ref. ~~9.108~~10.13) secured pursuant to Requirement 14B) will define the precise works to be undertaken by SZC Co. within 12 months of commencement of development under the DCO (the 'Year 1 works').

6.1.6 The Year 1 works will include, but not be limited to, the works listed below and will be aligned as relevant with the works required pursuant to the Fen Meadow Plan approved pursuant to Requirement 14A:

- Any further ecological surveys required[2] to further inform final design proposals and or protected species mitigation or monitoring requirements.
- Site acquisition and establishment of any required access or works compound.
- Any required ground works, such as reworking of ground levels, removal of field drains or re-alignment of surface drains or ditches, preparation of substrate if required. Natural England consider the following points to be fundamental to the success and acceptability of the proposed compensation and they will therefore be accounted for in developing the Wet Woodland Plan:
  - high quality wet woodland will develop in the same situations as high quality fen meadow (i.e. the absence of elevated nutrients and permanently high water table albeit without cutting or grazing). Consequently, many of the same activities are likely to be required including topsoil removal if enriched; and
  - it is noted that the re-establishment of natural hydrological regimes will provide the greatest likelihood of success and resilience in the establishment of wet woodland. Minimal water level controls will aid the restoration of natural flows and are likely to form an important part of the approach.
- Any required installation of monitoring equipment, such as boreholes or gauge boards.
- Establishment of target water levels.
- Installation of fencing / gates as required to define the subsequent management units and in accordance with any land agreements.
- The preferred approach to creating wet woodlands, as defined in the Wet Woodland Plan, will be via natural regeneration of woodland in suitable areas by extending adjacent wet woodlands into the chosen sites. Natural regeneration and expansion of wet woodland is likely to be more resilient and have greater biodiversity than a planted woodland. Initially this regeneration would include development of wet scrub and species such as grey willow (*Salix cinerea*) and alder are then be expected to colonise

[2] Noting that ecological surveys have been or are being undertaken in the period 2019-2021 at each site in any event to inform the Draft **Wet Woodland Plan** (Doc Ref. 9.108~~)~~(A))

once the willows are established. Planting of wet woodland species will only be undertaken in agreement with the Ecology Working Group and only if it is apparent that natural regeneration of wet woodland has not been successful.

d) Management – Years 2-5

6.1.7 The Year 2-5 works, at the relevant sites will include, but not be limited to, the following and will be aligned as relevant with the works required pursuant to the final Fen Meadow Plan:

- Monitoring and remedial works to any of the infrastructure installed in year 1 and any ongoing required management actions identified to optimise the water levels and ground conditions for the establishment of the target habitat, aligned as relevant with the Fen Meadow Plan (approved pursuant to Requirement 14A).
- Habitat monitoring.

e) Management – Years 6-10

6.1.8 Year 6-10 works at the relevant sites, will include, but not be limited to the following and will be aligned as relevant with the works required pursuant to the final Fen Meadow Plan:

- Any ongoing required management actions identified to optimise the water levels and ground conditions for the establishment of the target habitat.
- Habitat monitoring.

6.1.9 Success at any given site will be determined in Year 10[3] or sooner, as follows, for each site:

- Completion of works defined above for Years 1-10.
- Establishment of the target water levels, in accordance with the Wet Woodland Plan (approved pursuant to Requirement 14B), aligned as relevant with the Fen Meadow Plan (approved pursuant to Requirement 14A).
- Establishment of developing wet woodland habitat, as determined by quadrat survey, at the relevant site.

[3] Year 10 defined in the ~~s106 agreement~~ Deed of Obligation as 'the 12 months following the tenth (10th) anniversary of commencement of Work No. 1A in Schedule 1 to the Development Consent Order'

- Establishment of a long-term management plan which will be agree with the Ecology Working Group to maintain the newly established and developing wet woodland habitat for the operational lifetime of the Sizewell C Project. Fen meadow habitats are proposed at each site and the long-term management plan will therefore be integrated across both target habitat types. The long term management plans will target the establishment of the vegetation establishment and also the establishment of a diverse community of wet woodland invertebrates.

6.1.10 These criteria will determine whether habitats are successfully establishing at the relevant site, such that in the longer term, the establishment of mature wet woodland is considered apparent. The spatial extent of establishment will be mapped and the area of developing wet woodland habitat calculated.

f) Management – Year 10 onwards

6.1.11 Year 10 and onwards works at each of the relevant sites will comprise management in accordance with the long-term management plan agreed with the Ecology Working Group**.**

7 THE TEST OF SUCCESS

7.1.1 The critical metric is the establishment, by Year 10, of at least ~~3.06ha~~ 2.77ha of developing wet woodland[4] habitat within the onsite wetland corridor (0.7ha) and across the fen meadow sites at Benhall and Pakenham (at least ~~2.36ha~~2.07ha). It is acknowledged in this strategy that trees will not be fully mature by Year 10 and the wet woodland will not be mature by that stage.

7.1.2 Provided that ~~3.06ha~~ 2.77ha of developing wet woodland has been established by Year 10, with the long term management plan agreed with the Ecology Working Group in place to secure this compensatory habitat for the operational lifetime of the Sizewell C Project, then the Wet Woodland Plan (as approved pursuant to Requirement 14B) will have been successful in the context of vegetation establishment.

7.1.3 By or before Year 10, relevant information will be submitted to the Ecology Working Group for the Group to determine whether the target quantum of ~~3.06ha~~ 2.77ha of developing wet woodland has been achieved in accordance with the criteria set out at paragraph 5.1.11 above.

7.1.4 If ~~3.06ha~~ 2.77ha of developing wet woodland habitat has not been established, or is not demonstrably in progress towards this end state, via the process of habitat succession, by this time, the contingency approach detailed in **Section 8** will be triggered, subject to the decision of the Ecology Working Group to pursue this course of action. The Ecology Working Group has the option to defer this course of action, to enable further progress towards establishment of the wet woodland habitat.

7.1.5 In Year 10, or in a later year, as determined by the Ecology Working Group, the Group will also review and endorse as relevant the long-term management plan for each site where developing wet woodland habitat has been successfully established.

The establishment of a diverse insect assemblage characteristic of wet woodlands, in the newly created wet woodland habitats, will inevitably be a long-term process, extending beyond Year 10. The monitoring approach and success criteria for the establishment of the invertebrate assemblage will be set out in the final Wet Woodland Plan and also included in the long-term management plan.

[4] Developing wet woodland is here defined as 'wet woodland which meets the definition of W5 within the NVC in respect of tree and shrub components'. Herbaceous species are only likely to achieve frequencies associated with W5 once the trees are more mature and canopy gaps enable colonisation and so are excluded from this definition and the relevant test.

8 CONTINGENCY APPROACH

8.1.1 SZC Co. will provide ~~3.06~~ 2.77 ha of new wet woodland habitats of which it is proposed that 0.7ha of wet woodland will be on site at the Estate and ~~2.36ha~~ 2.07ha will be on the two fen meadow locations at Benhall / Pakenham.

8.1.2 In the event of failure to deliver all or part of the required ~~2.36~~ 2.07 ha across the Benhall and Pakenham sites, SZC Co. will, from Year 10 onwards and with the agreement of the Ecology Working Group and subject to the approach set out in Section 7 above, deliver any shortfall to meet the total of ~~3.06ha~~ 2.77ha on the Estate at either Aldhurst Farm or on the new wetlands which will have been established on the marsh harrier compensatory habitat area in the north-east of the Estate.

REFERENCES

1. Sizewell Marshes SSSI citation. Available at: [redacted]

2. Natural Environment and Rural Communities Act. 2006. (Online). Available at: [redacted] (Accessed 1 March 2019).

3. Suffolk Biodiversity Partnership. Suffolk Local Biodiversity Action Plan. May 2012. (Online). Available at: [redacted] (Accessed 7 February 2019).

4. National Policy Statements for energy infrastructure: National Policy Statement for Energy (EN-1). Available at: [redacted] (Accessed 12 March 2019

5. National Policy Statement for Nuclear Power Generation (EN-6). July 2011. Available at: [redacted] (Accessed 12 March 2019).

6. Rodwell, J.S. (ed.) 1991. British Plant Communities. Volume 1. Woodlands and scrub. Cambridge University Press. Available at [redacted]

7. JNCC, National Vegetation Classification field guide to woodland. Available at: [redacted]

7. Susan Osben – 3 December 2021

From: [redacted]
To: SizewellC
Cc: [redacted]
Subject: Sizewell C
Date: 03 December 2021 22:24:10

Dear Planning Inspectors,

I'm writing to you tonight with a final plea that you recommend that planning consent should not be granted to the proposed Sizewll C development.

In times when we are increasingly learning about the detrimental effects of our actions on our planet, it would be a tragedy if this project went ahead.
It will devastate vast swathes of our beautiful AONB without delivering many of the supposed benefits. It is a misguided project in the wrong place, and would not be built quickly enough to solve the UK's predicted fuel demand shortfall.
The project is costly beyond belief, money which could be better spent investing in a cohesive renewable strategy and developing ways to store power efficiently.
Nuclear energy is not "green". There is no solution to the waste and this is a toxic legacy to leave for future generations.

All over the world, people are realising that the time to act to save our planet is now. The Earthshot pledge to protect and restore nature notes that "Species all over the world face extinction as their homes are destroyed, but destroying nature threatens our lives too.
Forests and natural land are vital to human health and happiness, helping to prevent global warming and producing oxygen that we breathe. We must act now to protect our future.
We choose to repair and preserve the habitats that our animals need to live, from rainforests and grasslands, to wetlands, lakes and rivers."
Destroying precious habitats runs counter to this and is avoidable by choosing to locate any large nuclear projects, if anywhere, on brownfield or industrial sites, not in wonderful and beautiful natural areas.

Others have argued about the unsuitability of the EPR reactor with much more understanding than I could, but it is clear to the lay person that the technology has an appalling track record.
The Suffolk coast does not have the infrastructure to support a project of this scale.

EDF have not been able to confirm many of their plans, with so many changes introduced as the DCO process has progressed and even now their proposals are full of 'ifs' and uncertainties.

I would end with the words of Simon Armitage, the poet laureate:

so the peloton passed
like a line from a poem
across the eye,
millipede legs
scuttling for Holme Moss |
we trod in its slipstream,

authorised trespass,
the main road
cordoned-off

to petrol and piston,
the tarmac kindly and warm
to our bare feet,

an asphalt fairway
vaulted by sycamore, rowan, beech,
woods to both sides

reinstated as woods |
when a thought approached
in the form of a child

tightrope-walking the white lines
between cats' eyes | she said:
If I breathed the word
that disappeared all people
in the world,
leaving the world
to the world, would you
say it? Would you
sing it out loud?

Kind regards,
Susan Osben
[redacted]

Int Party ref 20026324

8. Dawn Lacey – 17 December 2021

From: [redacted]@btconnect.com
To: SizewellC
Subject: Sizewell C Planning Application
Date: 17 December 2021 19:26:14
Importance: High

To whom it may concern
A lot has happened within the last few months.
Concerning North Sea beach landslides not far from existing Sizewell B and proposals for C/D
Scientific facts proving sea levels are rising quicker than anticipated.
Plutonium nuclear reactor leaks in France
Continual global problems with EDF's current EPR design.
With EDF shares plummeting.
COP26 promises are NOT enough to curb global warming.
Many EU countries have realised that EDF's EPR nuclear energy reactors are not a responsible way forward, proving to be a financial burden and come with global safety concern.
EDF's EPR DESIGN IS DANGEROUS.
IT IS NOT GREEN
AND WOULD BE FINANCIALLY CRIPPLING FOR CONSUMERS
BUT MOST IMPORTANTLY FUTURE GENERATIONS FACE CATASTROPHIC EFFECTS, NOT ONLY DUE TO GLOBAL WARMING BUT ALSO WILL HAVE THE HUGE PROBLEMS OF NUCLEAR WASTE.
Thank you for taking time to read this.

9. Wickham Market PC – 17 December 2021

From:	[redacted]@btinternet.com
To:	SizewellC
Cc:	enquiries@beis.gov.uk; [redacted]
Subject:	Sizewell C Wickham Market PC Post Examination submission
Date:	17 December 2021 11:29:00
Attachments:	EN010012-WickhamMkt PC-Post-examination-submission-2021-12-17.pdf

Dear PINS, please find attached the Parish Council's post examination submission outlining the follow up to the Wickham Market PC Deadline 10 submission.
At Deadline 10 we explained that EDF had just commenced a local consultation on traffic impacts and proposals affecting the village; the results of which would be available after the end of the Examination.

We understand that this submission will be passed to the Rt Hon Kwasi Kwarteng for consideration and would be grateful if this was the case.

Regards

Anne Westover BA Dip LA CMLI

Anne Westover
Wickham Market Parish Councillor
[redacted]

Cc BEIS enquiry email
Dr D Poulter, MP
WMPC Chair Mr I French

[redacted] This email has been checked for viruses by Avast antivirus software.
[redacted]

WICKHAM MARKET PARISH COUNCIL



Chairman: Cllr Ivor French
Parish Clerk: Alistair Besly
E-Mail: wickhammarketparishclerk@gmail.com
[redacted]

SIZEWELL C: Application for Development Consent Order ADDITIONAL SUBMISSION 17th December 2021

To: Rt Hon Kwasi Kwarteng MP sent via Planning Inspectorate

This is a summary and update of the WMPC concerns, most of which have been highlighted in our submissions to PINS made throughout the Planning Examination. We have complied with all relevant deadlines from PINS for Wickham Market Parish Council (WMPC) and spoken at the Examination hearings raising issues of serious concern to Wickham Market and its parishioners.

The southern park and ride (SP&R) facility has been placed in a location which results in Wickham Market being in an extremely vulnerable situation with respect to increased traffic volumes.

In the WMPC deadline 10 submission we provided update on the Traffic Scheme consultation which EDF were carrying out for our village, launched on 27th September (25th October) and highlighted the following:

"We have established that the Summary/Conclusion of this consultation will be available (prepared by EDF) in early November.

However, this will be too late to submit to PINS and the Examination panel for consideration in any detail. Given we had pressed EDF to commence dialogue with the WMPC in late 2019 this timing is extremely disappointing and results in this Wickham Market scheme not being considered within the remit of the Examination. It is also confusing for our residents who feel somewhat let down by the process and the lateness of the consultation".

A public event facilitated by EDF and their traffic consultants as part of the traffic consultation took place over the weekend of 9th and 10th October in the village hall. WMPC felt it was important to consult with the residents of Wickham Market despite not being satisfied with the mitigation on offer; indeed, it is impossible to successfully mitigate for the traffic impacts which will arise from the SZC project.

The Questionnaire sheet presented five questions, so the results presented to WMPC by

EDF in November gave an indication of the opinion on the whole scheme, though comments allowed respondents to raise any other issues. The survey cannot be treated as a referendum on the scheme.

- The loss of parking was seen as a serious issue by affected residents. The measures which EDF are keen to promote will involve removing on street parking for residents on the High Street and Broad Road. This amounts to some 40 spaces in streets with no alternative locations for parking available. Residents in social bungalows on Broad Road have allocated spaces several of which are proposed to be removed with 11 car spaces removed along this length of road. EDF have not made any serious attempt to seek or provide alternative parking. EDF's traffic consultants have been dismissive of comments regarding loss of on street parking and have recently stated that is it the responsibility of WMPC to find solutions to this situation.
- The shared cycle path raised some concerns, the lack of any detail makes it impossible to fully assess the effectiveness of the route or otherwise.
- Respondents suggested a 20mph speed limit was necessary to reduce speeds throughout the village and improve highway safety. WMPC have previously pressed for this essential speed reduction but have met with an ongoing reluctance by EDF and SCC Highways.
- Some serious concerns were noted regarding the build outs and informal crossings points particularly as these will also necessitate removal of on street parking.
- There are several driveways and lanes off the High Street with low visibility and the changes are likely to make their use and safety ever more challenging.
- Our Post Office business is particularly concerned about the impacts arising from traffic congestion and any build outs which might impede their access. Clients can often be displaced and not return following disruption to accessibility.

The traffic through Wickham Market has become noticeably heavier over recent years. We fear that traffic will continue to increase and the B1078 will not be able to absorb the additional 1050 cars per day without causing serious disruption to residents and businesses. There will be cumulative impacts arising from other developments including from the other energy infrastructure schemes running through the planning process.

WMPC have submitted reports outlining feasible methods that EDF could use to monitor traffic to the SP&R. These could assist with keeping vehicles on the major routes, A14 and A12 rather than cutting across country. However, we are disappointed by EDF's lack of engagement on this topic despite some early discussions regarding the proposals. WMPC are also concerned by the lack of proposals to manage the routes which LGVs will use to access the postal consolidation facilities at the SP&R. Such vehicles will use various routes including the B1078 causing further pressure. It was hoped that EDF would monitor such vehicles, but they state that this is not possible (as with private cars).

We have suggested that extensive monitoring of traffic before and during Sizewell C construction is required so that the source of traffic can be determined. This could give an indication if more traffic was diverting onto the B1078 in preference to the A12.

Throughout the consultation we have been somewhat disappointed by the limited support offered by East Suffolk Council regarding the community and local environmental/amenity impacts arising from the proposals. With respect to Suffolk County Council they have undertaken much appreciated support in chairing the meetings with EDF. However, it has often been challenging to convey the significant concerns and daily experiences regarding traffic impacts. Holding virtual meetings and with only limited opportunity for site visits has

not assisted the situation. It is extremely unfortunate that the joint local authority and parishes (known as JLAG) meetings were discontinued after the last one took place online in July 2020. Since then there has been no collective local authority led District wide forum or support for debating issues of common concern.

WMPC maintain our objection to the SZC project owing to the considerable adverse direct impacts it will present for our Parish and residents. This is due to the significant additional traffic volumes which will be experienced during the long period of construction, both through the village, parish and on the A12 bypass.

In summary for Wickham Market, it is estimated by EDF that there will be up to 1,050 additional daily car and LGV movements through the village during its highest peak of construction. Whilst Wickham Market PC and the neighbouring parishes have worked with EDF to try to secure some mitigating measures we remain and are increasingly concerned over the impacts on village roads, businesses, and residents all as set out in previous submissions. You will have noted the submissions made by local residents who experience the current traffic situation daily.

Congestion in Wickham Market is already a problem and despite the proposed measures, drivers will face continuing and exacerbated delays when travelling through the village. HGVs are ever present on our roads and one can see each day how these vehicles create problems for the movement of other traffic along the High Street. Shift traffic (operating 24/7) will both exacerbate this congestion (with resulting air pollution/noise) and will often be held up by HGVs/delivery vehicles already travelling through the village, buses, refuse trucks and regular farm vehicles.

When the site at Hacheston was initially chosen, EDF did not appear to fully contemplate the significance of the traffic impacts on Wickham Market. The site was almost doubled (650 to 1250) in size following removal of an additional site proposed beside the A12 in Woodbridge/Melton. In addition to the adverse traffic impacts which will come about as a result of its location and size WMPC have also made very clear the considerable adverse landscape and visual impacts which will arise from the SP&R.

WMPC urge you to support the request by AEPA to attend a Parishes meeting to hear directly from the Parishes and consider the wider cumulative infrastructure impacts which will arise from SZC (and other projects). It was unfortunate that the date scheduled for 29th November (with Declan Burke) had to be cancelled for Covid reasons, but we anticipate a positive response from you and hope that a meeting early in 2022 will be possible.

Wickham Market Parish Council
17th December 2021

Examination
Documents have been submitted at Deadlines 1 -10 except for Deadlines 4 and 9.
Library references are as follows:
Rep1-191
Rep2-491
Rep2-492
Rep2-493
Rep3-151
Rep5-304
Rep6-080
Rep7-260
Rep8-292
Rep10-437

10. Mike Taylor – 21 December 2021

From: [redacted]
To: SizewellC
Subject: Sizewell C information
Date: 21 December 2021 09:20:19
Attachments: Observations on SZC ONR outstanding issues for resolution.odt
HPGE202110052 - Sizewell C - Response - 4 November 2021 (1).pdf

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IP 20025871

Dear Kathryn Dunne and Case team.

I have taken an active interest in the SZC case and as a member of the Office of Nuclear Regulation (ONR) /NGO forum and BEIS/NGO forum have maintained contact with both, throughout and prior to, the Sizewell C PINS DCO process.

I note your letter to BEIS dated 16 December 2021 requesting more time for the reporting stage.

As a member of TASC and personally, I would like to draw to your attention information on the site licencing process and concerns raised with ONR, some of which refer back to policy EN6, but mainly relate to lack of information from the developer, to be received by ONR at a later stage.

Please see attached original letter from ONR dated 4th November which represents the latest situation form ONR, and my response. For information in the hope it may throw some more light on outstanding matters.

Kind regards and best wishes for the festive season.

Mike Taylor

Sent from [redacted]

Observations on SZC ONR outstanding issues for consideration by PINS/ SoS.

Preamble

TASC previously had pointed out to BEIS through BEIS/NGO forum that it is essential that regulatory permitting and site licencing progress should feed in to the Planning Decision (ref Annexe 11 PINS guidance) to enable the SoS to make a properly informed decision based on all the facts. BEIS appeared to have misunderstood this essential requirement as evidenced by a letter to us from BEIS. It is now clear that this alignment may not happen because we understand that the EA permits and ONR licencing cannot be completed until end 2022. This would have avoided conflict between Planning and Regulation, a unique situation with Nuclear Power and emphasises the need, pointed out by many NGOs, for a proper review of the EN6 planning process and its overarching documents EN1-5 to have taken place prior to first consultation or at minimum prior to the developers DCO application. A planning review of EN6 finally started in December 2017 but was stalled by BEIS. Prior to that we had asked for a review of all Energy Policy as Coal had been removed. We recognise the important role of the ONR in the highly complex site Licencing (NSL) and Radiological Substance Regulation work [redacted] and [redacted]

This work may have started earlier than the PINs process but in our opinion still relies on proper design and accurate scale drawings of all the development site. The drawing in the application for NSL is we consider inadequate. The reactor design and acceptability of its performance and the company structure and financing must be known. Throughout the planning process, and prior to it, TASC has pointed out to BEIS officers that the consultation drawings were inaccurate, not based on the OS grid, but on google maps which were difficult to read. We have also raised concerns about the Regulators Code, which we believe is inappropriate, where professional opinion can be overridden in the interest of the industry. We equated this to the Grenfell tragedy where regulation may have failed. The risks from nuclear are evident UK and worldwide and there are, in our opinion, many unanswered questions related to health and environmental impacts. TASC is disappointed that the Local Authorities did not agree with our (and others assessment) of the consultation details and accepted that the Statement of Community consultation (SOCC) was adequate.

The following are extracts from ONR letter to MJT dated 4th November 2021 and observations from MJT. ONR verbatim and TASC MJT response in Red

"HPGE202110052 –Sizewell C (SZC) Thank you for your letter of 12 October 2021 and taking the time to raise these matters with us; please see below information on the points you raise.

Operator of SZC and Policy In terms of the SZC Development Consent Order (DCO) process we are a statutory consultee and as such have provided written representations to the Planning Inspectorate and responded to any questions from them. As you know, the scope of the DCO process is much wider than our legal vires, with only a limited amount of overlap. The main aspects of the DCO process where we have an interest include: • consistency with Government siting policy; "

TASC We understand from conversations with ONR officers that there had been no involvement of ONR in the BEIS decision that there was to be no change to existing EN6 policy criteria.

"• emergency planning, including taking account of input from relevant Local Authorities;"

TASC We believe that the emergency plan was altered to allow SZC to happen. BEIS officers had agreed that the DEPZ for SZB is 3-4 kms not a two-stage plan as currently adopted by EDF/SCC. The need for a 30 kms OPZ has never been consulted on. There have been approx. 540 dwellings planned for Leiston alone over and above the original development planned when consultation first started. Currently none of those built are social housing at an affordable rent. It must be assumed therefore that the Local Authority has encouraged substantial inward migration to the town, contrary to the spirit of restraining development in the vicinity of Nuclear Power stations.

"• any potential impact on or from the adjacent Sizewell B;"

TASC Raised concerns about existing SZA and B Planning lines and planning consents and conditions, flood risk, noise and vibration, ground conditions, use of cranes, security impact on grid.

"• external hazards (their impact on the proposed development); • additional matters related to National Policy Statements for nuclear power, for example access to required infrastructure and resources for nuclear safety purposes."

TASC. Apparently no consideration of the potential impacts on grid stability and grid stress due to climate and loading has been undertaken by National Grid, including cumulative impacts of additional wind farms.

"and • progress with our assessment of the Nuclear Site Licence (NSL) application."

See link above on the complex site licencing process.

"Turning to licencing, we use the guidance set out in Licensing Nuclear Installations for the NSL assessment. As you appreciate, the granting of a licence will not itself permit the licensee to commence nuclear safety-related construction on the site; further permissions from us, as specified, will be required before construction commences. This ensures adequate regulatory controls against the points outlined in your letter. In respect of construction detail, SZC has the benefit of being able to progressively gather learning on constructability challenges from the Hinkley Point C (HPC) project. We anticipate this will continue throughout the construction of HPC and that learning will be systematically captured from other EPR™ and relevant projects across the world."

TASC This is an indication that until HPC is completed (if ever) and all Assessment findings closed out along with the suitability of the UK EPR reactor in final service, that there can be no certainty in the financial outcome or suitability of the Sizewell site. It would be wholly inappropriate for a decision to be made by a Minister without full understanding of the Licencing and regulatory findings.

"For nuclear site licensing, ***we are*** assessing the suitability of the site for the engineering and infrastructure requirements of the facility and ***therefore do not expect in-depth construction details at this time".***

TASC Whilst it may not be an ONR requirement surely without the construction details how can the site be properly quantity surveyed and an accurate material and design specification be finalised. This could have a Major potential impact on transport and costs, impacting RAB funding.

"As part of this licensing assessment several key ***areas are currently under consideration***. These are whether:

• the site is of a sufficient size to accommodate all necessary systems to ensure safe operation (including your point on two EPR™ reactors on the same site)"; TASC notes 2011 EN6 policy at C8.89

• the site can be connected to the electricity grid supplies;

•That there is adequate cooling capability for all normal and fault conditions; "

TASC and fisheries expert PH had identified that the impacts on fisheries from the direct cooling of nuclear reactors like Sizewell B was underestimated. Previously TASC had pointed out that CEFAS, a government (DEFRA) sponsored company had a potential conflict of interest, having been engaged by EDF. Coincidently CEFAS were also involved in disagreements over the removal of fish deterrence case at HPC. The HPC cooling system was decided to be best available technique in 2012 but subsequently it was discovered that direct marine cooling was banned in the US for new plant. Again it would have been helpful if this BAT for cooling would have been investigated by the Environment

Agency at the 2017 review. Clearly damage to the marine environment needs a greater emphasis particularly because of climate change.

"• the environmental conditions would not preclude the use of the site with respect to external hazards; • the geology of the site will provide a secure long-term support to the necessary structures, systems and components; • there is a schedule for submission of the future safety case to support subsequent construction milestones; and • that operations of the site, including during construction, will not adversely affect the safety case for any adjoining nuclear licensed site (Sizewell B)."

TASC believe much of this information should have formed part of a Site Justification report ONR LNI condition 14 and 16 (guidance ref 67) [redacted]

supplied as part of the licence application, consistent with the DCO application, and to allow concurrent assessment. This is particularly important as the Government had also failed to update EN6.

"Siting SAP ST.6.2 sets out our expectations relating to the size of the site to accommodate operations. Considerations related to the size of the plot for development are expected to be covered as part of the site justification report.

Potable Water SZC's DCO documentation on the desalination plant states that the plant will be a temporary infrastructure to provide water during the construction phases of the project until the Northumbrian Water Limited (NWL) transfer main work is completed. It is therefore our current understanding that there should not be an issue with the availability of potable water to meet safety case requirements once fuel is delivered to site. If this position were to change, SZC would have to demonstrate through its safety case that it has an adequate potable water supply. Our future engagement plans with SZC will set out some of the key topics to be assessed in the applicant's safety case submissions. We would expect the requirements and availability of potable water and the elements important to nuclear safety to be considered at an appropriate stage in the development of the safety case."

TASC believe that the provision of a potable water supply is so fundamental to the safety of the operating plant and for construction that it would be very wrong to permit or commit to construction at this location. It is not proven that using desalination ie abstracting water in the vicinity of a live NPS is environmentally acceptable. The 1993 SZC Environmental Statement prepared by Nuclear Electric refers to potable water by desalination for construction and outages. During initial trials, on a completed reactor, vast quantities of water are needed for flushing of pipework as evidenced at Sizewell B. We pointed out to BEIS at review of EN6 in 2017 that IAEA siting criteria which includes potable (town) water should be adopted.
[redacted]

The ongoing current review of EN1 may finally have understood that potable water is a critical criterion, especially in view of climate change. We believe this is also a Human rights issue.

"Changes to plans We recognise that an adequate characterisation of the site is an important consideration for NSL, and we are learning from previous projects, for example the characterisation of the HPC site. However, it is also recognised that any site characterisation can never identify everything about the site and new information may be revealed once construction starts."

TASC members and others including a specialist Geotechnical expert believe that SZC Co withheld known data on the site, declaring it as confidential, when in fact some data was already in the public domain. Ground stability during the construction of Sizewell B was also a significant problem.

[redacted]

[redacted]

"Our guidance related to this is captured in Ground Engineering, Geotechnics and Underground Structure Design Technical Assessment Guide; TAG 17 Annex 3.4 This sets out our expectations that the licensee will update their ground model based on information gathered during construction. Our guidance states that; "an updated ground model and geotechnical risk register are key outputs of a ground investigation. During construction, this model may be changed as a result of the formation levels and strata which are exposed in the excavation work. This information may validate the model, but where the exposed strata are not as anticipated, the model should be updated to record the actual site conditions". This is a key area of our ongoing assessment for nuclear site licensing, and to date we have not identified any areas of concern."

"Regulators Code Please let me reassure you on the points you raise about the Regulator's Code. The code acknowledges circumstances where regulators may not be able to follow all of its provisions, for example decisions concerning safety and security, and that they will not be bound by the provision where these considerations justifiably outweigh provisions of the Regulators' Code. We do not put the requirements of the code before safety and security, nor are we influenced by any wider political pressure.

Climate Change As referred to earlier, the environmental conditions faced by the site, including appropriate consideration of climate change, are a key point of our assessment for NSL which is ongoing, which will be assessed against our published guidance, including TAG13 External Hazards"

TASC responded to a recent consultation on revised TAG 13 we believe climate risks are so urgent that they must be revised and incorporated urgently. MJT e mail to PINS refers [redacted]

"5. **Adequacy of Drawings** As part of the NSL application, SZC has submitted the proposed Nuclear Site Boundary map (see page 344), which includes grid references. "

TASC and many others have complained about the adequacy and standards of SZC Co. mapping which generally excludes OS grid references and lines, pointing out that for such a sensitive site involving previous planning lines, location of Sizewell B and its protection features, loss of SSSI negating biodiversity net gain claims. HPC past history of inadequate mapping was noted.

"6. The map submitted is adequate for the purposes of our on-going NSL assessment. Sea defences that protect nuclear licensed sites can lie outside of the nuclear site boundary. This does not prevent us ensuring these are adequate to meet any nuclear safety claims in regard to protecting the site. If SZC is granted a NSL, Licence Condition 28 (Examination, inspection, maintenance, and testing) requires a licensee to make and implement adequate arrangements for the regular and systematic examination, inspection, maintenance and testing of all plant which may affect safety. If sea defences are not under the direct control of the licensee, we would expect that alternative arrangements (for example, contracts) are in place to recognise and maintain their ability to deliver nuclear safety functions. The location of the sea defences outside the nuclear licensed site will not affect how the licensed nuclear site is defined.

Site geology and engineering For nuclear site licensing, we are assessing the suitability of the site for the engineering and infrastructure requirements of the facility. The cut-off wall is related to construction activities, for which in-depth details are not required at this stage."

TASC understands that the cut off wall which may include drains and diversion of river systems will affect the hydrology of the site with impacts elsewhere. It is also a technically difficult process which could prove impossible to construct thus affecting the viability of the project. The sea defence appears to have been excluded to allow public access along the top of the defence. It appears

bizarre that it is excluded from the NSL boundary. In view of the sacrificial nature of the sea defence this appears a risk to site safety.

For clarity, we are responsible for regulating safety at nuclear licenced sites. Flood risk beyond nuclear licensed sites is outside of our remit, provided it does not affect nuclear safety. For more information on our role and how this relates to the Environment Agency's remit, see the Working with the UK's environment agencies

7. In relation to site geology and characterisation, NNB GenCo has submitted the required information relating to site geology and characterisation and our nuclear site licence assessment is currently on-going.

Emergency Planning The Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPPIR 198) transferred the responsibility of determining Detailed Emergency Planning Zone (DEPZ) from us to the relevant local authority, however we have a duty to regulate and retain oversight of these determinations. With the introduction of the new regulations, the minimum distances on which the DEPZs are based were all recalculated based on hazard evaluations and consequence assessments for each site. There were very few changes to DEPZ sizes across all the nuclear sites with the change driven, in the main (95%), by the change in consideration of weather conditions. I can reassure you that we have maintained oversight over all the DEPZs and their changes. REPPIR 19 ensures that operators consider the full range of hazards for a site, and their possible consequences regardless of likelihood and plan for them proportionately. Emergency preparedness and response is therefore delivered through a commensurate and graded approach specific to the site. The International Atomic Energy Agency (IAEA) recommendations are not site-specific and so not commensurate to any specific level of hazard. While they do provide a generalised approach that some countries might find useful, the UK Government has chosen to determine emergency planning distances based on detailed and specific scientific modelling of the hazards at each site.

TASC do not support the EDF/SCC assessment of a DEPZ for SZB. As the plant ages there are potentially more hazards. 3-4 kms is also that recommended for a PWR by IAEA which requires 4 hours reaction time following an incident involving off site radiation release. There is also a point of disagreement between BEIS officers who supported 3-4kms and ONR assessment of a two stage DEPZ. We do not believe a two stage is credible or advisable and it is surely more prudent to adopt a DEPZ of 3-4kms and an OPZ of 30kms, even more so adopt the French example of a 20 kms planning zone "I know what to do" principle. In our opinion the emergency planning for Sizewell B has not been treated with understanding or any concern by the local authorities. Eg No priority given to alleviate regular flooding on one of the emergency routes.

"We can confirm that Suffolk County Council included the 30km Outer Planning Zone in their emergency planning arrangements for Sizewell."

TASC do not believe evacuation planning is adequate or taken seriously by the local authority East Suffolk Council. Housing development attracting inward migration continues. Evacuation routes are regularly flooded and no current action has been taken to alleviate the problem.

"We continue to provide advice to the Planning Inspectorate, Scottish Government, and local planning authorities on proposed developments on and around nuclear sites. This advice seeks to limit both the potential for developments to pose external hazards to nuclear sites, and the radiological consequences to members of the public in the event of a radiation emergency occurring on such sites. Our land use planning guidance sets out criteria when we would expect to be consulted on any proposed development. The current Sizewell DEPZ extend to between 3 and 4km on the inland section. We consider this to be appropriate, and in accordance with the hazards on the site. The referenced paragraph in your letter, from the REPPIR guidance, seeks to stop the case being

made for no off-site detailed emergency planning where hazards can be well controlled in a modern, highly engineered plant. It is our view that some detailed planning to a short distance around the plant will always be necessary and is proportionate."

To conclude we believe it is essential that at minimum all site licencing work be completed prior to any planning consent being granted or any works started.

MJT 14th December 2021.

Office for Nuclear Regulation

4 November 2021

Redgrave Court
Merton Road
Bootle
Merseyside
L20 7HS

[redacted]@hotmail.com

Contact@onr.gov.uk

Unique ref: 2021/80530

Dear Mike

HPGE202110052 –Sizewell C (SZC)

Thank you for your letter of 12 October 2021 and taking the time to raise these matters with us; please see below information on the points you raise.

Operator of SZC and Policy

In terms of the SZC Development Consent Order (DCO) process we are a statutory consultee and as such have provided written representations to the Planning Inspectorate and responded to any questions from them.

As you know, the scope of the DCO process is much wider than our legal vires, with only a limited amount of overlap. The main aspects of the DCO process where we have an interest include:

- consistency with Government siting policy;
- emergency planning, including taking account of input from relevant Local Authorities;
- any potential impact on or from the adjacent Sizewell B;
- external hazards (their impact on the proposed development);
- additional matters related to National Policy Statements for nuclear power, for example access to required infrastructure and resources for nuclear safety purposes; and
- progress with our assessment of the Nuclear Site Licence (NSL) application.

Turning to licencing, we use the guidance set out in [redacted] for the NSL assessment. As you appreciate, the granting of a licence will not itself permit the licensee to commence nuclear safety-related construction on the site; further permissions from us, as specified, will be required before construction commences. This ensures adequate regulatory controls against the points outlined in your letter.

In respect of construction detail, SZC has the benefit of being able to progressively gather learning on constructability challenges from the Hinkley Point C (HPC) project. We anticipate this will continue throughout the construction of HPC and that learning

[1] [redacted]

will be systematically captured from other EPR™ and relevant projects across the world.

For nuclear site licensing, we are assessing the suitability of the site for the engineering and infrastructure requirements of the facility and therefore do not expect in-depth construction details at this time.

As part of this licensing assessment several key areas are currently under consideration. These are whether:

- the site is of a sufficient size to accommodate all necessary systems to ensure safe operation (including your point on two EPR™ reactors on the same site);
- the site can be connected to the electricity grid supplies;
- there is adequate cooling capability for all normal and fault conditions;
- the environmental conditions would not preclude the use of the site with respect to external hazards;
- the geology of the site will provide a secure long-term support to the necessary structures, systems and components;
- there is a schedule for submission of the future safety case to support subsequent construction milestones; and
- that operations of the site, including during construction, will not adversely affect the safety case for any adjoining nuclear licensed site (Sizewell B).

Siting [redacted] sets out our expectations relating to the size of the site to accommodate operations. Considerations related to the size of the plot for development are expected to be covered as part of the site justification report.

Potable Water

SZC's DCO documentation on the [redacted] states that the plant will be a temporary infrastructure to provide water during the construction phases of the project until the Northumbrian Water Limited (NWL) transfer main work is completed. It is therefore our current understanding that there should not be an issue with the availability of potable water to meet safety case requirements once fuel is delivered to site. If this position were to change, SZC would have to demonstrate through its safety case that it has an adequate potable water supply.

Our future engagement plans with SZC will set out some of the key topics to be assessed in the applicant's safety case submissions. We would expect the requirements and availability of potable water and the elements important to nuclear safety to be considered at an appropriate stage in the development of the safety case.

Regarding the ultimate heat sink, this relies on sea water rather than potable water.

2 [redacted]

3 [redacted]

Changes to plans

We recognise that an adequate characterisation of the site is an important consideration for NSL, and we are learning from previous projects, for example the characterisation of the HPC site. However, it is also recognised that any site characterisation can never identify everything about the site and new information may be revealed once construction starts. Our guidance related to this is captured in Ground Engineering, Geotechnics and Underground Structure Design Technical Assessment Guide; [redacted]. This sets out our expectations that the licensee will update their ground model based on information gathered during construction.

Our guidance states that; “an updated ground model and geotechnical risk register are key outputs of a ground investigation. During construction, this model may be changed as a result of the formation levels and strata which are exposed in the excavation work. This information may validate the model, but where the exposed strata are not as anticipated, the model should be updated to record the actual site conditions”.

This is a key area of our ongoing assessment for nuclear site licensing, and to date we have not identified any areas of concern.

Regulators Code

Please let me reassure you on the points you raise about the Regulator’s Code. The code acknowledges circumstances where regulators may not be able to follow all of its provisions, for example decisions concerning safety and security, and that they will not be bound by the provision where these considerations justifiably outweigh provisions of the Regulators’ Code. We do not put the requirements of the code before safety and security, nor are we influenced by any wider political pressure.

Climate Change

As referred to earlier, the environmental conditions faced by the site, including appropriate consideration of climate change, are a key point of our assessment for NSL which is ongoing, which will be assessed against our published guidance, including [redacted].

Adequacy of Drawings

As part of the NSL application, SZC has submitted the proposed [redacted]. The map submitted is adequate for the purposes of our on-going NSL assessment.

Sea defences that protect nuclear licensed sites can lie outside of the nuclear site boundary. This does not prevent us ensuring these are adequate to meet any nuclear safety claims in regard to protecting the site. If SZC is granted a NSL, Licence Condition 28 (Examination, inspection, maintenance, and testing) requires a licensee

4 [redacted]
5 [redacted]
6 [redacted]

to make and implement adequate arrangements for the regular and systematic examination, inspection, maintenance and testing of all plant which may affect safety.

If sea defences are not under the direct control of the licensee, we would expect that alternative arrangements (for example, contracts) are in place to recognise and maintain their ability to deliver nuclear safety functions.

The location of the sea defences outside the nuclear licensed site will not affect how the licensed nuclear site is defined.

Site geology and engineering

For nuclear site licensing, we are assessing the suitability of the site for the engineering and infrastructure requirements of the facility. The cut-off wall is related to construction activities, for which in-depth details are not required at this stage.

For clarity, we are responsible for regulating safety at nuclear licenced sites. Flood risk beyond nuclear licensed sites is outside of our remit, provided it does not affect nuclear safety. For more information on our role and how this relates to the Environment Agency's remit, see the [redacted].
In relation to site geology and characterisation, NNB GenCo has submitted the required information relating to site geology and characterisation and our nuclear site licence assessment is currently on-going.

Emergency Planning

The Radiation (Emergency Preparedness and Public Information) Regulations 2019 [redacted]) transferred the responsibility of determining Detailed Emergency Planning Zone (DEPZ) from us to the relevant local authority, however we have a duty to regulate and retain oversight of these determinations. With the introduction of the new regulations, the minimum distances on which the DEPZs are based were all recalculated based on hazard evaluations and consequence assessments for each site.

There were very few changes to DEPZ sizes across all the nuclear sites with the change driven, in the main (95%), by the change in consideration of weather conditions. I can reassure you that we have maintained oversight over all the DEPZs and their changes.

REPPIR 19 ensures that operators consider the full range of hazards for a site, and their possible consequences regardless of likelihood and plan for them proportionately. Emergency preparedness and response is therefore delivered through a commensurate and graded approach specific to the site. The International Atomic Energy Agency (IAEA) recommendations are not site-specific and so not commensurate to any specific level of hazard. While they do provide a generalised approach that some countries might find useful, the UK Government has chosen to determine emergency planning distances based on detailed and specific scientific modelling of the hazards at each site. We can confirm that Suffolk County Council has

7 [redacted]
8 [redacted]

included the 30km Outer Planning Zone in their emergency planning arrangements for Sizewell.

We continue to provide advice to the Planning Inspectorate, Scottish Government, and local planning authorities on proposed developments on and around nuclear sites. This advice seeks to limit both the potential for developments to pose external hazards to nuclear sites, and the radiological consequences to members of the public in the event of a radiation emergency occurring on such sites. Our [redacted] sets out criteria when we would expect to be consulted on any proposed development.

The current Sizewell DEPZ extend to between 3 and 4km on the inland section. We consider this to be appropriate, and in accordance with the hazards on the site. The referenced paragraph in your letter, from the REPPIR guidance, seeks to stop the case being made for no off-site detailed emergency planning where hazards can be well controlled in a modern, highly engineered plant. It is our view that some detailed planning to a short distance around the plant will always be necessary and is proportionate.

In relation to the point you make on Hunterston, we are of the view that North Ayrshire Council determined the DEPZ in-line with requirements of REPPIR 19 and in particular Regulation 8. This regulation directs that the local authority must determine the DEPZ based on operator's recommendations and may extend the area on limited grounds only. As described in the REPPIR Approved Code of Practice and Guidance (paragraph 238), the size of the DEPZ and the protective action planned in it should not put people at risk of harm from unnecessary action. An excessively large area could also divert important resource from affected areas which require the most attention. In this case, we consider that the DEPZ around Hunterston reflects the benefits and detriments of protective action and the ability to focus protective action on those most affected by the emergency.

In addition, outline planning arrangements have been put in place to 30km at Hunterston, as is the case for all operating nuclear power plants and decommissioning nuclear power plants with the presence of irradiated fuels. Outline planning builds on the arrangements and capabilities in existing emergency plans to provide commensurate planning for low-probability events.

Conclusion

I realise this is a lengthy response, but I trust the detail is helpful in explaining our approach and why we are content that some information is not available prior to issuing a nuclear site licence. However, if helpful, we would be happy to discuss this further with you and any other interested parties.

Regards

Rachel Grant
Head of Policy

[9] [redacted]

11. John Bushby – 29 December 2021

From:	[redacted]
To:	SizewellC; [redacted]
Subject:	Sizewell C nuclear power station
Date:	29 December 2021 19:07:00
Attachments:	Distributed energy.doc Distributed Energy.pdf RAB Financing of Sizewell C Nuclear Power Plant (Revision2).pdf

>From: John Busby Unique Reference: 20025600

My Distributed Energy presentation and the accompanying aide to a presenter is lodged with the PI for post examination.

I have made a significant modification to Slide 6 after the announcement of a 340 MWh battery storage for Teesside. With the move away from fossil fuels the use of a standby generator to maintain renewable power feeds to an isolated section of a re-engineered grid was always inappropriate. A standby battery storage is a better option. Please bring this to the notice of the Inspector when considering my submission.

Also, BEIS cited the RAB financing of Heathrow and Tideway as models for debiting the 27 million or so households for advance payments for SZC during the construction period. This second revision considers this concept and is also attached for the Inspector's information.

Thank you for your continued referrals.

John Busby

[redacted]

From: [redacted]
To: SizewellC
Cc: [redacted]
Subject: Re: Sizewell C nuclear power station
Date: 05 January 2022 14:56:14
Attachments: image001.png
RAB Financing of Sizewell C Nuclear Power Plant (Revision2).pdf
Distributed Energy.pdf
Distributed energy.doc

>To: Jake Stephens
>From: John Busby Unique Reference: 20025600

Please note that the original Distributed Energy presentation, registered to be presented to the inquiry on the appointed day was pushed out by the need to give precedence to a number of local politicians. However, it was lodged for post-examination. If it was not post- examined and taken into account by the inspector, I think I have the right for it to be examined. Please ask the Inspector, if it wasn't, to do so.

With a growing distributed sector, beyond the control of the grid, the power of the control room to keep the lights on is reduced. Also, if no measures are in place to keep the renewable sources active, the circumstances of a drop out of a large generator are exacerbated. The National Grid ESO has a copy of it and should have a view of its importance.

The RAB financing report is already with the Secretary of State and perhaps that should be drawn to the attention of the inspector. It is under review with BEIS's Erin Coghlan.

Kind regards
John Busby

From: SizewellC <sizewellc@planninginspectorate.gov.uk>
Sent: 05 January 2022 13:52
To: 'John Busby' [redacted]
Cc: SizewellC <sizewellc@planninginspectorate.gov.uk>; Dunne, Kathryn [redacted]
Subject: RE: Sizewell C nuclear power station

Dear Mr Busby,

Thank you for your email. As the Examination has closed this cannot be passed to the Examining Authority. However it will be passed to the Secretary of State with the Examining Authority's Recommendation Report.

Kind regards,
Jake

Jake Stephens

Case Manager – National Infrastructure (Energy)

Direct Line: [redacted]
Helpline: 0303 444 5000
Email: [redacted]
Web: https://infrastructure.planninginspectorate.gov.uk
Twitter: @PINSgov

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DPC:76616c646f72

From: John Busby [redacted]
Sent: 29 December 2021 19:07
To: SizewellC <sizewellc@planninginspectorate.gov.uk>; [redacted]
[redacted]

[redacted]

Subject: Sizewell C nuclear power station

>From: John Busby Unique Reference: 20025600

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Thank you for your continued referrals.

John Busby



RAB Financing of Sizewell C Nuclear Power Plant

Financing of Hinkley Point C

The financing of Hinkley Point C (HPC) Evolutionary Pressurised-Water Reactor (EPR) nuclear power plant was subject to a European Commission Decision of 8 October 2014 on an Aid Measure SA.34947, the first measure of which is a Contract for Difference (CfD) providing revenue support during the operational phase.

The beneficiary is NNB Generation Company Limited (NNBG), which at the time of the decision was fully controlled by Electricité de France (EdF), but now is jointly owned by EdF and CNG, a Chinese state company

The Contract for Difference ('CfD') provides revenue support during the operational phase of HPC. The CfD is a private law agreement between NNBG and the CfD Counterparty.

Under the CfD, NNBG will receive an amount of revenues which is determined by the sum of the wholesale market price at which it sells electricity and a difference payment corresponding to the difference between the pre-determined Strike Price ('SP') and the Reference Price ('RP') observed in the previous reference period.

When the RP is lower than the SP, the CfD Counterparty will pay the difference between the SP and the RP, ensuring that NNBG will ultimately receive relatively stable revenues, subject to its selling strategy and the amount of output it produces.

Conversely, when the RP is higher than the SP, NNBG will be obliged to pay the difference to the CfD Counterparty.

The RP is a weighted average of wholesale prices which the UK sets. In the case of NNBG, the relevant RP is the Baseload Market RP, which applies to all baseload generation operators.

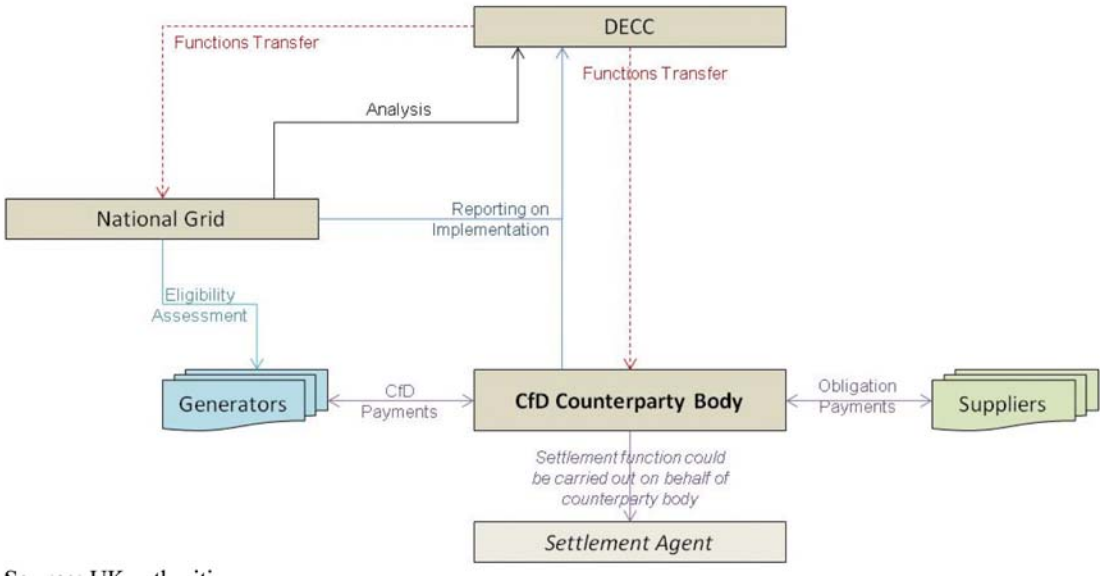
The “strike” price (SP) will be set at GBP 92.50 per MWh in 2012 nominal prices.

If an investment decision to build the Sizewell C new nuclear power station is taken, using the same design and allowing for the opportunity to share some costs for the HPC reactors, the SP will be changed to GBP 89.50 per MWh, again in 2012 nominal terms.

The SP will be fully indexed to the Consumer Price Index ('CPI') and the CPI adjustment will be annual with a base date of November 2011.

The CfD will have as ultimate starting date the Target Commissioning Window for each reactor.

Figure 1 – Roles and responsibilities in the operation of the CfD



In Figure 1 DECC is now BEIS. The Settlement Agent demands contributions from the Suppliers, depending on their electricity market share, which are passed to the Counterparty, which in turn passes sufficient funds taken from the Suppliers to meet the difference between the "strike" price and the settlement price.

The government has formed the Low Carbon Contracts Company Limited and its sister the Electricity Settlements Company Limited with powers to levy the Suppliers for money for the Counterparty to have sufficient funds to make CfD generator payments. Each supplier would be liable for these and LCCC/ESC's costs, depending on its market share defined by metered electricity use.

By 2026 when HPC may be commissioned, the "strike" price being subject to inflation will be around £105/MWh. But its magnitude was based on the HPC construction cost of then £16 billion. The cost is now estimated at £23 billion on completion, so to provide a return on capital the strike price should be raised by 23/16 to around £150/MWh.

With the withdrawal of coal-fired generation and with an increased recourse to natural gas the regulated wholesale electricity price will be forced to increase. As the situation in 2026 is liable to increase in severity, the Suppliers will be unable to pass funds to the Counterparty and the government will have to provide the difference.

It is therefore unsurprising that a different financial system for Sizewell C is sought. Heathrow and Tideway are regulated by the CAA and by OfWat respectively and are cited by BEIS as models for a Regulatory Asset Base advanced payment system for the financing of Sizewell C. Electricity supply is regulated by OfGem.

Infrastructure Debt Financing

Infrastructure in the UK is mainly owned overseas, with minimal equity and with capital spending financed by debt. The interest on the debt is set against the operating profits with little or no corporation tax paid. Bonds are issued overseas in tax havens avoiding withholding tax on the interest payments. The sector is in need of reform possibly by restricting the offsetting of profits by the interest payments on borrowings and other financial costs to say 20% to 40%.

Heathrow (FGP Topco Limited)

FGP Topco Limited - is Heathrow's owner.

British Airports Authority was privatised in 1987 as BAA plc. In 2006 it succumbed to a hostile takeover bid and was acquired by a consortium led by Spanish Ferrovial (62%) as FGP Topco Limited, the current owner of Heathrow. The sale price of £10.1 billion was raised by FGP Topco's borrowings of £2,865m before and £8710m after the acquistion of BAA plc..

By the end of December 2006 FGP Topco had debts of £11,712m, while at the end of December 2007 this had risen to £13,634m, both including the £10.6 billion borrowed for the acquisition of BAA plc, thus getting it for free. It then owned seven major UK airports, until when by 2014 those other than Heathrow were sold, raising over £4 billion. Ferrovial's stake is now reduced to 25% as one of the 90% foreign shareholders.

FGP Topco's financial statements were signed off by Ferrovial's Jorge Gil Villen, but he has been replaced as CEO by Luke Erik Bugeja.

FGP Topco's borrowings had risen to £16,863m by the end of 2019, but with Covid had risen to £20,135m by the end of 2020. See Figure 2.

FGP Topco

		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Totals
Revenue	£m	1090	2247	2590	2263	2312	2524	2362	2652	2691	2767	2809	2884	2970	3070	1175	36406
Operating costs	£m	823	1670	1570	1821	1530	1712	1697	1618	1902	1608	1798	1818	1879	1925	1998	-25369
Dividends	£m	140						240	555	1075	300	325	525	500	500	100	-4260
Borrowings	£m	11712	13634	12973	12652	12675	12794	12818	12577	11574	11891	14342	14214	14569	16863	20135	
Interest	£m		811	813	501	457	444	487	589	597	631	608	563	533	742	562	-8338
Financial costs	£m		24	-241	-81	-41	-31	71	-69	-78	138	-479	203	-570	-39	-353	-1546

As the "top company" in which the accounts of it and the other 12 major subsidiaries are consolidated, FGP Topco owns Heathrow Airport Limited (number 12 in the chain) which is licensed to operate and be regulated by CAA. BAA plc was delisted as BAA Limited and renamed Heathrow Airport Holdings Limited (number 4 in the chain).

FGP Topco has 4 finance companies. ADI Finance 1 and 2, (2 and 3 in the chain), Heathrow Finance plc (8 in the chain) and Heathrow Funding in Jersey (joint 10 with Heathrow (AH) Limited). FGP Topco's borrowings are raised by issuing bonds, 20% in the UK by Heathrow Finance plc and 80% offshore by Heathrow Funding Limited. In the prospectuses it states that withholding tax on interest payments will not be payable and if it is the bondholder will be compensated.

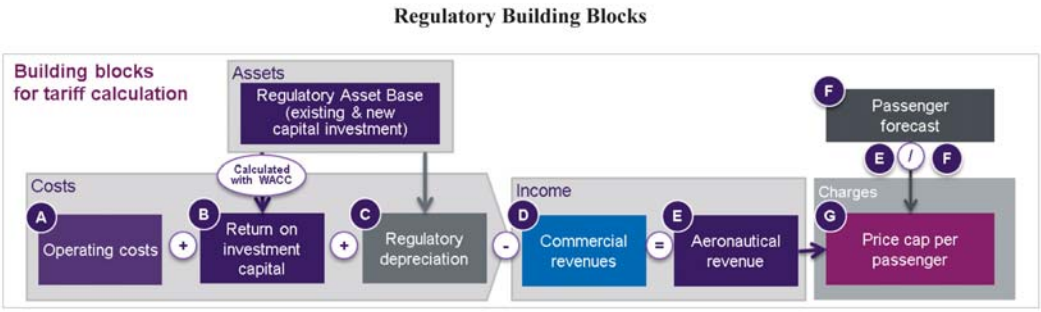
Over 2007 –2020 it has set its financial costs against its operating profits, paying no net corporation tax,. It has paid its bondholders around £8+ billion in interest, saving them perhaps £1.6 billion in withholding tax (20%?). It paid its shareholders (90% foreign owned) £4,260m in dividends, some taken from its £4+ billion in non-Heathrow airport sales, but mostly adding to FGP Topco's borrowings.

FGP Topco's shareholders paid up shares total only £13.1 million for which investment they have acquired £4.26 billion in dividends.

CAA's regulation

The CAA regulator sets its allowable airport charges at a "price cap" in accordance with 7 Regulatory Asset Base (RAB) "building blocks" including capital invested.

Figure 3



The Aeronautical revenue is divided by the passenger forecast numbers to establish the price cap for airport charges. The operating costs include the financial costs arising from the debt, the weighted average cost of capital (WACC) and the size of the RAB are determinents in the allowed total revenues, from which the commercial revenues are subtracted to calculate the allowed aeronautical revenues. The continuing rise of airport charges have allowed the interest charges on the borrowing to be covered and obviated the need for real investment. As the top company runs at a loss the dividends are borrowed, add to the debt and the size of the RAB. The airlines are critical of the regulator as from 2007 to 2020 the airport charges have risen from £8 to £22, bringing them up to 65% more than those of competitive hubs in Europe.

The CAA refused to allow additional airport charges to fund the airport expansion DCO, but added $300 million to the Regulatory Asset Base (RAB) to offset the losses caused by the reduction of traffic by Covid. Heathrow asked for a 90% increase in airport charges to cover the debt cover reduced by the loss of 75% of its revenue, but this is currently refused, but subject to consultation over the next regulation period. An interim settlement is for a 37% increase to now around £30.

With the net losses, net corporation tax is paid, so that the dividends are paid from borrowings. The tax avoidance, both of corporation tax and bond interest witholding tax, means that the Treasury receives only the VAT from the commercial revenues - as by international agreement air industries are tax free.

Relieving the UK's huge Covid debt burden will mean that the tax avoidance, resulting from the current practice of financing by debt, with the financial costs therefrom set against operating profits, performed by the majority of the UK infrastructure companies cannot be allowed to continue.

Kemble Water Holdings Limited and Bazalgette Equity Limited

Kemble Water Holdings Limited is the parent company of the Group owning Thames Water Utilities Limited (TWUL).

Bazalgette Equity Limited is the parent company of the Group owning Bazalgette Tunnel Limited (BTL), trading as Tideway

Thames Water Utilities Limited and Bazalgette Tunnel Limited are regulated by OfWat

Kemble Water Holdings Limited is owned by 16 international shareholders including some United Kingdom members. It has paid up shares of £1991.6m and at 31 March 2021 had borrowings of £13,536.5m with a loss that year of £500.9m.

Bazalgette Equity Limited is owned by 5 shareholders, with around half UK pension funds. It had paid up shares of £507.4m at 31 March 2021 and borrowings of £2,782m. There were £720.4m loans from the shareholders paying a 8% fixed rate as income in lieu of dividends.

Bazalgette Ventures Limited is the vehicle to organise shareholder loans financing.

TWUL has appointed Bazalgette Tunnel Limited (BTL or Tideway) for the construction of the tunnels, shafts and associated works under the Thames.

Tideway has appointed 10 construction companies, organised into five sections, a programme manager, West, Central and East Contract joint ventures consisting of 3, 2 and 3 member constructors respectively and a systems integrator.

BTL has appointed its own board directors remunerated as in the following table extracted from its successive annual reports up to 31 March 2021. See Figure 4.

Tideway directors remuneration	**£1000s**						
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	Totals
Andy Mitchell	484	729	720	729	1633	863	5158
Mark Corben	303	484	470	1964			3221
Mark Sneesby	285	459	470	478	1094	549	3335
Mathew Duncan				124	384	546	1054
Sir Neville Simms	166	275	275	275	279	285	1555
Richard Morse	56	90	90	90	97	100	523
Mike Putnam					64	70	134
John Holland-Kaye			39	54	61	64	218
Ann Baldock	33	54	54	54	18		213
Mark Fairbairn	33	54	54				141
Michael Queen	33	54	54	54	61	64	320
Baroness Ruby McGregor-Smith					48	64	112
Annual totals	1393	2199	2226	3822	3739	2605	
		3592	5818	9640	13379	**15984**	

The salaries are augmented by bonuses and amounted to around £16 million by 31 March 2021. Of interest is the remuneration of Mark Corben CFO of £3.221 million with just four years in service, including a deferred bonus of £1.5 million in 2019. He afterwards joined BEIS to advise it of the RAB financing of Sizewell C.

OfWat's regulation

TWUL's waste treatment consumers are charged an advanced payment for Tideway which up until 31 March 2021 amounted to £218.425m revenue paid to Tideway. TWUL's liability will be to pay a proportion of the revenue collected from its wastewater customers to BTL on a monthly basis. The charges will be included in TWUL's customers' bills and there will be no separate bills for the Tideway's portion.

The allowed annual revenue payments from TWUL to BTL are regulated by OfWat and are based on annual Regulatory Accounting Statements published in Tideway's annual reports.

The Regulatory Asset Base (RAB) is the basis of CAA's Heathrow airport charges price cap. The OfWat equivalent of it is the regulated capital value (RCV), one of the building blocks from which Tideway's annual charge on TWUL is calculated and agreed by OfWat.

There are Regulatory Accounting Guidelines (RAG) published by OfWat in document RAG-3.12. This lists the data tables to be completed (and statements to made) from which the RCV is calculated. This and other building blocks sets the allowed level of annual revenue payments TWUL makes to BTL. The definitions of the terms used in the tables are laid down in another document RAG-4.09

Tideway has published the completed tables (from which the allowed revenue in 2021-2022 will by calculated in pages 160-170 of its 2020-2021 annual report. Tideway has certified the accuracy of the data in the tables and published the required statements in pages 171 –180. Tideway then submits an allowed revenue statement to OfWat for approval.

Figure 5

Updated Revised Revenue Statement - 2021/22 Allowed Revenue

Submitted to Ofwat on 18 December 2020

£, nominal	Year preceding Prior Charging Year 2018/19	Prior Charging Year 2019/20	Current Charging Year 2020/21	Forthcoming Charging Year 2021/22
Allowed Revenue	49,235,940	63,431,062	76,465,429	87,029,095
Amounts received from TWUL	38,387,688	57,610,001		

The annual revenue, TWUL –BTL, covers the operational costs, interest on borrowings and on the 8% interest on shareholder loans, eventually paid as income to Bazalgette Equity Limited. However, it does not reduce the project borrowing which continues to add to Tideway's debt.

The revenue statement shows that it will increase to cover increasing costs and interest payments under the first regulatory framework until this ends in 2030. The second regulatory framework will commence from 2030.

See the delivery model extracted from Tideway 2020-2021 annual report.
In Figure 6

THE DELIVERY MODEL

The Thames Tideway Tunnel has an innovative delivery model, which was established to attract private sector capital to finance infrastructure and deliver value for money to customers.

It includes a bespoke regulatory framework, with a contingent Government Support Package, which recognises the unique nature of Tideway's business. This framework provides a revenue stream during both the construction and operational periods. Revenues are billed and collected on our behalf by Thames Water from its wastewater customers and passed to Tideway.

For the period until 2030, our revenues are calculated according to the framework set out in our Licence, which is primarily based on a percentage return (2.497 per cent) on the regulatory value of our company (Regulatory Capital Value or RCV). From 2030, we expect to be regulated in line with the rest of the water industry.

Tideway in its 2020-2021 annual report Page 18 gives a Timeline, which is a schedule for the delivery of the project. See an extract as Figure 7

- **Construction**
  This includes excavating deep shafts at the three drive sites and each CSO interception site, followed by tunnelling, tunnel secondary lining, installing mechanical and electronic equipment, and architectural and landscaping works.
- **Commissioning**
  All the worksites and tunnels will be connected to the London Tideway Tunnels (LTT) system and tested. Once this is complete, the MWCs hand over the Thames Tideway Tunnel (TTT) Works to Tideway. At this stage, the MWCs' activities will be complete, and the contractors will be demobilised.
- **System Acceptance period**
  This will be an 18 to 36 month proving period. The LTT will be operated across a variety of storm conditions, to demonstrate that it fulfils the project requirements. Once this is complete, Thames Water will become responsible for maintaining the near-ground structures and assets. Tideway will retain responsibility for the shafts and tunnel structures and ensure the TTT is available to allow flow to pass to the Lee Tunnel. This involves inspecting the deep tunnels and shafts, which we expect to do on a ten-yearly cycle, performing any maintenance as required.

In the Tideway Investor Report published in August 2021 is a list of issued bonds. See an extract as Figure 8

Debt Portfolio – March 2021

Drawn Debt Portfolio - March 2021

Facility	Drawn amount	Type	Drawdown date	Maturity (CY)
£75m CPI + 0.828%	75	Green Bond	Aug-17	2047
£300m 2.86%	300	USPP Loan Note	Sep-17	2032
£250m 2.375%	250	Green Bond	Nov-17	2027
£200m CPI+ 0.74%	200	Green Bond	Nov-17	2042
£100m RPI + 0.688%	100	Green Bond	Jun-18	2050
£80m Tranche 1	80	EIB	Jul-18	2051
£100m RPI + 0.249%	100	Green Bond	Dec-18	2040
£80m Tranche 2	80	EIB	Jan-19	2051
£100m RPI + 0.755%	100	Green Bond	Jun-19	2051
£80m Tranche 3	80	EIB	Jul-19	2051
£125m RPI + 0.192%	133	Green Bond	Jul-19	2049
£100m RPI + 0.01%	100	Loan	Sep-19	2049
£80m Tranche 4	80	EIB	Jan-20	2051
£25m RPI + 1.035%	25	Green Bond	Jun-20	2048
£50m RPI + 0.787%	50	Green Bond	Jun-20	2052
£25m RPI + 0.951%	25	Green Bond	Jun-20	2054
£80m Tranche 5	80	EIB	Jul-20	2051
£80m Tranche 6	80	EIB	Jan-21	2051
£80m Tranche 7	80	EIB	Mar-21	2051
Subtotal	**2,018**			

Committed and Undrawn Debt Portfolio - March 2021

Facility	Nominal amount	Type	Drawdown date	Maturity (CY)
RCF	160	Revolver	N/A	2025
EIB	140	Loan	Various 2021-2022	2051
£25m RPI + 1.042%	25	Bond	Jun-21	2048
£25m RPI + 0.954%	25	Bond	Jun-21	2054
£75m RPI + 0.01%*	75	Green Bond	Aug-21	2036
£75m 2.418%	75	Green USPP Loan Note	Sep-21	2041
£150m RPI + 0.01%**	150	Green Bond	Apr-22	2032
£75m CPI + 0.949%	75	Green Bond	May-22	2052
£50m RPI + 0.074%	50	Green Bond	May-22	2049
£50m RPI + 0.174%	50	Green Bond	May-23	2049
Subtotal	**825**			

(*) re-offer price of 112.157% reflecting negative yield of -0.754%

(**) re-offer price of 100.24% reflecting negative yield of -0.014%

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Bazalgette Finance plc's debt portfolio shows that it has a Green Bond maturing in 2052.

Bazalgette Equity Limited

Bazalgette Equity Limited is to exist as water company from 2030, perhaps for the anticipated 120 years' life of the tunnel. Bazalgette Equity Limited will have retained its debt, so the interest on which and other financial costs will continue to be paid by TWUL's waste treatment consumers. It will be able to set these against its operating profit for corporation tax avoidance.

Its subsidiary, Bazalgette Finance plc in its prospectus has stated that it will not deduct withholding tax from its payments to bondholders, unless ordered by tax authorities. Its longest maturity bond will demand payment of interest until 2052, unless it is "callable" and can be paid off early.

As the final costs of the works are likely to rise to around £5 billion (from the current estimate of £4.6 billion), it will exceed the original project cost of (£3.144bn in 2014/2015 prices) by the stipulated 130%. The government support fund will be liable to an equity payment, 60% to TWUL's waste treatment customers and 40% to Bazalgette Equity Limited. This could be used to reduce Tideway's debt on completion, but might simply be paid to shareholders as a dividend, leaving the debt as a device to avoid tax.

The fixed rate of return until 2030 will be 2,497%.

TWUL's investment in the connecting works and sewage plant upgrades will cost an amount of ca. £1 billion and will be added to its regulatory RCV and processed by OfWat in its 5 year determination of wastewater collection charges.

Bazalgette Tunnel Limited (Tideway) will continue to maintain the tunnels and shafts, with inspections on a ten-year cycle.

Tideway's handover to TWUL

The handover is described in Bazalgette Finance plc's 2019 prospectus on Page 11.

Once completed, the above-ground assets, structures and equipment of the Thames Tideway Tunnel (TTT) will be transferred to Thames Water Utilities Limited (TWUL), leaving the main tunnel, connection tunnels and shafts under the Bazalgette Tunnel Limited (BTL)'s ownership. Thames Water will operate the TTT, while Tideway will maintain and make available the deep tunnels and shafts.

BTL will operate and maintain the civil structures of the Tideway project, being the tunnels and shafts) in such manner as to keep them free from sediment and allow flows to pass along the tunnel up to the connection with the Lee Tunnel whilst maintaining the total storage volume in the tunnel and shafts. The principal maintenance activity undertaken by BTL will be the inspection of the Tideway project (anticipated to be on a 10-year cycle).

If in extreme circumstances, sewage continues to flow into the Thames, it will be difficult to attribute responsibility to which (or to both) of the companies involved. However, fines levied by OfWat will fall only on TWUL and if tunnel flows are blocked or attenuated there will be disputation.

Normally, the issuing of a handover certificate by a Vendor to a Supplier is the trigger for the contractual means of payment, but it appears that TWUL will in effect be leasing the handed over of the below ground listed works from Tideway, rather than paying for them. Presumably the advance payments by TWUL's waste treatment consumers would end, to be replaced with annual payments by TWUL, the prices of which being determined by OfWat.

The best way to settle this unique, business arrangement would be for Kemble Water Holdings Limited (KWHL) to takeover Bazalgette Equity Limited and its subsidiaries into its group. The assets and debt of BTL would then be consolidated into the top company's accounts.

There could then be a reorganisation of the KWHL multiple subsidiaries into a simpler structure, more open to audit and for regulation as one entity by OfWat. The multiple boards of directors could be merged and reduced in numbers.

Sizewell C

EdF and CGN signed the Sizewell C Project equity documents on 29 September 2016 alongside the HPC contracts, for the development, building and operation of two EPR reactors (3.2 GW) at Sizewell in Suffolk.

During development phase prior to final investment decision, EDF Energy's share of the project is 80% and CGN's is 20%. EdF has planned to pre-finance the development up to its share of an initial budget of £458 million. Final investment decision is likely to be made by mid 2022.

This project is based on the assumption that third party investors will invest and become majority shareholders of the Project. EdF plans, at the date of the final investment decision, to become a minority shareholder with corresponding limited rights and to deconsolidate the project from the Group's financial statements (At this stage, it is not certain that the Group will achieve this objective.)

This financing model has never been implemented for projects of that scale before and therefore would be one of the largest ever equity issuance and project financing on the European scene. Securing the appropriate risk-sharing mechanism and ultimately the corresponding financing structure ahead of the Final Investment Decision is therefore key for the project, the UK Government and the current shareholders.

EdF's ability to make a final investment decision on Sizewell C and to participate in the financing of this project beyond the development phase could depend on the operational control of the Hinkley Point C project, on the existence of an appropriate regulatory and financing framework, and on the availability of sufficient investors and financiers. From EdF Energy Holdings Limited annual report 2020.

RAB financing for SZC (as the Cambridge EPRG Working Party Model)

If applied to Sizewell C (SZC), the shareholders of a newly formed development company would issue shares of 30% of the estimated construction cost, i.e. £6 billion of the current cost of £20 billion, which would be paid up in annual instalments of £600 million over the 10 years of construction. If the date of commissioning was extended and the costs were increasing, further shares valued at 30% of the increased costs would be issued and paid up annually. Debt would be raised annually to cover the 70% of the increasing construction costs and would cover 70% of the additional costs accruing after the 10 years construction period.

During the construction period and up until SZC became operational, the 27 million householder consumers would pay the Weighted Average Cost of Capital (the WACC) on the 70% of the costs, which would be added to the electricity consumers' bills.

Once SZC is in operation, the "strike" price paid by the suppliers to the then owners of SZC would be a combination of the WACC for the 70% of the capital costs plus the running costs. Presumably in the negotiations with the formation of the development company a level of profit on the £6 billion equity, (plus the equity paid for the 30% of any increased construction costs) would also be included in the "strike" price.

The electricity suppliers would add these to their electricity payments to the development company, via a Counterparty. It is assumed that the "strike" price will be met by a contract for difference (CfD) and as for Hinkley Point C the Counterparty will need government subsidy.

The model envisages that OfGem's regulatory period would continue over the 60 years of operation.

Comments

In citing the Heathrow and Tideway's RAB as models for financing Sizewell C, BEIS has failed to take into account their current low equity, high debt financing enabling tax avoidance together with the passing of dividends paid out of borrowings to foreign shareholders.

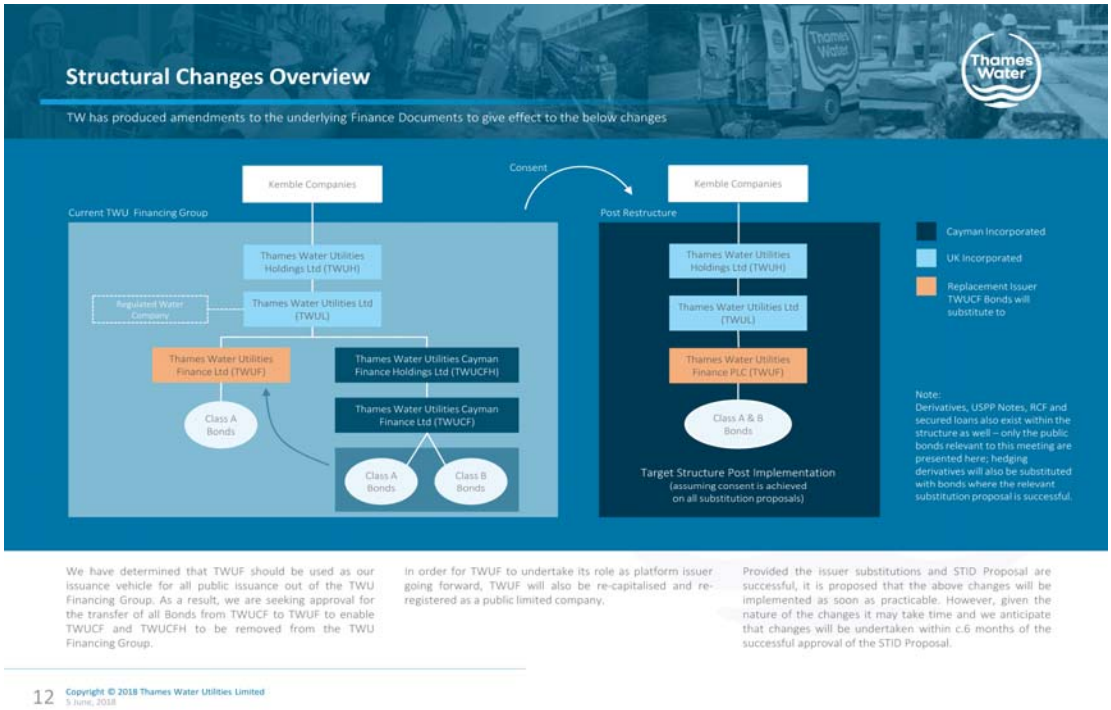
Heathrow is not the worst example of this scenario, but its initial paid up share capital of £13.1 million for a return totalling £8+ billion has evaded scrutiny by CAA and the Transport Select Committee. FRC and FCA have refused to adjudicate.

The Transport Committee hearing on 5 February 2017 failed to question the CEO of Heathrow's owner FGP Topco Limited's CEO Jorge Gil Villen on its financial practises, while its *modus operandi* was fully ventilated at a session of the APPG Heathrow in Portcullis House on 24 January 2018, but which had no impact on the later decisions on the third runway.

As an interim measure CAA has allowed Heathrow's airport charges to be increased by 37%, but it will still be unable to service its huge debt following Covid's traffic attenuation. Kroll's subsidiary Lucid Trustee Services Limited has a charge on FGP Topco Limited's first subsidiary ADI Finance 1 Limited. If this rescue attempt fails to raise an equity input, FGP Topco Limited could be put in administration by its creditors. Its subsidiaries Heathrow Airport Limited and Heathrow Express Operating Company Limited might then be taken over by the official receiver and continue to run the airport and its supporting auxiliaries.

Tideway had borrowed £2,757m by 31 March 2021, while revenue payments made by TWUL's waste management customers and passed to Tideway by then totalled just £218.4m. On handover of the above ground works to TWUL, those below will remain in Tideway's bailiwick, but the interest on the continued borrowings will continue to be paid.

In 2019 Kemble Water Holdings Limited engaged in a reform of its tax haven bond issuers, see an extract from Thames Water Utilities Limited 2018 as Figure 8.



Cayman Islands companies

There were two Kemble companies registered in the Cayman Islands, viz, Thames Water Utilities Cayman Finance Holding Limited (TWUCFH) owning Thames Water Utilities Cayman Finance Limited (TWUCF).

In 2019 the issued bonds from Thames Water Utilities Cayman Finance Limited were transferred to Thames Water Utilities Finance Limited (TWUF) re-capitalised as a plc.

TWUCF and TWUCFH were then removed from the TWU financing group. The annual reports of TWUCF were published which included a list of issued bonds, but TWUCFH is an exempted company with no need to publish accounts, so its function and holdings are unknown.

Although bonds from TWUCF have been moved to TWUF, both companies may still be in existence.

Sizewell C

SZC's massive, reinforced concrete, civil construction is due to safety considerations following incidents at Three Mile Island Unit 2 in the USA and Fukushima Units 1-4 in Japan. To make the EPR safer, the containment's reinforced concrete walls have been doubled to hold an hydrogen explosion pressure. So, with this and the increase in the reactor vessel size and ancillary equipment, the doubling of its standby generators and the addition of spent fuel casking and storage on site it has resulted in its vastly increased costs.

Its current cost estimate of £20 billion is likely to rise, as has HPC's £16 billion to £23 billion and SZC may end at £25 billion.

SZC's financing

The Heathrow RAB and Tideway RCV/RAG are cited respectively as models for the financing of Sizewell C by advance payments to the development company during construction and by CfDs when in operation, added to the bills of its 27 million consumers, but not shown separately.

The proposed RAB advanced payments by consumers will cover the interest on the borrowing for progress payments, but payments will continue for the interest on the remaining debt, on depreciation and operational costs until SZC's operation ends and the spent fuel leaves its pond and it is in dry casks. There is, anyway, a levy on the MWh generation for waste management.

The BEIS's Low Carbon Contracts Company and Electricity Settlements Company levy the Suppliers for funds for its Counterparty. This currently pays Contracts for Difference (CfDs) to 73 projects including wind, biomass, solar PV and Energy from Waste. It plans to administer the payment of CfDs to its projects for operational periods of 15 years, but Hinkley Point will have an operational period of 35 years.

The estimated CfD costs of its current projects over their 15 year operational periods will be £37 billion, while Hinkley Point C's CfDs over its 35 years' period will total £52 billion. The burden on the suppliers for the 73 LCCC projects (excluding HPC) will be ca. £7.5 billon a year, while HPC will add another £1.5 billion a year. If this cannot be recovered from the Suppliers, in part or in full, a subsidy will have to be added to the LCCC Counterparty's funds by the government.

Sizewell C

Sizewell C at 3.2 GW is too big for grid stability, as all the nuclear power plants will be on base load and there will be no equivalent standby if it drops out while HPC is under going a fuel change.

Its supplies of its fuel are subject to extraction cost rises as uranium ores reduce in concentration. World uranium production peaked in 2016, while production has since reduced by a quarter and is now lower than the anticipated consumption.

Nuclear power is unaffordable in the short term, but with the proposed advanced payments to cover loan interest costs during the construction period and if the excess capital costs reflected in its "strike" price were to be subsidised by the taxpayer **and if** SZC lasts its 60 years' anticipated life it may be affordable in the long term. But then it is faced with 20 years of cost for its closure procedures without revenue. Its fuel supplies' costs will rise (and may run out), its components are subject to corrosion, its controls will need to be regularly updated and it may be subject to a cyber attack.

A pressure water reactor will not survive a continuing station blackout, so it needs a secure supply of diesel for its standby generators to be available in an SBO and at the end of this century to maintain the cooling of the spent fuel ponds. It will also need a source of energy to manufacture dry casks of concrete and metal, to produce inert gas, for cranage to handle the spent fuel into the casks and for the ultimate building of a repository. It may be that the station battery storage could be increased, but some form of motive power will be needed post generation.

Moreover, it will leave a waste management legacy for the next century that will elicit a curse laid by our descendents on our generation.

SZC Development Company

EdF SA took over Areva the EPR nuclear power designer and constructor, while its partner CGN has overseen the building and commissioning of two EPRs in China. Although the first two EPRs in Finland and in France are yet to be commissioned, the knowledge and expertise of the consortium currently engaged in building the HPC EPRs is incomparable.

EdF SA has borrowings of around £67 billion, so that if it had taken a majority share in SZC's building of 80% it would have added £16 billion to its borrowings, or 24% extra. As this is at risk as equity and the average interest on its issued bonds is around 5%, it must have been deemed too much for a majority government-owned enterprise to find political support for another countries infrastructure.

With two EPRs, one with a supply contract signed in 2003 and one in 2007, still to be commissioned, there cannot be a certainty in ending with a successful, profitable project. If the Flamanville EPR is to be shortly generating, there may be excess electricity in France to sell to the UK through the inter-connector.

If investors can be attracted by the Cambridge University model of RAB financing, they will have to be ready to down pay the £6 billion equity in 10 yearly instalments of £600 million, perhaps extended over further annual payments with inflationary construction costs, with no return. The UK government may have to sign up to a subsidy by augmenting the Supplier payments to a Counterparty to make up to a "strike" price. It may be that the "strike" price will be raised to provide a profit on the £6 billion equity paid up by the development company (under the Cambridge Working Party study).

Although the advance payments by consumers may alleviate the rising costs, even the small additional costs of them will be resisted. TWUL's wastewater consumers will not welcome the inclusion of the advance payments in their bills - without the advising of the additional part of the bills. Anti-nuclear electricity consumers will object to paying extra on their current bills, perhaps over the 10 years or so of he build years of SZC.

Basically, the EPR capital costs are too much to produce affordable electricity, while with the world uranium production reducing, nuclear fuel costs are rising. Finding a developer to risk a £6+ billion equity down payment with, or without, government guarantees may prove to be an elusive pursuit and the government may have to provide the equity as the French and Chinese governments have done for HPC.

Regulatory financing

The CAA regulates Heathrow Airport Limited, a twelfth subsidiary of FGP Topco Limited, of which the shareholders have so far paid no equity **into** it, just taken **out** dividends from it, thus allowing it to burgeon its debt to more than £20 billion. It has allowed the cap of airport charges to progressively rise in spite of the hostility of the airlines to it. As interest charges are one of the building blocks of the RAB, increasing its borrowing for capital spending has allowed the RAB to increase in size and with it the cap on airport charges.

Around 80% of FGP Topco's borrowing is offshore in Jersey, but even the other 20% of bonds issued in the UK are also free of withholding tax, while its financial costs are set against its operating profits to reduce corporation tax.

OfWat is content to regulate Tideway as a separate construction and operating company in a duality with TWUL, a subsidiary of its partly foreign owner, currently loaded with £14+ billion debt, which will continue indefinitely. Capital charges will be eased by advanced payments by the wastewater treatment consumers, while interest charges on debt and running costs will continue after commissioning.

The duality of facilities ownership will mean the continuing costs of two administrations and scope for disputation over responsibility for illegal discharges. So, the merging of Kemble Water Holdings and Bazalgette Equity Limited is recommended.

BEIS has commended Heathrow's RAB and OfWat's RCV financing as models for SZC's financing, but their application to SZC's financing is questionable.

Office of Nuclear Regulation

ONRs regulation is technical and operational and it may not be willing to license a subsidiary of a development company as the prime investor. The development company could be wholly or partially owned overseas and deny the operator of adequate funding for solving future problems.

Published by John Busby Limited 26 December 2021

Figure 1
Extracted from European Commission decision on HPC State Aid 8 October 2014

Figure 2
Table of figures compiled from successive FGP Topco Lmited annual reports.

Figure 3
Regulatory building blocks diagram extracted from Heathrow Finance plc prospectus.

Figure 4
Table of directors' salaries formed from successive Tideway annual reports

Figure 5
Table of revenue passed from TWUL to BTL extracted from Tideway annual report 2020-2021

Figure 6
Tideway's delivery model extracted from Tideway annual report 2020-2021

Figure 7
Timeline, Commissioning and System Acceptance period from Page 18 Tideway 2020-2021 annual report

Figure 8
Kemble Water Holdings Limited debt restructuring

Sizewell C
Statement of EdF/CNG's withdrawal from full control of Sizewell C extracted from Page 22 of EdF Energy Holdings Limited annual report 2021

RAB financing model
Cambridge EPRG Working Paper 1926
Financing Low-Carbon Generation in the UK: The hybrid RAB Model
David Newbery, Michael Pollitt, David Reiner and Simon Taylor

LCCC Annual report to March 2021

Distributed Energy

Distributed energy and grid stability

National grid

- The electricity national extra high voltage grid connects to large power stations and offshore wind generation farms.
- It consists of 400 kV and 132 kV power lines and cables
- There are intercontinental connectors with ac/dc and dc/ac inverters to swop power at peak times

Distributed energy

- Consumers with self-generation are connected to the 33 kV and 11 kV power lines and with 415 V and 240 V local distribution
- Self-generation is mainly by solar PV, wind and anaerobic digestion
- The main advantage of this is that it makes better use of the existing power lines
- A consumer with a load of 10 kW with solar PV providing 5 kW will reduce its grid intake to 5 kW
- Local inputs reduce the overall load on the system

National grid control

- National grid has to balance inputs with demand
- If a major power station drops out of action it reduces temporarily the system frequency and the voltage
- The operator has to bring other generators on line to restore stability
- This usually is performed without a noticed disturbance
- If large generators drop out and standby generation fails, parts of the system may have to be isolated to prevent a national blackout

Effects on renewables of loss of a major generation input

- In August 2019 Little Barford gas-fired power station (698 MW) tripped, while moments later Hornsea offshore wind farm (Maximum 1.2 GW) shut down
- To avoid a complete national blackout a large section of the grid in Wales was shut down
- The effect was compounded when all the renewables' inverters in the switched off section lost their voltage and frequency references and shut off

Dropout section management

Renewables require network load and reference voltage and frequency for inverters

Connected mostly to 33kV, 11kV and 415/240V power lines

When major 400kV and 132kV sections are closed to maintain stability 33kV/11kV and 415/240V ring mains could be section-wise isolated and connected to standby batteries per section by automatic change-over

This would keep renewables working and providing their share of the section load while major sections are closed.

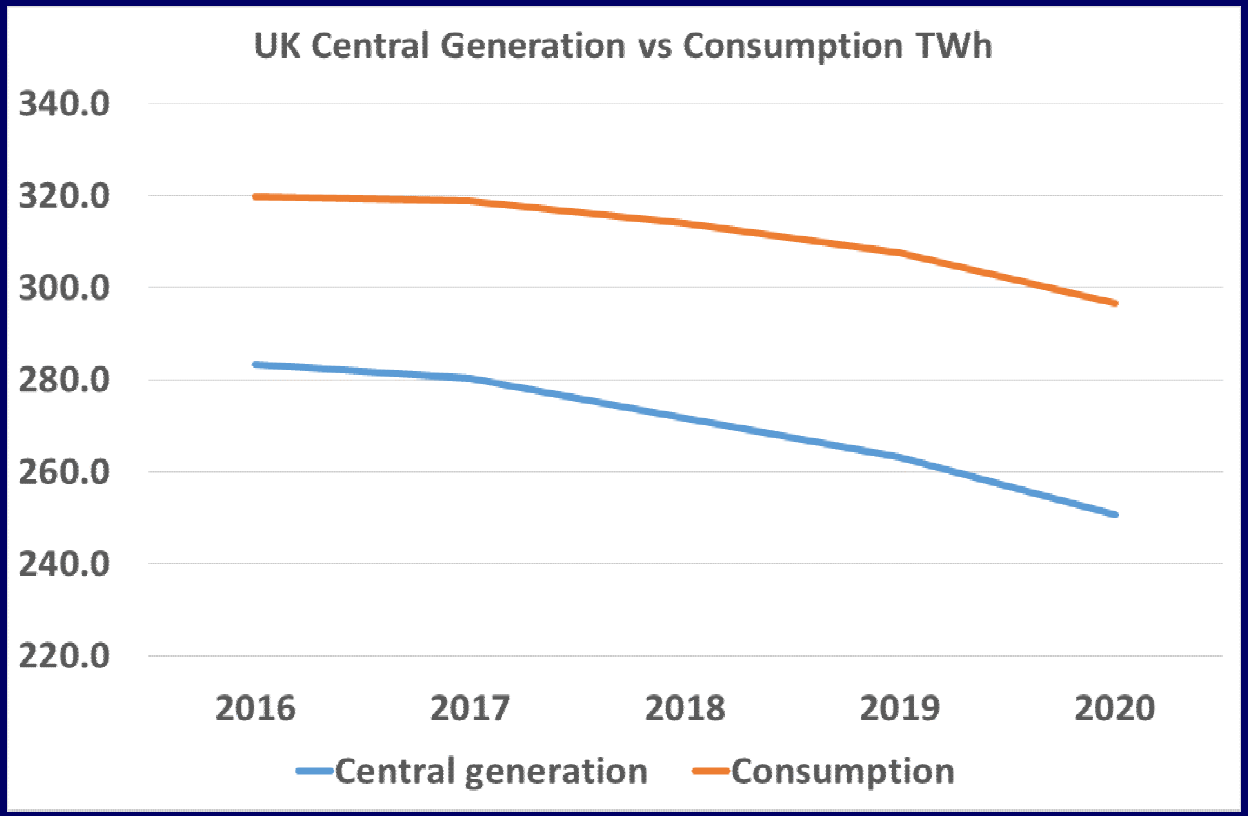
UK nuclear plants in operation

Sizewell B	1195 MWe
Torness	1205 MWe
Heysham 1 and 2	1240 & 1250 MWe
Hartlepool	1190 MWe
Hunterston B	830 MWe
Hinkley Point B	840 MWe
Dungeness B	1040 MWe

Coal-fired power plants

- Drax 5 & 6 (Wood fired) 1290 MWe
- West Burton A 2000 MWe
- Kilroot 520 MWe
- Ratcliffe on Soar 2000 MWe

UK Electricity Generation and Consumption 2016-2020



Central Electricity Generation and Consumption TWh

- Solar PV and anaerobic digestion is distributed, not central
- The UK's central generation on the grid has declined from 2016 to 2020 by 11% from 283 TWh to 251 TWh
- The UK's consumption has declined from 2016 to 2020 by 7% from 320 TWh to 297 TWh
- The additional 23 TWh between consumption and central generation is met by net imports/exports and by solar power

Electricity grid input power

See www.gridwatch.co.uk

- 2020 day averages in GW
- Power range:-
- Minimum 17.151 GW Maximum 47.275 GW
- Average 29.653 GW
- HPC 3.2 GW will provide 19 % input of minimum central power
- With SZB 1GW, SZC 3.2 GW and Hualong 2 GW nuclear will provide together 9.4 GW
- Nuclear would then provide 55% of minimum, 32% of average, 20% of maximum power

Electricity grid stability

- The bigger the input power the greater the effect on grid stability
- All the nuclear plants have to run 24/7 at a load factor of 90% to be viable
- Predominance of nuclear will cost inflate unaffordable “strike” prices per MWh
- Section closures will be essential to avoid a national blackout - it will be impossible to replace the output of a lost big input with multiple small units in time.
- Losing the HPC transmission line would require 2 or 3 major generator replacements
- SZC is not required

Section closure needs grid re-profiling

- 400 kV lines for major inputs
- 132 kV lines for major wind farms
- 33 kv lines for biomass and major solar
- 11 kV lines for large renewables
- 415/240 for small solar, wind and hydro

Small modular reactors

- Instead of SZC a number of distributed small modular (nuclear) plants, SMRs <300 MWe would be more appropriate for a distributed system
- Cooling in rivers is problematic in Summer as in France
- SMRs use fan air cooling systems, noisy and inefficient
- Communities are unlikely to accept SMRs
- Huge security problems with large numbers

My Conclusion

- SZC not required
- SMRs unacceptable and insecure
- Grid stability needs study
- Distributed energy a necessary concept
- Major inputs too big

Distributed energy

Commentary on Distributed Energy presentation.

Slide one

The UK's electricity grid was started in 1928 with the erection of 6,400 kilometres of mostly overhead cables, running at 132 kilovoltage and 50 Hz frequency and linking the then 122 most efficient power stations.

The 132 kV grid is now subsidiary to a 400 kV super grid run by National Grid's central control room with the task of maintaining stability of supply.

The introduction of renewable sources of electricity has created a distributed energy sector predominantly with solar PV on houses, industrial premises and large farm buildings. There are small and medium-sized wind turbines on farms and on some industrial sites. There is anaerobic digestion on farms, on sewage works and for food factories waste treatment.

Large, on- and off-shore wind farms augment central generation, but the stability of the national electricity supply is questioned by the introduction of the increased size of new nuclear power stations.

Stability of supply also relies on net imports/exports of electricity from the EU.

Slide Two

The national grid consists of 400 kv, 132 kV overhead and intercontinental interconnectors.

Slide Three

Below the 400 kV and 132 kV power lines in the hierarchy are 33kV and 11 kV high voltage underground cables and overhead lines for town and rural distribution, followed by 415 V and 240 V for local distribution, to which solar PV, small wind and anaerobic digestion are connected as distributed energy, beyond the control of the national grid.

This makes better use of the existing power lines as self-generation reduces the input from the mains.

Slide Four

The national grid has to balance inputs with demand. If a major source of power drops out of action, such as a power station or offshore wind farm, other sources have to be brought on line to maintain voltage and frequency.

The bigger the size of the source dropping out, the speed of response in bringing in alternative sources is critical in avoiding a national blackout.

The loss of a big source may mean the assembly of several smaller sources. The distributed sources on the local distribution lines are not available to the grid controller.

Also the closure of big coal stations, together with the soon to be closed AGR nuclear power stations, has reduced and will reduce the ability of the controller to maintain stability.

Slide Five

Two power sources lost in quick succession led to the closure of a large part of Wales to avoid a complete national shutdown.

Also the contribution of the distributed sources in the isolated section was lost.

Slide Six

To maintain the generation of the renewables in an isolated section closed to maintain national supply poses a complex problem. The grid controller would need to isolate sections of the 400 kV and 132 kV lines to relieve the national load sufficiently in which there would be 33kV, 11kV, 415 and 240 V sections in which renewables are connected.

The question is whether it would be possible to maintain local supplies from renewables in the closed sections with standby generation for reference voltage and frequency? With the introduction of >300 MWh battery storage systems, the complex control systems needed appear to be resolved.

The electronics in the dc/ac inverters might be adapted to work when severed from the mains to supply a local need and to reconnect once central power is restored. If this is the case, then it would mean an immediate and total severance of all the renewables in an isolated section, which would otherwise give them an excessive load and they would be shut down.

Slide Seven

Of the list of nuclear power plants currently in operation only Sizewell B will remain until 2035.

Slide Eight

While still in operation the coal and the wood fired boilers can offer flexibility of output.

Slide Nine

The consumption of 385 TWh in 2010 fell by 88 TWh or 23% to 297 TWh in 2021

Central generation of 382 TWh in 2010 fell by 131 TWh or 34%, to 251 TWh in 2021, showing the move to distributed energy.

Slide Ten

The UK's central generation, i.e., without the distributed energy has declined from 2016 to 2020 by 11% to 251 TWh

The UK's consumption has declined from 2016 to 2020 by 7% to 297 TWh

The contribution of net imports/exports and solar power of 23 TWh is significant.

Slide Eleven

The 2020 day GW averages are taken from the Gridwatch website.

At national minimum power of 17.151 GW, Hinkley Point C's transmission to the grid of 3.2 GW will provide 19% of the central load, which if it tripped with lightning would certainly be unrecoverable.

With SZB, HPC SZC and perhaps two Hualong 1 GW plants, nuclear would provide 55% of central generation.

These ratios will be more extreme with more distributed energy and the closure of the current nuclear plants, except SZB.

Slide Twelve

The owners of nuclear power plant have to run them 24/7 at 90% load factor to maximise revenue. If all those planned are in operation, unless considerable load is added, they will dominate 55% of the minimum load at night.

Just HPC's or SZC's transmission transfer of 3.2 GW would be 19% of minimum power. Either would not be available to fill the gap if one shut down. Both would need to run 24/7 for an even doubtful viability.

Slide Thirteen

The national electricity grid is soon to be not fit for the purpose.

It needs re-profiling to suit the increasing distributed energy and decreasing central generation. The potential new load for electrical vehicles might need a special grid extension for battery charging and part of the new nuclear could be diverted for this purpose, improving the stability of the current grid. The loss of a major nuclear power plant would then just stop vehicles being charged.

Slide Fourteen

Although small modular reactors are apparently more likely to fit into a distributed system, they are more likely to be uneconomical with the same technical staff costs and security. Also the automation and controls would be the same as for bigger plants.

As uranium supplies peaked in 2016, increased nuclear power fuel prices will rise and affect adversely the viability of SMRs.

Rivers in the UK are suffering low flow with water abstraction and SMRs would have to be sited on major estuaries. There would be concerns for radioactive outflows.

Otherwise, they would have to deploy fan air-cooled condensers, noisy and inefficient.

They would need to be sited in town industrial estates and there would be considerable local opposition.

Slide Fifteen

With central generation currently declining it is doubtful that Sizewell C is required. It is too big for grid stability and unacceptably expensive.

Domestic bills are rising and forward debiting for a future nuclear power station for over ten years will be unpopular, if not unaffordable.

SMRs are unacceptable to most communities and insecure.

Grid stability needs study, but major inputs are too big.

John Busby 26 August 2021

12. Ian Galloway – 2 January 2022

Mr I Galloway
[redacted]

The Rt Hon Kwasi Kwarteng MP
Secretary of State for Business, Energy and Industrial Strategy
Department for Business, Energy & Industrial Strategy
1 Victoria Street
London
SW1H 0ET

2nd January 2022

Sizewell C Nuclear Power Station

By e-mail only

Dear Secretary of State,

My purpose in writing to you is twofold;

First, to thank you for granting an extension to the Reporting Stage of the application process in respect to development consent being sought for a proposed two nuclear reactor Power Station at Sizewell, on the East Suffolk Coast within the AONB.

There can be no doubt that the Planning Inspectorate's Examination and report will have covered an enormous amount of ground that will undoubtedly take a significant amount of effort to condense into a high quality and comprehensive recommendation to yourself. Something I am sure you were only too aware of when granting the requested extension.

Second, as a member of the public who participated extensively in the Examination, after reading Mr Leigh's letter to the Planning Inspectorate confirming the extension, I feel compelled to make you aware of the effort expended by the Planning Inspectorate to *"…ensure that…timetables, including the Reporting stage, are adhered to so that…confidence in the certainty of timings under the Planning Act process for Nationally Significant Energy Infrastructure Projects is not eroded."* [Mr G Leigh Head, Energy Infrastructure Planning – 24th December 2021].

PRELIMINARY MEETING

At the meeting the Planning Inspectorate Panel made it clear to all participants (including the Applicant) that, 'the Examination Process must be heavily front loaded' in order that the prescribed time limit for consideration of the Application could be achieved. This fundamental issue was further reinforced on a number of occasions, with participants urged to recognise their responsibilities through making timely submissions, aligned with the published "deadline" timetable.

Counsel for the Applicant made it clear at Day 2 of the Preliminary Meeting that he regarded the Application as a *"…highly and unusually large and complex project."* for a *"…very substantial power station"*. The consequences of the assertions were neither quantified nor described in any detail [in open forum] by the Applicant or their Counsel.

EXAMINATION HEARINGS

In my opinion, The Planning Inspectorate team were constantly striving to maintain momentum and to conduct the Examination with thoroughness, despite obvious deficiencies in the Applicants degree of preparedness and the shortcomings of (what I consider to be) a considerable number of Applicant submissions, many of which were subsequently and/or serially; augmented, reviewed or materially revised during the Examination period itself.

DEPARTMENTAL AND AGENCY EVIDENCE AND 'EXPERT SCRUTINY'

As the Examination progressed, it rapidly became clearer that previously declared 'potential' resource constraints [of appropriate expertise from Departments and Agencies] were likely to occur.

Resource shortages for both; the examination of Applicant submitted evidence and 'close in support' of the Planning Inspectorate Panel became more evident and increasingly critical as the Examination progressed.

At one point a Government Minister appeared (at an Examination hearing) with the express and singular intent of seeking the Planning Inspectorate's agreement to submit a request to seek an extension to the Examination itself, in order to alleviate known deficiencies in specific Government Departments. I understand the Planning Inspectorate felt it unnecessary or inappropriate to seek an extension of the Examination at that time.

Subsequently, representatives speaking on behalf of the Minister made similar representations at later hearings.

APPLICANT SUBMISSIONS

In my opinion, the Planning Inspectorate Panel took reasonable and timely action to remind the Applicant of the need for their submissions to be made in accordance with the published deadlines.

In addition, the Planning Inspectorate Panel specifically addressed issues with the Applicant on their document; indexing, referencing, accuracy, completeness, etc.

PLANNING ACT PROCESS FOR NATIONALLY SIGNIFICANT ENERGY INFRASTRUCTURE PROJECTS

It is hard to believe the designers of the 'process' intended that an Applicant might gain advantage from delaying submission of material to the Planning Inspectorate, such that it might avoid full scrutiny by Interested Parties participating. It is a moot point as to whether the degree and impact of this happening on this occasion was excessive.

The 'Rochdale Envelope' now appears regularised as an integral part of the Planning process, irrespective of size or complexity. However, it is questionable as to whether the degree and intensity of its use in projects such as this one is to be condoned, particularly when the ramifications are likely to be widespread and significant.

Leaving aside the issue of (current or recent) illness, I am gravely concerned that the conduct of the Sizewell Examination largely by 'virtual means', over such a protracted period, with little or no respite for all participants may have had serious, lasting and deleterious impacts on people and process.

SUMMARY

From my perspective it seems that whilst the 'Examination phase' was largely (but not totally or satisfactorily) completed within the prescribed timescales, the Planning Inspectorate may now become the 'scapegoat' for deficiencies not directly within their control (i.e. Departmental and Agency dependencies, the degree of preparedness of the Applicant, an appropriate and agreed resourcing strategy for an Application prior to acceptance for Examination.

One potential remedy for the future, should be to look further 'upstream' in the process and examine the opportunity to more effectively 'gate' an Application, such that the hurdle height for 'acceptance for Examination' is that much greater where applications with complexity and scale may incur an additional load, not only within the Planning Inspectorate but also in Departments and Agencies where dependencies do, or are likely to be required.

So, whilst Mr Leigh rightly points to the Planning Inspectorate's responsibility to make provision for foreseeable events *"…such as very large volumes of documentation…"* I contend it is not that simple, as evidenced in this instance.

For example, it may be beneficial for the Planning Inspectorate to explore more fully pre-defining the specific; minimum content required at the point of submission, the structure within which it is to be contained, the indexing to be used and any other standards required of documentation submitted in support of and comprising an Application; rather than being required to acquaint themselves with differing formats and standards, depending on each Applicant.

Whilst writing it would be remiss of me not to mention the combined impact of the 'energy' projects prior to this one (i.e. Scottish Power Renewables) and those being brought forward subsequent to the Sizewell Examination ending (i.e. Nautilus, similar interconnect proposals, etc.).

The lack of a cohesive strategy for dealing with this highly and unusually large and complex issue is placing an inordinate strain on County, District, Town and Parish Councils as well as residents and businesses, all of whom are likely to be adversely impacted as a result.

In concluding, I thank you for taking the time to consider my points and look forward to receiving any comments you may have.

Yours Faithfully

Ian Galloway

cc; **Ms Kathryn Dunne** – Operations Lead, The Planning Inspectorate
Mr Gareth Leigh – Head, Energy Infrastructure Planning, BEIS
The Rt Hon Steve Barclay – Minister for the Cabinet Office

13. Mike Taylor – 2 January 2022

From: [redacted]
To: Dunne, Kathryn
Subject: Sizewell C case
Date: 31 December 2021 12:24:29

Dear Kathryn, Please forgive this mail but I feel BEIS minister is being critical of the inspectorate when essentially the Government and developer are responsible for the delays and uncertainty in this case. As a member of the BEIS/NGO forum representing Sizewell area, it has been evident since 2019 that the developer did not want to fund the project using EDF France finance. Without government or taxpayer funding the project managers pointed out that the development would not proceed. This clearly has implications for licencing and other developer commitments.
Throughout the many public consultations it was pointed out to SZC Co that information was inadequate, incomplete, poorly mapped and especially did not protect the AONB. Meanwhile the EN6 policy and energy policy suite from EN1-6 was out of date and the Need for nuclear to be part of the mix was not reviewed. I note the reply from Gareth Leigh did not address this issue. It is the ministers responsibility to ensure that policy is up to date and appropriate.
In December 2017 I and other NGOs attended a meeting with BEIS officers to start updating/revising EN6. This process was stalled by BEIS and yet the developer has also failed to acknowledge that the policy was out of date. Implying they would start construction before 2025, not the proper definition of operation by 2025.
A revised EN6 properly consulted on and using up to date regulatory input may well have resulted in a number of sites being removed from the list, especially for flood risk and/or environmental concerns. I note in this respect that the Environment Agency latest statement of common ground for SZC has a number of red lines. It would have been helpful to PINS if policy EN6 had been properly updated.
It seems most likely that BEIS are trying to pressure PINS to **deliver** Sizewell C as for many years there has been a SZC delivery board set up by DECC. A similar situation existed at Wylfa and Hinkley C. BEIS have never made a public decision on Wylfa despite the PINS recommendation to refuse.
Hope this information is helpful

Kind regards Mike Taylor
BEIS/NGO forum member.

[redacted]

14. MF Rowe – 3 January 2022

From: [redacted]
To: [redacted]
Cc: beiseip@beis.gov.uk
Subject: Fwd: Sizewell C.
Date: 03 January 2022 09:55:29

Good Morning. I hope you do not mind me forwarding a few emails that we have been forwarded to town and parish council.
The local town and parish councils along with ourselves are very concerned about the use of heavy goods trains using the Ipswich to Lowestoft rail track, transporting up to and over 2000 tons of materials seven times a night from 11pm to 7am, there is eight towns and parishes that are going to be effected, who have hundreds of residents some only living 20ft from the track, none of which are at this time are subject to sleep deprivation.
Not sure if this is the correct department to forward this to, but any help in getting night trains stopped would be much appreciated.
Kind Regards M. F.Rowe. Whitearch Ltd. Benhall, Suffolk.

Sent from my iPad

Begin forwarded message:

> **From:** Vivien Rowe <[redacted]@icloud.com>
> **Date:** 9 December 2021 at 07:22:08 GMT
> **To:** townclerk@saxmundham.org
> **Cc:** clerk@campsea-ashe-pc.org, townclerk@woodbridge-suffolk.gov.uk, clerk@martleshamcouncil.org.uk, clerk@melton-suffolk-pc.gov.uk, [redacted]@btinternet.com, Stuart Dobson [redacted]@btconnect.com>, [redacted]@gmail.com, [redacted]@parliament.uk
> **Subject: Sizewell C.**
>
> I am hoping that most of you will recall my previous emails, not all replied, with the pending approval of Sizewell C I am hoping that all will reply this time.
> The situation appears to be that Sizewell C is going to get the go ahead, when this happens it is intended to run up to seven heavy goods trains hauling 2000 plus tons of materials to Sizewell C, every night from 11pm to 7am.
> My position is this, I am a director in Whitearch Ltd, a company that owns and runs the Whitearch residential / holiday park in Benhall, the park is situated adjacent to the Ipswich Lowestoft train track, as a result of the night trains, the holiday side of the business will have to be put on hold for the duration of the Sizewell build, the other issue with night trains is the noise and vibration blight on our residents, all of which are elderly and are not deserving of this disruption.
> Bringing me to the point of this email,it is to inquire if any representation is being provided to the residents effected by the pending night trains, we for our part are in talks with Delcour Maclaren the representatives of EDF, via Clarke and Simpsons.
> The ideal response to this email would be to have a person, persons or agent to represent all the residents in all the wards, giving them and us the best chance of receiving acoustic barriers and compensation, to offset the blight this is going to inflict upon all of us.

Kind Regards M.F.Rowe.
[redacted], Main Rd, Benhall, Saxmundham, [redacted]

Sent from my iPad

From: [redacted]
To: [redacted]
Cc: beiseip@beis.gov.uk
Subject: Fwd: SizewellC night trains.
Date: 03 January 2022 09:56:49

Morning again. Another email to local council.

Sent from my iPad

Begin forwarded message:

> **From:** Vivien Rowe [redacted]@icloud.com>
> **Date:** 12 December 2021 at 17:00:48 GMT
> **To:** townclerk@saxmundham.org
> **Cc:** Klaus Fortmann <clerk@campsea-ashe-pc.org>, townclerk@woodbridge-suffolk.gov.uk, Clerk Mpc <clerk@martleshamcouncil.org.uk>, Parish Clerk <clerk@melton-suffolk-pc.gov.uk>, [redacted]@btinternet.com, Stuart Dobson [redacted]@btconnect.com>, [redacted]@gmail.com, [redacted]@parliament.uk
> **Subject: SizewellC night trains.**
>
> Dear Councillors. Further to my previous email, I have received three replies to date for which we are very thankful, hopefully the rest will follow.
> My latest thoughts are. Is it possible to get a volunteer or volunteers in each ward to go round with a partition and get all households, that are going to be effected by these night trains, to sign and date it, a lot of work for those in Campsea-Ashe, Melton and Woodbridge, keeping in mind it would not just include those in the villages and towns, but also those more remote area adjacent to the train track that would be subject to noise and vibrations levels.
> I for my part have delivered 957 leaflets through people's doors from Leiston to Little Bealings, in a bid to make them aware of the pending disruption to there lives, although Leiston appears to be saved from all this, with a new link being put in place to bypass them. I am prepared to collect signatures in Benhall.
> If this can be achieved, then there is a better chance of getting acoustic barriers and a compensation bid put in place, showing a united front along with the knowledge and expertise of the parish and town councillors, we could stand a chance of EDF listening to us.
> Kind Regards Malcolm. F. Rowe. [redacted], Main Rd, Benhall, Saxmundham, [redacted]
>
> Sent from my iPad

From: [redacted]
To: [redacted]
Cc: beiseip@beis.gov.uk
Subject: Fwd: Sizewell Night Trains.
Date: 03 January 2022 09:59:35

Apologies for sending more emails, it's in a bid to get some one to listen and hopefully assist. Regards M.F.Rowe.

Sent from my iPad

Begin forwarded message:

> **From:** Vivien Rowe <v[redacted]@icloud.com>
> **Date:** 29 December 2021 at 18:10:27 GMT
> **To:** clerk.benhall@gmail.com
> **Cc:** Roz Barnett <townclerk@saxmundham-tc.gov.uk>, Klaus Fortmann <clerk@campsea-ashe-pc.org>, Parish Clerk <clerk@melton-suffolk-pc.gov.uk>, Town Clerk <townclerk@woodbridge-suffolk.gov.uk>, Clerk Mpc <clerk@martleshamcouncil.org.uk>, [redacted]@btinternet.com, [redacted]@parliament.uk, Stuart Dobson <[redacted]@btconnect.com>, [redacted]@eastsuffolk.gov.uk, Edwina Galloway <[redacted]@gmail.com>
> **Subject: Sizewell Night Trains.**
>
> Hello. Having received responses from most of the town and parish councillors, those who did in my opinion have represented the households within there wards extremely well, putting forward there points of view regarding night trains. Some have voiced there concerns that there representation will be brushed aside when it gets to the planning stage.
> My quest was to have a signed partition within each ward by those households directly effected. This involves a lot of work, is it possible to made a list of all properties within 250m of the rail track, either taken from a street map or by a property count, giving a total property count that I would then be prepared to ensure was presented to ESC, local MP, Dalcour McLaren and Sizewell.
> On another note, I have counted the properties in Farnham and Stratford St Andrews, there is about 36 directly effected by the extra volume of lorry traffic, the village is receiving a well deserved bypass after years of campaigning, at what ever cost that brings and as far as I can see no lorries will be travelling this route at night, now when it comes to trains, no investment is being made apart from a few upgrades to level crossings, no replacement of track to provide the extra line to enable the heavy goods to be transported during the day, it has been stated the the rail company has not had the time to do this, the passenger trains at this time travel almost completely empty as they pass Whitearch Residential / Holiday park.
> On another note but still related. Lord Bamford and his team of engineers at JCB, have in the past year developed a Hydrogen engine that can make use of many of the components of a standard combustion engine and be manufactured at the same price as a Diesel engine, give zero omissions and it will work all day on a fill of Hydrogen, the tank is the same size as these fitted to a standard digger, the Hydrogen has three times the mass of diesel. Now batteries on a 20 ton excavator would weigh 8 tons the excavator now weighs 28 tons, as a result all components such as sprockets and tracks etc would

have to be heavier, making the cost of the excavator double that of a Hydrogen one, it would not have the capacity to work all day. It is possible there will be a reference to this on BBC 2 at 9pm tonight, unless a repeat.
Siemens are preparing large capacity production of Hydrogen in Germany, we may require extra electricity capacity for domestic use, but in my opinion and that of Lord Bamford it will not solve the pollution problem because it does not have the capacity, also limited supplies with ever increasing prices of Lithium, Cobalt and Copper will be a problem.
If night trains are given the go ahead then the effected households must be assured of acoustic barriers, compensation for the noise and vibration and zero council tax.
Apologies for a long email, the fact that this will almost certainly stop work on our holiday park, the fact is also this it will ruin hundreds of people's lives and reduce there property values to almost zero.
Regards M.F.Rowe. [redacted], Main Rd, Benhall, Saxmundham, [redacted]

PS. Perhaps Hydrogen can be used for domestic boilers, a planet saver, its been known of the power of Hydrogen since 1808, bring it up to date and start to built plants around the country using desalinated sea water, something we need to reduce.
Sent from my iPad

15. Graham Lacey – 10 January 2022

From: [redacted]@btconnect.com
To: [redacted]@parliament.uk
Cc: [redacted]
SizewellC; Dawn Lacey
Subject: RE: PROPOSED DEVELOPMENT SIZEWELL C, SUFFOLK.
Date: 10 January 2022 12:33:56

Dear Prime Minister,

NET ZERO TARGETS

Please advise how you intend achieving your Net Zero Targets during the construction phase of this development, should EDF's Application receives Planning Inspectorate approval.

Under the new rules, set out in [redacted], in-scope organisations need to produce a [redacted] detailing where their emissions come from and what environmental management measures they have in place.
While some large companies already self-report Scope 1 (direct) and Scope 2 (indirect owned) carbon emissions under the [redacted], the new targets require them to go further. This includes committing to achieving net zero by 2050 and reporting Scope 3 emissions such as business travel, employee commuting, transportation, distribution and waste.

MATERIAL SHORTAGES & CONSTRUCTION PHASE PROGRAMME OVERRUN

Please confirm if you have been provided with a meaningful, updated Construction Cost Plan, for this proposed development, by the applicant EDF.

The Department for Business and Energy and Industrial Strategy's [redacted] consistently showed month-on-month price rises throughout 2021. The Construction Leadership Council reported improvements in product supply in some areas, and the Timber Trade Federation (TTF) is now receiving record-breaking timber imports – however, supplies are still likely to be under strain in 2022. A shortage of HGV drivers to deliver materials remains an issue, with take-up low for the government's 10,500 visas for overseas lorry drivers. An FMB survey shows jobs are still being delayed as a result.

Your earliest response would be appreciated as a matter of urgency and most certainly prior to expiration of the Extension of Time recently granted to the Planning Inspectorate.

Thank you.

Kind regards

Graham K. Lacey MCIOB MIOD

[redacted]
Fordley Road
Middleton
Suffolk
[redacted]

E: [redacted]@btconnect.com
M: [redacted]

16. Mr & Mrs Lacey – 10 January 2022

From:	[redacted]@btconnect.com
To:	SizewellC
Cc:	[redacted]@parliament.uk
Subject:	Sizewell C application - Urgent request
Date:	10 January 2022 12:12:39
Importance:	High

For the attention of Wendy McKay

Ref URGENT MATTER - Fordley Road Middleton IP17 3LS

-

Good morning

Please would you look into our outstanding huge concerns within the 6 week extension period. As the most significant stakeholder affected by the SLR, rat running, road blocking and congestion of Fordley Road remains a huge concern for ourselves, Middleton cum Fordley Parish Council, Kelsale cum Carlton Parish Council if the SLR goes ahead.
The above Fordley Road issues remain outstanding and unaddressed, therefore require urgent time and effort from all concerned to enable traffic calming and congestion measures preventing rat running and increased traffic flow to be agreed and request measures are put in place within the 6 week extension period.
Middleton cum Fordley Parish Council, Kelsale cum Carlton Parish Council and Suffolk County Council Highways are in agreement that Fordley Road issues will require mitigation measures. Along with Dorley's Corner, Kelsale village, Butchers Road, Tiggins Lane and Town Farm Lane, North Green.
It would beneficial if traffic calming and elimination of road congestion measures were included in Planning Inspectorate's final report as a planning condition.
Please, we strongly request, appropriate measures are put in place by the Planning Inspectorate covering our joint concerns within the 6 week extension period.
Thank you.

Kind regards

Mr & Mrs Lacey

[redacted]
Fordley Road
Middleton
[redacted]

17. Nick Scarr – 11 January 2022

From:	[redacted]
To:	SizewellC
Subject:	Document - "Sizewell C Main nuclear platform flood resilience in the next century."
Date:	11 January 2022 12:31:13
Attachments:	SzC Main nuclear platform flood resilience in the next century.pdf

Dear Planning Inspectorate, Sizewell C.

Please find enclosed a brief paper that summarises the primary concerns of flood risk to the proposed Sizewell C if it is approved and built as presented in the DCO hearing.

The paper studies two definitive statements made by the Applicant about flood risk in the next century and the timescale for spent fuel removal.

I understand the Application is closed to new papers but nevertheless this 'summary' document may prove helpful.

Regards
Nick Scarr - IP 20025524

Document enclosed: 'Sizewell C Main nuclear platform flood resilience in the next century.'

Sizewell C Main nuclear platform flood resilience in the next century.

Author: Nick Scarr IP 20025524—11/1/22 – 8:05

The next century will be a critical time for Sizewell C if it is approved and built as presented in the DCO hearing; security from flood risk will be of utmost importance as the spent fuel created by the reactors will be onsite in cooling ponds until its temperature lowers sufficiently to allow removal.

The Applicant has made a definitive statement on flood risk to Sizewell C's main nuclear platform for the period. The Applicant states that the 7.3m AOD (Above Ordnance Datum) main nuclear platform will be free from flood risk until 2140 under the RCP8.5 scenario. This is presented in its '*Table 2.1'*.

The Applicant has also made a second definitive statement, presumably informed by the first, that spent fuel will be removed from site by this 2140 date.

The following document reviews these crucial statements in the following two short papers.

Paper 1 analyses the limitations of the data presented in the Applicant's '*Table 2.1*' and concludes that it does not reflect reasonable worse-case conditions at the main nuclear site.

Paper 2 assesses whether spent fuel removal by 2140 is a plausible timescale and concludes that even if one is to accept the data presented in '*Table 2.1'* as worse-case flood data, safety of the site will still be compromised as spent fuel removal by this date does not appear to be feasible.

Overall, the papers posit that Sizewell C, as presented in the DCO Hearing, will not be able to offer the sufficient and necessary flood resilience in the next century.

Paper 1—Sizewell C and the wave data used in the Applicant's FRA to establish flood levels on the main nuclear platform in the next century.

Introduction and purpose.

The Applicant used its Flood Risk Assessment to establish that the main nuclear platform, at 7.3m AOD, is resilient to flood risk until 2140.

This paper critically reviews the data presented by the Applicants table 2.1 and splits it into its component parts—still water flood levels and wave induced (overtopping) flood levels.

The paper concludes that the wave data utilised by the Applicant does not represent worse-case conditions and that *Table 2.1* may therefore under-estimate flood levels to the main nuclear platform.

A) The Applicant's data for overall wave overtopping scenarios of the main nuclear platform as presented in its FRA Table 2.1:

The Applicant's 'Table 2.1':

> *"2.1.5 Table 2.1* [reproduced below] *presents a list of overtopping scenarios for the reasonably foreseeable (RCP8.5 95 percentile) and credible maximum (H++ or BECC Upper) climate change allowances and respective extreme still water levels, highlighting in red bold those scenarios with extreme sea level above platform height that were not undertaken in this assessment"* FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

"Table 2.1: Summary of wave overtopping scenarios"

Return period	2090 epoch		2140 epoch		2190 epoch	
	RCP8.5	H++	RCP8.5	BECC	RCP8.5	BECC
200-year	4.58	5.19	5.48	7.58	6.31	**8.48**
1,000-year	5.12	5.73	6.02	**8.12**	6.85	**9.02**
10,000-year	5.98	6.59	6.88	**8.98**	7.71	**9.88**

FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

Figures shown are in height of water at the main platform AOD. Any figure greater than 7.3m AOD (main nuclear platform height) represents a flood event which compromises the main nuclear platform and spent fuel storage safety. Figures in red are highlighted by the Applicant.

These analysis results show that the main nuclear platform at 7.3m AOD is not expected to flood before 2140 based on the RCP8.5 scenario and the maximum storm period return considered for nuclear installations.

These results are understood to be a composite figure of maximum still water levels (which incorporate climate and storm surge level effects) combined with the impact on those levels from waves overtopping and breaching Sizewell C's defences.

The following section breaks down these data into the two component parts presented in the Tables B1 and B2 following.

B) Breakdown of 'Table 2.1'.

B.1 Still water data used in the Applicant's 'Table 2.1'.

To examine the component that waves add to the Table 2.1 data it is necessary to abstract the still water level components. These values are shown in the table below by using the following data:

- Still water level data (AOD) for storm event return periods used:
  1:200 3.13m; 1:1000 3.55m; 1:10,000 4.21m

- Climate change sea level rise data used for RCP8.5 scenario:
  RCP8.5 2100 1.12m; RCP8.5 2140 1.8m; RCP8.5 2200 2.9m; BECC 2200 5.00m

For reference the 1953 flood level is approximately 1:1000. Figures in blue in Tables B1 and B2 are the Applicant's still water figures from its table 4.2 that are slightly different and shown where available. See FRA ADDENDUM: EN010012 Main Development Site Flood Risk Assessment Addendum. Table 4.2 *'Assessed flood depth on the main platform'* (Still water levels).

In developing the table B1 below, I have utilised the above figures combing the two sets of data. So, for example, for the scenario of a 1 in 200 year still water level and a 2140 climate change sea level rise gives a level of 4.93m (3.13 + 1.8m).

The table B1 thus excludes the wave action component from the Applicant's Table 2.1, considering only the still water levels of return period sea level rise and climate change sea level rise:

Return Period	2100 epoch		2140 Epoch		2200 Epoch	
	RCP8.5	H++	RCP8.5	BECC	RCP8.5	BECC
200-year	4.25	5.03	4.93	no data	6.03	8.13/8.00
1,000-year	4.67	5.45	5.35	7.94	6.45	8.55/8.84
10,000-year	5.33	6.11	6.01	8.85	7.11/7.58	9.21/9.75

Table B1 - Figures shown are in height of water AOD.

B.2 Flood level component from overtopping (breaching) waves in the Applicant's 'Table 2.1'.

Subtracting the data in the Table B1 above from the Applicant's Table 2.1 arrives at the following:

Return Period	2100 epoch		2140 Epoch		2200 Epoch	
	RCP8.5	H++	RCP8.5	BECC	RCP8.5	BECC
200-year	0.33	0.16	0.55	no data	0.28	0.35/0.48
1,000-year	0.45	0.28	0.67	0.18	0.4	0.47/0.18
10,000-year	0.65	0.48	0.87	0.13	0.6/0.13	0.67/0.13

Table B2 - Figures shown are in height of water AOD.

Table B2 then, shows the maximum contribution of overtopping waves to water levels on and around the platform that could have been allocated by the Applicant for each return period and epoch.

It appears that the Applicant has used '*inshore wave heights of 3.73m-4.48m'* to calculate these wave contributions. See: FRA Main development site Flood Risk Addendum Page 1,2: Table 4.1.

However, should the offshore Dunwich bank be lost or compromised by the next century—**a plausible scenario as it has no underlying hard geology**—then **moderate as well as high storm waves** (the significant 1:100 offshore wave heights are 7.3- 7.8m from the N –NNE sector) could breach, break over and erode the 'soft and erodible' inner and outer longshore bars and the South Minsmere levels, immediately to the North of Sizewell C. In flood conditions these waves would then add to the water volumes in the contiguous marshes of South Minsmere and Sizewell. Storm-wave access around the landward side of the main nuclear platform could then occur and there are no

proposed defences against such scenarios. **In these scenarios wave action could present significantly greater contributions to flood levels on the main nuclear platform than suggested by Table B2 which, in turn, would then result in an understatement of flood risk in the Applicant's Table 2.1.**

The adequacy of the flood modelling on the main platform height of 7.3m AOD to 2140 is essentially then dependent upon the assumptions of:

- little or no change to the offshore geomorphology (primarily the Dunwich bank and the longshore, nearshore bars)
- the present shoreline surrounding Sizewell C remaining uneroded until the middle of the next century with no consideration given to the historical precedent of the Sizewell foreshore being the '*most eroded shoreline'* in records assembled by Pye and Blott until the development of the Dunwich bank (see REP2-393 Section 2) and
- no significant unrepaired breaches to sea defences north of the site.

In my view there is no plausible mechanism that could justify the assumption for the maintenance and preservation of the unconsolidated Dunwich bank over the next two 100-year episodes of coastal processes, the uncertainties of which can only be increased by climate change sea-level rise and storm level change. This loss could result in significant shoreline erosion around Sizewell C. See my papers REP2-393, REP7-219, REP10-345.

In a meeting with the Environment Agency on 23rd January 2020 it was acknowledged that Sizewell C may become subject to 'islanding'. I believe that the consequences of this are not being considered, namely: in the highly plausible event of significant shoreline recession by and during the next century, Sizewell C could become an established promontory or headland. Sea defences would then need to fully surround the main nuclear platform.

Paper 2—Sizewell C and the Applicant's claim for spent fuel removal by 2140. Is this a plausible timeframe?

Introduction and purpose.

The Applicant's flood risk assessment for Sizewell C is committed to 2140 as the 'decommissioned date' for spent fuel confirmed by the following:

- ***"The lifetime of the development includes for removal of all spent nuclear fuel by 2140…The Application and flood risk assessment are explicit about the timeframes being assessed in relation to 2140."***
- ***"The key dates relevant to flood risk for the operation of the station are; the end of operation of the station at 2085…end of interim spent fuel store 2140…*** 6.12 Rev: Reports Referenced in the Environmental Statement. Page 14
- ***"…on-site risks would only be considered*** **[modelled]** ***to 2140 as the end of Interim Spent Fuel Store."***
  Royal Haskoning, flood risk modelling, page 2 of 22 in 6.12 Revision: Reports Referenced in the Environmental Statement.

This timeframe of 2140 is then important as '*on-site risks would only be considered to this date*' according to the Applicant's own modelling presented by Royal Haskoning.

This paper is a response to this stated, 'decommissioned date of 2140' and posits the view that such a timeframe is imposed by the Applicant's flood risk assessment presented in its '*Table 2.1*'and its selected main nuclear platform level. This paper suggests this timescale for spent fuel removal is implausible and that the spent fuel store could remain in commission well beyond 2140 and consequently be untenable being exposed to unacceptable flood risk.

1. The critical nature of the 2140 date—EDF's assessment of still water and wave overtopping of the main nuclear platform beyond 2140.

Again, refer to the Applicant's 'Table 2.1':

> *"2.1.5 Table 2.1 [reproduced below] presents a list of overtopping scenarios for the reasonably foreseeable (RCP8.5 95 percentile) and credible maximum (H++ or BECC Upper) climate change allowances and respective extreme still water levels, highlighting in red bold those scenarios with extreme sea level above platform height that were not undertaken in this assessment"* FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

Table 2.1: Summary of wave overtopping scenarios

Return period	2090 epoch		2140 epoch		2190 epoch	
	RCP8.5	H++	RCP8.5	BECC	RCP8.5	BECC
200-year	4.58	5.19	5.48	7.58	6.31	8.48
1,000-year	5.12	5.73	6.02	8.12	6.85	9.02
10,000-year	5.98	6.59	6.88	8.98	7.71	9.88

FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

This table clearly shows that beyond 2140 the main nuclear platform is at risk of flooding in a 1:10,000 RCP8.5 scenario and that there is a consequent critical requirement for Sizewell C to be decommissioned (at least in terms of spent fuel removal) by this date for the safety of local populations, environment, and staff.

2. The profound difficulties in achieving a decommissioned date of 2140.

Government policy is that spent fuel is transported directly from site of creation to a geological disposal facility (GDF), **there is no 'intermediate' location for spent fuel proposed**. However:

2.1 Policy: Spent fuel is not waste and *is not currently destined for geological disposal.*

- *"…your understanding that spent fuel is 'not waste' and is not destined for geological disposal unless and until it is classified as waste, is correct."*

13th October 2021 email to me from Radioactive Waste Management Ltd.

2.2 Spent Fuel Cooling: High burnup spent fuel of the type produced by Sizewell C requires a longer cooling period (see my paper REP2-503) before geological disposal can be considered and that does not correlate with a decommissioned date of 2140.

- The Nuclear Decommissioning Authority (NDA) suggests the cooling requirements will result in a decommissioning date for Sizewell C between **2180 to 2230**:

  "Current RWMD generic disposal studies for spent fuel define a temperature criterion for the acceptable heat output from a disposal canister. In order to ensure that the performance of the bentonite buffer material to be placed around the canister in the disposal environment is not damaged by excessive temperatures, a temperature limit of 100°C is applied to the inner bentonite buffer surface. ***Based on a canister containing four EPR fuel assemblies, each with the maximum burn-up of 65 GWd/tU and adopting the canister spacing used in existing concept designs, it would require of order of 140 years for the activity, and hence heat output, of the EPR fuel to decay sufficiently to meet this temperature criterion****."*

  "It is acknowledged that the cooling period specified above is greater than would be required for existing PWR fuel to meet the same criterion **[due to its higher levels of radioactivity and high decay heat radioisotopes]** *and RWMD proposes to explore how this period can be reduced. This may be achieved for instance through refinement of the assessment inventory (for example by considering a more realistic distribution of burn-up), by reducing the fuel loading in a canister* **[which will increase the geological disposal footprint]** *or by consideration of alternative disposal concepts. The sensitivity of the cooling period to fuel burn-up has been investigated by consideration of an alternative fuel inventory based on an assembly irradiation of 50 GWd/tU. For this alternative scenario it is estimated that the cooling time required will reduce to the order of* ***90 years*** *to meet the same temperature criterion."*

  NDA 'Geological Disposal Generic Design Assessment: Summary of Disposability Assessment for Wastes and Spent Fuel arising from Operation of the UK EPR' Jan 2014 section 6, page 6.

'Together Against Sizewell C' raised the above points from the Nuclear Decommissioning Authority (NDA) with the Office for Nuclear Regulation (ONR) who responded as follows with reference to HINKLEY POINT C:

"As an example, for HPC (using indicative timescales and dates):

- *The assumed availability date for the GDF ~2130 for fuel from new reactors.*
- *Assumed start of generation of HPC: 2025*
- *Assumed end of generation of HPC: 2085*
- *The date from which fuel will be sufficiently cool to start to transfer to the GDF (from 55-60 after end of generation): 2140-2145*
- *The date by which all fuel will be transferred to the GDF: ~2150-2155 (assumed to take just over 9 years)*
- *The dry fuel store will not be needed until ~10 years start of operation of HPC: ~2035*
- *The dry fuel store will then be needed for 50 years remaining operation of HPC, 55-60 years for the fuel to cool and 10 years to allow transfer of fuel to the GDF, which is 115-120 years.*
- *Removal of all fuel from site and end of use of the dry fuel store is therefore: ~2150-2155.*
- *The initial design life for the dry fuel store is 120 years (noting the design is conceived to allow for refurbishment or replacement) which would take it to: ~ 2155*

- *"In summary, the number of years before the fuel can be taken off site to the GDF is approximately 55-60 years from end of generation, which is because of the temperature criterion associated with the GDF canister. Fuel could potentially be moved from site safely earlier (but not currently to the GDF), although this is not planned." ONR reference HPGE202006066, 'TASC Review of the Minutes of the ONR/Stop Hinkley Meeting in Bridgewater January 2020 Authors: Chris & Jen Wilson Date: 17 June 2020'.*

The basis of the ONR's 'downward revision' of the NDA's specified high burnup spent fuel cooling period, as stated in its response above, is that not all fuel will be burnt to 65 GWd/tU. I accept this although the ONR is unclear as to what the average burn rate will be and hence, in my view, there is a sense of the arbitrary about the revision which would benefit from more detailed validation. In my opinion, there is a need for a statement of common ground between the NDA and the ONR defining this cooling period within somewhat finer limits than 55-140 years, particularly the period in cooling ponds.

Even if the 'revised cooling period' from the ONR is correct and applied to Sizewell C's spent fuel, and we accept the GDF will be commissioned and run smoothly, and one assumes that Sizewell C is completed on time (2035) and will operate until 2095 without lifetime extensions, then spent fuel could, at the very earliest, be removed by 2160/2165 (2095 + 55-60 years cooling +10 years to remove).

Summary.

For spent fuel to be removed from site by 2160/2165 (20-25 years *after* the "*explicit timeframes"* committed to by the Applicant) requires the acceptance of ***major*** assumptions as follows:

1. Spent fuel will be classified as waste. This is currently not the case.

2. That there are no over-runs in construction time of Sizewell C.

3. That there are no lifetime extensions to Sizewell C.

4. That one accepts the validity of the ONR's downward revision of the required cooling period specified by the NDA from 140 years to 55-60 years.

5. That a GDF is available within 120 years, and it will take no more than 10 years to consign the Sizewell C spent fuel.

6. That the GDF can accept and consign Sizewell C's spent fuel at the same time as other nuclear waste if necessary. It is not at all clear that this will be the case.

7. That the timeframe (considered to be 100 years as far as I am aware) for the deposition of other committed nuclear waste to be consigned prior to Hinkley C and Sizewell C— that is, legacy nuclear waste, including spent fuel from power stations and the highly enriched submarine spent fuel— operates within the allocated timescale without over-run.

Therefore, in summary I suggest that the Applicant's 2140 date for decommissioning is implausible and that even the later dates of 2160/65 are dependent on major assumptions and unsupported by an agreed and conclusive analysis of fuel cooling requirements.

The insufficiency of flood resilience of the proposed Sizewell C's main nuclear platform beyond 2140, based on the Applicant's own data, will then expose the spent fuel stored onsite to unacceptable flood risk and consequently threaten the safety of the environment, local populations, and decommissioning staff.

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Overall summary of Papers 1 and 2.

Paper 1 shows there may be significant understatements of the flood risk to the main nuclear platform in the next century. The depletion of the Dunwich bank and the attendant possibility of Sizewell shoreline retreat and exposure of the main nuclear platform on the landward side do not appear to be considered when the wave component of the data in Table 2.1 is examined. In the highly plausible event of shoreline recession by and during the next century and Sizewell C becoming a promontory or headland prior to spent fuel removal, sea defences would need to fully surround the main nuclear platform.

Paper 2 shows that should we accept the Applicant's Table 2.1 data as valid for worse case scenarios and accept that there will be no shoreline retreat at Sizewell through the next two centuries, we are still left with the Applicant's seemingly implausible requirement and claim for spent fuel removal from site by 2140.

Overall, therefore, I suggest that the Sizewell C will not provide the necessary and required flood risk resilience until spent fuel removal.

Please see my papers REP2-393, REP7-219, REP10-345 and REP2-503 for Spent Fuel.

18. Together Against Sizewell C – 13 January 2022

Together Against Sizewell C

Gareth Leigh

Head of Energy Infrastructure Planning, BEIS

By email only. To: beiseip@beis.gov.uk : Cc Kathryn Dunne Planning Inspectorate.

Dear Mr Leigh,

With reference to your letter to the Planning Inspectorate dated 24th December 2021 in response to PINS letter dated 16th December 2021 which requested a delay in the Reporting stage for Sizewell C (SZC), we wish to make the following comments.

Together Against Sizewell C (TASC), along with local authorities, other government bodies, NGOs and members of the public have followed the process of the proposed SZC nuclear power plant through all its stages including all of its six consultations, including two during the DCO examination, over the last eight years of our lives. We have engaged with BEIS via the BEIS/NGO nuclear forum as well as with the ONR/NGO forum of which TASC are members. We have written and voiced our concerns about the suite of energy policy documents which were written in 2008. Many changes have taken place in the energy sector in that time and the manner of energy policy development is now fundamentally and predominantly reliant on the Planning Act, 2008 section 105 and a Ministerial statement.

While we fully understand that the NSIP process is developer led, in our opinion, when the SZC DCO Application was submitted, it was incomplete, a fact which, we believe led the DEFRA sponsored group of regulators to request a delay in planning proceedings due to the incomplete nature of the application. There was so little relevant information pertaining to such a massive and complex project as the construction of two EPRs in such an inappropriate and remote site which will affect a 25 mile wide corridor of development that we were surprised that PINS accepted the application in such an inadequate form, bearing in mind that there was so little information on the massive project which will entail major disruption and destruction of the environment, the construction of a jetty, many new roads and roundabouts, accommodation blocks, rail disruption, ‘park and ride’ facilities and a new access road across the Suffolk Coast and Heaths AONB.

TASC members, parish and town councils and individuals voiced their concern about so many missing vital facts, figures and information relating to the proposed development, including Ordnance Survey maps which had no grid references and lacked distinguishing features. TASC members and many members of the public took part in the Issue Specific Hearings during which planning inspectors repeatedly and called for more information until the last throes of the examination. Two weeks after its end, additional information was required due to the absence of an identified supply of potable water for construction and the possibility of the need for a desalination plant, matters which remain unresolved.

Throughout the inquiry, it has been evident that inspectors, public and regulators alike have been frustrated by this lack of information and the 22 changes to the original application sought by the developers, took up valuable time and resources, even to the extent of needing a further, separate consultation on transport strategy during the conducting of the inquiry.

It is fully understood by all persons who have taken part in the process of the DCO for a new nuclear power station in an AONB at Sizewell that this was a "planner's nightmare" and that a great deal of time and effort would be needed to produce a useful and accurate report for the Secretary of State. Your words, "to ensure developer confidence" in respect of what is hoped for the PINS response, show a complete lack of official comprehension of and insight in the SZC DCO process. It seems clear to all who spent many hours, days, weeks and months involved in the DCO process that any delays fall squarely at the feet of the applicants, EDF.

If we are to have a new nuclear power plant at Sizewell, TASC are grateful to the Planning Inspectorate for the care and concern they have given, to the best of their abilities and knowledge, to the complexities of this NPS. Those of us who live and work in this area of Suffolk are grateful for their diligence and expertise in the very difficult circumstances of the pandemic, but the fact remains that if the application is successful, it will be based on a process which was sadly lacking in information detail from the developer and compromised by insufficient openness, transparency and a willingness to listen to the legitimate concerns of the East Suffolk community.

Yours sincerely,

[redacted]

Pete Wilkinson
Chairman TASC
13 January 2022

19. Mike Taylor – 14 January 2022

From:	[redacted]
To:	Contact@onr.gov.uk
Cc:	SizewellC
Subject:	Sizewell C ground tests and anchoring
Date:	14 January 2022 11:52:13
Attachments:	Request to ONR Site characterisation Sizewell C.odt Report from SZC Co. to LTC December 2021.odt TASC Deadline 10 information and concern.odt

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Dear All, we have previously been discussing the site licencing of Sizewell C at EA/ONR Community forum and our latest response was a mail sent for information only 20th December 2021. In that we noted that the site characterization appeared not to be done. Please see attached a request for Scoping opinion sent to East Suffolk Council. Attachment 1

Please can ONR confirm if they have been asked for an opinion.?

SZC Co intend to carry out anchoring trials for the wall surrounding the site (Confirmed in a report attachment 2 to Leiston Town council by SZC officer. Highlighted in red page 3) This will require planning consent via ESC

Is an ONR structural inspector likely to be involved in this work and will ground trials data be fed back to ONR?

I await your reply with interest. Attachment 3 was sent to PINS for information and may form a deadline 10 submission from TASC

Kind regards Mike Taylor

Sent from [redacted]

Request to ONR Site characterisation Sizewell C

. [redacted]

Sizewell C Sizewell Power Station Road Sizewell Leiston Suffolk
Ref. No: DC/21/5408/EIA
East Suffolk Council Planning reference Public Access.

Pre-meeting Reports
07 December 2021

172. The Chairman introduced Mr Andrew Mower, Senior Community Relations Manager at EDF Energy who gave an update on the Sizewell C Project, his written presentation is attached to these minutes.

Thank you for the opportunity to provide an update to the council this evening. I'm the Senior Manager for Community Relations at Sizewell C. I have been working from the Sizewell C office on Leiston High Street since joining in late-September.

I joined the project after spending four-and-a-half years as the regional manager for policy, communications and engagement at the Federation of Small Businesses (FSB) in East Anglia, prior to which I worked for five years at an energy markets consultancy based in Norwich.

These roles facilitated a degree of interaction with Sizewell C. Particularly through my role at FSB, as part of which I spoke to local policy-makers about the priorities of the region's small firms, I was able to understand some of the challenges and opportunities associated with the project.

I recognise the major contribution that Sizewell C can make to the UK's long-term energy objectives; however, given my previous involvement in issues such as skills and regeneration at FSB, I was above all drawn to the project by an interest in ensuring that its delivery leaves a positive legacy for the area – and nowhere more so than in its home parish of Leiston-cum-Sizewell.

A core element of my role is to engage with parish councils in East Suffolk in order to keep them updated on developments at Sizewell C and to ensure that their concerns or queries about the project are answered promptly by our team.

As I will discuss, at least part of that engagement will, should the project progress to construction, come through the governance arrangements that have now been set out in the Deed of Obligation (DoO) as part of the planning process. But I would stress that the community relations team here in Leiston will always remain accessible to the Town Council outside these formal mechanisms, and we will be eager to attend meetings like this or to offer support through other channels as requested by councillors.

On this note, and by way of my first update, I can say to the council that the community relations team in the Leiston Office is continuing to expand, and we anticipate recruiting a new team member to lead on our engagement with local residents early in the new year. This will be a pivotal role in building our relationships with communities during the development and construction phases at a time when public interest in the project is likely to increase further.

You will be aware that, since Tom last provided you with an update, the planning examination for Sizewell C has concluded. The Planning Inspectorate is now just over half-way through its allotted three-month timeframe for filing its report to the Secretary of State, setting out a recommendation on whether to grant the project a Development Consent Order (DCO). The Secretary of State will have three months, taking us through to mid-April 2022, to decide on whether to grant the DCO. Parties will then have six weeks after the announcement to decide whether to seek a Judicial Review of the decision.

Towards the end of the planning process, we announced that the DoO for Sizewell C had been agreed with Suffolk County Council and East Suffolk Council. Much of the focus on

the DoO subsequently has related to the various funding streams that it would put in place – for example, the £23mn commitment to a Community Fund for East Suffolk, or the £12mn Tourism Fund – but it is no less a document focused on governance, and on ensuring that throughout the construction process communities and their representatives not only have their voices heard but play an active role in the decision-making processes.

Leiston Town Council will have a pivotal role to play in these arrangements. As I'm sure councillors are aware, the council will be part of the Main Development Site Forum, which will mirror the Site Stakeholder Group in place at Sizewell B. It would be put in place ahead of construction to provide a mechanism for discussion during the construction process between Sizewell and community representatives local to the site.

The forum will include also representatives from Theberton and Eastbridge, Middleton-cum-Fordley, Aldringham-cum-Thorpe, Aldeburgh and Knodishall – as well as other key stakeholders such as the local representatives of East Suffolk Council and Suffolk County Council, the Office of Nuclear Regulation and the Environment Agency.

One of the key learnings that we have taken from Hinkley Point C is the value in establishing a model of governance that allows communities and their representatives to engage on issues that matter the most to them. That is why separately we will establish two transport forums, for communities surrounding the proposed park and ride sites – again with the aim of allowing those communities near the associated developments both to be informed of issues and to raise concerns of their own.

Each of these forums will be independently chaired and held on a quarterly basis, with one representative per council. We want this process to be inclusive: parishes who are not part of the initial list of participants in any of these forums are entitled to apply to the chair for membership if they feel that they should have representation.

A larger community forum will be held on an annual basis, with representatives of each parish council in East Suffolk invited to participate and members of the public able to attend.

The DoO includes much to unpack and it will be one of the main issues addressed within our next community newsletter, which will be delivered to all residents within 10 miles of the site early in the new year and outline the next steps for the project.

Alongside the planning process, the government has been progressing legislation through Parliament which would introduce new funding arrangements for large-scale nuclear power plants in the form of a Regulated Asset Base (RAB). We would not expect Royal Assent for that legislation until at least May 2022, after which it would be necessary for detailed secondary legislation to be agreed.

A successful outcome to these processes would put us in a position to make a Final Investment Decision on Sizewell C in late-2022 or early-2023.

It is vitally important that, while these processes move forward nationally, we continue to deliver our programme of engagement, survey work, and other activities in East Suffolk so that, should the project progress to construction, we are in the strongest position possible to deliver on our commitment to mitigate the impacts and maximise the opportunities.

On 22 November, we held a major conference, "Doing the Power of Good for East Suffolk", at Trinity Park, bringing together our key stakeholders from across the district. As we emphasised before and during the event, the conference was above all an opportunity for us to hear from councillors, environmental groups, businesses and other organisations on the key opportunities that would materialise from Sizewell C and how we could take advantage of them.

We have been grateful to have received highly positive feedback about the event, but more importantly we have taken away a long list of actions that will inform our activities over the coming months. The “Focus on Leiston” break-out room, which was chaired by Tom, examined the question of leaving a positive legacy for the town. I understand that council representatives who attended that day will report to the council separately at this meeting, so I shall leave any further discussion on the outcomes for another day.

I would also like briefly to address some of the more significant survey activity that has been undertaken locally in recent weeks and is planned for the new year.

In the last few weeks, we have been conducting surveys of users of recreational locations around or near the Main Development Site. This includes Sizewell Beach Car Park and Sizewell Common. The purpose of these surveys is to gather baseline information about the usage of these sites, so that we can monitor how this usage evolves if and when we enter the construction phase, and thereby consider the introduction of further mitigation measures at agreed trigger points.

There are two main elements to this research. Firstly, we are conducting questionnaires with users of the locations to record the numbers of people and their behaviour at selected times of the year. The second aspect is the installation of people counters that will count users throughout the year.

A couple of points should be made about the way that these surveys are being conducted. Firstly, I would emphasise that the intention is to undertake the questionnaires at various points during the year, at times of both high and low demand. If the project proceeds to construction, then the people counters would remain in place for 10 years.

Secondly, the use of cameras as part of this process is essential as we must ensure that we are accurately tracking usage. The data, once recorded by the cameras, is anonymised, analysed by a computer and destroyed. The number of people counted is outputted onto spreadsheets for our records. The use of the cameras is fully GDPR-compliant and no personal, private data is captured or can be shared more widely.

Looking ahead, I would like to highlight to the council some notable geotechnical trials that we are planning to progress at the Main Development Site from March or April 2022.

The first component of these works, which will take around four months to complete, is the trialling of the ground anchors that would provide support to the cut-off wall, which will be constructed around the main development area. The anchor design is a critical part in the overall scheme design, and it is therefore crucial to demonstrate the anchors’ technical and practical viability.

The second component of the works is deep soil mixing trials. These are necessary to facilitate ground improvement works, which would ensure that all areas of the Sizewell C main platform area were of the strength required for the foundation of earthworks. The deep soil mixing trials will inform the design of the ground treatment technique to be used well in advance of the start of the main enabling works. These trials would take approximately six months to complete.

In each case, we would of course seek to minimise disruption, and provide the council with notification in advance so that you were prepared for any questions from local residents.

That completes my update. Thank you for listening. I look forward to working with you in future and Caroline has my contact details if you have any queries or issue you wish to raise with the community relations team.

Direct extract from Leiston Town Council Minutes and report dated December 7th 2021

TASC Deadline 10 information and concern.

TASC have complained at all previous SZC consultation responses, that the SZC Co mapping and diagrams were of poor quality and did not allow a full understanding of proposals. These "consultations" were based on "Google maps, computer generated images and inadequate OS maps. Maps which accompanied the application did not include OS grid line references and permanent features of importance. The developer also used designations for rights of way which were not to the SCC Highway Authority standard. They also omitted villages and points of reference. We were disappointed that the local councils (ESC and SCC) did not take up this issue in their Statement of Community Consultation responses. TASC members with experience of previous Nuclear Electric Applications for a Sizewell C believe the mapping was not to an acceptable standard.

Throughout the pre-consultation and DCO process we have found the quality of mapping to be, in our opinion, inadequate to fully inform the developers' plans. We raised this matter at BEIS/NGO forum. BEIS officers were in regular dialogue with the developer.

It has become evident from a recent request for a formal scoping opinion made to East Suffolk Council that mapping is still inadequate.

We refer you to the East Suffolk Council Planning portal on "Public Access" via Planning Applications and make a comment. [redacted] DC/21/5408/EIA which can also be found by searching Sizewell B.

This application is of interest in several aspects in that:-

- It confirms our point made in previous representations that essential site characterization had not been carried out sufficient to inform foundation work on SZC some of which involves a curtain wall in what is essentially a marsh.
- That the ONR site licence application was also potentially premature in that information was missing.
- That the maps used in the scoping opinion application although clearly marked "reproduced by permission of Ordnance Survey" exclude many features normally found on the Ordnance Survey mapping eg OS grid lines, landscape features such as trees, water courses and contour lines. A typical SZC drawing ending 100306 illustrates our point.
- According to IAEA siting guidance [redacted] this work should have been done prior to identification of the site as a potential site in the existing EN6.

Notwithstanding that the ESC have made a decision on this scoping opinion which does not appear to have been based on all the facts, nor have consulted all regulators. We simply wish to highlight the risks posed by this application alone, should it eventually be the subject of a planning application to the ESC.

- Potential loss of trees which form part of the planning consent for Sizewell B. (These trees are not on the supplied map).
- Further disturbance of habitat and risk to the SSSI and AONB. Not marked.
- Potential loss of more SSSI. SSSI Boundary not marked.
- That the foundation of the site may be unsuitable.
- That ground heave which occurred on SZB development may reoccur.

- That further material removed may have to be taken off site resulting in extra transport movements.

Conclusion. That the application made to PINS by the applicant was not based on all facts, sufficient to prove whether the construction in such a sensitive area should be recommended for consent. The developer had adequate notice that the standard of consultation, especially critical mapping needed to be of the highest standards. Previous applications by the developers' organisation at Hinkley Point C indicated the need for material and non-material changes post consent. Further to this the ground conditions at HPC were found inadequate, requiring additional stabilization at extra cost. If the intention of the developer is to hand over the project for development under the RAB Nuclear Financing concept it is quite evident that the information so far supplied cannot be relied on to allow a properly costed project meriting taxpayer funding.

20. Mike Taylor – 19 January 2022

From: [redacted]
To: [redacted]; SizewellC
Subject: Sizewell C site testing
Date: 19 January 2022 10:02:53
Attachments: Sizewell C Site testing trials Planning Application to East Suffolk Council Jan.odt

---

Dear Mr Mawdsley, Please see attached information on the SZC site testing application. I can confirm I am content for the information to go to BEIS.
Kind regards Mike Taylor
Wood Farm Leiston IP16 4HT

Sent from [redacted]

Sizewell C Site testing trials Planning Application to East Suffolk Council Jan.2022

Please be advised that a planning application has been made for geo technical trials which is self explanatory. As far as I am aware the plans were posted on East Suffolk Council Planning Public Access around 17th January 2022.

- [redacted]



Sizewell C Sizewell Power Station Road Sizewell Leiston Suffolk
Ref. No: DC/22/0078/FUL | Validated: Fri 07 Jan 2022 | Status: Awaiting decision

21. Nick Scarr – 24 January 2022

From: [redacted]
To: SizewellC
Subject: Statement of Common Ground
Date: 24 January 2022 09:52:45

Dear Sizewell C Team

Fao. Mr Neil Humphrey

Ref: Issue Specific Hearing ISH11

Dear Mr Humphrey,

At the ISH11 hearing of the 14/9/21 you expressed a wish that the Applicant's flood risk assessment team should discuss matters with me.

In response to this request I held a conference call with the team comprising James Hanson, Stephen Roast, Kate Bozek, Helena Wicks and Tony Dolphin on the 21/9/21.

Despite subsequent effort, no 'statement of common ground' could be reached and it was therefore agreed between the parties that no such statement of any sort would be submitted.

Kind regards
Nick Scarr - IP 20025524

22. Theberton and Eastbridge Parish Council, Middleton cum Fordley Parish Council, Stop Sizewell C, B1122 Action Group and Minsmere Levels Stakeholders Group – 29 January 2022

From:	[redacted]@gmail.com
To:	SizewellC
Cc:	[redacted]
Subject:	Two Sizewell C Examination Submission documents
Date:	29 January 2022 14:36:26
Attachments:	Parish Council and NGO Sizewell C Summary.pdf SZC - Property Price Support Scheme.pdf

Dear Sizewell C Project Team,

I've attached two documents for the Sizewell C DCO Application Examination on behalf of the following interested parties;

- Theberton and Eastbridge Parish Council
- Middleton cum Fordley Parish Council
- Stop Sizewell C
- B1122 Action Group and
- Minsmere Levels Stakeholders Group

I am aware that the documents will not be seen by the Examining Authority and understand that they will be sent with the ExA's final report to the Secretary of State in February.

Can you also let me know when these documents might appear publicly on the Sizewell C PINS website?

Can you also let me know when the ExA's report is actually sent to the Secretary of State for consideration?

Thank you for your help.

Kind regards,

Paul Collins
Cllr. Theberton and Eastbridge Parish Council
Chair, Stop Sizewell C
Co-Secretary, Minsmere Levels Stakeholders Group

[redacted]
Bakers Hill
Eastbridge
Leiston
Suffolk
[redacted]

22. Theberton and Eastbridge Parish Council, Middleton cum Fordley Parish Council, Stop Sizewell C, B1122 Action Group and Minsmere Levels Stakeholders Group – 29 January 2022

Attachment 1

Summary of Concerns and Objections to the Sizewell C Development Consent Order Application

With comments regarding the 10 Year Consultation and Development Consent Order Examination

On behalf of the following Interested Parties:

Theberton & Eastbridge Parish Council
Middleton cum Fordley Parish Council
Stop Sizewell C
B1122 Action Group and
Minsmere Levels Stakeholders Group

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1. Executive Summary

We encourage the Secretary of State to carefully consider our concerns for East Suffolk, its environment and economy in examining the issues that Sizewell C in particular, plus all of the other energy projects, namely; two Scottish Power off-shore wind farms, expansion of greater Gabbard and Galloper off-shore wind farms, Nautilus (Belgium) and Eurolink (Netherlands) interconnectors and two National Grid interconnectors between Sizewell and Kent, destined for this 10-mile stretch of coast and countryside imply.

Regarding Sizewell C, the following report will highlight our collective dismay at,

- the Applicant's lack of information provision throughout 10 years of consultation
- a poor and incomplete DCO submission requiring 22 changes during the examination and still leaving unknowns and questions unanswered
- inconsistent and missing DCO documentation, including at the very last deadline (Deadline 10)
- critical assessments not started before end of the DCO examination
- lack of engagement of several of the statutory agencies most notably Natural England and Marine Management Organisation at Issue Specific Hearings
- a site too constrained to adequately host a dual EPR installation
- inadequate water supply issues
- uncertainty regarding the geo-competence of the land to host the nuclear platform and coastal defences
- unsustainable relief road and materials transport strategy
- inadequate transport mitigation strategy
- un-allowed claims for biodiversity net gain when SSSI land is developed upon
- exaggerated and unsupportable biodiversity net gain claims
- exaggerated local employment and economic benefits
- unsustainable accommodation strategy
- exaggerated and unrealistic benefits for using reactor waste heat
- significant technical problems with the EPR reactor
- unrealistic expectations for spent fuel removal and decommissioning
- unclear project costs and over-optimistic development schedule
- the inability of the market and the Applicant to commence the Sizewell C project without significant financial assistance from government and consumers and
- the impact on consumers of the Regulated Asset Base financing of the Sizewell C.

In the eleven years that the Sizewell C project has taken to get to this point, whilst legislation, assessment and understanding of the impacts of such infrastructure projects has moved forward, the Applicant still sees this project as a "replica" of Hinkley Point C, even though National Planning Statement EN-6 assessments see

Hinkley Point as the most strategically sustainable site out of 11 and Sizewell as one of the least sustainable.

In the early years when Hinkley Point C Development Consent Order and Financial Investment Decision seemed to be in the balance, the Sizewell C consultation saw removal of resources from the project.

Even though Sizewell C will use the same approved reactor design, the different geographical, geophysical and demographical setting has been inadequately allowed for by the Applicant and the development of a Development Consent Order application has been beset by lack of commitment to bring the project to an appropriate level for submission, in a reasonable time frame.

Whilst changes to a National Strategic Infrastructure Project planning application, as complex as this, could perhaps be expected, to have 22 change requests submitted by the Applicant during the examination, requiring three additional public consultations within the 6-month timeframe allowed, demonstrates the inadequacy and under-preparedness of this Development Consent Order application.

Added to this, the fact that the Examining Authority had to insist upon missing coastal defence plans being submitted for the examination to consider, which then underwent four iterations during the examination, poses a valid question as to whether the Development Consent Order application should have been accepted in the first place.

Even now, critical assessments of site suitability are only just being planned and requested through local planning [redacted]

Apart from the size, complexity and duration of the Sizewell C project along with the inevitable planning conditions and qualifications that the project will likely be considered necessary by the Examination Authority, we are now faced with a company that cannot afford to build the power station and is requesting significant funding and risk transfer to consumers, tax-payers and investors.

It is worth remembering that the Applicant has presided over 6 other reactor developments that have all overrun development schedules and cost estimates. Currently, only one of two completed reactors is operational, Taishan 1 having to be taken off-line for issues with damaged fuel rods and is still under active investigation.

All of these issues are explored in further detail below, but the impact of this project alone on East Suffolk, its residents, economy, fragile environment and coastline, questions whether sufficient mitigations and compensations are being proposed by the Applicant, whilst also delivering benefits to East Suffolk. Suffolk County Council is still not convinced and our MP, Dr. Therese Coffey, cautions whether a project with a long list of conditions will be capable of successful delivery. And that is before considering the eight other energy projects proposed in this area.

2. EN-6, Strategic Site Reports and EN-1

Before going into the Sizewell C details, we urge you to reflect on the Strategic Appraisals of Sustainability Site Reports that were undertaken and published in October 2010 in association with National Policy Statement EN-6. All eleven proposed potential sites for new nuclear power stations were reviewed at that time and each had a summary table of likely effects and issues covering a broad array of potential impact areas.

Following completion of the eleven appraisals, a decision was taken not to include the existing Dungeness nuclear site, Braystones or Kirksanton in the designated list of potential sites even though Sizewell, Bradwell and Sellafield all assessed as less strategically suitable than Dungeness and are similarly assessed as Braystones and Kirksanton (see: [redacted]).

The Hinkley Point site, where construction is now underway, was assessed as the most suitable of the eleven sites in the strategic sustainability assessments.

Reflecting on the various issues and objections that have been raised during Sizewell C consultations, and throughout the Sizewell C Development Consent Order (DCO) examination, they simply mirror and reinforce what was clearly assessed back when the EN-6 Strategic Appraisals of Sustainability were completed.

	Sizewell			Dungeness			Braystones			Kirksanton		
Appraisal of Sustainability: Table 6.1	Sizewell AoS			Dungeness AoS			Braystones AoS			Kirksanton AoS		
Sustainable Development Themes	Constr.	Oper.	Decomm.	Constr.	Oper.	Decomm.	Constr.	Oper.	Decomm.	Constr.	Oper.	Decomm.
Air Quality	-	- ?	- ?	-	- ?	- ?	-	- ?	- ?	-	- ?	- ?
Biodiversity and Ecosystems	-- ?	-- ?	-- ?	-- ?	-- ?	-- ?	-- ?	-- ?	-- ?	-- ?	-- ?	-- ?
Climate Change	-	++	- ?	-	++	- ?	-	++	- ?	-	+?	- ?
Communities: Population, Employment and Viability	+?	+?	0	+?	+?	0	+?	+?	0	+?	+?	0
Communities: Supporting Infrastructure	-	-	-	- ?	- ?	- ?	- ?	- ?	- ?	- ?	- ?	- ?
Human Health and Well-Being	+	+	+	+	+	+	+	+	+	+	+	+
Cultural Heritage	-	-	-	-	-	-	-	-	-	-	-	-
Landscape	--	--	0?	-	-	0?	--	--	0?	--	--	0?
Soils, Geology and Land Use	-	- ?	- ?	- ?	- ?	- ?	-	- ?	-	- ?	- ?	- ?
Water Quality and Resources	-	-	-	-	-	- ?	-	-	-	-	-	-
Flood Risk	-	-	-	-	-	-	-	-	-	-	-	-
++	existing sustainability problem; effect considered to be of regional/national/international significance											
+	effect considered to be of regional/ national/international significance											
0	Neutral Effect											
-	Potential sustainability issues, mitigation and/or negotiation possible; effect considered to be of											
--	Problematical because of known sustainability issues; mitigation or negotiation difficult and/or expensive; effect											
Uncertainty												
?	for example because insufficient information is available at the plan stage to fully appraise the effects of the development or the potential for successful mitigation, the significance category is qualified by the addition of '?'											

A question remains as to why the three site rejections based on the Appraisal of Sustainability Reports were not also applied to Sizewell, and possibly Bradwell, given their assessments were very similar to two rejections and clearly less favourable than that of Dungeness. Perhaps, in Sizewell's case, the existence of the only Pressurised Water Reactor in the UK had some bearing on the outcome.

A fundamental premise of the privatisation of electricity generation and attendant National Policy Statements was that new energy infrastructure should be proposed and brought to fruition by the market.

In EN-1, section **2.2 "The road to 2050"** it states

- 2.2.1 ….It requires major investment in new technologies to renovate our buildings, the electrification of much of our heating, industry and transport, prioritisation of sustainable bioenergy and cleaner power generation….
- 2.2.2. ….Within a market-based system and with severe constraints on public expenditure in the near-term, the focus of Government activity in this transformation is clear. It should be on developing a clear, long-term policy framework which facilitates investment in the necessary new infrastructure (**by the private sector**) and in energy efficiency.
- 2.2.19 ….While the Government may choose to influence developers in one way or another to propose to build particular types of infrastructure, it remains a matter for the market to decide where and how to build, as market mechanisms will deliver the required infrastructure most efficiently….

By engaging in proposals to potentially underwrite the construction of Sizewell C with the Regulated Asset Base scheme, the consumer, through the government, is going to become potentially liable for an industry which has proven time and time again to be unable to bring such projects to fruition on time and on budget, loading unnecessary risk on to those same consumers.

More recently the provision of £100m towards attaining a Financial Investment Decision is all the more concerning especially as there seems to be a belief that should the project not go ahead that the land could be used for other energy infrastructure such as wind-farm substations or perhaps SMRs. However, Scottish Power rejected a site only hundreds of yards inland of the SZC site because of unsuitable salty air conditions and any developer will still have to significantly raise the SZC site from ~1m to >7.5m above sea level to avoid Flood Risks and provide significant coastal defence features against erosion by the sea.

3. Background

As a group of organisations and individuals, we are not, in principle, opposed to nuclear power and have tried to work with the Applicant to find a way to influence the project proposal to reflect the concerns of the local community and ultimately produce an acceptable proposal.

However, after three of the seven consultations it became clear that the options and alternatives proposed by the Applicant were not in good faith and those suggested by local parish and town councils, District and County Councils as well as a variety of NGOs and statutory agencies were, in the main, rejected as they did not fit with the Applicants pre-determined strategy.

As a result, following consultation 3, we all separately and reluctantly resolved to oppose the Applicant's Sizewell C project.

a. Challenges in engaging with the Applicant

Throughout those consultations and continuing into the fourth and fifth consultation alongside the Planning Inspectorate examination, with 22 changes introduced during the DCO examination process, we are still faced with an unacceptable proposal surrounded by issues of insufficient information, unsatisfactory community engagement, obfuscation, and hidden agendas.

For example:

- the choice of the Sizewell Link Road route
- the initial reluctance to provide a Coastal Defence Plan to the examination
- the reason for Sizewell B Facilities Relocation including destroying Coronation Wood
- continuing spurious Biodiversity Net Gain claims
- the issue of potable and non-potable water supply
- unrealistic waste heat and power usage claims
- uncertainty of the suitability of the land to support the dual reactor and coastal defences
- cumulative impacts on our community and environment
- the reliance on an unchanging offshore geomorphology
- a guaranteed low inshore wave climate and low coastal erosion rates
- no plausible basis for the assumption of the resilience and retention of the Dunwich bank, and
- no plausible basis for the assumption of the resilience and retention of nearshore longshore bars over the project lifetime.

Whilst we understand there is a presumption of support for National Strategic Infrastructure Projects from our District and County Councils as well as other statutory authorities, it cannot be at any cost to the hosting community, its existing economy, infrastructure and environment.

b. Working with Statutory Consultees

Despite several Joint Local Authority Group meetings on Sizewell C for both parish/town councils and local NGOs, we feel that the level of enthusiasm and support for the Applicant's plans expressed by the East Suffolk District Council has at times overridden their statutory duty to hold the Applicant to account for their proposals. Issues including Sizewell B Relocation/Coronation Wood, adequacy of accommodation provision through the workers campus and caravan site, coastal defence and light pollution/dark skies policy come to mind.

It is also a concern that both East Suffolk District Council and Suffolk County Council stated at the beginning of the consultation process and throughout this 11-year journey that they would only support the Sizewell C project if there was a clear net

benefit for East Suffolk, a goal which has not been proven and is disputed in a number of reports referenced below in the Finance section below.

Throughout the examination the non-attendance of both Natural England and Marine Management Organisation was a source of frustration from all Interested Parties, the Applicant and the Examining Authority. Questions that would be pertinent, as a result of issues and questions arising during the Issue Specific Hearings, could not be pursued and ended up as multiple exchanges of disconnected written response and counter response or additional questions and responses leading to poor communication and assimilation by statutory and interested parties.

Whilst we understand that the DCO examination is primarily a written examination exercise, excessive reliance upon the written form results in a stilted exchange. The significant numbers of documents generated (>4,000 documents in total) means that issues that cannot be resolved during Issue Specific Hearing sessions are much more likely to be forgotten, simply not followed up or reacted to by those IPs interested in a particular issue.

The statutory agencies' non-attendance is even more frustrating given that almost all the Issue Specific Hearings were held virtually on Teams, with the remainder as blended sessions between Teams and physical meetings at Snape Maltings.

There is simply no excuse for non-attendance even though written submissions were made prior to the Issue Specific Hearings.

4. Poor Quality DCO Submissions

a. Inconsistent and missing documentation

For instance, we are surprised to see plans in the Design and Access Statement Part 2 (REP10-056) and Estate Wide Management Plan (REP10-136), submitted as part of the final Deadline 10 submissions to the Examining Authority, that are out of date and, as an example, still show Pillbox Field as an outage car park, with an access footpath to the Relocated Sizewell B training centre car park and laydown area.

The laydown area has been moved onto unused Sizewell A land, car parks have been rearranged and pill box field now has no car parking area and is planted as partial compensation for the destruction of Coronation Wood via local planning application DC/20/4646/FUL, permitted 16 November 2020, as an amendment to the original application DC/19/1637/FUL permitted on 13 November 2019. However, plans in "6.3/ 10.14 Volume 2 Main Development Site Chapter 2 Description of the Permanent Development Appendix 2A of the Environmental Statement: Drainage Strategy - Clean Version - Part 1 of 3" (REP10-030) has the updated plans present.

There are also inconsistencies in plotting of power station site soil cores in AP-291 with a cross-section showing parts of Sizewell Marsh SSSI incorrectly as consisting

of “Made Ground” and correctly as “Peat” and “Sand and Shingle” in another cross-section.

It is also regrettable that Appendix O, Biodiversity Net Gain Note, in document 9.120 Comments on Earlier Deadlines, Subsequent Written Submissions to Issue Specific Hearings 11-14 and Comments on Responses to Change Request 19 - Appendices - Part 2 of 4 (REP10-158) was omitted from this report and this will not be considered by the Examining Authority in its deliberations.

Further details and issues with Biodiversity Net Gain assessments, Appendix O Biodiversity Net Gain Note and continuing misleading public claims by the Applicant are given below.

b. Inconsistent and misleading justification

This state of confusion within DCO documents also parallels the inconsistency of purpose for the relocation given during the application to East Suffolk District Council for the Sizewell B facilities (referenced above), claimed to be vital to ensure the continuing operation of Sizewell B, regardless of Sizewell C being permitted or not.

It is clear, however, that should planning permission for Sizewell C not be granted, the relocation would not be necessary as the existing facilities are operating perfectly adequately for Sizewell B operation now, and would continue to do so for its remaining operational lifetime.

This questions whether interrelated component projects have been ‘salami sliced’ to avoid being scrutinised as a whole, something that has been found to be unlawful in [redacted] under the EIA Regulations.

In the second [redacted] (paragraphs 2.2.13, 2.2.14 and 3.3.7) from the Secretary of State it was clearly stated that the Sizewell B relocation should be fully examined in the Development Consent Order and yet the local planning application was applied for and passed 13 November 2019.

c. Late assessments and adequacy of the DCO Application

Throughout the 10-year pre-examination, consultation period we have been asking for information about required water supply and the suitability of the site itself to host such an extensive development in such a challenging erosion prone coastal location and on land that is characterised by sands, shingle and peat over a fragile crag formation and London clay layers.

The water supply issue is addressed below in [redacted].

It has recently come to our attention that, only now, is the Applicant starting the process of evaluating the competency of the land below the power station platform

and its coastal defence having applied for planning permission ([redacted]) to undertake Ground Anchor and Soil Mixing tests on the Sizewell C site.

It is as some surprise that a scoping report ([redacted]) for the work was not commented on by the Environment Agency as the work will be within 10m of Sizewell Marsh SSSI and will involve potential run-off of highly alkaline waste in an area that is predominantly acidic in nature. The adjacent Sizewell Drain feeds into Minsmere and Walberswick Heaths and Marshes SSSI which has overlapping Special Area of Conservation and Ramsar designations.

East Suffolk Council has determined that an Environmental Impact Assessment is not required with only Suffolk County Council Archaeological Service and Suffolk Fire and Rescue submitting any responses.

The application ([redacted]) to undertake Ground Anchor and Soil Mixing tests on the Sizewell C site, is a necessary pre-requisite study to determine whether the site is suitable to host a dual nuclear power station.

What is more surprising is that this was not determined right at the outset of the process of consultation over 10 years ago, otherwise as a hosting community, along with the various statutory consultees and many interested parties, we have potentially been participating in a completely pointless exercise.

The fact that Sizewell C is proposed close to Sizewell A and adjacent to Sizewell B might suggest that the proposed site is suitable as the underlying quality and structure of the site will simply be an extension of that upon which the existing two power stations are sited.

However, nothing could be further from reality. Sizewell A and Sizewell B are both sited on a raised part of the local crag formation, +5-10m above ordnance datum, whereas the crag formation in the Sizewell C site is some 5-10m below ordnance datum and overlain with made ground, peat, sand and shingle.

As a result, the Applicant has to be able to support the ~60m deep cut-off wall to allow the platform to be excavated up to 40m depth and dewatered whilst construction occurs.

The proposal to use ground anchors into the Crag deposits layer is yet to be tested and with complications introduced by siting the three cooling water tunnel boring access shafts along with a desalination plant pumping shaft outside of the cut-off wall will mean that anchors will not be available at these four locations to ensure the safety of those working on excavations within the cut-off wall.

It is also unknown whether the soil mixing trials will lead to a satisfactory solution to ground strengthening below and horizontally, to avoid lateral collapse, of the Hard Coastal Defence Feature over the operational and decommissioning lifetime of the power station.

The results of these trials and a fully elaborated solution to the issues of ground suitability and stability should have been determined during the consultation period and included in the DCO application. This late engineering trial places the Examining Authority, the Secretary of State and the residents of East Suffolk in an invidious position as no assessment or proffered solution has been available to be examined and assessed.

d. Operational Site Size

To accommodate the Sizewell C operational site on the available land between Sizewell beach, Sizewell B site, Sizewell Marsh SSSI and Minsmere Levels SSSI, several unacceptable adjustments have had to be made,

- the eastern extremity of the hard coastal defence has moved to the existing sacrificial dune removing over 100m of the Sizewell frontage
- the Sizewell C defence cannot be linked to the adjacent Sizewell B defence
- at the southern end, the defence advances into the existing shingle beach removing space where the rare shingle vegetated habitat has developed
- maintenance of the soft coastal shingle defence will repeatedly damage any rare shingle habitat that regenerates across the Sizewell frontage
- Sizewell B facilities have had to be moved to make space for Sizewell C, and
- 100-year-old Coronation Wood had to be felled to make way for Sizewell C and claimed erroneously to be required for essential Sizewell B operation.

These changes will permanently change the Heritage Coast profile across the Sizewell frontage and have visual impacts to the Sizewell B site due to Coronation Wood's felling.

It is accepted that should the Applicant be granted permission for Sizewell C, the relocation of Sizewell B facilities would be essential, as the two reactor Sizewell C proposal cannot be accommodated without the space that the Sizewell B visitor centre, training centre, outage laydown area and car park currently occupy being vacated.

The highly restricted operational footprint also calls into question some of the more fanciful claims for waste heat enhanced hydrogen generation and direct air carbon capture at Sizewell which are [redacted].

5. Transport

a. Failure to take local views into account

The Examining Authority raised the issue of the sustainability of the Sizewell Link Road with the Applicant during Issue Specific Hearing 2 following the Applicant's refusal to consider a request from Felixstowe Town Council for a safer access route to the Freight Management Facility close to the A12/A14 junction on the basis that it would add about 2 miles additional journey length to the managed HGV fleet using that facility enroute to the site.

The absurdity of this position taken by the Applicant only becomes clear when you realise that the route choice for the Sizewell Link Road requires all HGVs and Park & Ride buses from the southern Park & Ride to travel ~7 additional miles for each return journey compared with the southern W North route the Applicant "consulted" on and supported by Suffolk County Council Highways department and others.

b. Hidden agendas

Latterly, we became aware during Issue Specific Hearings that perhaps one of the reasons for selecting the Sizewell Link Road route was that the Applicant expects to glean 90,800 tonnes of excess excavated material from this route as backfill (2.4.29 APP-446), alongside 45,000 tonnes from the Two Villages Bypass, for the Main Development Site which would not be available from route W North due to the flatter landscape. This information was never made available during public consultations.

Normal practice is to seek to balance earthwork cut and fill on highway schemes wherever possible which the Highways Department thought had been achieved.

Statements were also made during Issue Specific Hearings that the project intends to use the Sizewell Link Road route as a haul road for moving the backfill to the Main Development Site (REP6-074).

As the stated intention is to build the Sizewell Link Road from east to west, it is difficult to see how this will be feasible given the bridges required to cross the East Suffolk line, Pretty Road and Fordley Road, the number of deep cuttings also required along the route, some over 4m below current ground level and the logistics of using a roadway being constructed at the same time as coping with the ~7,000 HGV movements required to move 136,000 tonnes of backfill to the Main Development Site.

In reality, the vast majority of the 136,000 tonnes will have to be transported along the B1122 in the Early Years, and the 45,000 tonnes of backfill that will be gleaned from the Two Villages Bypass will also have to travel up the A12 from Farnham before joining the B1122 at Yoxford. The ~7,000 HGV movements will be shorter

than if the backfill materials came from elsewhere, but the majority of these HGV movements will still have to travel on the A12 and B1122.

We question if selection of the Sizewell Link Road route, and the statement that it would be used for moving excess material to the Main Development Site, is an approach to try to minimise aggregate tax levy at the expense of greater environmental impact associated with a longer travel route. We presume that if the scheme proceeds Customs & Excise will question this matter.

c. Impact on local villages

In the Applicant's initial proposal, every road that crossed the route of the Sizewell Link Road was to be blocked to vehicular traffic, severing the villages of Middleton, Middleton Moor, Westleton, Theberton and Eastbridge from direct routes to Saxmundham. Only after significant pressure from Theberton and Eastbridge Parish Council has the proposed Pretty Road bridge access been upgraded from footbridge/bridleway to a fully motor vehicle capable bridge. Moat Road, which is used by children cycling to school via George Road is severed with no adequate alternative provided and using Pretty Road would add several miles to a cycle journey to Leiston.

The case for a motorised underpass for Fordley Road, which is supported by some Middleton residents, has been rejected by the Applicant and Suffolk County Council. Significant concerns arising from the severance of Middleton from Fordley and Kelsale by the Sizewell Link Road remain unaddressed including the diversion of footpaths to unprotected crossing points on the Sizewell Link Road. There are also concerns that have not been adequately addressed that the proposed configuration of the Fordley Road junction with the Sizewell Link Road will encourage rat-running.

d. Scheduling of Sizewell Link Road works too late

Interested Parties and the ExA have all queried why the Sizewell Link Road cannot be provided as mitigation in advance of any work commencing on the Main Development Site, but it has become clear that the Main Development Site has to be prepared to accept the backfill material from the Two Village Bypass and Sizewell Link Road. As a result, the volume of traffic using the B1122 to access the Main Development Site means that the Early Years are close to being the busiest period of road traffic usage for the entire Sizewell C project.

Can the scale of works proposed on the Main Development Site in these Early Years, prior to any relief road being operational, be justified given the impacts on the B1122 corridor without any significant mitigation?

Over the two Early Years, ~3000 Abnormal Indivisible Loads - on average eight or nine per day but clearly weighted towards the first year (REP2-054 Tables 3.1 and 3.2) - will use the B1122, of which ~830 would require police escort, more than one per day for the Early Years period.

There are five points along the B1122 where large Abnormal Indivisible Loads will cause significant hold-ups (East Suffolk Line level crossing, a “z-bend” at Middleton Moor, poor visibility at Mill Street, blind bend and junction at Pretty Road Theberton and a further “z-bend” south of Theberton). No significant mitigation is proposed during the early years apart from a possible speed limit restriction.

The justification for the Sizewell Link Road route selection and rejection of D2 (W North) was questioned by Suffolk County Council Highways Department and was clearly on the Examining Authority’s mind when questioning the sustainability of this choice by the Applicant.

e. Has the response from the planning authority been compromised?

It is notable that the proposed W North junction with the A12, considered by the Applicant, was further north than that originally considered in the Sizewell B D2 proposal, which placed it into conflict with East Suffolk District Council plans for a Saxmundham Village housing development and led to the District Council supporting the Applicant’s choice rather than supporting Suffolk County Council Highways position.

Another reason given for this rejection was the stated requirement for a roundabout to be introduced between W North and the B1121 only several hundred yards after leaving the A12. Such a junction is completely unnecessary given the existing junction between the southern end of the B1121 and the A12 only half a mile away.

6. Flood Risk and Coastal Impacts

The Suffolk Coast is an eroding coast and is subject to unpredictable episodes of erosion along its length including across the Sizewell Bay and frontages both north and south of Sizewell.

Cefas, the Applicant’s own consultants, has stated clearly that [redacted], with any confidence, beyond a 10-year horizon is effectively impossible. This development will sit in this coastal environment for close to two centuries and, with the added impacts of climate change, it was essential that full scrutiny of the plans for the proposed coastal defences was made available by the Applicant.

a. Failure to provide detailed plans

It came as a significant surprise when no detailed plans of the coastal defence were submitted with the DCO, and we learned they had not been developed.

The Applicant felt that the design and scrutiny of the plans could be left to submissions post DCO approval, relying entirely upon a Coastal Processes Monitoring and Mitigation Plan to be submitted to the Examining Authority.

The plan was under discussion, behind closed doors, with East Suffolk District Council and Coastal Protection East and ultimately the Office for Nuclear Regulation.

This approach gave no opportunity for knowledgeable local coastal protection organisations, such as Minsmere Levels Stakeholders Group, Alde and Ore Association and Suffolk Coast Action for Resilience to scrutinise the potential coastal impacts of any proposed hard and soft coastal defence design.

The assertion, by the Applicant, that because there is a paper Coastal Process Monitoring and Mitigation Plan that this is an appropriate location for Sizewell C is seriously flawed.

b. Avoiding the tough questions

The absurdity of relying upon a Coastal Process Monitoring and Mitigation Plan without reference to an actual coastal defence plan was clearly apparent to the Examining Authority, and the Applicant was instructed to provide clear plans to the examination during pre-examination hearings.

This was welcomed, but the Applicant is now on iteration 4 of said plans and there remain questions to be answered regarding:

- the technical viability of ground strengthening beneath the 14-16m high Hard Coastal Defence Facility
- confirmation of the actual position of the Hard Coastal Defence Facility toe relative to the existing sacrificial defences and beach, especially at the southern end
- the validity of the Soft Coastal Defence Facility modelling (REP8-280)
- the impact of the loss of the Sizewell B outfall on the shingle beach and outfall salient following Sizewell B shutdown in 2035 or extended date should Office for Nuclear Regulation permission be granted (REP8-280)
- impacts beyond the claimed 3km zone of influence from Minsmere Sluice to the Ness at Thorpeness, and

- the Hard Coastal Defence Facility and 7.3m platform height suitability given the limited timeframe that the Applicant is using (2140 - AS-170) Flood Risk Assessment beyond 2140 and the Office for Nuclear Regulation decommissioning timeframe prediction of 2190

The potential for the Hard Coastal Defence Facility to become exposed, especially at the southern end (REP8-280), is of serious concern following Sizewell B's future shutdown as the behaviour of the Sizewell Bay shoreline will alter dramatically at that point.

Active management of the Soft Coastal Defence Facility, through the Coastal Process Monitoring and Mitigation Plan, is unlikely to be able to mitigate the natural drive for the coast to restore its profile to the natural sweep of the bay between Minsmere Sluice and The Ness at Thorpeness.

c. Compromised time scales

As mentioned above, another question about this site's design comes from the use by the Applicant of the 2140 date for end of operations and decommissioning:

- 2140 is being used by the Applicant as that is the last year that the platform height meets Flood Risk Assessment guidelines, and all spent fuel must be removed from site
- the Applicant is reliant upon implausible assumptions that both the Dunwich Bank and inshore sandbanks (that have no stabilising hard geology) will remain unchanged over the lifetime of the project and does not account for wave and still water inundation occurring from the north, west or south sides of the platform as the Hard Coastal Defence Facility does not totally surround the site (see REP2-393, REP7-219 and REP10-345)
- to meet the 2190 date specified by Office for Nuclear Regulation, the platform itself would have to be raised at least 0.5m based on current Flood Risk Assessment guidelines using RCP8.5 (reasonably foreseeable) or 2.6 m using H++ or BECC Upper (credible maximum) (AS-170) to avoid overtopping and standing water issues on the main platform.
- in the event of increased coastal erosion, caused by any loss or major degradation of the protective offshore geomorphology, the wave overtopping could more directly affect the landward side of the main nuclear platform, which is unprotected by sea defences. For more details, see "Sizewell C Main nuclear platform flood resilience in the next century" by Mr. Nick Scarr submitted since the close of the examination.

d. Decommissioning and high-burn fuel

From EN-6 the earliest expectation that high level waste can be moved to a Geological Disposal Facility from any new nuclear build, such as Hinkley Point C or Sizewell C, is 2135:

- currently **spent fuel is not classified as high-level waste** and the Nuclear Decommissioning Authority has confirmed that until spent fuel is reclassified as such, or the proposal for the Geological Disposal Facility is changed to accept spent fuel in Dry Fuel canisters, all spent fuel will remain on site or at an above ground facility
- in the case of Hinkley Point C and Sizewell C, high-burn spent fuel will take longer to cool to a point where it will be suitable for transfer to Dry Fuel canisters: see [redacted]
- there is no practical experience of managing the high-burn fuel from a European Pressurised Reactor (EPR), with Taishan 1 and Taishan 2 being the only currently operating EPRs and Taishan 1 is currently off-line following fuel rod failure associated with vibration in the reactor base
- the Nuclear Decommissioning Authority suggests a decommissioning date of between 2180 and 2230, assuming a 60-year operation from 2035, although the Office for Nuclear Regulation suggested that by using a lower dry fuel canister loading, this could be reduced to 90 years from cessation of operations i.e., 2185, closer to the lower end of the Nuclear Decommissioning Authority assessment, but not as early as 2140
- the 2140 date used by the Applicant, just 5 years after 2135, does not give sufficient time for spent fuel from Sizewell C to be moved to the Geological Disposal Facility, a process predicted by the Nuclear Decommissioning Authority to take 10 years, especially when there is no practical experience of the cool down of this fuel or the elapsed time before it becomes suitable for encapsulation into dry fuel containers for disposal at a Geological Disposal Facility and
- conventional spent fuel from Sizewell B and high-burn fuel from Hinkley Point C will also be in the queue for Geological Disposal Facility transfer ahead of Sizewell C's fuel.

Overall, the Applicant is over-optimistic regarding timelines for bringing the site to being fully decommissioned and free of spent fuel and waste by 2140 and is being constrained by its ability to provide a platform at a height that will meet the Flood Risk Assessment demands of the 2190 date given by the Office for Nuclear Regulation.

e. Inadequate and constrained site size

Any requirement to raise the main platform further to meet those requirements may also require further changes to the height and seaward extent of the Hard Coastal Defence Facility and Soft Coastal Defence Facility, further endangering coastal processes and exacerbating the impact on the Heritage Coast and beach frontage at Sizewell. Considering the 2190 Flood Risk Assessment assessments in the Applicant's submissions and Mr. Nick Scarr's paper, referred to above, the current Hard Coastal Defence Facility protection is also inadequate as it does not fully enclose the site.

The Applicant freely admits that moving the platform to the west with further incursion into Sizewell Marsh SSSI is not possible or acceptable.

There are also significant concerns regarding the existing position of the Hard Coastal Defence Facility toe at the southern end of the Hard Coastal Defence Facility and how that could be impacted and exposed as Sizewell B is retired and the beach relaxes (erodes) back to its natural embayment profile (REP8-280).

7. Environmental Impact

The environmental impact of the Sizewell C project has already been significant, even though no planning permission has been granted or funding arranged. The 110-year-old Coronation Wood was felled in December 2020, to make way for those Sizewell B facilities that would need to be moved should Sizewell C be approved and funded.

a. Biodiversity Net Gain and Environment Act 2021

Appendix O to REP10-158, submitted by the Applicant **after the close of the examination**, states that the Biodiversity Net Gain assessment was prompted by requests from Natural England, RSPB and Suffolk Wildlife Trust.

The Applicant also points out, in Appendix O, that it is not a requirement of the Nationally Significant Infrastructure Project DCO process for such an assessment to be made and that the Main Development Site is the "the key driver of the overall net change in biodiversity units associated with the proposed development as a whole".

EN-1 recognises there may be some short-term impacts from the construction and development phase of new energy infrastructure, but new large nuclear power stations are likely to take 12-14 years to complete and have a peculiarly long and intense impact given the nature of such complex concrete and steel engineering.

Improvements and developments in Defra's Biodiversity Metric assessment tool since EN-1 and EN-6 were first published have led to the incorporation of Biodiversity Assessments using Biodiversity Metric 3 for future developments. Section 99 and Schedule 15 of the Environment Act 2021, that received assent in November 2021, by default, requires at least 10% net gain to be demonstrated by Nationally Significant Infrastructure Projects as well as other developments. Indeed, since July 2021 Biodiversity Metric 3 is considered to be the current and up-to-date Biodiversity Metric assessment tool.

The applicant's position on Biodiversity Net Gain throughout the consultation, application and examination phases (essentially that 'it doesn't need to demonstrate it in any event'), has thus been overtaken by events and its approach to the matter is revealed as having been backward facing from the outset.

b. Low confidence in EDF stewardship

Coronation Wood was stated to be a visual shield for the Sizewell B Dry Fuel Store project in July 2011. It is part of the EDF Energy Estate at Sizewell, which was supposed to be maintained by EDF as part of that planning approval.

However, according to both EDF and East Suffolk District Council it was in poor condition. One can only conclude that EDF has been delinquent in its maintenance obligation and East Suffolk similarly in its enforcement of planning statements made by EDF during the Dry Fuel Store application and during post approval monitoring and regulation processes.

No matter what condition Coronation Wood was in, it will be replaced by modern buildings and a car park and will no longer be able to function as a screen for Sizewell B's Dry Fuel Store or contribute to biodiversity. The replacement Sizewell B buildings will be a significant and permanent intrusion on the Suffolk Coast & Heaths AONB. This relocation project, although already started, was also required to be justified by the Sizewell C DCO based on feedback in the Scoping Opinions of [redacted] and [redacted].

What is in no doubt is that despite EDF's bold statements of planting 10 saplings for every tree in Coronation Wood, it will still take at least 100 years to achieve a replacement for Coronation Wood even in poor condition. It is also a fact that the vast majority of the 10-fold replacement will be thinned out or will not survive the journey to maturity and, in comparison, the replacement area plan is scattered and cannot be considered as equivalent to the loss of the Coronation Wood block of trees.

The need to avoid the destruction of older established woods and habitats is well-accepted in environmental conservation, as the replacements take too many years to mature and to contribute the same level of biodiversity and ecological system services as those lost, be they in good or poor condition. It would have taken much less time and be far less damaging to the environment to have maintained Coronation Wood than pursue the misguided strategy of early removal and wistful future replacement even before Sizewell C gains approval.

c. Exaggerated Biodiversity Net Gain claims

The Applicant claims 19.6% Biodiversity Net Gain (REP1-004) for the relocation of Sizewell B facilities, but the Biodiversity Metric 2 calculator used by the applicant (despite being superseded) is unable to account for four years when the construction area has no biodiversity as it is a construction site. So, in this case the construction will take 4 years, but the replacement woods will take decades to mature to achieve their final additional biodiversity contribution. Even if the full additional contribution was to start at year 5, it will take at least a further 20 years to pay back the loss of biodiversity and ecological system services experienced for those 4 years of construction and there remains a permanent and significant visual impact within the landscape of the AONB.

Notwithstanding the above, the Applicant claims publicly that 19% Biodiversity Net Gain will be the result of the Sizewell C project.

Julia Pyke, Sizewell C Director of Financing, is reported in [redacted] and [redacted], stating "planned efforts should lead to a 19% increase in biodiversity at Sizewell in comparison with not building Sizewell C".

This was also stated by the Applicant's QC during the DCO examination during Issue Specific Hearing 7.

However, as discussed above for the Coronation Wood and Sizewell B Facilities Relocation case, this is a misleading statement on multiple levels:

- Biodiversity Net Gain calculations using Biodiversity Metric 2 calculator do not take into account the 12-14 year development phase when the Main Development Site will be a construction site with no biodiversity or ecological system services contribution
- the 19% (10.1.2 REP1-004) claim relies on all the Biodiversity Net Gain from off-site areas and any assessed Associated Development Sites to be applied against the Main Development Site construction area loss

- for the Main Development Site and adjacent off-site areas, the claimed Biodiversity Net Gain is 18.03% (8.1.2 REP1-004) with the construction area showing a 26% biodiversity loss and the smaller adjacent off-site areas showing a 128% biodiversity gain.
- The transfer of the 128% to the Main Development Site, to achieve the 18.03% figure, leaves the off-site areas theoretically un-improved. This mathematical treatment is allowed but actually leaves the AONB significantly damaged from the shore to its inland border
- taking the 12-14 year construction phase 100% biodiversity loss for the Main Development Site into account, it will take between 32 and 40 years following construction site restoration to pay back the biodiversity loss of the construction period. This is equivalent to between 50% and 67% of the 60 year operational life of Sizewell C (REP6-075)

Biodiversity Metric 2 calculator cannot be used to assess areas of Sites of Special Scientific Interest, ~12 hectares of which will be permanently destroyed during this development. The loss of SSSI is thus conveniently ignored in the 19% net gain claim by the applicant

- **NE guidance states Biodiversity Net Gain should NOT be claimed where SSSI losses are incurred during a development.**
- the Applicant's Biodiversity Metric 2 calculations examine the Sizewell Link Road, Two Villages Bypass, Sizewell B Relocation and Yoxford Roundabout developments only
- no account of biodiversity loss is made of the two Park & Ride Sites nor the Freight Management Facility, all three of which will convert arable land, field margins and hedgerows to hard landscape car parks for the 12-14 years of the development (REP5-288) and have near zero contribution to biodiversity during that period
- insufficient details of the assessment foundations, in particular the base calculations in the Biodiversity Metric 2 spreadsheet were not made available to the examination within the DCO documentation
    - these were only latterly made available after considerable and persistent pressure at the eleventh hour of the examination following a Statement of Common Ground meeting, requested by the Examining Authority, with Interested Parties, namely, Mr. Collins and Bioscan
    - the meeting took place barely a month before the conclusion of the examination, and the full information required for independent review was subsequently made available barely two weeks before the close of the examination
- although hindered by the late release of this information, following a quick walk-over assessment of some of the Main Development Site area, those same Interested Parties (including expert ecologists) consider the Applicant to have undervalued baseline assessments and be over-optimistic about potential end-states following post-development habitat restoration or development

- transposition of the Applicant's Biodiversity Metric 2 spreadsheet for the Main Development Site including its off-site areas, provided following the Statement of Common Ground meeting, into the Biodiversity Metric 3 spreadsheet, to be used for applications subject to the Environment Act 2021, showed that at best the Biodiversity Net Gain would amount to 2-3% (REP9-044) as a result of the biodiversity loss from 12-14 years of development. This is short of the statutory requirement for NSIPs
- The 25% loss of biodiversity on the Main Development Site in Biodiversity Metric 2 assessment rises to 41% in Biodiversity Metric 3 assessment due to changes and updates in this latest version of the biodiversity metric
- changes and refinements made to condition assessment criteria within Biodiversity Metric 3 for some existing habitat areas (e.g., established conifer and mixed plantation woodland) increase the biodiversity value of these areas compared to the assessment within Biodiversity Metric 2, potentially resulting in further reduced Biodiversity Net Gain assessment using Biodiversity Metric 3
- trading rules violations raised by the Biodiversity Metric 3 assessment referred to the loss of coastal shingle and dune habitat that are 95% losses and no equivalent replacement is (or can be) proposed, although the Applicant claims that following completion the shingle habitat will redevelop naturally as experienced with Sizewell B
    - the salient upon which the vegetated coastal shingle developed for Sizewell B will not be maintainable following the cessation of operation of Sizewell B and its salient maintaining outfall (see Coastal Impacts section above)
- **Biodiversity Metric 3 cannot be used to assess Sites of Special Scientific Interest as the Biodiversity Metric 3 calculations also do not properly assess such environmentally sensitive and unique habitats (~12 hectares of which will be permanently destroyed during this development)**, and
- for such reasons, the **Secretary of State can have no confidence that the reality of the development will have any net gain of biodiversity**

d. Optimism Bias

In Issue Specific Hearings 7 and 8, the Applicant was challenged to explain why they did not "recognise" the 25% loss of biodiversity across the Main Development Site on-site area nor the 95% loss of biodiversity across the coastal shingle and dune habitats that were a result of the Biodiversity Metric 2 assessments made by themselves (REP6-075 and REP7-241).

The Applicant stated that it believed its Outline Landscape and Environment Management Plan would achieve significantly better outcomes than predicted by the Biodiversity Metric 2 assessment, a position that is further stressed in late submitted Appendix O.

However, based on the collective experiences that have gone into developing Biodiversity Metric 2 and Biodiversity Metric 3, you would expect that whilst setting ambitious targets is a valid approach, realism says that there is likely to be a strong correlation to the overall assessments made by Biodiversity Metric 2 or Biodiversity Metric 3. This is corroborated by the independent expert ecologists Tom Langton and Dominic Woodfield (Bioscan) who appeared as Interested Parties in the examination.

Such confident expressions by the Applicant are characteristic of optimism-bias, especially when considering that the Biodiversity Metric 2 and Biodiversity Metric 3 assessment underpinnings are based on wide ranging real-life experiences.

It is worrying that the Applicant contends that it can buck the trend in such a manner. Indeed, there is a real chance that it will not reach the Biodiversity Metric 2 assessed levels or those it contends will be attained through implementation of the Outline Landscape and Environment Management Plan.

The Applicant completely disregards the Biodiversity Metric 3 outputs, which form the basis of implementation of the statutory requirements under Environment Act 2021 section 99 and Schedule 15 and which indicate that the project fails to meet the statutory target, despite admitting in the Statement of Common Ground meeting that their consultants did look at its outputs.

It is widely accepted and evidenced that, where a natural landscape is bisected by a road, the area to each side has its biodiversity impacted for several hundred metres.

Following restoration of the Sizewell C main development site there will be:

- a Sizewell C site access road that will permanently bisect the entire width of the AONB, with vehicle movements throughout the day and very busy at shift changes
- reduced effectiveness of what was previously a quiet contiguous area of fields, hedges and woodland between Sizewell Marsh SSSI and Minsmere & Walberswick Heaths and Marshes SSSI (with additional international designations) which is destined to become mainly lowland acid grassland and heath
- a very mature pine plantation, with significant understory, will be replaced by a car park for ~900 Sizewell C workers and security gatehouse to the Sizewell C site

It is no surprise therefore that the Biodiversity Metric 2 assessment for this area of the Main Development Site shows a permanent 25% biodiversity loss (Biodiversity Metric 3, 41% loss). It is highly unrealistic that any Outline Landscape and Environment Management Plan implementation will be able to improve on that outcome.

Also, the shingle and dune habitat frontage of Sizewell C:

- will be completely removed and replaced by the Hard Coastal Defence Facility and Soft Coastal Defence Facility, and
- the Soft Coastal Defence Facility will be subject to maintenance over the lifetime of the station which will further disrupt and chance of the existing vegetated shingle to re-establish itself at a similar level to that which exists today
- when Sizewell B is finally closed, the shingle frontage across the whole of the Sizewell A, B and C frontage will be subject to erosion as the coast inevitably returns to its natural embayment profile, and
- the southern tip of the Sizewell C Hard Coastal Defence will be under threat of exposure due to its position on the beach frontage (REP8-280).

It is worth noting that the scheme to provide compensatory Fen Meadow and Wet Woodland habitats, for that which will be lost at Sizewell Marsh SSSI, has a built-in failsafe condition should the sites at Halesworth, Benhall and Pakenham not provide the required compensation. This condition reflects the possibility that such efforts may not succeed, but no such failsafe is available for any failure of restoration or creation on the Main Development Site or across the beach frontage.

Separately, the question of whether any efforts funded by the Fen Meadow failsafe will be able to provide satisfactory compensation, perhaps decades after the damage is sustained, is similarly fraught with uncertainty and by which time the mounting losses to biodiversity and ecological system services will likely never be reclaimed.

Overall, the Sizewell C development will be an environmental and biodiversity disaster for what is one of the most biodiverse areas in the UK and an area celebrated for that fact, with concomitant tourism and economic benefits.

The continuing claims of the Applicant for 19% Biodiversity Net Gain are, therefore, specious and greenwashing of the worst kind when the Applicant is clearly cognizant of the limits of the Biodiversity Metric 2 calculations and yet continue to claim publicly that the only way to improve this highly biodiverse area is to build Sizewell C.

The reality is that continuing the ecologically sensitive management of the unchanged EDF Energy Estate, in collaboration with Suffolk Wildlife Trust, would be a far better outcome.

8. Community Impacts

We have engaged with the Applicant for the full ten years of consultation and throughout the examination and are still discussing some issues regarding early years transport impacts and changes. However, we have been unsuccessful in persuading the Applicant to change several other aspects of their proposals.

a. Failure to take local views into account

Collectively, we have pressed for a relief road to relieve pressure on the B1122, the Applicant's delivery route of choice, in proposals up to Consultation 3. Our suggestion was that the Applicant implement the proposal for D2 (W North) that was originally scoped for the Sizewell B development.

So, whilst the Applicant lauds the Sizewell Link Road as a success of our pressure for a B1122 relief road, it conveniently forgets that this route is not supported by Suffolk County Council or any of the residents or parish councils along its route.

Also, the number of residents impacted, and fragmentation of farms is far higher than that for D2 (W North), making this route selection even more damaging. The result of the Sizewell Link Road is two parallel roads, both of which Suffolk County Council is concerned will become its responsibility for maintaining, with the Sizewell Link Road providing little long-term benefit, given its more northerly junction with the A12.

Considering our objections to the Sizewell Link Road route, Theberton and Eastbridge Parish Council has persuaded the Applicant to upgrade its Sizewell Link Road plans to ensure Pretty Road has a vehicle bridge across the SLR. This will be the only vehicular access that will be maintained, across the SLR route, out of five existing roads and lanes.

The Applicant has also made much of reducing the footprint of the workers' campus from both sides of Eastbridge Lane to just the area to the east of Eastbridge Lane. This ignores the fact that this single-site campus for 2,400 workers is completely isolated in a rural environment and in a totally unsuitable location for such a large number of workers. At maximum capacity, the campus is approximately 45% of the total population of Leiston and around ten times the combined population of Theberton and Eastbridge, the two closest villages.

b. Exaggerated benefit and impact claims

[redacted] for discussion of the Applicant's exaggerated claims of economic benefit for the local area.

c. Impacts on low-cost rental accommodation

We have repeatedly requested a split campus, like that at Hinkley Point C, where the major site is at a brownfield site in Bridgewater (a town of ~40,000 residents, c.f.

Leiston ~5,400) 10.6 miles from the Hinkley Point site. Despite several other options, in and around Leiston, suggested by [redacted] commissioned by Suffolk County Council, the Applicant has insisted on there being only a single and now inadequate site at the Main Development Site entrance on Eastbridge Lane.

The Applicant's accommodation proposal has failed to make additional provision for the increase in the maximum workforce from 5,400 to 7,900 (plus 600 Associated Development Sites workers) at consultation 4. This increase was initially described as being for traffic modelling purposes only but became firm in this consultation and at about the same time as a request was made at Hinkley Point C for a similar increase to the on-site workforce.

We are also disappointed in the acceptance of this increase by East Suffolk District Council without any additional accommodation provision by the Applicant beyond the 3,000 provided by the campus (2,400) and caravan site (600). We believe this will place intolerable pressure on the local low-cost rental sector and that the housing fund provision by the Applicant, whilst going to fund additional staff at East Suffolk District Council, will not be able to negate the pressure or provide the additional level of accommodation required by such a dramatic increase (2,500) in workforce numbers. There is already some evidence of increasing rental costs in Leiston even though no planning permission has yet been granted.

d. Inconsistent impact mitigation policy

Disparities and inequalities between the Property Price Support Scheme offered for Hinkley Point C (REP5-205) and at Sizewell C are significant, and the Applicant has so far been unable to satisfactorily explain to those living close to the development boundaries either at the Main Development Site or at any of the Associated Development Sites why there is such a dramatic difference. At Hinkley Point C there is a clear area defined for potential application of the scheme that is approximately two kilometers from the Main Development Site boundary. For Sizewell C the scheme is almost completely defined by the Main Development Site boundary and Associated Development Sites boundaries.

Discussions between Theberton and Eastbridge Parish Council and the Applicant about this scheme have been active now for over 12 months and have yet to bring forward a scheme that has any clarity, or approaches that offered at Hinkley Point C. We have also been unable to engage with East Suffolk District Council and solicit their support on this matter, despite a reference being made to such a scheme in the s106 Heads of Terms documentation (APP-600) provided by the Applicant.

Unfortunately, the Property Price Support Scheme is not referenced in the final Deed of Obligation, which replaced the s106 agreement during the DCO examination, and a commitment to provide the scheme details to the Examining Authority through the PINS website was not fulfilled.

A copy of the scheme, as of August 2020, is provided along with this report.

9. Water Resources

East Anglia is one of the most water-stressed areas of the UK. We are perhaps both blessed and cursed with having one of the lowest annual rainfall levels in the country, but this means that much of our water comes from aquifers that are under increasing strain as demand outstrips the ability of rainfall to replenish our existing usage.

It is, therefore, not surprising that the Environment Agency is reviewing and reducing abstraction licenses not only for individual farmers but also for the local water company, Essex and Suffolk Water. The Blyth area, within which the Sizewell C development falls, is already struggling to satisfy the existing needs of the area, including Sizewell B.

a. Lack of planning and foresight

We have been requesting details from the Applicant of Sizewell C's water needs and for confirmation that those needs can be catered for within the water management plans of the local supplier Essex and Suffolk Water. We have been assured for the entire consultation period right up to 6 weeks before the end of the examination that water supply was not going to be an issue, even though any level of detail on how this was to be achieved was missing.

So, despite the Applicant's previous confidence, it came as no surprise when, 6 weeks before the end of the examination, Essex and Suffolk Water reported that it could not supply sufficient water for the development or the operational phase of Sizewell C without a 20 km pipeline and pumping station to bring water from an adjacent water management area, and even that solution was subject to Environment Agency approval as part of their abstraction review. The time required to provide sufficient water for the construction phase was deemed too tight and resulted in the Applicant having to revert at the last minute to an on-site desalination plant, which comes with its own environmental impact concerns.

We subsequently learned that changes to Essex and Suffolk Water abstraction limits mean that the existing water supply in the adjacent area is even unable to satisfy the much lower requirement for Sizewell C operation without additional water supply from new treated wastewater or permanent desalination facilities, neither of which are currently within Essex and Suffolk Water's infrastructure plans.

For such a conclusion to arise so close to the end of this decade-long process, and the Applicant's insistence that Essex and Suffolk Water are obliged to make such a supply available, smacks of incompetence and an unacceptable level of arrogance by the Applicant. Essex and Suffolk Water strongly contests that it has a statutory obligation to supply water to the Applicant. EDF and the Applicant know full well the

stressed nature of water resources in the area, having operated Sizewell B for all of these years. It is certainly a situation well appreciated by the local population.

10. Finance

Whilst there are several issues with the financial impacts of this development on the local economy, we firstly consider the impacts of water supply and general finance for the project.

a. Additional uncosted impacts

The financial implications for Essex and Suffolk Water of creating the additional water supply infrastructure does not appear in the £20bn cost estimate that the Applicant has placed on this development and is not currently budgeted by Essex and Suffolk Water or approved by the regulator.

If this infrastructure is to be built primarily for Sizewell C, we contend that the costs should be fully reflected within the cost base of the Sizewell C development.

b. Escalating costs

Separately during the examination, we have asked for an updated cost from the Applicant to be provided following an increase in the quantities of materials required by the Applicant to construct Sizewell C, alongside increased costs for both steel and concrete.

Nothing has been forthcoming from the Applicant, with commercial confidentiality being quoted as one reason and time to develop an update as another. It simply isn't credible for the Applicant to claim that it was incapable of providing an update to the materials costs during the examination. We can only assume that the new cost is simply too embarrassing to be released, given Hinkley Point C is already at £23bn at last count and, no doubt, increasing.

Add in the construction overruns and cost escalations that all EPRs being built (Olkiluoto, Flamanville and Hinkley Point C) or that have been completed (Taishan 1 and 2) and increased costs over £20bn are inevitable.

The chances of experiencing a 30% cost saving, as agreed in the [redacted], as a result of Sizewell C being a "second" of a kind is receding into the fiscal distance, if it was ever a real possibility.

The commercial confidentiality argument, considering this is effectively a monopolistic development with only one developer is absurd. With the developer also asking for government financial assistance, in the form of a Regulated Asset Base (RAB) funding mechanism and now an additional £100m loan to bring the project to a Financial Investment Decision, such diversionary tactics can only be considered as a ploy by the Applicant to conceal what is becoming an unacceptable

spiraling cost of development which will never provide value for money and the fact that they simply have no funds to continue.

These costs will be seen as unacceptable by the electricity consumer base who will have a RAB levy dumped on their energy bills, to subsidize an Applicant who has stated many times that they are unable to finance the Sizewell C development themselves.

c. Impacts on East Anglia's workforce

Continuing with local considerations, many impacts will be felt by local businesses particularly in the hospitality, care and local trades sectors. Local developers are concerned both for the impact on their workforce at a time when increased government targets for housing are already stressing the sector and they fear a drain to the Sizewell C development (REP5-305).

Sizewell C will also compete for skilled workforce in East Anglia's important offshore wind industry. These fears have been expressed off the record by local companies and organisations in the sector.

Indeed, the Applicant's own figures expect at least 725 of Sizewell C's employees to be taken from existing local businesses, imposing a significant financial and emotional burden on them to recruit and train new staff.

Levels of unemployment in the local area are low, so the scope for "back to work" schemes are also low and the potential for recruitment in this area from the larger county towns of Ipswich and Norwich or towns such as Felixstowe, Lowestoft or Great Yarmouth will be severely hampered by accessibility issues, given the distance to the Sizewell C site and difficulty in reaching the Park & Ride sites.

d. Exaggerated benefit and impact claims

Many claims are made by the Applicant about employment benefits of the development, but independent assessments of the claims and benefits that are espoused by the Applicant are challenged as inflated or unrealistic (REP2-449c and REP2-449l).

Based on the experience of Sizewell B there are legitimate concerns that Sizewell C would lead to considerable workforce displacement and negative economic impacts on established businesses.

The investment needs of the area used to support the Applicant's case are also questioned. Analysis of multiple socio-economic indicators across the nuclear sites named in EN-6 legislation has concluded that similar projects in Hartlepool, Moorside, Wylfa, Heysham and Bradwell would all bring greater proportionate economic benefit to their local area than Sizewell C. See (REP2-449f and REP2-449q) and a more recently updated [redacted].

11. EPR Design and Current Experiences

There is no experience of operating an EPR in Europe.

a. Lack of practical regulatory experience

The only two fully operational reactors are in China, at Taishan, and recent experience with Taishan 1 is concerning. The openness of the Chinese operators to scrutiny is questionable given the fact that it took an EDF employee in the USA to alert CNN to the fuel rod failure at the facility only 30 months into its operating life.

It took a further number of weeks for EDF to persuade the Chinese partner and authorities to close Taishan 1 down and investigate the issue.

The incident was not shared in a timely fashion with other nuclear authorities around the world and the hesitancy to shut the facility down raises difficult questions about the veracity and timeliness of information coming from the investigation at Taishan 1.

b. Design and operational issues

Subsequently, there have been reports from a [redacted] that the fuel rod failure is more extensive than is being reported publicly and that a [redacted] within the base of the reactor vessel below the fuel assemblies may be a problem endemic to the EPR design. Questions raised by the issue at Taishan 1 and the vibration problem can be found in a [redacted] to ASN (French nuclear regulatory authority).

At Olkiluoto, according to IRSN (French Institute or Radiological Safety) documentation, the vibration problem in the primary circuit of the Olkiluoto 3 EPR was first observed during cold tests although CRIIRAD state that it was also present in scaled mock-ups during design testing.

c. French regulatory concerns

The vibration problem in the EPR has resulted in the following exchanges with ASN:

- the suggestion to ASN by EDF that the vibration problem is fixed with a damper on the pressurizer in the primary circuit
- this was rejected by ASN until EDF presented a full understanding of the vibration cause, which does not seem to be the case at this time
- EDF has since told ASN that changes to the reactor to fix the vibration issue cannot be made as it would endanger the integrity of the reactor
- EDF have recently proposed a change to the fuel rod assembly design and manufacture that will make the fuel rods more secure within the assembly at the base of the reactor
    - this solution confirms that it is at the base of the reactor where the vibration in the cooling water flows is causing the mechanical damage to the fuel rods

This proposition by EDF does not directly address the cause of the problem, as requested by ASN, which is turbulent flow of the cooling water entering the reactor from multiple inlets and having to change direction to vertical flow through the reactor core.

Like the damper proposal, this proposal attempts to avoid damage to the fuel assemblies by making them stronger. **The turbulent flow and vibration will still exist at the base of the reactor and will continue to stress and potentially damage the fuel assemblies.**

- ASN has recently [redacted] that the Flamanville 3 reactor and the EPR2 design “must not be affected, or to propose provisions to prevent degradation of the fuel”
- ASN have been clear that Flamanville 3 cannot be given the go-ahead to load fuel until such time as the Taishan issue is diagnosed and rectified to ASN’s satisfaction at Flamanville 3 and EDF have now postponed the proposed date of fuel loading into 2023, adding a further €300 Million to the cost
- Flamanville also has issues with the carbon content of the reactor casting and will have to replace the reactor head, originally expected to be in 2023 based on a startup date of 2021
- Flamanville is also in the process of rectifying the integrity of some of the welds of pipework within the reactor circuits which are difficult to repair
- Questions are now being raised in the press as to whether Flamanville 3 will ever be started.

d. Olkiluoto 3 in Finland

In Finland TVO, the owners of the Olkiluoto 3, have just taken the EPR to first criticality and testing will continue over the coming months before full commercial operation starts in mid-2022. It will be instructive over time to see if any further light will be shone on the EPRs fuel and vibration problem, although a bitumen damper has been fitted to the pressuriser at Olkiluoto 3.

Considering the vibration problem is clearly being created below the fuel assemblies in the reactor core. A bitumen damper remote from the source of the problem is unlikely to prevent issues at the problem source, so may not improve the performance of the fuel rod assemblies.

As there is a significant likelihood that damage to the fuel assemblies will still occur, given their proximity of the source of vibration, it is no surprise that ASN have already rejected this proposed solution by the Applicant.

12. Consequences for UK EPRs

The Office for Nuclear Regulation is currently of the opinion that the vibration problem is not systemic to the EPR, which is at odds with the whistleblower account and both EDF and ASN's responses discussed above.

Given the lack of practical experience outside of China of operating an EPR and the as yet unresolved cause and extent of the problem at [redacted], it is difficult to understand how the Office for Nuclear Regulation can have any confidence in this opinion.

a. The on-site spent fuel problem

A recent experience at Sizewell B is worth considering as it involves the consequences of a spent fuel rod leak, as has happened at Taishan 1, and raises a concern should the EPRs at Hinkley Point C, or an approved Sizewell C, go into operation.

Following a period in the Sizewell B fuel cooling ponds, a spent fuel rod was loaded into a Dry Fuel Cask for storage in the Dry Fuel Store at Sizewell B. The cask was sealed and flushed dry with Helium gas. Measurements were made on the gas inside the cask, and it was found that at least one of the fuel elements was leaking radioactive gases into the cask. This gas leakage is what was detected at Taishan 1 in the reactor itself and led to the current shutdown and problems with that EPR.

This cask cannot be sent to the Dry Fuel Store until such time as the leaking fuel element(s) are removed from the cask. This is an operation that has not been done before in the UK and so the cask remains in the cooling ponds at Sizewell B until such time as the cask can be opened and the defective fuel rod removed.

The Fuel rod will then have to remain in the cooling ponds and cannot be moved into a Dry Fuel Cask in this condition. It is not clear what the final solution to managing this fuel rod will be.

A Dry Fuel Store is proposed at Sizewell C and the cooling ponds are sized with the expectation that spent fuel will be cooled to the point that they can be placed into Dry Fuel casks. If leaking fuel rods are a significant issue and cannot be moved into Dry Fuel casks, there is a danger that the cooling ponds will have insufficient capacity as they are sized against a low (but not zero) expectation of fuel rod failure.

At Hinkley Point, no Dry Fuel Store was proposed with the DCO application and a request to make an application change to reduce the cooling ponds size and add a Dry Fuel Store was rejected as it was considered a material change. It is likely that a separate application will be made for Hinkley Point C later once the station is operational. However, the issue raised above for Sizewell C, should a larger number of fuel rod failures occur, applies equally for Hinkley Point C whether or not a Dry Fuel Store application is made.

b. EPR - a failed design

When Hinkley Point C was agreed and Sizewell C proposed as the “follow-up” development, one of the conditions of the UK’s offer of loan guarantees was that the Flamanville 3 reactor would be successfully operating. With Flamanville 3 development now suspended, Olkiluoto 3 will be the first operating EPR in Europe, assuming the current testing and fully operational connection to the grid is successful in the middle of 2022. However, the design of Olkiluoto 3 is modified with a vibration damper fitted and so will not necessarily reflect performance at Hinkley Point C or any additional reactors at Sizewell if there are design and implementation differences.

The French government, which is 80% owner of EDF, has indicated that it is interested in building six new EPR2 reactors (***not*** EPRs) at a quoted cost of £46bn, compared to the current £23bn forecast for the two Hinkley Point C EPRs and unknown cost for two EPRs at Sizewell C. It has also expressed interest in SMRs alongside continuing expansion of its renewables programme.

So, it is evident that the French government has lost interest in the existing EPR design and may yet have an unstartable reactor on its hands at Flamanville.

ASN has told EDF that its EPR2 design (which uses the same reactor as the EPR) must not have the vibration issue that affects the EPR when it is submitted for ASN approval. [redacted] states “IRSN recommends that Framatome identify the origins of the high vibrations of the expansion line of the pressurizer observed on various EPR reactors and present, at an early stage of the design, the changes required on future EPR2 reactors to overcome this vibration problem”.

Whilst there are several expressions of interest from countries such as Poland and India, until the Taishan problems are resolved, it is unclear whether these expressions will result in projects being contracted.

With EDF and the French government now focusing on EPR2, the existing EPR is clearly a design that even EDF has now consigned to the history books as too complex and yet a question still remains as to whether the primary vibration problem can be resolved in either design.

Why would the UK consider commissioning a further two of these failing, expensive and overly complex discredited designs?

c. Who pays?

Whilst Hinkley Point C is being built on EDF and China General Nuclear’s books and will not receive any public or consumer funds until the reactors are producing electricity to the grid, this will not be the case for Sizewell C, should RAB be used as a funding approach.

Any approval of this development, with its currently flawed and rejected EPR design, using RAB as a funding mechanism, will transfer risk of cost escalation and construction delay financing onto taxpayers (via the government), third party investors (such as UK pension funds) and the UK consumer through the RAB levy.

A RAB-type levy approach - called Early Cost Recovery - used in the USA has resulted in consumers being left with billions of dollars of costs for nuclear plants that have catastrophically overrun and/or have never been completed.

13. The Applicant's Additional Benefit Claims

Alongside the spurious claims of 19% Biodiversity Net Gain, there has also been increase in the claims that further benefits are possible through:

- District Heating
- Thermally enhanced Hydrogen generation
- Carbon Dioxide sequestration by thermally enhanced Direct Air Capture

For either of the thermally enhanced proposals, both of which are currently being evaluated, it would be preferable for any plant to be as close as possible to Sizewell to avoid the installation of long, thermally lagged pipework from the secondary/tertiary cooling system of the reactor to the production site.

In all three cases there will also be a discussion to be had with the Office for Nuclear Regulation regarding modification of the reactor cooling system alongside the seawater cooling planned for Sizewell C, despite the Applicant's Mr. Cadoux-Hudson stating there would be no changes to the design of the EPRs for Sizewell C.

a. District heating

It is perhaps instructive that the initial stories about District Heating have already subsided and, despite EDF being part of the [redacted] project, that District Heating does not form any part of those proposals. District Heating suffers from the same issue as the thermally enhanced proposals and is constrained by the fact that reactors do not operate continuously, thus there is a potential issue should one or both reactors be off-line for an extended outage period. There are also significant issues trying to retrofit District Heating into existing/older properties with poor thermal efficiency and/or restricted access. It is a technology that potentially works well in purpose-designed accommodation or large commercial developments with heat requirements, but there is still an issue of a replacement heat source at outage times and at the end of life of the reactors.

b. Hydrogen

Initially there was a flurry of stories about hydrogen generation for the Port of Felixstowe to power some of their on-site vehicle requirements. Once the suggestion that this could be based at the Sizewell site had been rejected (little available space and potential issues with Office for Nuclear Regulation approval given that both hydrogen and the oxygen byproducts are potentially explosive), it became obvious that the hydrogen generation units would probably be based at Felixstowe and the only requirement was for electricity from the grid which could be supplied by EDF but could just as easily be contracted to any other commercial supplier.

There have also been suggestions that Sizewell C construction vehicles and potentially Park and Ride Buses could be powered by hydrogen generated at, or

close to, Sizewell from power provided by Sizewell B. However, there are few, if any, details of this in the DCO proposals and the assumptions and Environmental Impact Assessments are all based on conventional internal combustion power.

c. Direct Air Capture (carbon dioxide)

Direct Air Capture, whether thermally enhanced or not, will require a significant footprint to operate at scale and, assuming the thermal enhancement is viable, will need to be reasonably close to Sizewell C. The closest potential site would be Land East of Eastlands Industrial Estate once the use of this land for the Sizewell C development is finished. The land is arable at present and the stated intention is to return it to arable use, so it would require a change of use and appropriate planning permission. This may be difficult due to the nature of Direct Air Capture, which uses high volume air fans as part of the carbon dioxide extraction process, and the proximity of the site to residential and commercial properties in Leiston.

14. Conclusion

Given growing concerns over the EPR design, the escalating costs and schedule overruns experienced at all nuclear reactor developments and especially at EPR developments, it is time the UK government stopped this experimental dalliance with the “not-so-new” EPR that is showing itself to be significantly flawed as a design, potentially problematic in operation and still with unknowns in managing its spent fuel.

Add to those the issues the proposition to build two more reactors in an environmentally sensitive biodiverse location, on an eroding coast with significant flood risk during a time of sea level rise, a lack of suitable infrastructure to deliver the millions of tonnes of materials to the site, potential impacts to the existing economy, a timeframe that makes it too late to make any significant contribution to 2030 or 2050 decarbonization targets, and the conclusion must be that the money can be better spent on generation projects that are quicker to deliver and fit better with the flexible grid that the UK needs and is being pursued by the Electricity Supply Operator at the National Grid.

Sizewell C is the wrong project, in the wrong place at the wrong time.

Please refuse to grant permission for the development as it is not in anyone’s interest to permit what could easily become the third and fourth white elephants in the UK and, in Sizewell C’s case, with a significant bill falling squarely on the tax-payer and consumer through the use of the Regulated Asset Base financing proposal, should it be approved and subsequently applied to Sizewell C.

22. Theberton and Eastbridge Parish Council, Middleton cum Fordley Parish Council, Stop Sizewell C, B1122 Action Group and Minsmere Levels Stakeholders Group – 29 January 2022

Attachment 2

Sizewell C

Doing the power of good for Britain

EDF CGN



Property Price Support Scheme

AUGUST 2020

Sizewell C
Doing the power of good for Britain

EDF CGN

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Foreword

We recognise that homes within the immediate vicinity of the Sizewell C proposals may be affected by the length and proximity of the construction works for the new power station and associated works, should its development be consented. For this reason we have developed a voluntary Property Price Support Scheme (PPSS), although we are not required by law or planning policy to do so.

In developing the PPSS, we have taken into account the questions, concerns and suggestions we received from residents and homeowners during consultation, as well as considering our experience from Hinkley Point C. This booklet explains the details of the scheme.

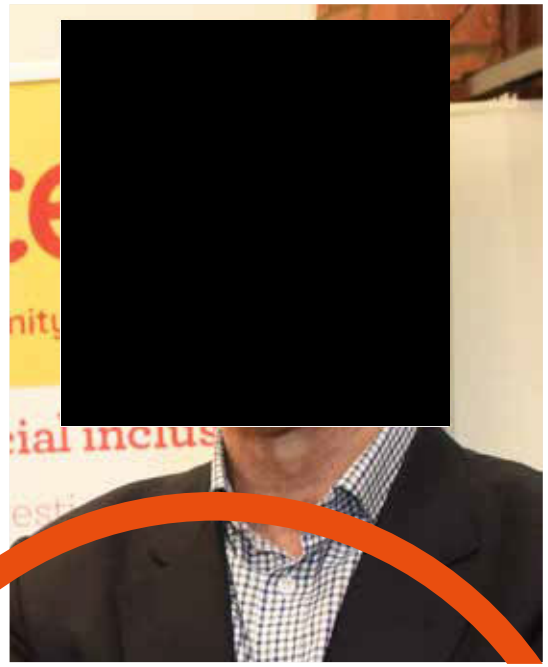
If you are the owner of a property within the areas shown on the boundary maps on pages 6-11, we are prepared to offer assistance should you wish to sell your property. We hope you won't feel you need to move house, but if you do, we will try to make it easier for you.

We appreciate the uncertainty the planning process for Sizewell C brings, so we are making our team available to visit eligible homeowners to explain the PPSS in full. We will review the Property Price Support Scheme periodically and undertake a full review five years from the effective date.

I very much hope that you feel the support we are offering is fair and responsible, and encourage you to get in touch using the form at the back of this booklet should you wish to learn more about the PPSS.

Humphrey Cadoux-Hudson

Managing Director



One of the overarching aims for EDF's development of proposals for Sizewell C is limiting or mitigating adverse effects of construction on local people.

The boundary

The PPSS boundary includes properties within the immediate vicinity of the current Sizewell C redline boundary where, based on our proposals, properties may be impacted. In setting the boundary we were mindful of the duration of the construction period, the proximity to the proposed works and the rural nature of the areas surrounding these neighbouring properties.

Property Price Support Scheme

EDF will offer homeowners within the PPSS boundary an 'Assistance Payment' up to the difference between the 'without Sizewell C' value and the 'with Sizewell C' value when they sell their property. This 'Assistance Payment' will be paid once we have received confirmation from your solicitor that the property sale is in completion.

EDF has voluntarily developed this scheme. We are not required to do so by law or policy and it is subject to contract. EDF therefore reserves the right of final decision in cases of dispute, having consulted with the homeowner and the appointed valuers.

Eligibility criteria

You are eligible for the PPSS if your property is within the boundary and you owned the property prior to the scheme announcement date (see Table 1),

AND on the date when you sell the property you:

- are the owner of the residential property and it is your principle private residence
- do not have a wider property interest being acquired by EDF in relation to Sizewell C;

AND

- have lived in the property continuously for at least the last six consecutive months prior to applying for the PPSS.

Table 1: Scheme announcement dates

Area	Proposal	Scheme Announcement Date	Page
1	Main development site	19 July 2011	6
2	Land east of Eastlands Industrial Estate	21 November 2012	6
3	Sizewell link road (Theberton Bypass)	4 January 2019	7-8
4	Two village bypass	23 November 2016	9
5	Northern park and ride	21 November 2012	10
6	Green rail route	21 November 2012	11

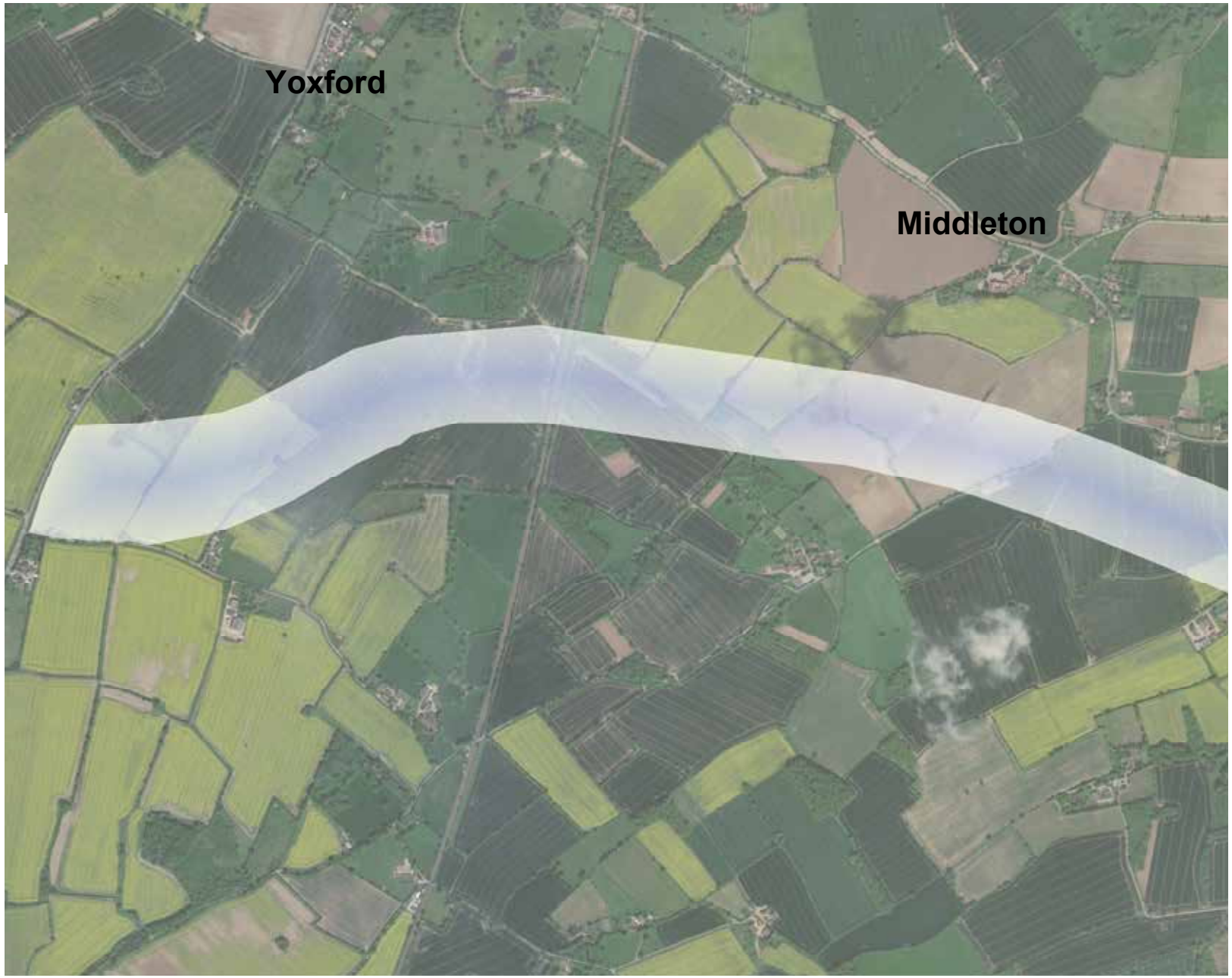


1. 1 - Main Development Site
2. 2 - Sizewell Link Road 1
3. 3 - Sizewell Link Road 2
4. 4 - Two Village Bypass
5. 5 - Northern Park and Ride
6. 6 - Green Rail Route



1

Main development site and Land east of Eastlands Industrial Estate



2

Sizewell link road 1



3

Sizewell link road 2



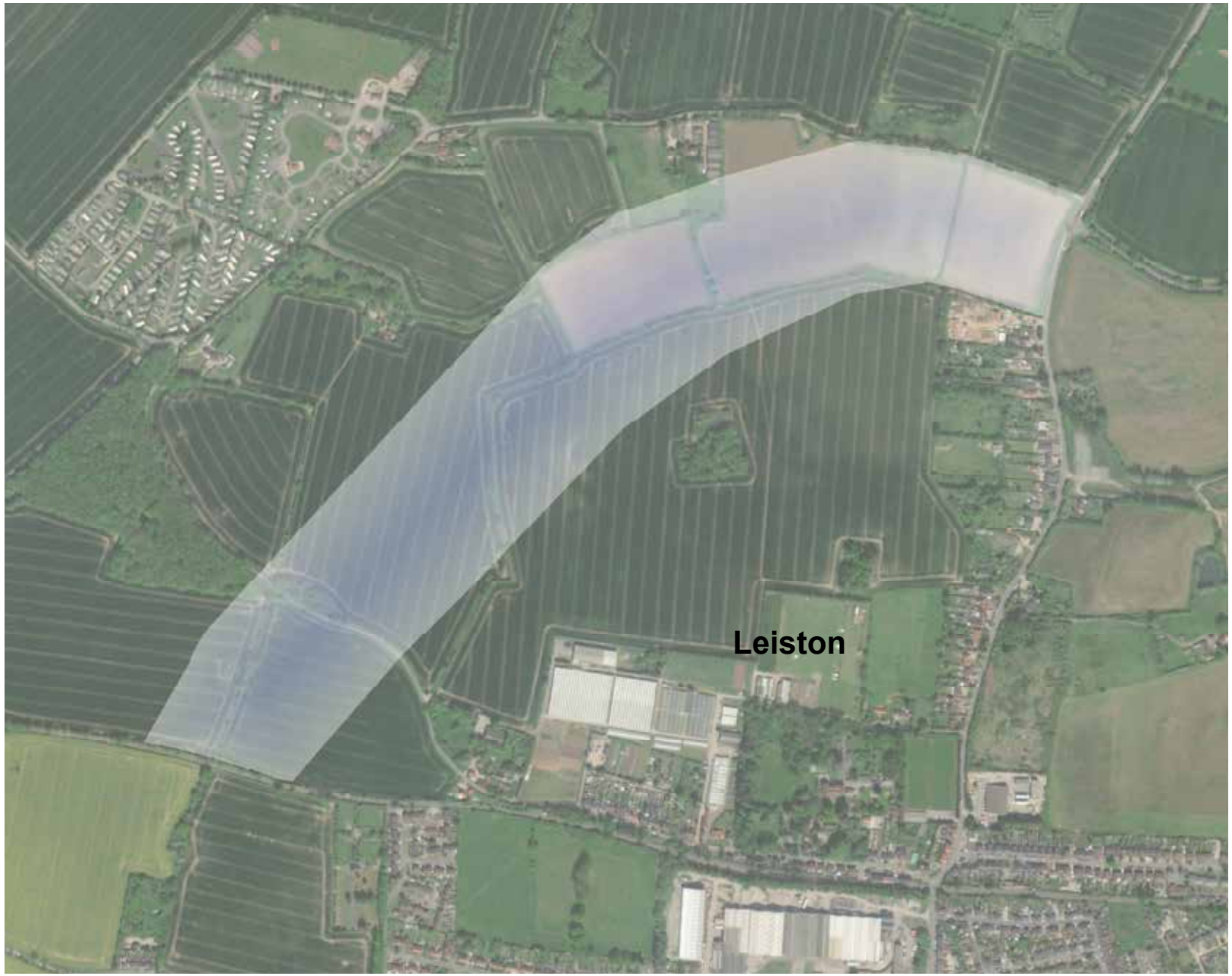
4

Two village bypass



5

Northern park and ride



6

Green rail route

How it works

STAGE 1
Valuing your property

STEP 1
If your property is within the boundary and you choose to participate in the PPSS, you should complete and send back the attached form to SZC-NNB@dalcourmaclaren.com.

STEP 2
A member of the PPSS team will then confirm receipt of the application and begin reviewing it for eligibility. You will then be informed whether the application is accepted or not.

STEP 3
If you meet all criteria, the PPSS team will arrange for an independent RICS registered valuer to visit your property and assess the value of your property in a scenario 'without Sizewell C' and the value of your property today 'with Sizewell C'.

STEP 4
If you wish, you can request a second valuation and appoint an RICS registered valuer yourself from the schemes panel of independent registered valuers, using EDF's formal basis of instructions. EDF will pay the cost of this valuation.

STEP 5
Copies of the valuations will be sent to you and the PPSS team.

STEP 6
If two valuations are completed and the difference between the two exceeds 10%, we will arrange a third valuation and the agreed 'with and without Sizewell C' values will be the average of the closest two.

STEP 7
The PPSS team will issue notification of the 'with and without Sizewell C' value to you. The difference in these values will be the maximum Assistance Payment that will be offered.

Following notification from EDF on the values, Stage 2 below sets out the next steps on selling your property.

STAGE 2
Selling your property

STEP 1
You would be required to market the property with a reputable estate agent based on the agreed 'with Sizewell C' value.

STEP 2
If the property is sold more than 12 months after the offer is issued, the valuation will need to be updated.

STEP 3
Once your solicitor has confirmed to us that the sale of your property is complete, EDF will pay the difference between the 'without Sizewell C' value and the sale price, up to the maximum value of the 'Assistance Payment'.

Property Price Support Scheme Q&A

1. When will you value my property?

When the Planning Inspectorate accepts our application for development consent for examination, we will engage with independent RICS registered valuers to begin valuations of eligible properties whose owners choose to participate in the scheme.

2. When does the scheme start and finish?

The scheme will officially commence when the Planning Inspectorate accepts our application for development consent for examination. The scheme will initially run for five years, at which time it will be subject to review to ensure the scheme objectives are being met.

3. Who will conduct the third valuation?

We will endeavour to engage the local district valuer to carry out this valuation, however we may need to appoint another third party RICS registered valuer.

4. When can I apply to this scheme?

You can apply to this scheme at any time whilst the scheme remains open. We will write to residents and give six months' notice in advance of the scheme closing.

5. What if I can't sell my property at the 'with Sizewell C' value

The 'with and without Sizewell C' values are the most accurate way of assessing the impact of our proposals. There will of course be other market factors which influence the transactional property market and this is not something that EDF can mitigate.

6. Who will pay my moving costs

You will be responsible for covering your own costs associated with selling and moving house.

7. What are my alternatives to this scheme if I want to sell my property?

This is a voluntary scheme which is not required by law or planning policy. Homeowners will need to seek advice on other alternatives available to them.

Next Steps

Should you wish to participate in the PPSS, please register your interest by completing the application form provided and sending to SZC-NNB@dalcourmaclaren.com or by hardcopy to the Sizewell C Information office, 48-50 High Street, Leiston, IP16 4EW

After receipt of this, we will make contact to confirm receipt before reviewing the application.

We look forward to hearing from you.

If you have any questions about the scheme, please contact the EDF information line during normal office hours on 0800 197 6102 and we will ensure your question is passed to the relevant person.

For information about how EDF will handle your personal information please see our Privacy Notice, which is available via the following link [redacted]

Glossary of Terms

Property Price Support Scheme (PPSS) - EDF's voluntary scheme to support homeowners within the immediate vicinity of the Sizewell C proposals where EDF believes property values may be impacted by the proposals.

PPSS - the area identified by the blue shading on the plans on pages 6-11 within which homeowners may apply to the scheme.

Development Consent Order - means by which planning permission is granted for a Nationally Significant Infrastructure Project such as Sizewell C.

Sizewell C redline boundary - land within which consent for construction would be sought and compulsory powers requested.

'Without Sizewell C' value - value of the property if Sizewell C was not proposed.

'With Sizewell C' value - value of the property with the Sizewell C proposals.

Scheme announcement date - the date on which the scheme was first published for consultation.

RICS registered valuer - valuer who is a member of the Royal Institute of Chartered Surveyors.

EDF - NNB Generation Company (SZC) Limited has been formed as a separate company (Company No 9284825) to finance and construct Sizewell C. It is currently a joint venture company between EDF and China General Nuclear Power Corporation (CGN). EDF will seek additional shareholders in NNB Generation Company (SZC) Limited and is currently in discussion with UK pension funds. NNB Generation Company (SZC) Limited is referred to in this document as EDF.

Sizewell C

Doing the power of good for Britain

EDF CGN



edfenergy.com

NNB Generation Company (SZC) Limited,
90 Whitfield Street, London, England W1T 4EZ

Registered in England and Wales.

Company registration number 09284825

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23. Tom Langton – 1 February 2022

From: [redacted]
To: SizewellC
Subject: SZC Post- Deadline 10 hearing submission LANGTON ID no.: 20026399
Date: 01 February 2022 17:54:39
Attachments: LANGTON Response toEDF D 10 Submissions .docx

Dear Sir/Madam,

Please can you provide my final comments to the examination and/or the attention of the Secretary of State in response to final matters raised in the examination.

Many thanks, Tom Langton

Tom Langton Registration ID no.: 20026399

Local resident and nature conservation consultant.

Response to: EDF's Deadline 10 Submissions for the Sizewell C Project and Final Review of accumulated Concerns and Objections regarding the 10 Year Consultation and Development Consent Order Examination

SIZEWELL C DEVELOPMENT APPLICATION

NNB Generation Co (SZC) Ltd: EN010012

Biodiversity and Ecology: (2. Terrestrial ecology)

Final Summary Report

The Application to build a new nuclear facility with a construction site, for over a decade across effectively the entire width of an AONB is astonishing.

Whoever conceived the idea of a building site across the AONB and a permanent road either cannot have been aware of its environmental consequences or did not care.

Not only habitats and species losses but the impact of a permanent busy road, probably the most damaging action that is possible to nature, bringing noise, pollution, wild animal avoidance and mortality and intrusion to a quiet, special place of high nature conservation and recreation value. It is almost unthinkable.

What is more, the applicant has gone about showing its details in a divisive manner. The examination has been a fight for facts, a time-wasting chase for what was meant and a battle with contradictions and for missing information.

The fact that many if not all statutory consultees are dissatisfied with information provision and are still objecting speaks volumes and is highly unusual. Towards the end of the examinations some of the questions concerning inadequate information were exposed but not answered or not answered adequately, with platitudes or ambiguous undertakings. Many questions remain about the adequacy and quality of data provision and gaps in essential information to inform a proper examination.

We have seen misinformation with respect to Biodiversity Net Gain, with the irreplaceable loss of the SSSI wetland area (and ongoing threat) being ignored in favour of claim of gain, contrary to government guidelines.

Mr Woodfield's and Mr Collins evidence show up the calculations as incomplete and in need of checking and at the end of the day resulting in totally inadequate protection and compensation.

The work at Aldhurst farm to create habitats, as some kind of cure-all for poorly addressed issues is a failure. Not established correctly, it has been presented as a place where for example skylarks will nest, in compensation for damage around long road routes to the A12. When in fact the north side of the arable reversion is scrubbing up and the south side is allocated to dog walkers. It is all too little and 'all in one basket' to be credible.

A lot of time and effort has been expended. But not quite enough and sufficiently in the wrong direction for alarm bells. It is my suspicion that proper environmental protection before, during and beyond the construction period would amount to in the order of £660 Million while the application might try to get away with £190 Million. This is the order of magnitude of shortfall and an explanation of the corner-cutting that is plain to see even now with pre-development construction activities damaging nature in the name of Sizewell C e.g. the felling of Coronation Wood in the name of Sizewell B but ostensibly as a SZC precursor.

Many aspects of the application are illogical. The fragmentation of mitigation for coastal fenland (fen meadow) to small or remote sites, one near Bury St Edmunds is poorly conceived with futile reference to unwanted translocations (see Annex 1) and Natural England are far from content over the build up and justification for work, as well as even the aims and objectives at each site. It has been rushed and is muddled and risks reputational damage if attempted.

Habitat creation on surrounding sandy fields has been skimped in terms of the normal process for nutrient stripping and ground de-compaction and micro-habitat creation. Objectives for habitat creation are large in scale but lack operational delivery and will form a forest of scrub in need of annual failing as is already the case in some of the older areas. Woodland plans are chaotic and unexplained. It just isn't being thought though properly and there is resistance to accepting something may be wrong which is very worrying sign as these matters are easily negotiated.

The approach to reptile mitigation has been especially woeful and potentially unlawful and still the subject of legal investigation and concern with respect to the misuse of government guidelines. The dealing with the population of adders present appears to be unlawful and a threat in several ways including to the survival of the species.

The beach habitat that was very carefully reformed as a part of Sizewell B has only just recovered, albeit in an altered state and after 50 years, only to be destroyed contrary to the original undertakings. It will now form a steep beach slope in a manner that would not have been allowed when SZB was built.

There is a very long catalogue of things not planned properly, not done well, unlikely to deliver or doomed to failure or that will bring about long-term damage, that will outlive their architects and leave a legacy of environmental shame for all to view in the future.

And this was so unnecessary. The application build-up kept to voluntary body stakeholders with whom it had some vested interest or hold as funders and has ignored local and national expertise on offer. Hardly the way to engage with important detail. At every point, public consultation comments on environmental matters were not responded to / ignored and eventually a promised investigation into allegations of malpractice (made by the project manager in 2018) disappeared with his employment. There have been many small concessions but not enough on the biggest of issues.

Something is and has gone badly wrong with environmental protection proposals for this application. They have in part been exposed by the examination. What happens next, if it is approval can only amplify inadequacies further and lead to a catastrophe for the Suffolk Coast AONB to add to the UK biodiversity crisis over the years that are important, as mentioned by the Defra Minister in 2021.

The Climate and Biodiversity crises need dealing with together in harmony. It is not acceptable for recovery of one to trample over the other to try to snatch at the rescue rope.

ANNEX 1. EMAILS WITH NATURAL ENGLAND

From: Walkden, Niall [redacted]@naturalengland.org.uk>
Sent: 18 November 2021 16:55
To: Tom Langton [redacted]@langtonuk.co.uk>
Cc: Haynes, Jack <[redacted]@naturalengland.org.uk>
Subject: RE: SZC/Pakenham Fen

Hi Tom, Thank you for the email.

The Applicant produced various 'measure of success' objectives within their plans and strategy documents which look at both indicators of successful habitat creation and the establishment of biodiverse invertebrate communities. We have commented on these where appropriate and provided advice to strengthen these measures at various points within the process.

To date we have not advocated for the translocation of invertebrates or plants from Sizewell Marshes. We understand that the Applicant has proposed green hay transfer and turve translocation at fen meadow sites. While we do not actively oppose this methodology our advice has repeatedly highlighted a preference for natural colonisation over artificial interventions where possible.

As outlined in our responses, Natural England's priority is to see the sustainable establishment of the agreed quantity of fen meadow and wet woodland with minimal artificial long term management structures. Natural England's advice is that the underlying hydrology of the site is fundamental to establishing habitats of sufficient quantity and quality to support an 'outstanding invertebrate assemblage' comparable to that at Sizewell Marshes SSSI.

At the close of examination our advice is that we do not believe the Applicant has provided sufficient evidence that the current plans have a high likelihood of success. Consequently, we have flagged it to the Examining Authority as an outstanding issue. It is now up to their recommendation and the Secretary of State as to what weight they give our advice in the decision making process. We appreciate and share your concern on this issue, however at this time, there is limited scope for Natural England to bear any further influence on the proceedings. I would suggest that if you wish to make further contributions to the process you contact the Applicant directly, the Examining Authority or the Secretary of State.

We will continue to provide advice within our remit and should the development be consented our advice will aim to ensure that the habitat creation sites as proposed have the best chance of establishing.

Kind Regards, Niall Walkden

Senior Adviser | Sustainable Development | Norfolk & Suffolk

[redacted]

Phone: [redacted]

[redacted]



From: Tom Langton [redacted]@langtonuk.co.uk>
Sent: 12 November 2021 16:01
To: Walkden, Niall <[redacted]@naturalengland.org.uk>
Cc: Haynes, Jack <[redacted]@naturalengland.org.uk>
Subject: RE: SZC/Pakenham Fen

Many thanks Niall,

However, I am afraid that you have not answered my question of principle, but have deferred it to a point further down the process. Beside the quite surprising lack of data on species present in the proposed habitat creation area, what at the start and as a baseline, will Natural England endorse in respect of mixing invertebrate communities in or around the SSSI and beyond?

Is it the case that NE wants to see more of the species adapted to the existing catchment increase, or is it content to see an attempt at introducing a coastal invertebrate/plant community so that they mix? So the questions is how is NE measuring biodiversity here, what are the detailed objectives (in respect of loss on the coast at Sizewell) and how will outcomes be measured and judged?

I don't understand how the situation can be considered without the relevant data, proposals and undertakings. These could /should have been provided for a proper examination? What is the Working Group going on or are you suggesting the decisions on principles can be delegated until later?

This is not so much a matter of advice as its position in relation to acceptability of the principles, something that I would hope that you might comment upon before the December deadline (for final comment to the S/S), because so far it is missing, despite it being pointed out as an uncertainty during the examination. Otherwise what is the measure of success that you refer to?

Surely 'measure of success' would be an indicator to acceptability of the proposal, before it is accepted? So what exactly is it please?

Many thanks, Tom Langton

From: Walkden, Niall <[redacted]@naturalengland.org.uk>
Sent: 12 November 2021 12:11
To: Tom Langton [redacted]@langtonuk.co.uk>
Cc: Haynes, Jack [redacted]@naturalengland.org.uk>
Subject: RE: SZC/Pakenham Fen

Hi Tom,

Apologies for the late response, as you can imagine we've been exceptionally busy. Thankfully with the examination over there has been some respite.

To answer your question I don't believe we do have any recent vegetation or invertebrate surveys for Pakenham Fen SSSI. We acknowledge that plant and invertebrate community composition at neighbouring sites are an important factor in the sites overall suitability and likely success of establishing biodiverse habitats. Our engagement up to this point has prioritised ensuring the underlying hydrology is as natural as possible in order to maximise the chances of successful and sustainable habitat creation. At the last deadline we were still concerned at the management plans for both fen meadow and wet woodland didn't reflect our advice in this regard and so highlighted it as a 'red' outstanding issue for us.

Going forward if the project were to be approved Natural England would participate in the Ecology Working Group which inputs into these plans and would ultimately aim to ensure we provide advice which gives habitat creation the greatest chance of success. We will do this by consulting with our specialists in conjunction with our local team to provide bespoke input into the plans and management.

We appreciate your concern and hope you find this information helpful.

Kind Regards, Niall Walkden

Senior Adviser | Sustainable Development | Norfolk & Suffolk

[redacted]

Phone: [redacted]

[redacted]



From: Tom Langton [redacted]@langtonuk.co.uk>
Sent: 29 September 2021 15:57
To: Haynes, Jack <[redacted]@naturalengland.org.uk>
Subject: FW: SZC/Pakenham Fen

Hi again Jack,

Following your supply of relevant information, I was just wondering if you had any feedback for me on the second part of my second question from my email in July.

"It would be useful to check what plant and invertebrate species currently survive at Pakenham Meadows SSSI. Are any of you aware of any recent vegetation/invert survey reports for this SSSI? This is an important point as introduction (translocation) of material nearby from outside could

cause by positive or negative effects and to the downstream catchment that should be assessed as a part of any considerations of suitability."

Specifically for a Level 1 feasibility report I would have thought a decision is needed whether to recover the fauna/flora of the current Pakenham SSSI (which appears to be drying out) is to be rescued and encouraged to spread, or is the system to be brought in from Sizewell, or a mixture of these approaches?

Surely to be able to satisfy the proposal as viable, these questions need answering, using real data from relevant surveys. There seems to be reference to satisfying NE in some of these matters but that is later post-decision. The nature and viability of what is being proposed is unclear in the latest documents (attached and below), but it is founded on translocation of material and this surely needs to be explained and justified in terms of genetic pollution and plant/invert community assemblage strategy and specific targets and success criteria, up front?

- [redacted]NNB Generation Company (SZC) Limited Deadline 8 Submission - 9.64 Draft Fen Meadow Plan - Tracked Changes Version - Revision 2.0

Also the scheme seems to rely on leaks of polluted river water as a top up to abstraction?

I am concerned that this Level 1 plan is not really fit for purpose?

Many thanks, Tom

Tom Langton

24. Ruth & David Watson – 2 February 2022

From: [redacted]
To: [redacted]@eastsuffolk.gov.uk
Subject: Reference DC/22/0078/FUL
Date: 02 February 2022 18:27:14

We have just learnt that EDF is only now investigating whether the Sizewell C site is geologically suitable for the proposed construction.

Why did EDF not carry out this exercise long before getting to this stage? It is breathtaking that such a fundamental issue has not already been resolved. And, why did East Suffolk Council not require an environmental impact assessment?

It is bad enough that EDF, who have no interest in preserving our countryside and local infrastructure, should act so negligently but quite extraordinary that both government and council have not insisted on this basic investigation before the planning application was allowed to proceed.

Kind regards, Ruth and David Watson

[redacted]

25. Together Against Sizewell C – 3 February 2022

From:	Together Against Sizewell C
To:	SizewellC
Cc:	correspondence@tasizewellc.org.uk
Subject:	Post SZC DCO examination submission
Date:	03 February 2022 16:15:24
Attachments:	mapiaogbifaiidap.png TASC post exam response to 9.67 doc at D10 Final.pdf

[redacted]

TOGETHER AGAINST SIZEWELL C

Meadow Cottage, Hubbard's Hill, Peasenhall,Saxmundham, Suffolk IP17 2JN

Dear Sizewell C Team,

Please find attached TASC's response to D10 document REP10-135, which TASC understand will be passed on to the Secretary of State with the planning inspectorate's recommendation.

Please acknowledge receipt.

Best wishes

Chris Wilson

Together Against Sizewell C

TASC Post-Deadline 10 Submission TASC IP no. 20026424

Comments on REP10-135 9.67 Quantifying uncertainty in Entrapment Predictions for Sizewell C

Prepared by Dr Peter Henderson for TASC, January 2022

About the author; Dr P A Henderson

1. I am a marine biologist with an in-depth knowledge of the ecological issues linked to power generation having worked in the field for over 40 years. I also have extensive experience working on wedge wire screens for the protection of water intakes in both the USA and the UK. I lecture and hold the position of Senior Research Associate in the Department of Zoology, University of Oxford, UK. I am an ecological consultant and research scientist with 40 years' experience combining theoretical, applied, and field research, with extensive experience of the management of major ecological assessment projects including preparation and presentation of material for public enquires and liaising with conservation bodies and engineers. Projects undertaken include conservation planning for large tropical nature reserves, ecological effects studies of nuclear power station intakes (including the Sizewell B intakes), conservation studies of rare freshwater life and effects of climate change and drought. I have written 7 books including the standard textbook 'Southwood's Ecological Methods'.

2. The focus of these comments is the assessment of the level of under-estimation of the number of fish that will be sucked into the cooling water system at the proposed Sizewell C Nuclear Power Station. TASC, in their submission REP2-481h and supported by later submissions REP7-247 and REP8-284, pointed out that the total number of fish sucked into the cooling water system was seriously underestimated by the Applicant because small fish and long and thin eel-like species had not been sampled in the studies undertaken at Sizewell B cooling water intakes. This was because small and thin fish would pass across the 10 mm filter screens and thus not be counted in the impingement samples. Further, they would not have been captured by the pump sampler used to sample the plankton because their swimming ability allows them to avoid capture. The water velocities close to the intake orifice of a pump sampler are too low to efficiently draw in fish once they perceive the sampler and take evasive swimming action. It is because of this low sampling efficiency that high speed nets rather than pump samplers are used by marine biologists including CEFAS to sample post-larval and juvenile fish at sea.
3. The calculations undertaken by CEFAS in 9.67 [REP10-135] show that they agree that under sampling did occur and that all the estimates previously produced for fish entrapment on the proposed Sizewell C cooling water intakes were underestimates. CEFAS have made estimates for sprat, herring and sand gobies in an attempt to assess the missing size fraction. They selected these species because they spawn nearby and are abundant in entrainment monitoring samples. However, approximately 80 species of fish are vulnerable to entrainment and impingement and, as many of these have been under-sampled, there needs to be a complete

reanalysis of the estimated numbers of fish entrapped if a proper assessment of the impact of Sizewell C is to be produced. The choice of 3 taxa is arbitrary and dismisses the large impacts on many other species. The reasons given for the choice of species does not bear scientific scrutiny.

4. We have previously highlighted other fish species which will have been seriously underestimated in entrapment estimates. Examples include, sticklebacks (3 species), gobies such as transparent, crystal, painted, black and rock, butterfish and viviparous blenny. Another class of fish which has been greatly underestimated are those with a long, thin body form that can penetrate the mesh as adults or late-stage juveniles. These include the abundant Nilsson's, greater and snake pipefishes. Nilsson's pipefish is particularly abundant at Sizewell and is regularly recorded in impingement samples. The vast majority of pipefish will penetrate the screens, so the number recorded in the impingement samples is probably a tiny fraction of the total that are killed. Another group of long, thin, fish which are common and have been grossly under-estimated are the sand eel, a number of species of which occur off Sizewell. CEFAS have taken the view that they need only reassess numbers for highly abundant species. However, for fish such as sand eel and transparent goby which have not been properly sampled there is not even the data to know how abundant they actually are. Another group which needs to be properly quantified are the flatfish. Juvenile flatfish such as sole are particularly adept at forcing themselves through a 10 mm mesh as their bodies are flexible and they are able to use the diagonal distance of 14 mm across the square mesh to pass across using a corkscrew action. Juvenile sole species, plaice and dab are highly abundant in the Sizewell region and are important commercial species which need to be correctly quantified.

Finally, in addition, eel and river lamprey have certainly been underestimated as a wide size range occur in the sea and even quite long individuals can wriggle through a 10 mm mesh. The CEFAS calculations for the under-sampling of sprat and herring also apply to anchovy and pilchard. Why have calculations for these species not been included? The argument that none of the above species are commonly recorded by the pump sampler is irrelevant as they are all capable of swimming and avoiding capture by a pump sampler designed to sample eggs and larvae only.

5. Even for the 3 taxa for which they have attempted to assess the degree of under sampling, there are serious problems linked to the assumptions made.
6. In the case of sprat, it is claimed by CEFAS that TASC are wrong in claiming sprat need to be > 70 mm SL ('Standard Length')[1] before they are always retained by a 10 mm mesh (Section B.2.2). CEFAS reach this conclusion by showing that in a fish of 70 mm SL, the depth of the head is greater than 10 mm. **CEFAS have failed to understand that the critical dimension for mesh penetration is not the 10 mm length of each side of the mesh but the diagonal distance across the mesh**. For a 10 mm mesh this is the square root of 200 = 14.14 mm. Oddly and quite surprisingly, this lack of understanding by CEFAS that it is the diagonal dimension that is critical in defining the length of fish that will penetrate the mesh, is repeated elsewhere. For example, for smelt on p 71 the following is written "*Smelt ascent to upper estuaries and freshwaters in February to April to spawn. Most of the juvenile fish descend to*

[1] Standard length (SL) is the length of a fish measured from the tip of the snout to the posterior end of the last vertebra or to the posterior end of the midlateral portion of the hypural plate. Simply put, this measurement excludes the length of the caudal (tail) fin.

the lower estuary by early autumn of their first year (Colclough and Coates, 2013) and by that time their lengths is ~ 6 cm TL [Total length][2] *(Scholle et al., 2007). At this stage juvenile smelt have a body depth of approximately 10mm (Froese and Pauly, 2021), the size of the drum screen mesh.*" As in the case of sprat, they assert, incorrectly, that it is 10 mm body depth which is the maximum size for penetration when in actual fact it is closer to 14 mm.

7. A critical, incorrect assumption made by CEFAS, is that efficient entrainment sampling occurs up to a length of 35-39 mm TL. "*Therefore, this represents the starting point to back-calculate numbers of smaller fish between the maximum size of efficient entrainment (35-39mm TL) and the minimum size of 100% impingement (85-89mm TL)*." (p 73). There is no evidence presented that a pump sampler has a high efficiency of capture of sprat above 30 mm TL. The result is an underestimation of the number entrained.
8. Exactly the same errors occur with respect to herring. "We assume that entrainment sampling misses fish > 40mm TL (32mm SL) and the minimum size of fully impinged fish is the precautionarily assumed to be of the size class of 70 – 74mm SL, 85-89mm TL as suggested by TASC [REP2-481h]." (p76). There is no evidence presented that a pump sampler efficiently samples herring in the 30 – 40 mm size range.

9. In the case of gobies there are a number of errors made in CEFAS's calculations. **First**, there is the error of not using the diagonal dimension of the mesh when

[2] Total length (TL) is the length of a fish measured from the tip of the snout to the tip of the longer lobe of the caudal fin, usually measured with the lobes compressed along the midline. It is a straight-line measure, not measured over the curve of the body

considering mesh penetration. "*Sand gobies of 87mm SL (as suggested by TASC [REP2-481h]) would have a body depth of 15.3mm. This far exceeds the minimum size to be fully retained by 10 mm mesh. Therefore, we precautionarily assume the smallest size class subjected to 100% impingement by a 10mm mesh is 70-74mm TL (62-65mm SL) with a body depth of 10.9-11.4mm. This is based on the maximum body depth being 10% higher than 10mm mesh size.* " (p80) **Second**, they assume the pump sampler is 100 % effective up to a length of 35-39 mm TL. "*Therefore, we precautionarily defined the entrainment gap as occurring between the size classes of 35-39mm and 70-74mm TL.*" **This is untrue** as small gobies about 18 mm SL are fully formed fish and will avoid capture in a pump sampler. **Third** CEFAS assume the smallest juveniles are 20-24 mm TL. Gobies enter the water column at a length of about 9 mm and well-formed juveniles > 16 mm are observed in high numbers. No explanation of the 20-24 mm TL cut off length is presented. The **fourth** erroneous assumption relates to the assumed age of maturity. "*The age of 50% maturity of P. minutus in the Northeast Atlantic is 1 year (Bouchereau and Guelorget, 1998). Impingement calculations precautionarily assumed all gobies (Pomatoschistus spp.) had an EAV on 1. To determine the EAV for the missing fraction we assume that the age of 100% maturity is 1.5 years as the maximum age is 2.7 years (Froese and Pauly, 2021) and that all gobies would be mature before the second year*." (p82). The maximum age of maturity of sand goby at Sizewell is not 2.7 years and is much closer to 1 year. They quote data for *P. minutus* and avoid data for *P. lozanoi* which is smaller and lives for only about 1 year. Further the maximum longevity of 2.7 years is not for southern North Sea British waters. **Finally**, CEFAS argue that the entrapment death rate is insufficient to affect the sand goby population. The

problem here is that there is not a sand goby species, there are 3 species. CEFAS treats it as a single species which is incorrect. The *P. minutus* species complex in North Atlantic waters comprise 3 species *P. minutus*, *P. lozanoi* and *P. norvegicus*. *P. norvegicus* is an offshore species found at depths > 18 m. It would be unlikely to be caught by the Sizewell B intakes but may well be sucked into the offshore C station intakes. *P. minutus* and *P lozanoi* are closely related species: studies by Hamerlink in the 1980s demonstrated that these species had notably different ecological characteristics. *P. lozanoi* is smaller and predominately feeds on mysids. **CEFAS have not produced any evidence that the *P. lozanoi* or *P. minutus* populations are individually of a size that would not be impacted by the entrapment losses.**

CONCLUSION

10. In summary, while CEFAS have conceded that there is a serious under-estimation in entrapment losses of fish at the proposed Sizewell C cooling water system, the full extent of this under-estimation has not been assessed. Further, for the 3 taxa which have been assessed there are serious errors in the assumptions made which have resulted in a repeated under reporting of the likely losses. These errors, together with the absence of assessments for the entrapment for all 80 vulnerable species, lead to the inevitable conclusion that there is still a gross underestimate of the fish likely to be killed by the proposed Sizewell C cooling water system. As a result, TASC make the following observations:-

- as fish mortality is substantially underestimated, then the adverse impact of all the dead/dying biota that will be discharged at the outfall point will be underassessed, and

- as fish mortality is substantially underestimated, the impact on protected fish, those of conservation concern and the species that prey on them has been understated, and

- as fish mortality is substantially underassessed, then the benefits for the inclusion of mitigation in the form of acoustic fish deterrents will likely be underassessed (for further TASC comments regarding the acoustic fish deterrent see REP6-077), and

- as fish mortality is substantially underassessed, then the consideration of, and comparison with, alternative cooling systems eg cooling towers, will be incomplete.

[redacted], Hubbard's Hill, Peasenhall, Saxmundham, Suffolk [redacted]

26. Dr Daniel Poulter MP – 4 February 2022

DR DANIEL POULTER MP
Llb (hons), MBBS, AKC, MRCPsych

HOUSE OF COMMONS
LONDON SW1A 0AA

Ms W McKay
Planning Inspectorate
Temple Quay House
2 The Square
Temple Quay
Bristol BS1 6PN

04/02/2022

Dear Ms McKay,

Ref: FORMAL REQUEST FOR EXTENSION TO THE REPORTING STAGE OF THE APPLICATION BY NNB GENERATION COMPANY (SZC) LIMITED FOR THE SIZEWELL C NATIONALLY SIGNIFICANT INFRASTRUCTURE PROJECT

I read with some concern that one of the reasons for requesting the extension to the reporting stage cited by Kathryn Dunne in her letter to Gareth Leigh at BEIS is that there is a worry about the health and wellbeing of members of the Examining Authority. Whilst I obviously am not aware of the nature of those concerns, I am very aware of the enormous workload that the Examiners have taken on, both during the Examination itself and in preparing the report for the Secretary of State – I sincerely hope the pressures of that workload have not been the overriding cause of the health and wellbeing issues.

I also recognise the complexity of the task facing your team and I hope that the extension of time will be granted swiftly by the Secretary of State to allow you to fully consider the remaining outstanding issues. My own constituents in Marlesford and Little Glemham have continuing concerns about the absence of a Four Village Bypass solution for the villages of Farnham, Stratford St Andrew, Little Glemham and Marlesford. To provide a bypass for the two villages of Stratford and Farnham only, using a route that will make a future connection with a bypass for Little Glemham and Marlesford all but impossible, is short sighted. I realise that the long-hoped for Four Village Bypass is not part of EDF's application, but if in the reporting time remaining to you and your team, you can consider this missed strategic opportunity it would be appreciated by the residents of Little Glemham and Marlesford who, as you will have seen, currently experience heavy traffic which will become worse as the Sizewell C construction starts.

I wish you well in preparing your final report and hope you and your team have a very happy new year.

[redacted]

Dr Daniel Poulter MP

27. MF Rowe – 6 February 2022

From: Vivien Rowe [redacted]
Sent: 06 February 2022 15:07
To: Dunne, Kathryn [redacted]
Cc: Dunne, Kathryn [redacted]
SizewellC <sizewellc@planninginspectorate.gov.uk> **Subject:** Fwd: Sizewell C night trains.

My latest attempt to get people to do away with night trains that will devastate hundreds of lives along this stretch of rail track, all the town and parish council are against the night trains, the track from Saxmundham to Woodbridge is about 11 miles, the granite base is still in place and compared to a bypass and proposed rail link to avoid Farnham and Leiston the cost is small.
Give the people living beside the rail track the peace they deserve and secure the investment they have put into there properties, some living within 15ft of the track. Kind Regards M.F.Rowe. Whitearch Ltd
Acoustic barriers are also essential.

Sent from my iPad

Begin forwarded message:

> **From:** Vivien Rowe [redacted]
> **Date:** 6 February 2022 at 12:16:19 GMT
> **To:** [redacted]
> **Subject: Sizewell C night trains.**
>
> Dear Dr Therese Coffey M
> As you are aware I have contacted you before regarding the above.
> My interest in this is with Whitearch Residential/ Holiday park, Main Rd, Benhall, which if night trains are permitted, we will have to close down the development of the holiday side of the company, consideration also needs to be given the residents.
> I have carried out my own survey of properties within 200m of the rail track, as a result the following figures, Saxmundham 218, Benhall 24, Campsea Ashe 101, Melton 110, Woodbridge 192, Martlesham 32 and Little Bealings 8, plus three residential homes with 85 places in addition out laying properties not counted.
> By chance on my survey I met a councillor, who living within 800m on the rail track, informed me that last year a heavy goods train used the line at night, the result being, they were awoken by the vibrations.
> With the proposed bypass at Farnham and Stratford, a total of 36 homes near to the A12, costing what ever and no night lorries, the rail link in Leiston to avoid the town again with no night trains, then why is there no investment to reintroduce the second rail track from Saxmundham to Woodbridge to protect the people along side the rail track from sleep deprivation, depreciation of property value and probably mental health issue through lack of sleep, we are talking about up to seven trains a night from 11pm to 7am, for the duration of the build.
> All the town and parish councils are against night trains, notice needs to be taken of there concerns to protect the residents within there wards, get the second track reinstated and run the trains during the day a small cost within the scheme of things, also protective acoustic barriers put in place, reduced council tax and although I think there was a condition put in place in 1993 to protect rail companies from paying out compensation, that should not apply to this situation.
> Give the residents the help they need, as when it gets to the local planning stage,the local councillors opinions with probably be brushed aside.
> Yours Sincerely,

Malcolm F. Rowe. [redacted].
This communication could be shared.

Sent from my iPad



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DPC:76616c646f72



28. Nick Scarr – 7 February 2022

From:	[redacted]
To:	SizewellC
Subject:	The Sizewell C Project Ground Anchor and Deep Soil Mixing Trials proposed survey
Date:	07 February 2022 20:01:49
Attachments:	Sizewell C Main Development Site Geology, Land Quality and Ground Investigation.pdf

Dear Sizewell C Team

The Applicant has made a planning application in order establish the suitability of the geology and substrates of the proposed site to major excavation and construction of the Sizewell C nuclear reactors.

This application has been made when the Examination is closed yet may impact on that Examination. It also appears to have a particular scope.

Please find enclosed a document that considers these points.

Kind regards
Nick Scarr

Sizewell C Main Development Site Geology, Land Quality and Ground Investigation

Author: Nick Scarr IP 20025524—7 February 2022

For the attention of the Planning Inspectorate, Sizewell C.

1 – Application to East Suffolk Council for a site geology and land quality survey.

I understand that the Applicant has entered a planning application to East Suffolk Council reference: DC/22/0078/FUL for the purpose as defined below:

> *"Planning application seeking full planning permission for the geotechnical trails for the enabling works of the proposed Sizewell C power station. These works comprise (i) up to 16 ground anchor trials, in 5 locations up to 0.95 ha with a further 0.09 ha for welfare compound, 1.04 ha in total (of which 0.54 ha is above ground) and (ii) deep soil mixing trial area comprising a total area of 0.52 ha, together with welfare and compound areas to support the works and access."*

The Applicant is intending to embark on a geological and ground investigation survey to establish whether the proposed Sizewell C main development site land quality is capable of being stabilised to sufficient depth to enable the safe construction of Sizewell C.

The Examination for Sizewell C is now closed and the Applicant's decision to instigate these studies at this late, post-application stage suggests that the critical knowledge of land suitability and site safety and security will not be available to the scrutiny of the Examiners, statutory consultees or the public.

2 – Confidential documentation on land quality entered by the Applicant in the DCO Application and subsequently withdrawn.

The proposal discussed above raises a secondary consideration:

In the DCO Application four documents relating to Geology and Land Quality of the Sizewell C main construction site, listed below, were marked confidential and no content was accessible.

I understand the confidentiality was based on a claim of commercial sensitivity by the Applicant and the documents were requested to be withdrawn by the Applicant.

This is covered in the documents on the National Infrastructure Planning site for Sizewell C by AS-006, 16/11/20, AS-049, 8/1/21 and PD-10, 22/1/21, Procedural decision part of which is reproduced below on the.

From PD-010 Procedural decision:

"Confidential Documents
https://infrastructure.planninginspectorate.gov.uk
The ExA's Procedural Decision dated 23 October 2020 [PD-005] requested that the Applicant explain the basis for the redaction and confidentiality of certain documents submitted with the application. The Applicant provided a summary of its reasons for redactions and/or confidentiality of the various

documents in Table 2 of its letter dated 16 November 2020 [AS-006]. The Applicant explained that the following documents contained commercially sensitive information and also that they were not required for the examination of the application. As such the Applicant requested that they be withdrawn from the application:
• 6.3 Volume 2 Main Development Site Chapter 18 Geology and Land Quality Appendix F of Appendix 18A - Ground Investigation on Sizewell C Construction Site Area and Associated Development Part 2 of 2 CONFIDENTIAL [APP-294]
• 6.3 Volume 2 Main Development Site Chapter 18 Geology and Land Quality Appendix L of Appendix 18A - Pre-existing Geotechnical Data Synthesis and Interpretative Report CONFIDENTIAL [APP-295]
• 6.3 Volume 2 Main Development Site Chapter 18 Geology and Land Quality Appendix F of Appendix 18A - Summary of Terrestrial Surface Water Quality Monitoring CONFIDENTIAL [APP-292]
• 6.3 Volume 2 Main Development Site Chapter 18 Geology and Land Quality Appendix F of Appendix 18A - Ground Investigation on Sizewell C Construction Site Area and Associated Development Part 1 of 2 CONFIDENTIAL [APP-293]
The ExA requested a further explanation of the commercially sensitive aspect of the documents and justification for them not being required in its letter dated 22 December 2020 [PD-009]. The Applicant subsequently responded in its Cover Letter dated 8 January 2021 [AS-049] and stated that:
"With regard to query (i), the documents that SZC Co. seeks to withdraw are historical reports. These reports were redacted because they contain commercially sensitive information that was not deemed suitable for public circulation. Due to the reports being of a historic nature, SZC Co. has been unable to make contact with either the Project Manager or consultancies who produced the reports. Therefore, SZC Co. is unable to amend the protective marking on documents and ultimately requests their withdrawal from the Application. With regard to query (ii), the information provided in each of these historical reports has been used to interpret the ground conditions at the main development site and is summarised in the Phase 2 report provided in Appendix 18A which is an appendix to Volume 2, Chapter 18 Geology and Land Quality of the ES [APP-281 to APP-291]. Furthermore, the historical reports that are requested to be withdrawn from the Application contain information that has since been surpassed by more recent ground investigation data that has been provided within Volume 2, Chapter 18, Appendix 18A [APP-281 to APP-291]."
The ExA has given careful consideration to the Applicant's further explanation and justification for seeking the withdrawal of these documents. Given that these historic reports have been superseded by more recent data that has been submitted to support the related conclusions and findings in the main part of the Environmental Statement (ES), we are satisfied that the adequacy of the ES would be maintained if they are not considered further. The description of the published documents listed above has been amended on the project page of the NI website to reflect the correspondence on this matter."

The criteria that established this Procedural Decision by the Examiners may now have now been materially altered by the Applicant's recent planning application to instigate land quality survey and in this case the decision could then be reviewed.

3 – Survey extent

Referring to the Applicant's document "*The Sizewell C Project Ground Anchor and Deep Soil Mixing Trials: Planning Statement Revision: 1.0 January 2022*", it appears that the intended survey focusses on sections of the main platform area and will not seemingly include studies of the ground conditions under the main sea defences. In my view, the underpinning of the northern sea defences will be particularly tested in the event of any coastline retreat occasioning from loss or compromise of the Dunwich bank. See my documents REP5-253, REP7-219, REP10-345.

In summary, it is critical that there is good understanding of the underpinning of the main sea defences—particularly the northern sections which could be exposed in event of any coastal retreat due to the loss or compromise of the Sizewell-Dunwich bank. The proposed survey does not appear to concentrate on these areas.

As funding for the Sizewell C construction will be substantially public, all reports relating to the suitability of the ground conditions, whether historic or yet to be published, should, I believe, be made available for independent and public appraisal. I submit that the Examiners require sight and scrutiny of the geology and land quality surveys that the Applicant intends to undertake, and I also suggest that the Examiners could reconsider their acceptance of the Applicant's withdrawal of the original four land quality documents listed above.

Regards
Nick Scarr

29. Martin Deighton – 16 February 2022

From: Martin Deighton [redacted]
Sent: 16 February 2022 10:35
To: SizewellC <sizewellc@planninginspectorate.gov.uk>
Cc: [redacted]
Subject: Letter to the Sizewell C planning Inspectorate.

Sir,

Whatever our views are about the use of nuclear fission to generate heat to drive electricity generating turbines we must consider the location of these huge and potentially dangerous facilities.
The U235 isotopes used in these reactors and their waste isotopes remain a hazard to humanity for a thousand years.
The enormous difficulties in the management of these and smaller, radio active isotopes and associated waste is only now becoming apparent with current problems at Sellafield.
Sellafield is not an eroding and subsiding beach.

If we are to build these nuclear fission reactors then safe location is paramount.
The last place to build these reactors is on a subsiding and rapidly eroding beach at Sizewell in the face of a rising sea level.
The reactors and the radio active waste on that beach will eventually and inevitably go into the sea. The consequences will be catastrophic. Far from building another nuclear fission reactor on Sizewell beach we should be addressing ourselves to the decommissioning of the existing reactors and the removal of the U235 waste before it is too late.

Dungeness is growing every year. Hinkley point is a rising coastline. The West coast of France is rising.
The Sizewell beach is subsiding and eroding. Vast tracts of the Suffolk coastline, including houses, land and lighthouses have been lost to the sea in recent years.

Whatever our views are about the continued building of nuclear fission power stations, the Sizewell beach is the wrong place to build such a facility. To do so will leave another catastrophic and poisonous legacy for future generations to endure.
It is the wrong place.
Please think again and try to prevent this madness before it is too late.

I write to you on behalf of our children's children.

martin deighton
woodbridge.

30. Mike Taylor – 19 February 2022

From: Mike Taylor [redacted]
Sent: 19 February 2022 09:10
To: SizewellC <sizewellc@planninginspectorate.gov.uk>
Subject: Fw: Further plans for SZC

Dear Case team, I recognise this matter is probably now out of your hands but referring to the planning application to East Suffolk Council, and further investigation into the role of the Office of Nuclear Regulation in this case. I can only come to a conclusion that East Suffolk Council should not have accepted the planning application application.
I have copied direct from the ONR site licencing handbook below :-
A site licence was applied for from ONR in June 2020. Therefore there was adequate time to have carried out this critical work under the remit/scrutiny of the PINS and ONR process. There appears to be a deliberate attempt to avoid scrutiny under the PINS process.

NB ONR regs were **revised November 2021** [redacted]

Extract from ONR regs.

"Site suitability

35 The sites listed in the NPSNPG were assessed at a strategic level via a strategic siting assessment (SSA). The conclusion of the SSA is that a site is potentially suitable for deployment of new nuclear power stations in England and Wales before the end of 2025. The listing of a site as potentially suitable does not guarantee that applications to the Planning Inspectorate for development consent on that site will be granted or that we will consider the site to be suitable. Before a licence is granted, a licence applicant must demonstrate to our satisfaction that the site is suitable to support safe nuclear operations. To allow adequate time for our assessment, a licence **applicant is expected to submit a site justification report (SJR) with its licence application.**

The SJR should be produced in line with the applicant's proposed LC 14 arrangements.

36 The SJR **should be based on suitable and sufficient characterisation of the site**. If an application for development consent is being assessed at the same time as our assessment of a nuclear site licence application, the licence applicant should ensure that the information in **the SJR is consistent with the information in the development consent application.**

37 To facilitate parallel processing of a development consent application and a nuclear site licence application, the SJR should cover matters on which **the Planning Inspectorate will liaise closely with us or rely on our processes.** These matters are described by relevant nuclear impacts and flags for local consideration in the NPSNPG. "

- **The LA East Suffolk Council could/should have chosen not to accept the application. It is evident from the above that this should be/have been a PINS/ONR matter as part of the PINS inquiry.**
- **The developer has chosen to ignore this critical aspect (and other critical aspects) of an NSIP project until the last moment.**

I feel it is my duty to advise PINS of this matter and am content that any information is passes to BEIS or action taken by PINS as seen fit.

Kind regards Mike Taylor

Sent from Outlook

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31. Nick Scarr – 21 February 2022

From: [redacted]
To: SizewellC
Subject: Fwd: Response to the Environment Agency correspondence AMC/2020/4725-5, AMC/2020/10992.
Date: 21 February 2022 10:26:29
Attachments: EN010012-007731-DL8 - EA ISH 11 Hearing submis.pdf
From EA main reply to me 4725-5 2022 02 16 reply.pdf
Sizewell C flood resilience,response to the EA - AMC20204725-5.pdf

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Dear Sizewell C Team
From Nick Scarr - IP 20025524

Please find enclosed correspondence bewteen myself and the Environment Agency.
I would be grateful if this could be forwarded to the Secretary of State with your recommendations.

Kind regards
Nick Scarr - IP 20025524

Subject: Response to the Environment Agency correspondence AMC/2020/4725-5, AMC/2020/10992.
To: Area Manager Correspondence, East Anglia <AreaManagerCorrespondence.EastAnglia@environment-agency.gov.uk>, Barlow, Simon <s[redacted]@environment-agency.gov.uk>, Cable, Ian <[redacted]@environment-agency.gov.uk>, [redacted]@environment-agency.gov.uk>, <beiseip@beis.gov.uk>

Response to the Environment Agency correspondence AMC/2020/4725-5, AMC/2020/10992.

To: The Environment Agency: Simon Hawkins, Simon Barlowe, Ian Cable, Sir James Bevan,

Cc: The Secretary of State

Thank you for your reply on 16/2/2022, Your ref: AMC/2020/4725-5 and AMC/2020/10992
Dated: 16 February 2022.

Please find enclosed my reply " Sizewell C flood resilience..." to your correspondence.

Thank you for your reply to me. I have enclosed two other files for your convenience.

Regards
Nick Scarr

31. Nick Scarr – 21 February 2022

Attachment 1

creating a better place
for people and wildlife

Environment Agency

Wendy McKay

Lead member of the Panel of Examining Inspectors
National Infrastructure Planning
Temple Quay House
2 The Square
Bristol, BS1 6PN
sizewellc@planninginspectorate.gov.uk

Our Ref: 20026727

Your Ref: EN010012

Date: 24 September 2021

By email only

Dear Ms McKay

Planning Act 2008 – Section 88 and the Infrastructure Planning (Examination Procedure) Rules 2010 – Deadline 8: Post Hearing submission of oral case for Issue Specific Hearing 11 (Flooding, Water and Coastal Processes).

Application by NNB Generation Company (SZC) Limited for an Order Granting Development Consent for the Sizewell C Project

For Deadline 8 (24th September) the Examining Authority (ExA) have requested written submission of the oral case presented at Issue Specific Hearings.

Our comments (Appendix A) provide a summary and further detail of our oral case presented at ISH11, Flooding, Water and Coastal Processes.

Yours sincerely

[redacted]

Simon Barlow
Project Manager
Sizewell C Nuclear New Build
Environment Agency

[redacted]

[redacted]

Appendix A: Environment Agency summary of oral case for ISH11: Flooding, Water and Coastal Processes

Agenda Item	EA Position
1. Welcome, introductions and arrangements for the Hearing	
Reference will be made in Agenda items to the Applicant's and IP's responses to ExQ1 and ExQ2, the comments on those responses and all written representations up to Deadline 7.	No Environment Agency comments
2. Water Supply	
The Water Supply Strategy and the availability of both potable and non-potable water to meet the full demands of the Project with particular regard to the early years of construction.	**SZC Water Supply Strategy** At Deadline 7 (3rd Sept), SZC Co submitted a updated [REP7-037] Planning Statement, Appendix 8.4KL Site Water Supply Strategy - Revision 2.0. Within the hearing the Environmental Agency noted that there had been too little time given to provide comments, but we will do so at Deadline 8 (24th September). We also noted that we considered any potential extension of desalination operation beyond the construction phase may result in additional environmental impacts not yet assessed. **SZC Mains Water Supply** We have provided a detailed update on our understand of SZC mains water supply proposals within our Deadline 8 response on [REP7-037] Deadline 7 Submission - 8.4 Planning Statement - Appendix 8.4K - Site Water Supply Strategy - Revision 2.0
3. Main Development Site Flood Risk Assessment (MDS FRA)	
Outstanding issues with respect to the Applicant's assessment, in particular: (a) Coastal flood risk; and	The EA highlighted that there was an outstanding issue regarding the increase in offsite flood risk at Tank Traps, in the event of a 0.5% (1 in 200) annual probability coastal overtopping flood event in 2090. There would be up to a 0.2m increase in flood depth on land owned by RSPB in this flood event, although the land is already at risk of flooding to 1.54m in this event, so the depth of flooding would

	increase to 1.74m deep. We understand that the applicant are in discussions with RSPB regarding the acceptability of this. We also highlighted that there are also small areas of land that would become at risk of flooding that aren't presently, in a 0.5% (1 in 200) annual probability coastal overtopping event in 2090. However, these are very small areas on the edge of existing floodplain, and flood depths would be approximately 0.05m or 5cm. Again we understand that the applicant is in discussions with the landowners regarding the acceptability of this. If landowner permission is not received then we consider that paragraph EN1 5.7.17 requires the Decision Maker to determine the acceptability of these small increases in flood risk elsewhere. **ExA Query regarding Sizewell-Dunwich Banks** The latest modelling (as reported in TR545) uses wave data from a buoy located offshore of the Sizewell – Dunwich banks and applies this into a model domain inshore of the feature. This means that the waves used in the model have not been impacted by the banks (which are known to cap inshore storm wave height). Various bank scenarios have also been assessed involving different sizes, orientation, height etc. as part of the expert geomorphological assessment work. The Environment Agency therefore agrees with the applicant that the modelling is suitably conservative. We had previously questioned the degree of conservatism when examining earlier technical reports, but after further discussions with the applicant and subsequent review of the updated versions of TR545 and TR544 we are satisfied that our concerns have been addressed.
(b) Any other areas of outstanding concern for the MDS FRA.	There are no other outstanding EA areas of concern for the MDS FRA.
4. Associated Development Site Flood Risk Assessments	
Outstanding issues relating to the following: (a) Sizewell Link Road FRA; and	There previously was an outstanding issue regarding increases in flood depths on the floodplain upstream of some of the river crossings, however most of these have since been shown to be within the development boundary, and so are considered to be acceptable and do not need landowner permission. There was one area for SW6 crossing outside of the site boundary, however the applicant

	has since clarified that this was a mapping error, and inspection of the modelling cross-sections shows that the water remained within the channel in all flood events.
(b) Other Associated Development Sites.	There are no other outstanding areas of concern for the other associated development sites.
5. Outline Drainage Strategy [REP2-033]	
Outstanding issues relating to the Outline Drainage Strategy with particular reference to: (a) Main Development Site, including Water Management Zones	We have reviewed the Main Development Site Drainage Strategy [REP7-017] submitted at Deadline 7. We are satisfied that additional control measures will be considered for mitigation of increased pollution risk. Although this will be identified and explored in future design concept works, terminology in the drainage strategy document should be clear and state when increased, additional or fail-safe methods will be considered and implemented where appropriate.
(b) Drainage strategies for Associated Development Sites	No Environment Agency comments
6. Water Monitoring and Response Strategy [AS-236]	
Outstanding issues relating to the Water Monitoring and Response Strategy.	We have reviewed the Water Monitoring Plan [REP7-074] submitted at Deadline 7 and have no comments to add.
7. Water Framework Directive Compliance Assessment	
Outstanding concerns with respect to the Water Framework Directive Compliance Assessment.	**SSSI Crossing** The applicant has submitted at Deadline 7 a revised SSSI crossing design [REP7-005] for the construction phase which would remove the drainage pipe.

	The triple span bridge design remains our preferred option as it would further reduce impacts to the ecology of the area including invertebrates, and it would have the minimal land take from the SSSI. Notwithstanding this, we consider this updated design, would reduce the risk of deterioration, under The Water Environment (Water Framework Directive) Regulations 2017 (WFD), to an acceptable level, and would not require a regulation 19 exemption. **WFD Assessment Report Second Addendum** At Deadline 7 the applicant submitted [REP7-284] the updated SZC Bk8 8.14Ad2 Ch WFD Assessment Report Second Addendum - Revision 1.0 We will provide comments at Deadline 8 (24th September): **WFD Ore & Alde TFCI deterioration risk EA Position** In the hearing the Environment Agency highlighted we are concerned that as a result of entrapment losses to some fish species from the operation of SZC that a reduction in the number of fish entering the Ore & Alde and Blyth waterbodies has the potential to lead to a deterioration of this element under the Water Environment (Water Framework Directive) Regulations 2017 (WFD). The Blyth is not currently monitored for fish under the WFD programme and assessment will be undertaken on the Ore & Alde and applied to the Blyth by proxy. SZC Company at the request of the Environment Agency have run some potential fish reduction scenarios for the Ore & Alde Transitional Fish Classification Index (TFCI) looking at a targeted number of species of greatest importance in this waterbody. A within class deterioration is observed in all scenarios which brings the Ecological Quality Ratio (EQR) score close to the good/moderate boundary (0.58) and reduces the confidence in the classification to uncertain or no confidence. A greater number of scenarios have been run by the Environment Agency using a greater number of species that feature in the Ore/& Alde TFCI in the 6 year reporting cycle (2013-2018), these additional scenarios resulted in a class deterioration from good to moderate potential for fish in this waterbody.

	Due to the uncertainty which remains as to what the final predicted and actual entrapment loss figures will be from the operation of SZC, we are currently unable to conclude that a risk of deterioration for fish within this waterbody and by proxy the Blyth waterbody does not exist. In order for us to maintain WFD compliance we recommend requirements are included in the DCO to address this potential impact. These requirements would secure robust monitoring and provide mitigation and compensation to undertake improvements which would benefit fish in the affected waterbodies should a deterioration occur. As a response to this At Deadline 7 the applicant has submitted on additional monitoring, mitigation/compensation proposals via: [REP7-040] 8.17 Draft Deed of Obligation Revision 7.0 [REP7-077] 9.89 Draft Fish Monitoring Plan - Revision 1.0 [REP7-007] Deemed Marine Licence conditions 50 & 51 in 3.1 Draft Development Consent Order - Revision 8.0 We will provide comments at Deadline 8 (24th September) **In-combination assessment for WFD compliance** In the hearing we also highlighted that through the Environmental Permitting Regime, we will also need to complete an in-combination assessment to ensure WFD compliance, this will include consideration of impacts associated with operational and construction related permits, such as the water discharge activity, and combustion activity permits. We will only be able to complete this when we have determined these permits.
8. Coastal Processes Update	
Coastal processes update to include the following: Modelling for SCDF through decommissioning to 2140;.	We received modelling extending the assessment out to 2140 at Deadline 7 to account for the full duration of the decommissioning phase. At the Hearing stage, we highlighted our review of that modelling work is still ongoing, but we are in a position to share some broad headline messages: 1. It is notable that the assessment work in this latest addition of TR545 uses two of the three storm parameters previously used in the assessment to 2099; namely a 1 in 20 yr event from NE and S (we understand that insufficient time was available to run the Beast from the East

	sequence, which equates to a larger 1 in 107 yr return interval for cumulative wave energy, but was shown in the previous modelling phase to be less erosive than the 1 in 20 yr northerly event). At ISH6 we outlined our view that more severe storm conditions should be modelled when assessing geomorphological change beyond 2099, and whilst we note that this has not yet been provided to us, it is our understanding from a conversation with the applicant that work is planned to consider 1 in 10,000 yr return interval conditions equating to very severe sea level rise and wave events occurring simultaneously. We consider this a necessary step to account for the full range of plausible scenarios, and look forward to receiving this work for further technical review. 2. We will need to complete our detailed review of the modelling, but in light of what we have seen to date (i.e. a partial assessment of risks for the full duration of the project), we are comfortable with the approach being used and the preliminary conclusions that have been drawn so far. Further comments have been provided separately at Deadline 8.
modelling relating to the detailed design of the adapted HCDF;	As with our previous response, we must add the caveat to this response that our detailed review remains ongoing, and so at this time we can only share broad headline messages based on an early light touch review. We are pleased to see the inclusion of the updated HCDF design, including pairing back of the crest at the northern end and a seaward deviation at the southern end. We note that further work is planned to model this design during the operational phase, though this version of the design report does suggest that this is considered unlikely to alter the existing conclusions. It is notable that the modelling of the adapted design and RCP8.5 sea level with the NE 1 in 20 yr return period wave climate results in erosion locally exceeding the sacrificial layer volume, meaning immediate recharge would be required to avoid HCDF exposure in the event that another moderate storm were to occur soon after. The report notes that this is an ‘unlikely worst case scenario’ but we feel this will require further examination in the next iteration of the modelling and design reports (particularly when considering more severe wave conditions and possibility of storm clustering as a reasonable worst case).

	A coarse cobble layer buried beneath the main SCDF and sitting atop the HCDF is suggested as mitigation for this risk. We recognise the logic behind this suggestion, and look forward to reviewing the modelling of this scenario in version 4. We particularly welcome suggestions such as this which would in theory avoid coarsening of the main SCDF particle size towards the upper end of or beyond the natural size range for the Sizewell frontage, given the environmental impacts that could result from such a modification away from native conditions. However, this would be provisional on a high degree of comfort that the cobble layer would remain buried, since regular or prolonged exposure could alter the morphodynamics and detrimentally affect the environment.
the SCDF design;	At the hearing we highlighted we remain fairly comfortable with the SCDF design, with the caveat again that work is ongoing to complete the necessary assessments which will ultimately determine the final design options.
the provision of additional modelling, plans, sections, and information sought by IPs;	The key remaining outstanding work in our view is the modelling of more severe joint probability events which we referred to under the first item in this section of the hearing. We also note that the detailed designs of both the HCDF and SCDF remain in development, and we welcome the opportunity to feed into those discussions, for example in relation to the geometry and sediment grain size composition of the SCDF (as discussed at ISH6). The EA welcome the ExA request that applicant provide a list at D8 of which further information will be submitted going forward.
the Minsmere Sluice Operation Technical Note;	No Environment Agency comments
the monitoring, triggers, mitigation, and controls incorporated within the latest revisions of the draft DCO requirements, the DML and the CPMMP	In the hearing we highlighted that we view the CPMMP as critical for ensuring ongoing monitoring and mitigation of coastal change impacts at the site, which is clearly of great importance in light of the inherent and unavoidable uncertainty when forecasting changing conditions over timescales in excess of a century. Experience suggests that it is critical for adaptive management plans such as the CPMMP to have clear and robust governance and enforcement arrangements in place, and we are aware that conversations are ongoing to ensure that this is the case through the DCO and DML requirements.
9. Any other matters relevant to the agenda	
10. Close of hearing	

31. Nick Scarr – 21 February 2022

Attachment 2

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for people and wildlife

Environment Agency

Nick Scarr
[redacted]@gmail.com

Our ref: AMC/2020/4725-5

Date: 16 February 2022

Dear Mr Scarr,

The Applicant's treatment of the offshore geomorphology in its FRA and its approval [redacted] Environment Agency

Thank you for your emails of 25 January 2022 to Simon Barlow; and 31 January and 3 February 2022 to our Chief Executive, Sir James Bevan. James has read your emails and asked me to respond on his behalf. He will also receive a copy of this response.

You have asked us to confirm our acceptance and approval of the wave inputs used by the [redacted] Risk Assessment (FRA) and that it represents conservative values, and to confirm that there is no degree of misunderstanding.

[redacted] ent Agency (EA) is a statutory consultee in the Development Consent Order (DCO) process (further mention is made of this below), and we have already offered expert advice and opinion to the Examining Authority (ExA), who in turn will offer their advice to the Secretary of State for (Business, Environment and Industrial Strategy) BEIS.

In more specific terms, we recognise that the modelling undertaken for the separate flood [redacted] work streams produced different results regarding the role of the Sizewell-Dunwich bank in capping nearshore wave height. The Applicant used different models for the separate flood risk and coastal geomorphology work streams, meaning a different set of parameters and calibration and validation approaches were used to generate appropriate outputs in each case. Both work streams utilised approaches which were subject [redacted] pport and scrutiny from relevant specialists within the EA and [redacted] was assessed in-house, whilst EA flood risk specialists reviewed the flood risk modelling with additional expert support from a consultancy familiar with the type of modelling employed.

We were, and we remain, satisfied that the outputs represent an appropriate worst case, despite the counter-intuitive way in which the interaction between the bank and waves is represented.

[redacted]

Turning to your other points:

At the Issue Specific Hearing ISH11 it seems clear that Mr Neil Humphrey for the Planning Inspectorate had expected and assumed that the Environment Agency had studied my papers analysing the Applicant's Sizewell C flood risk assessment.

[redacted]

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Our recollection is that we were asked if your reports had raised issues that may alter our position and we advised that we remained satisfied that the FRA and coastal [redacted]ological assessments submitted by the applicant remained acceptable.

Despite my repeated requests for the EA to consider my papers and enter constructive dialogue, pleas that extended to writing to my MP Therese Coffey asking her to intercede, the EA had steadfastly refused to review them considering it '…inappropriate to do so...' See enclosed document (S. Barlow email 22 May 2020).

We are treating this matter under our escalated formal complaints procedure, as we do feel that we have addressed your concerns on this matter previously through correspondence and discussion, but to clarify once more and by way of a final explanation on this point.
[redacted]nment Agency's role in the planning process is to review the FRA and coastal geomorphological impacts assessments* - submitted by the applicant - and comment upon their adequacy, and their findings, to the planning decision maker. This we did and in immense detail. Mr Barlow correctly advised that you could (and should) submit your observations (your reports) on these assessments to the Examining Authority (ExA) so that they could also take account of your views and you did so.
[redacted]estion that we did not review your reports – we did, in fact do so. However, this was not until after the email from Mr Barlow to which you refer (at the time of that email, opportunity had not yet existed to undertake the review you had sought from us).
[redacted]ecessary to adjust our position on the applicant's submissions, nor did we deem it appropriate to comment on your reports to the ExA. Should the ExA have asked us to comment upon your submissions then we would have done so, but they did not.
We are an advisor to the planning process not the decision maker. Your observations (reports) were better submitted to the ExA where they could form part of the evidence that they can draw upon before making their recommendation to BEIS.
[redacted]onsibility with the Local Authority, as the Coastal Protection Authority

The Environment Agency was therefore unable to comment in any substantial form on my papers at ISH11 but did not appear to inform Mr Humphrey at the time of its attitude towards my work. The Planning Inspectorate presumably remains unaware.

[redacted]orts, and we confirmed that they had not adjusted our position [redacted]geomorphological assessment modelling submitted with the [redacted]at the end of the enquiry we advised the ExA that we were still awaiting further modelling on the coastal defence design and that we had not yet reached common ground on this matter. We have been diligent in our review and remained dissatisfied on areas where inadequate information was provided during the examination. However, where the work was complete and the modelling considered acceptable to us, we have been content to confirm that this is the case.

I thi[redacted]t in an open public enquiry that the Planning Inspectorate is made fully aware of these concerns. I would be obliged if you could address correspondence to the Inspectorate accordingly

The Examination is now closed, and the Examining Authority will not accept any further submissions.

[redacted]

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Environment Agency

Finally, on the point of your Freedom of Information Request:

The Environment Agency also turned down my Freedom of Information request for [redacted]R319 – a document essential to understanding the Applicant's Flood Risk Assessment and inshore wave behaviour. I eventually obtained this document from Cefas. See enclosed document.

In relation to your request for information (our reference EAN/2020/177503), I refer you to our letter of 27 August 2020 (copy enclosed) in which we explained the reasons why we were unable to provide a copy of BEEMS TR319.

If you require further details concerning the Environment Agency's complaints procedure and service commitment standards, more information is available on our website at: [redacted]

If you remain unhappy with our position, you still have the right to refer your complaint to the Ombudsman. Their contact details are available on our website by following the link supplied above or at:

[redacted]- Local Government Ombudsman (For complaints about flood defence and land drainage issues).

[redacted]- Parliamentary and Health Service Ombudsman (For complaints about all other aspects of our work. These complaints must be made through your local MP).

For complaints about alleged failures of public authorities to comply with environmental law you can also now contact the Interim Environmental Governance Secretariat (IEGS). You can find out more information about the IEGS, and their complaint service here: [redacted]. Our web pages will be updated to reflect this additional escalation route in due course.

Yours sincerely

[redacted]

Simon Hawkins
Area Director
East Anglia Area

Tel: [redacted]
Email: areamanagercorrespondence.eastanglia@environment-agency.gov.uk

[redacted]

31. Nick Scarr – 21 February 2022

Attachment 3

Concerns regarding the flood resilience of the Sizewell C main nuclear platform could be overlooked due to the incoherent analysis and confused responses of the Applicant and the Environment Agency to the inshore wave conditions and the role and importance of the Sizewell-Dunwich banks.

Response to the Environment Agency correspondence AMC/2020/4725-5, AMC/2020/10992.

Date 21 2 2022

To: The Environment Agency: Simon Hawkins, Simon Barlowe, Ian Cable, Sir James Bevan,

Cc: The Secretary of State

Thank you for your reply of the 16/2/2022, Your ref: AMC/2020/4725-5 and AMC/2020/10992 Dated: 16 February 2022.

I appear to have not made myself clear for which I apologise. Please see the brief comments below that explain why the Applicant's treatment of inshore wave conditions in the DCO must overall be re-examined:

The Applicant, in written communication states:

> *"The wave condition outputs taken from the coastal geomorphological studies provide for a conservative assessment for application within the FRA coastal overtopping assessment. The flood risk assessment took the most conservative values as input data to the modelling. This approach has been reviewed and* ***validated by the Environment Agency."***
> *"…the assessment concluded that the Baseline scenario, i.e. with the Sizewell - Dunwich bank in situ, resulted in more conservative (i.e.worst case) nearshore wave conditions than with their removal. As such,* ***the scenario with the bank in place*** **[i.e. the Sizewell-Dunwich bank in an unchanging form]** ***was adopted in the MDS FRA for all scenarios and epochs as a conservative approach****." ExQ2 epage 130*

This position of the Applicant, supported by the Environment Agency, that the Sizewell-Dunwich bank in place (in an unchanging form for all the station life) represents "a conservative approach" is not only incorrect but results in the obtuse corollary that the **loss of the Dunwich bank must necessarily be of benefit to the proposed Sizewell C.**

This has been recognised by the Applicant and indeed the Applicant has stated and confirmed as follows:

> *"If Dunwich Bank were lost or substantially reduced (in extent or elevation) there is a greater potential for erosion of the shoreline around Dunwich and, importantly, the Minsmere – Dunwich Cliffs, resulting in a local increase in the supply of sand and pebbles (i.e., beach shingle) from the cliffs. This sediment would move south and could reduce erosion rates. Reduced erosion rates could tend to increase resistance to flooding over the Minsmere and Sizewell frontages."* Responses to the ExA's Third Written Questions (ExQ3) Volume 1 - SZC Co. Responses epage 68.

This position of the Applicant that the presence of the Sizewell-Dunwich bank is the conservative approach and therefore the loss of Dunwich Bank must be a *benefit* to Sizewell C is then effectively supported by the Environment Agency. (This support is stated as '***validated by the EA***' in the Applicant's responses in ExQ as above and by the Environment Agency itself as ''… ***content with how it*** **[The Sizewell-Dunwich banks]** ***was modelled***…' see ISH11 as shown in my email 25/1/22, 3/2/22 enclosed in Appendix 1).

This position is not '*counter-intuitive'*, as the EA states (Your ref: AMC/2020/4725-5), it is wrong because the Applicant itself confirms the approach is wrong in its earlier validated research with brief examples of evidence as follows:

> The Applicant, BEEMS TR311 2.3.2.2.3 "*Sizewell nearshore waves… are substantially lowered before arriving at the shore due to dissipation across the GSB's three positive relief features; the Sizewell – Dunwich Bank and the two longshore bars. Coastal sandbanks and longshore bars dissipate wave energy"*
>
> The Applicant, BEEMS TR058 p.45 *"…1) the inner longshore bar which will cause wave breaking during almost all wave conditions; 2) the deeper outer longshore bar which will cause wave breaking during moderate and large storms; and 3) the Sizewell bank, which will cause only the largest waves (e.g., Figure 17) to break. In large storms all three will cause breaking and progressively lower the wave energy propagating toward the shoreline. Together they are likely to be a key factor explaining the comparative stability of Sizewell shorelines."*
>
> The Applicant, BEEMS TR139, explains that the Sizewell-Dunwich banks control even moderate storms which can produce notable erosion and flooding of the low-lying areas faced by the proposed location for Sizewell C:
>
> *"Very extreme tide plus surge conditions, or tide plus surge plus waves, are not necessary to cause significant erosion and flooding of low-lying areas. Studies to the north [the South Minsmere Levels] and south of Sizewell have shown that even moderate storms, with estimated return periods of 1 in 5 to 1 in 10 years, have caused significant flooding as a result of breaching of shingle ridges, narrow dunes and earth embankments (e.g. Pye & Blott, 2006, 2009). The outer defence at the northern end of the Minsmere frontage was breached, and the inner defence partially overtopped, during moderate storms in 2006 and 2007. These events also caused significant dune erosion between Sizewell B and Minsmere Sluice but had relatively little effect on the beach and dunes in front of the 'A' and 'B' power stations.* ***The main reason for this long-shore variation in storm susceptibility appears to be the morphology of the Sizewell-Dunwich Bank. Waves from the NNE are refracted across the northern end of Dunwich Bank and focused towards the shore at the northern end of the Minsmere frontage. Refracted north-easterly waves also pass through the saddle between Dunwich Bank and Sizewell Bank. The size, depth and position of this 'saddle' is therefore of critical importance with regard to the risk of erosion and flooding between the proposed Sizewell 'C' site and Minsmere Sluice."***

The Applicant's approach in the DCO then **disagrees with its own research and must, therefore be untenable and unsupportable by any other parties in the absence of significant explanation**.

The Applicant has admitted to me that the '*narrative has changed'* in the DCO with regards to the Sizewell-Dunwich banks (Conference call between myself, James Hanson, Tony Dolphin, Stephen Roast, Kate Bozek and Helena Wicks for the Applicant 21/9/21 – a conference call conducted at the

request of Neil Humphrey for the Secretary of State/Planning Inspectorate at ISH11). However, **there is no new information that I am aware of that validates a narrative change. The science and empirical evidence that offshore banks or a harbour wall reduces the inshore wave climate is a given and cannot be summarily dismissed.** BEEMS TR319 is referred to as the defining document yet **even if we are to accept TR319, it does not validate this 'narrative change' for all epochs and scenarios.**

Although the Sizewell Dunwich banks are not mentioned by name in any of the original FRA and Addendum FRA documents produced by the Applicant, an omission I find puzzling, the Sizewell Dunwich banks are ***the*** critical arbiter of micro-stability of the nuclear coastline at Sizewell. They protect the inner and outer longshore bars and after the growth of the Dunwich bank from 1836 has protected the shoreline from being the '*most eroded in records'* through accretion to stability. The banks will always be of critical importance to Sizewell C. See my document REP2-393 sections 2, 6, 7.

However, in my view there is no plausible mechanism that could justify the assumption for the maintenance and preservation of the unconsolidated Dunwich bank over the next two 100-year episodes of coastal processes, the uncertainties of which can only be increased by climate change sea-level rise and storm level change. The northern section of the Dunwich bank has dropped by 2 meters in the last decade alone according to the Marine Management Org. (ExQ) See REP8-248, REP10-345.

Hence my concerns.

That the 'changing narrative' of the importance of the Sizewell-Dunwich banks has been supported and underpinned by the Environment Agency '*and its partner organisations*' is perplexing. (Your reply AMC/2020/4725-5 Date: 16 February 2022).

In my conference call with Oliver Burns of the EA on the 4/10/21 (Mr Burns represented the EA at ISH11 one month earlier when Neil Humphrey for the Planning Inspectorate raised the issue of my papers) although it appeared that he did not seem to have particular knowledge of my work, led me to understand that he would not consider supporting this 'changing narrative' that the loss of the Dunwich bank would be beneficial to Sizewell C.

- Note Ref. ISH11 - Your response to me AMC/2020/4725-5 16 Feb states at the ISH11 meeting with the Planning Inspectorate that when asked about my papers:
  "Our recollection is that we were asked if your reports had raised issues that may alter our position and we advised that we remained satisfied that the FRA and coastal geomorphological assessments submitted by the applicant remained acceptable"

  This is not consistent with my understanding. I do not recall you informing the Planning Inspectorate in this manner at ISH11 nor is any reference to my papers made in the EA's post-ISH11 submission, Your Ref: *20026727 24 Sept 2021. "Our comments (Appendix A) provide a summary and further detail of our oral case presented at ISH11, Flooding, Water and Coastal Processes."*

Summary

The Environment Agency, by supporting the Applicant's approach to the Sizewell-Dunwich banks in the DCO, as declared at ISH11 and as understood by the Applicant (my email 3 Feb 22), is seemingly supporting and, according to the Applicant, *validating*, the following:

- The Sizewell-Dunwich bank structure will remain unchanged over the lifetime of the plant (beyond 2140),

- that there is a more conservative (greater) inshore wave climate with the Sizewell-Dunwich banks present for all scenarios and epochs and thus the loss of the Dunwich bank must be beneficial to Sizewell C.

The Applicant states: *"The flood risk assessment took the **most conservative values** as input data to the modelling. This approach has been reviewed and **validated by the Environment Agency."*** See Appendix 1.

The Environment Agency states that *"**We were, and we remain, satisfied that the outputs represent an appropriate worst case, despite the counter-intuitive way in which the interaction between the bank and waves is represented**."* Your reply to me AMC/2020/4725-5 16 Feb

- Note: 'Outputs' are not independent of 'inputs' and therefore I read '*inputs and outputs*' rather than '*outputs*' and you make this overall clear by confirming that the EA is ''… ***content with how it*** **[The Sizewell-Dunwich banks]** ***was modelled*** **[by the Applicant]**…'

This is not 'counter-intuitive' as you suggest in your correspondence to me. It is wrong. The Dunwich bank has no hard geology and is actively depleting as we speak (the northern section has reduced 2m in the last decade alone according to the MMO); the wave climate position *is wrong according to the Applicant* in its BEEMS documents as shown above **and also according to the EA itself** in point 4 of EA Ref: 20026727 *"Our comments (Appendix A) provide a summary and further detail of our oral case presented at ISH11, Flooding, Water and Coastal Processes."*

In what appears to be an attempt to address some of these problems the Applicant produced TR545 towards the end of the DCO process. The meaning of TR545 needs careful consideration; TR545 is a particular study in 'cut and fill' of a soft coastal defence feature. Its claims to conservative modelling are extremely limited as shown in my document REP7-220 *and particularly so if such claims are contextualised to be representative of overall flood and erosion risk modelling of the proposed Sizewell C.* The Environment Agency specifically acknowledges the limitations of TR545 in Point 8 of the document, EA Ref: 20026727 *"Our comments (Appendix A) provide a summary and further detail of our oral case presented at ISH11, Flooding, Water and Coastal Processes."* Please see my document REP7-220.

If Sizewell C is approved and built as presented in the DCO hearing it may not have the flood resilience in the next century and the later part of this century because the Applicant's Flood Risk Assessment has failed to recognise and consider important aspects of the Applicant's own research found in BEEMS studies. This is summarised in my papers REP2-393, REP5-253, REP7-219, REP7-220, REP7-220, REP8-248, REP10-345 and a post-Deadline 10 paper '*Sizewell C Main nuclear platform flood resilience in the next century*' which has been forwarded to the Planning Inspectorate for the attention of the Secretary of State. Please find a copy enclosed in Appendix 2 of this document.

As stated, the Applicant's approach in the DCO *disagrees with its own research* and must, therefore be untenable and unsupportable by any other parties in the absence of significant explanation.

I hope that this now makes clear the nature of the problem, a problem among others that I have been trying to convey in my documents that I have sent you and the Planning Inspectorate.

I accept that, despite making considerable effort to do so, I have failed in my attempts to make contact with or engage with the Environment Agency's specialist teams in any constructive debate apart from one brief call with Mr Burns and, as you say, the DCO Application is now closed.

I can only hope that in your ongoing work with the Applicant towards a SoCGs which you refer to, you find the possibility of addressing the somewhat unorthodox modelling methodology applied to the Sizewell Dunwich banks as expressed above and in my papers.

I remain willing to assist and work with the EA and make clear that my concerns relate to, and are limited to, the flood resilience of Sizewell C later this century and next.

My documents, REP2-393, REP5-253, REP7-219, REP7-220, REP7-220, REP8-248, REP10-345 justify points made above and many more. **Please note that my main paper REP2-393 has been validated by two published and respected professors of geomorphology. (See REP6-068).**

Regards Nick Scarr

Following:

Appendix 1 — my original email 25/1/22 and 3/2/22
Appendix 2 — Copy of my paper "Sizewell C Main nuclear platform flood resilience in the next century" sent to the Planning Inspectorate post-D10 for the Secretary of State.

Enclosed documents:
1) Environment Agency correspondence AMC/2020/4725-5, AMC/2020/10992.
2) *"Our comments (Appendix A) provide a summary and further detail of our oral case presented at ISH11, Flooding, Water and Coastal Processes."*

==========*==========

Appendix 1

My emails of 25 January 2022 to Simon Barlow and 3 February 2022 to Sir James Bevan as below.

Nick Scarr nickscarr1@gmail.com Sent email 3 Feb 2022

to Ian, CE, james.bevan, Simon,

Dear Sir James Bevan, Ian Cable,

Re: Sizewell C – papers submitted to PINS.

At the Issue Specific Hearing ISH11 it seems clear that Mr Neil Humphrey for the Planning Inspectorate had expected and assumed that the Environment Agency had studied my papers analysing the Applicant's Sizewell C flood risk assessment.

Despite my repeated requests for the EA to consider my papers and enter constructive dialogue, pleas that extended to writing to my MP Therese Coffey asking her to intercede, the EA had steadfastly refused to review them considering it *'…inappropriate to do so..'* See enclosed document.

The Environment Agency was therefore unable to comment in any substantial form on my papers at ISH11 but did not appear to inform Mr Humphrey at the time of its attitude towards my work. The Planning Inspectorate presumably remains unaware.
The Environment Agency also turned down my Freedom of Information request for BEEMS TR319 – a document essential to understanding the Applicant's Flood Risk Assessment and inshore wave behaviour. I eventually obtained this document from Cefas. See enclosed document.

I think it important in an open public enquiry that the Planning Inspectorate is made fully aware of these concerns. I would be obliged if you could address correspondence to the Inspectorate accordingly.

Regards
Nick Scarr Plus copy of the 25/1/22 email as below

---------- Forwarded message ---------
From: **Nick Scarr** [redacted]@gmail.com>
Date: Tue, 25 Jan 2022 at 11:07
Subject: The Applicant's treatment of the offshore geomorphology in its FRA and its approval by the Environment Agency
To: Barlow, Simon [redacted]@environment-agency.gov.uk>, <[redacted]@environment-agency.gov.uk>, <[redacted]@environment-agency.gov.uk>

25/1/22

Dear Simon Barlowe, Eleanor Stuart, Ollie Burns,

I hope all is well.

At the Issue Specific hearing ISH 11, 14/9/2021 the Environment Agency expressed its general satisfaction with the Applicant's FRA. This is expressed below referring to the transcripts:

> *"33:56 Good morning, sir Sarah Palmer for the Environment Agency. We just wanted to clarify that in terms of the main development site and coastal flood risk. Only outstanding issue is regarding the increase in offsite flood risk tank traps…" Session 2*

The Environment Agency also expressed satisfaction of the Applicant's modelling of the Sizewell Dunwich banks in its FRA:

> *"07:35 Good morning, sir. Sarah Palmer for the Environment Agency. I'm afraid I can't answer the detail about the modelling of the bank* [Sizewell Dunwich bank] *and how that relates to the flood risk assessment**. I know that my coastal geomorphology colleagues have looked into this and I believe they were content with how it was modelled**, but I can't provide the details to you. But I do believe they were content, how it was represented within the flood risk assessment." ISH11 Session 2*

The Applicant then confirmed both its treatment of the Sizewell Dunwich banks and the Environment Agency's approval of the methodology:

> *"…So, so one might assume that the fra, if the bank was in place, that that would actually have an energy as the dissipation. Actually, as it turns out for the fra conversely, that's true. So so the having the bank in place, in terms of fra assessment actually gives you a more*

conservative outcome in terms of understanding what coastal overtopping is at the high coastal defence feature. So that's actually the approach that we've taken there. So in the will then be a reference to how is that addressed in the coastal geomorphology. In effect, both studies have taken the worst case scenario and applied it. So it's a sort of non is a without prejudice approach. And we take we assume the worst and apply that and that's how we've gone about and that's how the assessment has taken place. That work has obviously been shared with the Environment Agency. And I hope that ***the comments from the Environment Agency a few moments ago will give some confidence that actually they've review that in some detail on thoroughly and find that the the finding sound****" ISH11 Session 2*

The Applicant, in written communication states:

"The wave condition outputs taken from the coastal geomorphological studies provide for a conservative assessment for application within the FRA coastal overtopping assessment. The flood risk assessment took the ***most conservative values*** *as input data to the modelling. This approach has been reviewed and* ***validated by the Environment Agency."***

"As discussed in Section 5.3 of Appendix A of the Coastal Modelling Report (Appendix 1 of the MDS FRA [APP-094]), the assessment concluded that the Baseline scenario, i.e. with the Sizewell - Dunwich bank in situ, resulted in more conservative (i.e. worst case) nearshore wave conditions than with their removal. ***As such, the scenario with the bank in place was adopted in the MDS FRA for all scenarios and epochs as a conservative approach****." ExQ2 epage 130*

I am perplexed by this approach of the Applicant and the subsequent approval of the Environment Agency as we know the Applicant's treatment in its DCO of wave condition inputs as expressed above i.e., that *a higher (and therefore more conservative) inshore wave climate occurs with the Sizewell Dunwich banks in place*, **is unorthodox and in direct contradiction with the Applicant's own accredited research found in BEEMS documents and explained in my enclosed papers.**

I would be grateful if you could confirm to me that your acceptance and approval of the wave inputs used by the Applicant in its FRA and that it represents conservative values is correct and does not represent some degree of misunderstanding.

Regards

Nick Scarr

Appendix 2

Copy of my paper "Sizewell C Main nuclear platform flood resilience in the next century" sent to the Planning Inspectorate for the Secretary of State.

Sizewell C Main nuclear platform flood resilience in the next century.

Author: Nick Scarr IP 20025524—11/1/22 – 8:05

The next century will be a critical time for Sizewell C if it is approved and built as presented in the DCO hearing; security from flood risk will be of utmost importance as the spent fuel created by the reactors will be onsite in cooling ponds until its temperature lowers sufficiently to allow removal.

The Applicant has made a definitive statement on flood risk to Sizewell C's main nuclear platform for the period. The Applicant states that the 7.3m AOD (Above Ordnance Datum) main nuclear platform will be free from flood risk until 2140 under the RCP8.5 scenario. This is presented in its '*Table 2.1'*.

The Applicant has also made a second definitive statement, presumably informed by the first, that spent fuel will be removed from site by this 2140 date.

The following document reviews these crucial statements in the following two short papers.

Paper 1 analyses the limitations of the data presented in the Applicant's '*Table 2.1*' and concludes that it does not reflect reasonable worse-case conditions at the main nuclear site.

Paper 2 assesses whether spent fuel removal by 2140 is a plausible timescale and concludes that even if one is to accept the data presented in '*Table 2.1'* as worse-case flood data, safety of the site will still be compromised as spent fuel removal by this date does not appear to be feasible.

Overall, the papers posit that Sizewell C, as presented in the DCO Hearing, will not be able to offer the sufficient and necessary flood resilience in the next century.

Paper 1—Sizewell C and the wave data used in the Applicant's FRA to establish flood levels on the main nuclear platform in the next century.

Introduction and purpose.

The Applicant used its Flood Risk Assessment to establish that the main nuclear platform, at 7.3m AOD, is resilient to flood risk until 2140.

This paper critically reviews the data presented by the Applicants table 2.1 and splits it into its component parts—still water flood levels and wave induced (overtopping) flood levels.

The paper concludes that the wave data utilised by the Applicant does not represent worse-case conditions and that *Table 2.1* may therefore under-estimate flood levels to the main nuclear platform.

A) The Applicant's data for overall wave overtopping scenarios of the main nuclear platform as presented in its FRA Table 2.1:

The Applicant's 'Table 2.1':

> *"2.1.5 Table 2.1* [reproduced below] *presents a list of overtopping scenarios for the reasonably foreseeable (RCP8.5 95 percentile) and credible maximum (H++ or BECC Upper) climate change allowances and respective extreme still water levels, highlighting in red bold those scenarios with extreme sea level above platform height that were not undertaken in this assessment"* FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

"Table 2.1: Summary of wave overtopping scenarios"

Return period	2090 epoch		2140 epoch		2190 epoch	
	RCP8.5	H++	RCP8.5	BECC	RCP8.5	BECC
200-year	4.58	5.19	5.48	7.58	6.31	8.48
1,000-year	5.12	5.73	6.02	8.12	6.85	9.02
10,000-year	5.98	6.59	6.88	8.98	7.71	9.88

FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

Figures shown are in height of water at the main platform AOD. Any figure greater than 7.3m AOD (main nuclear platform height) represents a flood event which compromises the main nuclear platform and spent fuel storage safety. Figures in red are highlighted by the Applicant.

These analysis results show that the main nuclear platform at 7.3m AOD is not expected to flood before 2140 based on the RCP8.5 scenario and the maximum storm period return considered for nuclear installations.

These results are understood to be a composite figure of maximum still water levels (which incorporate climate and storm surge level effects) combined with the impact on those levels from waves overtopping and breaching Sizewell C's defences.

The following section breaks down these data into the two component parts presented in the Tables B1 and B2 following.

B) Breakdown of 'Table 2.1'.

B.1 Still water data used in the Applicant's 'Table 2.1'.

To examine the component that waves add to the Table 2.1 data it is necessary to abstract the still water level components. These values are shown in the table below by using the following data:

- Still water level data (AOD) for storm event return periods used:
  1:200 3.13m; 1:1000 3.55m; 1:10,000 4.21m

- Climate change sea level rise data used for RCP8.5 scenario:
  RCP8.5 2100 1.12m; RCP8.5 2140 1.8m; RCP8.5 2200 2.9m; BECC 2200 5.00m

For reference the 1953 flood level is approximately 1:1000. Figures in blue in Tables B1 and B2 are the Applicant's still water figures from its table 4.2 that are slightly different and shown where available. See FRA ADDENDUM: EN010012 Main Development Site Flood Risk Assessment Addendum. Table 4.2 *'Assessed flood depth on the main platform'* (Still water levels).

In developing the table B1 below, I have utilised the above figures combing the two sets of data. So, for example, for the scenario of a 1 in 200 year still water level and a 2140 climate change sea level rise gives a level of 4.93m (3.13 + 1.8m).

The table B1 thus excludes the wave action component from the Applicant's Table 2.1, considering only the still water levels of return period sea level rise and climate change sea level rise:

Return Period	2100 epoch		2140 Epoch		2200 Epoch	
	RCP8.5	H++	RCP8.5	BECC	RCP8.5	BECC
200-year	4.25	5.03	4.93	no data	6.03	8.13/8.00
1,000-year	4.67	5.45	5.35	7.94	6.45	8.55/8.84
10,000-year	5.33	6.11	6.01	8.85	7.11/7.58	9.21/9.75

Table B1 - Figures shown are in height of water AOD.

B.2 Flood level component from overtopping (breaching) waves in the Applicant's 'Table 2.1'.

Subtracting the data in the Table B1 above from the Applicant's Table 2.1 arrives at the following:

Return Period	2100 epoch		2140 Epoch		2200 Epoch	
	RCP8.5	H++	RCP8.5	BECC	RCP8.5	BECC
200-year	0.33	0.16	0.55	no data	0.28	0.35/0.48
1,000-year	0.45	0.28	0.67	0.18	0.4	0.47/0.18
10,000-year	0.65	0.48	0.87	0.13	0.6/0.13	0.67/0.13

Table B2 - Figures shown are in height of water AOD.

Table B2 then, shows the maximum contribution of overtopping waves to water levels on and around the platform that could have been allocated by the Applicant for each return period and epoch.

It appears that the Applicant has used '*inshore wave heights of 3.73m-4.48m'* to calculate these wave contributions. See: FRA Main development site Flood Risk Addendum Page 1,2: Table 4.1.

However, should the offshore Dunwich bank be lost or compromised by the next century—**a plausible scenario as it has no underlying hard geology**—then **moderate as well as high storm waves** (the significant 1:100 offshore wave heights are 7.3- 7.8m from the N –NNE sector) could breach, break over and erode the 'soft and erodible' inner and outer longshore bars and the South Minsmere levels, immediately to the North of Sizewell C. In flood conditions these waves would then add to the water volumes in the contiguous marshes of South Minsmere and Sizewell. Storm-wave access around the landward side of the main nuclear platform could then occur and there are no proposed defences against such scenarios. **In these scenarios wave action could present significantly greater contributions to flood levels on the main nuclear platform than suggested by Table B2 which, in turn, would then result in an understatement of flood risk in the Applicant's Table 2.1.**

The adequacy of the flood modelling on the main platform height of 7.3m AOD to 2140 is essentially then dependent upon the assumptions of:

- little or no change to the offshore geomorphology (primarily the Dunwich bank and the longshore, nearshore bars)

- the present shoreline surrounding Sizewell C remaining uneroded until the middle of the next century with no consideration given to the historical precedent of the Sizewell foreshore being the '*most eroded shoreline'* in records assembled by Pye and Blott until the development of the Dunwich bank (see REP2-393 Section 2) and
- no significant unrepaired breaches to sea defences north of the site.

In my view there is no plausible mechanism that could justify the assumption for the maintenance and preservation of the unconsolidated Dunwich bank over the next two 100-year episodes of coastal processes, the uncertainties of which can only be increased by climate change sea-level rise and storm level change. This loss could result in significant shoreline erosion around Sizewell C. See my papers REP2-393, REP7-219, REP10-345.

In a meeting with the Environment Agency on 23rd January 2020 it was acknowledged that Sizewell C may become subject to 'islanding'. I believe that the consequences of this are not being considered, namely: in the highly plausible event of significant shoreline recession by and during the next century, Sizewell C could become an established promontory or headland. Sea defences would then need to fully surround the main nuclear platform.

Paper 2—Sizewell C and the Applicant's claim for spent fuel removal by 2140. Is this a plausible timeframe?

Introduction and purpose.

The Applicant's flood risk assessment for Sizewell C is committed to 2140 as the 'decommissioned date' for spent fuel confirmed by the following:

- ***"The lifetime of the development includes for removal of all spent nuclear fuel by 2140…The Application and flood risk assessment are explicit about the timeframes being assessed in relation to 2140."***
- ***"The key dates relevant to flood risk for the operation of the station are; the end of operation of the station at 2085…end of interim spent fuel store 2140…*** 6.12 Rev: Reports Referenced in the Environmental Statement. Page 14
- ***"…on-site risks would only be considered* [modelled] *to 2140 as the end of Interim Spent Fuel Store."***
  Royal Haskoning, flood risk modelling, page 2 of 22 in 6.12 Revision: Reports Referenced in the Environmental Statement.

This timeframe of 2140 is then important as '*on-site risks would only be considered to this date'* according to the Applicant's own modelling presented by Royal Haskoning.

This paper is a response to this stated, 'decommissioned date of 2140' and posits the view that such a timeframe is imposed by the Applicant's flood risk assessment presented in its '*Table 2.1*'and its selected main nuclear platform level. This paper suggests this timescale for spent fuel removal is implausible and that the spent fuel store could remain in commission well beyond 2140 and consequently be untenable being exposed to unacceptable flood risk.

1. The critical nature of the 2140 date—The Applicant's assessment of still water and wave overtopping of the main nuclear platform beyond 2140.

Again, refer to the Applicant's 'Table 2.1':

> *"2.1.5 Table 2.1 [reproduced below] presents a list of overtopping scenarios for the reasonably foreseeable (RCP8.5 95 percentile) and credible maximum (H++ or BECC Upper) climate change allowances and respective extreme still water levels, highlighting in red bold those scenarios with extreme sea level above platform height that were not undertaken in this assessment"* FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

Table 2.1: Summary of wave overtopping scenarios

Return period	2090 epoch		2140 epoch		2190 epoch	
	RCP8.5	H++	RCP8.5	BECC	RCP8.5	BECC
200-year	4.58	5.19	5.48	7.58	6.31	**8.48**
1,000-year	5.12	5.73	6.02	**8.12**	6.85	**9.02**
10,000-year	5.98	6.59	6.88	**8.98**	7.71	**9.88**

FRA ADDENDUM: op cit., Main Development Site Flood Risk Assessment Addendum Appendices A-F Part 10 of 10

This table clearly shows that beyond 2140 the main nuclear platform is at risk of flooding in a 1:10,000 RCP8.5 scenario and that there is a consequent critical requirement for Sizewell C to be decommissioned (at least in terms of spent fuel removal) by this date for the safety of local populations, environment, and staff.

2. The profound difficulties in achieving a decommissioned date of 2140.

Government policy is that spent fuel is transported directly from site of creation to a geological disposal facility (GDF), **there is no 'intermediate' location for spent fuel proposed**. However:

2.1 Policy: Spent fuel is not waste and *is not currently destined for geological disposal*.

- *"…your understanding that spent fuel is 'not waste' and is not destined for geological disposal unless and until it is classified as waste, is correct."*
  13th October 2021 email to me from Radioactive Waste Management Ltd.

2.2 Spent Fuel Cooling: High burnup spent fuel of the type produced by Sizewell C requires a longer cooling period (see my paper REP2-503) before geological disposal can be considered and that does not correlate with a decommissioned date of 2140.

- The Nuclear Decommissioning Authority (NDA) suggests the cooling requirements will result in a decommissioning date for Sizewell C between **2180 to 2230**:

"Current RWMD generic disposal studies for spent fuel define a temperature criterion for the acceptable heat output from a disposal canister. In order to ensure that the performance of the bentonite buffer material to be placed around the canister in the disposal environment is not damaged by excessive temperatures, a temperature limit of 100°C is applied to the inner bentonite buffer surface. ***Based on a canister containing four EPR fuel assemblies, each with the maximum burn-up of 65 GWd/tU and adopting the canister spacing used in existing concept designs, it would require of order of 140 years for the activity, and hence heat output, of the EPR fuel to decay sufficiently to meet this temperature criterion****."*

*"****It is acknowledged that the cooling period specified above is greater than would be required for existing PWR fuel to meet the same criterion*** **[due to its higher levels of radioactivity and high decay heat radioisotopes]** *and RWMD proposes to explore how this period can be reduced. This may be achieved for instance through refinement of the assessment inventory (for example by considering a more realistic distribution of burn-up), by reducing the fuel loading in a canister* **[which will increase the geological disposal footprint]** *or by consideration of alternative disposal concepts. The sensitivity of the cooling period to fuel burn-up has been investigated by consideration of an alternative fuel inventory based on an assembly irradiation of 50 GWd/tU. For this alternative scenario it is estimated that the cooling time required will reduce to the order of* ***90 years*** *to meet the same temperature criterion."*

NDA 'Geological Disposal Generic Design Assessment: Summary of Disposability Assessment for Wastes and Spent Fuel arising from Operation of the UK EPR' Jan 2014 section 6, page 6.

'Together Against Sizewell C' raised the above points from the Nuclear Decommissioning Authority (NDA) with the Office for Nuclear Regulation (ONR) who responded as follows with reference to HINKLEY POINT C:

"As an example, for HPC (using indicative timescales and dates):

- *The assumed availability date for the GDF ~2130 for fuel from new reactors.*
- *Assumed start of generation of HPC: 2025*
- *Assumed end of generation of HPC: 2085*
- *The date from which fuel will be sufficiently cool to start to transfer to the GDF (from 55-60 after end of generation): 2140-2145*
- *The date by which all fuel will be transferred to the GDF: ~2150-2155 (assumed to take just over 9 years)*
- *The dry fuel store will not be needed until ~10 years start of operation of HPC: ~2035*
- *The dry fuel store will then be needed for 50 years remaining operation of HPC, 55-60 years for the fuel to cool and 10 years to allow transfer of fuel to the GDF, which is 115-120 years.*
- *Removal of all fuel from site and end of use of the dry fuel store is therefore: ~2150-2155.*
- *The initial design life for the dry fuel store is 120 years (noting the design is conceived to allow for refurbishment or replacement) which would take it to: ~ 2155*
- *"In summary, the number of years before the fuel can be taken off site to the GDF is approximately 55-60 years from end of generation, which is because of the temperature criterion associated with the GDF canister. Fuel could potentially be moved from site safely earlier (but not currently to the GDF), although this is not planned."* *ONR reference HPGE202006066, 'TASC Review of the Minutes of the ONR/Stop Hinkley Meeting in Bridgewater January 2020 Authors: Chris & Jen Wilson Date: 17 June 2020'.*

The basis of the ONR's 'downward revision' of the NDA's specified high burnup spent fuel cooling period, as stated in its response above, is that not all fuel will be burnt to 65 GWd/tU. I accept this although the ONR is unclear as to what the average burn rate will be and hence, in my view, there is a sense of the arbitrary about the revision which would benefit from more detailed validation. In my opinion, there is a need for a statement of common ground between the NDA and the ONR defining this cooling period within somewhat finer limits than 55-140 years, particularly the period in cooling ponds.

Even if the 'revised cooling period' from the ONR is correct and applied to Sizewell C's spent fuel, and we accept the GDF will be commissioned and run smoothly, and one assumes that Sizewell C is completed on time (2035) and will operate until 2095 without lifetime extensions, then spent fuel could, at the very earliest, be removed by 2160/2165 (2095 + 55-60 years cooling +10 years to remove).

Summary.

For spent fuel to be removed from site by 2160/2165 (20-25 years *after* the "*explicit timeframes"* committed to by the Applicant) requires the acceptance of ***major*** assumptions as follows:

1. Spent fuel will be classified as waste. This is currently not the case.

2. That there are no over-runs in construction time of Sizewell C.

3. That there are no lifetime extensions to Sizewell C.

4. That one accepts the validity of the ONR's downward revision of the required cooling period specified by the NDA from 140 years to 55-60 years.

5. That a GDF is available within 120 years, and it will take no more than 10 years to consign the Sizewell C spent fuel.

6. That the GDF can accept and consign Sizewell C's spent fuel at the same time as other nuclear waste if necessary. It is not at all clear that this will be the case.

7. That the timeframe (considered to be 100 years as far as I am aware) for the deposition of other committed nuclear waste to be consigned prior to Hinkley C and Sizewell C— that is, legacy nuclear waste, including spent fuel from power stations and the highly enriched submarine spent fuel— operates within the allocated timescale without over-run.

Therefore, in summary I suggest that the Applicant's 2140 date for decommissioning is implausible and that even the later dates of 2160/65 are dependent on major assumptions and unsupported by an agreed and conclusive analysis of fuel cooling requirements.

The insufficiency of flood resilience of the proposed Sizewell C's main nuclear platform beyond 2140, based on the Applicant's own data, will then expose the spent fuel stored onsite to unacceptable flood risk and consequently threaten the safety of the environment, local populations, and decommissioning staff.

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Overall summary of Papers 1 and 2.

Paper 1 shows there may be significant understatements of the flood risk to the main nuclear platform in the next century. The depletion of the Dunwich bank and the attendant possibility of Sizewell shoreline retreat and exposure of the main nuclear platform on the landward side do not appear to be considered when the wave component of the data in Table 2.1 is examined. In the highly plausible event of shoreline recession by and during the next century and Sizewell C becoming a promontory or headland prior to spent fuel removal, sea defences would need to fully surround the main nuclear platform.

Paper 2 shows that should we accept the Applicant's Table 2.1 data as valid for worse case scenarios and accept that there will be no shoreline retreat at Sizewell through the next two centuries, we are still left with the Applicant's seemingly implausible requirement and claim for spent fuel removal from site by 2140.

Overall, therefore, I suggest that the Sizewell C will not provide the necessary and required flood risk resilience until spent fuel removal.

Please see my papers REP2-393, REP7-219, REP10-345 and REP2-503 for Spent Fuel.

32. Suffolk County Council – 22 February 2022

From: [redacted]@beis.gov.uk
Cc: [redacted]
Subject: Suffolk County Council"s position: Sizewell C DCO application
Date: 22 February 2022 16:02:51
Attachments: 2022-02-22 SoS BEIS Sizewell C.pdf
2022-02-22 SCC SoS position statement.pdf

Dear Secretary of State

Please find attached covering letter and document regarding Suffolk County Council's position on the Sizewell C DCO application on 22 February 2022 for consideration in the determination of the application.

Kind regards

Matthew

Matthew Hicks
Leader of Suffolk County Council
County Councillor for the Thredling Division
Tel : [redacted]
E-mail : [redacted]@suffolk.gov.uk
Twitter: @HicksCllr

The information contained in this email or any of its attachments may be privileged or confidential and is intended for the exclusive use of the addressee. Any unauthorised use may be unlawful. If you receive this email by mistake, please let me know immediately by using the reply facility in your email software.

This privacy notice [redacted] tells you how I collect and use personal data.

32. Suffolk County Council – 22 February 2022

Attachment 1

Enquiries to: Michael Moll, Programme Director
Sizewell C
Email: [redacted]@suffolk.gov.uk
Date: 22 February 2022

The Rt Hon Kwasi Kwarteng MP
Secretary of State for Business, Energy and Industrial Strategy
1 Victoria Street
London
SW1H 0ET

Via Email Only: [redacted]@beis.gov.uk

Dear Secretary of State

Suffolk County Council's position on the Sizewell C DCO application on 22 February 2022 for consideration in the determination of the application

As, with the submission of the report by the Examining Authority due on 25 February, you will now consider the Sizewell C Development Consent Order application, Suffolk County Council would like to highlight, in the attached document, its outstanding concerns to you, as I consider that these issues need, and still could, be addressed before a development consent is granted.

I would encourage you to carefully consider these issues as part of your decision making. We will be very happy to provide further detail on any of the matters raised.

Yours sincerely

[redacted]

Matthew Hicks
Leader of Suffolk County Council

Cc SizewellC@planninginspectorate.gov.uk
[redacted]@beis.gov.uk
[redacted]@suffolk.gov.uk

32. Suffolk County Council – 22 February 2022

Attachment 2

The Sizewell C Project, Ref. EN010012

Suffolk County Council's position on the Sizewell C DCO application on 22 February 2022 for consideration by the Secretary of State in his determination of the application

Suffolk County Council Registration ID Number: 20026012

22 February 2022

OVERVIEW

At the end of the examination, Suffolk County Council (SCC) had a number of outstanding issues about the Sizewell C Development Consent Order application. These were set out in a Deadline 10 submission, in SCC's Final Position Statement [REP10-210].

Now that the Examining Authority is due to submit its report to the Secretary of State, SCC would like to highlight its outstanding concerns to the Secretary of State, as it considers that these issues need, and still could, be addressed before a development consent is granted.

Where issues have changed since Deadline 10, the position in this document has been updated – this is the case in relation to the drainage issues and there is a new issue regarding to a late change by the Applicant to Article 9(7) (consent to transfer benefit of the Order) of the dDCO.

The document summarises SCC's overall position, and for convenience then sets out the issues of substance where agreement could not be reached, followed by outstanding issues of mechanics in respect of the DCO drafting. SCC requests that these issues are carefully considered by the Secretary of State. As mentioned above, SCC considers that the issues could still be resolved at this late stage in the process.

For ease of reference, the Appendices set out a summary of the issues, how they can be resolved, and where in SCC's submissions detailed information is set out.

SUMMARY OF SUFFOLK COUNTY COUNCIL'S POSITION AT DEADLINE 10

1. SCC started the Examination by stating (at the Open Floor Hearing on 18 May 2021 [REP2-190]) that it wanted to work with the Applicant to develop its proposals but, at that stage, the proposals were not yet ones SCC could fully support. SCC indicated that its officers would do everything possible to improve the development so there could be a Sizewell C which would work for Suffolk. SCC's specific concerns had been set out at the outset in SCC's Relevant Representation [RR-1174].

2. Over the course of the examination, positive progress was made on many (but not all) matters of concern to SCC and SCC welcomed the constructive engagement of the Applicant in helping to achieve that progress. For instance, SCC agreed and completed the Deed of Obligation [REP10-076 to REP10-084].

3. As set out in SCC's Final Position Statement [REP10-210], SCC considers that the mitigations secured by the Deed of Obligation will not overcome the residual adverse impacts of the proposal on the natural environment and the AONB. In that regard, SCC welcomed the Applicant's proposal to provide funding for the Environment Trust, secured in a separate Deed ('the Environment Deed') which was agreed and completed in parallel with the Deed of Obligation. In simple terms, what is now proposed by the Environment Deed is the future establishment of an environmental charity (or similar non-charitable entity with related objects), which will include representatives of the Applicant, SCC, East Suffolk Council, and other stakeholders. This body will become responsible for deciding on the allocation of funding that the Applicant has committed to (as described in [REP7-056], the Applicant's response to ExQ2 LI2.2) in ways which further the objects of the environmental charity/entity. Those objects are "to promote, for the benefit of the public, the conservation, protection and improvement of the physical and natural environment, including the protection and enhancement of Natural Beauty and the advancement of education of the public in the conservation, protection and improvement of the physical and natural environment in and around East Suffolk". For the reasons explained in Appendix C, SCC does not consider that the Environment Deed (as now completed) should be treated as a material consideration. It had not, therefore, been submitted in evidence to the Examination.

4. In addition to the agreement on the Deed of Obligation, SCC acknowledges that, since the start of the examination, a number of substantial improvements were made to the development proposals by the Applicant.

5. Notwithstanding the above, there remain important matters that have not been satisfactorily resolved in the Applicant's formulation of the proposals. However, SCC considers that the unresolved matters could still be addressed at this late stage in the process, as set out further in this submission.

6. Below, SCC sets out the outstanding issues, both on the substance of the proposals and on the mechanics of DCO drafting.

UNRESOLVED ISSUES ON SUBSTANCE OF THE PROPOSALS

7. With regard to the substance, SCC's concerns relate to topics for which the Applicant's approach is inadequately justified, and to unresolved issues related to surface water drainage.

8. SCC remains unpersuaded that there is an adequate justification for (a) the use of pylons for the power export connection or that a less intrusive technical solution is not feasible, (b) the provision of an outage car park in the AONB (and that shared use of the Sizewell B outage car park is not feasible), and (c) the permanent retention of the Sizewell Link Road after the completion of construction. An issue that has not been fully resolved is (d) that a less intrusive SSSI crossing (of a three-span bridge) would be preferable, albeit it welcomes the improved proposals put forward during the course of the examination. Appendix A.1-4 provides a summary of these issues, the alternative options SCC seeks instead, how this can be done, and where in the Examination Library the full information of SCC's stance can be found.

9. SCC considers that, if these issues were resolved, the residual impacts of the development on the natural environment and the AONB could be substantially further reduced compared to the current proposals, better safeguarding those environmental assets and securing them for the longer term.

10. SCC set out in its Deadline 9 submission [REP9-034] its amendments to the DCO which would bring its proposals into effect. That submission also sets out that, in SCC's opinion, these changes could be achieved within the current DCO application, albeit that some elements (i.e., the removal of the Sizewell Link Road and the change to the SSSI crossing) would require a consultation on revised proposals by the Applicant.

11. SCC invites the Secretary of State to carefully consider these suggestions, in particular the suggestion that consultation be undertaken by the Secretary of State at decision stage.

12. In addition to these matters of substance where the Applicant's approach has inadequate justification, there are unresolved issues of substance related to surface water drainage. At the end of the examination, SCC, as the Lead Local Flood Authority (LLFA), considered that the Applicant's Drainage

Strategy submitted at Deadline 10 was not acceptable as a certified control document. This is because the Applicant had not been able in its Drainage Strategy to demonstrate that their primary surface water drainage mitigation is suitable, sufficient, and deliverable within the Order Limits and in accordance with national and local policy, best practice and guidance.

13. Since the end of the examination, the Applicant has undertaken a substantial amount of work aiming to address these shortcomings. This is reflected in a joint position statement between the Applicant and SCC to be submitted separately to the Secretary of State. Whilst we understand that an updated and much improved drainage strategy is close to completion, the Applicant has indicated that it is not its intention to submit this document to the Secretary of State. Without this, SCC's concerns remain as stated at Deadline 10 [in REP10-210].

14. SCC urges the Secretary of State to seek a submission of an updated strategy, alongside the views of SCC about the update, which could replace the inadequate Deadline 10 version of the Drainage Strategy as a control document.

UNRESOLVED ISSUES RELATED TO THE MECHANICS OF DCO DRAFTING

14. SCC requests that the following changes are made to the final, made version, of the DCO:

15. Discharge of Requirement 5 (surface and foul water drainage): Currently, the DCO provides that East Suffolk Council would be the discharging authority for Requirement 5. SCC has asked that this requirement be amended so that SCC, as the LLFA, is the discharging authority for surface water drainage. This change would reflect SCC's statutory responsibility for surface water drainage, and would provide assurance that impacts and related risks to surface water drainage flooding are discharged by the most relevant and competent authority. However, this change in and of itself would not be sufficient to overcome the drainage issues of substance outlined above but rather would ensure that once a satisfactory drainage strategy is in place, the detailed discharge of its requirements is fully and properly considered.

16. SCC has not reached agreement with the Applicant on a small number of DCO articles and other requirements. SCC requests the proposed changes set out in Appendix B are made to the final, made, version of the DCO. to Secretary of State. SCC notes that, in addition to those comments made in SCC's Deadline 10 submission, it is raising concerns about a change in the dDCO article 9(7), submitted at Deadline 10 by the Applicant, which had not been agreed by SCC.

APPENDICES

APPENDIX A: DETAILED SUMMARY ON ISSUES OF SUBSTANCE

A1. Alternatives to the use of pylons for the power export connection

Summary of the issue

1.1. SCC considers that the Applicant has not properly considered alternatives to its proposal for the electrical connection between the turbine halls and the NGET (National Grid Electricity Transmission) substation. The proposed pylons and overhead lines substantially increase the adverse residual impacts of the Main Development Site, on the character and special qualities of the Suffolk Coast and Heaths AONB. It is noted that NPS EN-1 (Para 5.9.9) recognises that

AONBs have 'the highest status of protection in terms of landscape and natural beauty' and that the conservation of natural beauty should be given 'substantial weight' when considering DCO proposals within an AONB.

1.2. SCC and its consultants AFRY consider that the use of Gas Insulated Lines (GIL) appears to be a viable, and significantly less impactful, alternative to pylons and overhead lines. It is noted that the Applicant raised a number of challenges in implementing GIL technology; however, SCC and its consultant consider, from the information available to them, that these do not appear insurmountable.

1.3. SCC has provided in its submissions (reference in 1.5 below) a considerable level of technical detail to show how such a solution could be achieved.

How can the issue be resolved at this stage

1.4. A GIL Connection would in SCC's view be in principle achievable within the parameters already assessed. SCC considers that, subject to technical confirmation, the DCO could simply be amended, with wording as proposed on pages 7 and 8 of [REP9-034].

Where to find full information

1.5. Local Impact Report [REP1-045]; Written Representation including relevant Appendices [REP2-189]; SCC's response to the Applicant's comments on [REP2-189] [REP5-172, Page 60]; post hearing submission for ISH5 [REP5-176]; and proposed amendment to DCO wording in [REP9034].

A2. The outage car park at Goose Hill in the AONB

Summary of the issue

2.1. The Applicant intends to provide two separate car parks for outage staff, one each for Sizewell B and Sizewell C. Both would be in the AONB, with the Sizewell C one located away from the power station platform at Goose Hill. SCC questions whether there is a sufficient need for an outage car park for Sizewell C in this location at Goose Hill, within the AONB, as this location would override policies set out in EN-1 and EN-6. SCC particularly questions whether this meets the tests set out in EN-1 para 5.9.10, where SCC considers that it is not only the need for the whole development that needs to be assessed, but in this case the need to have two car parks in the AONB that are rarely, if ever, likely to be used simultaneously. It is accepted that there could be occasions on which this is needed, albeit infrequently. However, SCC considers that the risk of this happening is so infrequent that it does not outweigh the construction of a second permanent facility in the AONB, and that there are solutions available to deal with the needs of such occasions.

2.2. SCC argues that the occasions when both outage car parks would be needed simultaneously are likely to be extremely infrequent and when this does happen, other arrangements could be made for parking of staff, which do not require additional land-take within the AONB.

2.3. SCC's position is supported by, amongst others, the SCHAONB [REP7-230] and Natural England [REP7-144], the latter noting that "SCC makes a very clear and compelling case for an alternative solution".

How can the issue be resolved at this stage

2.4. SCC considers that the DCO should be changed, to exclude the outage car parking (see proposed amendment to DCO wording on page 6 of [REP9034]).

Where to find full information

2.5. Local Impact Report [REP1-045], Written Representation [REP2-189], Further considerations on alternatives to the proposed outage car park [REP5-171], SCC's D8 comments to the Applicant's response to ExQ LI.2. [REP8-179] Post Hearing Submission to ISH5 [REP5-176], and proposed amendment to DCO wording in [REP9-034].

A3. Removal of Sizewell Link Road

Summary of the issue

3.1. The current proposals in the DCO are to retain the Sizewell Link Road, a 6.8 km long new road between the A12 and the site entrance, as a permanent feature. SCC is seeking the removal of the Sizewell Link Road at the end of construction of Sizewell C – a stance that SCC has maintained since well before the start of the examination.

3.2. SCC welcomes the intention that a relief for traffic growth along the B1122 is to be provided during the construction period. SCC considers that, during the construction phase, the benefits of such a relief road on the local communities outweigh the damage caused to the environment by the construction of such a road for this phase and that its early provision is essential mitigation for construction traffic impacts.

3.3. However, after the Sizewell C construction is complete, and traffic volumes on this route will significantly reduce, the proposed route of the Sizewell Link Road will merely replicate the function of the existing B1122, without having any strategic legacy benefit.

3.4. On balance, with the relatively low flows of traffic after the end of construction, SCC does not consider the Sizewell Link Road to have sufficient strategic legacy benefit after construction of Sizewell C (running parallel to the existing B1122) to justify the environmental impact, the impact on local receptors and additional maintenance burden of retaining two routes. SCC would therefore welcome the removal of the road when construction of Sizewell C is complete, and returned to, or improved upon, its original state. SCC would anticipate that the removal of the Sizewell Link Road would not cause greater impact than its construction.

How can the issue be resolved at this stage

3.5. As set out in [REP7-160], SCC considers that this change may require additional consultation by the Applicant, which would have to take place in advance of the Secretary of State's decision. The change would require a number of small amendments to the DCO as set out on pages 3 to 5 of [REP9-034].

Where to find full information

3.6. Local Impact Report [REP1-045]; SCC Written Representation [REP2189]; Implications of removal in context of Compulsory Acquisition [REP7160]; and proposed amendment to DCO wording in [REP9-034].

A4. SSSI crossing

Summary of the issue

4.1. Pre-submission consultations by the Applicant on the crossing of the SSSI included options that would have provided bridges or causeways. SCC, in common with other stakeholders, made clear that it preferred the proposals for a three span bridge across the remaining width of the SSSI (part having already been taken by the base for the construction of the power station). This was because its footprint on the remaining SSSI would be significantly smaller (in itself, less damaging) than that for a causeway and there was better light penetration beneath the bridge that would more effectively ensure the ecological linkage of important habitats either side of the structure.

4.2. SCC acknowledges that the Applicant has made important changes to the originally submitted SSSI crossing proposals, having changed the design from a causeway with culvert to a causeway and single span bridge design. We note that the Environment Agency considers that the revised design has now reduced harm to acceptable levels, but that the alternative of a triplespan bridge would be preferable, as having less ecological impact and reduced SSSI landtake [REP7-090, Table 2.1, MDS_TE2], and that Natural England considers the revised proposal is a best alternative, albeit that there are potentially less damaging alternatives, including a triple-span bridge which would have the least impact ecologically on the SSSI [REP8-094, Summary Table, Items 48 and 49].

4.3. SCC requests that the Secretary of State considers further whether an alternative SSSI design, with its reduced SSSI landtake and ecological impact, should be pursued.

How can the issue be resolved at this stage

4.4. As set out in [REP7-160], SCC accepts that such a change may require a further consultation and that, if there was a consultation on the removal of the SLR, these could be undertaken in parallel.

Where to find full information

4.5. Local Impact Report [REP1-045], SCC Written Representation [REP2189]; Post-Hearing submission for ISH7 [REP5-178]; REP5-176]; and [REP9-034].

A5. Surface water drainage and flooding

Summary of the issue

5.1. At Deadline 10, SCC noted that it could not be satisfied at that point that the Applicant had demonstrated that their primary mitigation for surface water drainage and flooding is suitable, sufficient, and deliverable within the Order Limits, and in accordance with national and local policy, best practice and guidance to prevent an increase in surface water flood risk and/or pollution. It was noted that at a few sites, no surface water drainage strategy had been progressed at all. Therefore, at Deadline 10, SCC as the LFFA considered that the Drainage Strategy was not acceptable as a certified document.

5.2 Since the end of the examination, further work has been undertaken by the Applicant; however, as mentioned above, the Applicant is not minded to provide an updated drainage strategy to the Secretary of State. Therefore, SCC maintains its view that the current Drainage Strategy is not acceptable as a certified control document.

How can the issue be resolved at this stage

5.3 SCC's concerns remain as raised at Deadline 10 [in REP10-210].

5.4 SCC considers that, with the additional work undertaken by the Applicant since the close of examination, an updated drainage strategy could readily be produced and submitted by the Applicant in a short timeframe. Based on recent discussions, SCC would be optimistic that such an updated strategy might sufficiently address SCC's concern and thus be, in SCC's view, an acceptable certified control document.

5.5 As mentioned above (and as set out in the amendments in Appendix B), it remains important and beneficial for SCC as the statutory body for surface water drainage to be responsible for approving the detailed surface water design.

Where to find full information

5.6 SCC's Final Position Statement [REP10-210] sets out a summary of the concerns about the drainage strategy as submitted at Deadline 10, with a full description of the shortcomings of the draft Drainage Strategy and related proposals submitted as [REP10-211].

APPENDIX B: DETAILED SUMMARY ON ISSUES OF MECHANICS: SCC'S COMMENTS ON THE FINAL DRAFT DCO [REP10-009] (REVISION 10 VERSION)

SCC has not reached agreement with the Applicant on a small number of DCO articles and requirements. SCC requests that the Secretary of State considers making the proposed changes, set out in the table below, to the DCO.

This Annex does not include amendments that would be required to meet SCC's concerns about the permanent SLR, the main development site pylons, the second outage car park and the SSSI crossing, which are addressed elsewhere in this document.

Note: The numbering of articles and requirements have been updated to reflect the final draft version of the dDCO submitted at D10 [REP10-009] (the numbering in SCC's D10 submission was based on the Revision 10 version of the dDCO).

DCO provision	Proposed Amendment	Justification for Proposed Amendment
Art. 9(7) (consent to transfer benefit of the Order)	Article 9(7) of the Deadline 10 version of the dDCO [**REP10-009**] included additional wording **"in accordance with article 10 (Enforcement of the Deed of Obligation)"** which had not been shared with SCC in advance of submission. ***Either*** amend Article 9(7) to its previous version, by deleting the new wording: "The obligations of the undertaker under the Deed of Obligation are enforceable ~~**in accordance with article 10 (Enforcement of the Deed of Obligation)**~~ against any person to whom the power to construct or operate the main platform work has been transferred or granted under this article for so long as that person benefits from the power to construct or operate any of those works, and such transferee or lessee shall be treated for all purposes as the undertaker who entered into the Deed of Obligation with the other parties to it."	The words shown highlighted and underlined were not included in previous versions of the dDCO. The wording "in accordance with article 10 (Enforcement of the Deed of Obligation)" potentially limits the enforcement options for SCC or ESC against successor undertakers to those matters under article 10, namely: injunction, entry on to land and, potentially, enforcement as a local land charge. There is a possibility that a transferee could argue that enforcement mechanisms usually available but which are not mentioned in article 10 (for example suing for breach of contract for a debt) are not available.

	Or amend Article 9(7) as follows: "The obligations of the undertaker under the Deed of Obligation are enforceable **including** in accordance with article 10 (Enforcement of the Deed of Obligation) against any person to whom the power to construct or operate the main platform work has been transferred or granted under this article for so long as that person benefits from the power to construct or operate any of those works, and such transferee or lessee shall be treated for all purposes as the undertaker who entered into the Deed of Obligation with the other parties to it."	
Art. 11 (2) **(modification and discharge of deed of obligation)**	Amend paragraph (2) as follows (i.e.to include the underlined words): (2) The undertaker may**, at any time after the expiry of the period of five years beginning with the date on which the Deed of Obligation was entered into**, apply to the Secretary of State for the obligation— (a) to have effect subject to such modifications as may be specified in the application; or (b) to be discharged, and must notify East Suffolk Council and Suffolk County Council as soon as any such application is made.	SCC require the five year "relevant period" for applications for modification/discharge to the Secretary of State included here. This five-year period was the period that Parliament considered appropriate when enacting section 106A(4)(b) of the Town & Country Planning Act 1990 ("TCPA 1990") and this period of time does serve a purpose of ensuring some certainty from SCC's perspective in the obligations agreed in the Deed of Obligation. Parliament clearly contemplated that this restriction could apply to the modification/discharge of 'development consent obligations' when s.106(14) and s.106A(11)(aa) TCPA 1990 were introduced into that regime by the Planning Act 2008. In so doing, Parliament would have been fully aware of the full range of projects that could be NSIPs, including energy projects of the scale of Sizewell C. Moreover, the Secretary of State has not taken the opportunity to prescribe a different period for NSIPs, or types of NSIPs, using the power in s.106A(4)(a).

Art. 11 **(modification and discharge of deed of obligation)** **(reinstatement of deleted Art 9B (3))**	On 11 October 2021, the day before D10, the Applicant's solicitors wrote to the County and District Councils' solicitors and informed them that they were removing paragraph (3) from then Article 9B (now article 11) which was included in Revision 10 of the DCO [REP8-35]. The deleted Paragraph (3) said: "(3) An application under paragraph (2) for the modification of an obligation in the Deed of Obligation may not specify a modification imposing an obligation on any other person against whom the Deed of Obligation is enforceable." The effect of its removal would be to remove a limitation on the types of application that could be made for modification of the DoO. Without the paragraph, applications could be made so as to specify a modification imposing an obligation on any other person against whom the Deed of Obligation is enforceable. It was explained that the removal of the paragraph addressed a concern that its retention may be unduly restrictive given the nature of the Deed of Obligation, which features many governance arrangements, collaborations and commitments by various parties in the Deed and the deeds of covenant under it. It was explained that in circumstances where the Applicant were seeking to go to the Secretary of State to seek a variation, the sort of variation needed could require modifications of existing arrangements which could be said to constitute the imposition of new/varied arrangements on parties other than SZC Co. It seemed important that the Secretary of State has that ability otherwise art 9B(2) may be of little value in practice. It was said that the TCPA drafting works for most standard s106 agreements – where a developer just wants to remove a payment or move trigger date, but the Deed of Obligation is obviously more complex. SCC considers that the deleted paragraph should be reinstated.	Paragraph (3) is identical to s.106A(5) of TCPA 1990. Parliament has specified that the limitation in that subsection should apply to all section 106 agreements in relation to schemes of whatever magnitude or complexity and irrespective of the number or nature of parties involved. In SCC's view, paragraph (3) reflects the safeguards embedded in the TCPA regime for planning obligations (which is also applied to the DCO regime without amendment) and is to be interpreted so as to prevent the SoS from varying the DoO if the variation would impose an obligation on Party B in place of Party A, or if the variation would impose an obligation on Party B in circumstances where Party B was not previously subject to any obligation in relation to the subject matter of the variation. SCC question why that should be allowed to happen without Party B's agreement. Although the Applicant has followed up by saying there is no intention of the above happening, there is nothing in the DCO to preclude this outcome. These are matters that it is appropriate to deal with by agreement under a deed of variation, with the undertaker having recourse to judicial review challenge if it considers that SCC has unlawfully refused to agree to a variation of the DoO. Such an approach retains parity with the statutory regime that Parliament has put in place for both planning obligations and development consent obligations, and SCC is not persuaded that any departure from those arrangements is warranted in this case.

Article 23 (2) **(Agreement with street authorities)** **additional routine/cyclic maintenance costs**	Amend article 23(2): (2) Such an agreement may, without prejudice to the generality of paragraph (1)— (a) make provision for the street authority to carry out any function under this Order which relates to the street in question; (b) specify a reasonable time for the completion of the works; and (c) contain such terms as to payment and other matters as the parties consider appropriate, including such matters as may be included in agreements made pursuant to section 278 or section 38 of the 1980 Act, **and including payment for additional costs for routine and cyclic maintenance works done outside of normal working hours as a consequence of the carrying out of the authorised development.**	SCC's external highways works contractors are responsible for carrying out certain routine maintenance works, including cutting grass, emptying gullies, refreshing road markings and filling-in potholes. On the A12, which is traffic sensitive, the contractors usually do these works during the daytime "off peak" period; however, if they are done during the "overnight" as there is too much traffic in the daytime off peak times, there is an uplift in the costs payable to the contractors. There are also uplifts if the work is done at night, on a Sunday, or on a bank holiday. On the B1122 there are no restrictions on working in the peak hours but is considered that the SZC construction traffic will prevent this and these works will also need to be undertaken at night or at weekends. Since it would likely be impractical for such routine maintenance works in or around the Works areas to be done during the "off peak" daytime period, the Council wants any additional costs incurred (i.e. the additional expenditure for shifting from daytime "off peak" to either daytime peak, night, or Sunday / bank holiday) to be met by the Applicant. The proposed amendment seeks to capture this.

Art. 24 (Traffic regulation measures)	Amend Article: 22.—(1) **Subject to the consent of the traffic authority in whose area the road concerned is situated,** the undertaker may at any time, for the purposes of the authorised development make provision, in respect of those streets specified in columns (2) and (3) of Schedule 14 (Traffic regulation measures), as to the speed limit of those streets as specified in column (4) of that Schedule. (7) If the traffic authority fails to notify the undertaker of its decision within 28 days of receiving an application for consent under paragraph (1) **or (2)**, that authority is deemed to have granted consent.	In other cases where undertakers who are not themselves traffic authorities are given traffic regulation powers, the consent of the traffic authority is required before a traffic regulation order can be made. See, for instance, the National Grid (Hinkley Point C Connection Project) Order 2016 (article 40), the National Grid (Richborough Connection Project) Development Consent Order 2017 (article 39), and the Abergelli Power Gas Fired Generating Station Order 2019 (article 15). SCC see no need for Sizewell to be any different and that it is entirely appropriate for the traffic authority to be able to exercise this level of control over a private company taking on traffic regulation functions.
Schedule 25 (procedure for approvals, consents and appeals)	Amend paragraph 4(5) of Schedule 25: (5) Any written representations concerning matters contained in the further information must be submitted to the appointed person, and made available to all appeal parties within **20** ~~10~~ working of the date mentioned in sub-paragraph (3).	Paragraph 4(5) of Schedule 25 sets a time limit by which written representations must be made by parties to an appeal in response to further information which in turn is provided in response to a request by the appointed person dealing with an appeal. The relevant PINs advice note indicates that the period should be 20 business days, which SCC supports. (Since the Applicant refers to "working days" in the dDCO, SCC is content for "20 working" (rather than "business" days to be referred to here).

Various (articles 13(3) (power to alter layout, etc., of streets), 14(2) (street works), 14(3) (street works), 19(5)(b) (temporary closure of streets and private means of access), and 24(2)) (traffic regulation measures)	Amend the following provisions (articles 13(3), 14(2), 14(3), 19(5)(b), and 24(2)) as follows: Art. 13(3) (power to alter layout, etc., of streets): (3) The powers conferred by paragraph (1) must not be exercised without the consent of the street authority ~~which may not be unreasonably withheld or delayed~~. ***Reason: The struck-through words are unnecessary because there is a deeming provision in paragraph (4).*** Art. 14(2) (street works): (2) Without limiting the scope of the powers conferred by paragraph (1) but subject to the consent of the street authority, which consent must not be unreasonably withheld ~~or delayed~~, the undertaker may, for the purposes of the authorised development, enter on so much of any other street whether or not within the Order limits, for the purposes of carrying out the works set out at paragraph (1) above. ***Reason: The struck-through words are unnecessary. The precedent (for example the equivalent provision in the Thames Water Utilities (Thames Tideway Tunnel) Order 2014) does not include these words.*** Art. 14(3): Delete the paragraph ***Reason: Unnecessary and precedent (not included in the equivalent article in the Thames Tideway)*** Art. 19(5)(b) (temporary closure of streets and private means of access) (5) The undertaker must not temporarily close, alter or divert—	In a number of cases, SCC is under a requirement to approve various documents, and provision is made to say that approval must not be unreasonably withheld or delayed and there is also a provision that it is deemed to be given after a certain period, sometimes relatively short. In several cases this appears to be unprecedented in DCOs or not well precedented. SCC will be receiving considerable numbers of requests for approval and will of course ensure that they are dealt with as quickly as possible. With the deeming provisions included there is no need to say that the approvals must not be unreasonably withheld or delayed, and in some cases the deeming provisions are unprecedented and unnecessary. Moreover, by section 161(1)(b) (breach of terms of order granting development consent) of the Planning Act 2008, it is an offence for a person to fail to comply with the terms of a DCO. SCC considers it excessive for it to potentially face criminal liability in these circumstances.

	(a) any street specified as mentioned in paragraph (4) without first consulting the street authority; and (b) any other street without the consent of the street authority, which may attach reasonable conditions to any consent, but such consent must not be unreasonably withheld ~~or delayed~~. ***Reason: Unnecessary: there is a deeming provision in paragraph (10).*** Art. 24(2) (Traffic regulation measures) (2) Without limiting the scope of the specific powers conferred by paragraph (1) but subject to the provisions of this article and the consent ~~(such consent not to be unreasonably withheld)~~ of the traffic authority in whose area the street is situated, which consent may be subject to reasonable conditions, the undertaker may, for the purposes or in connection with the authorised Development …. ***Reason: Precedent: this does not appear to be in other DCOs. SCC makes clear that there is no intention to unreasonably withhold consents, but it sees these words as creating an unnecessary additional requirement in a subject area of great importance to SCC.***	

Req. 5 (Project wide: surface and foul water drainage): **SCC as discharging authority**	**Previously requested amendments** **5. Project wide: Surface and foul water drainage – option 1** Replace Requirement 5 with: (1) No part of the authorised development (save for Work No. 1B, 1C, 4A(c), 9(b), 10(b), 11, 12, 13(b), 14, 15, 16 or 17) may be commenced until details of the foul water drainage system for that part (including projected volume and flow rates, management and maintenance arrangements, means of pollution control, sewage treatment works and a programme of construction and implementation) have been submitted to and approved by East Suffolk Council, following consultation with the Environment Agency, the relevant Statutory Nature Conservation Body, the East Suffolk Internal Drainage Board and the sewerage undertaker. (2) No part of the authorised development (save for Work No. 1B, 1C, 4A(c), 9(b), 10(b), 11, 12, 13(b), 14, 15, 16 or 17) may be commenced until details of the surface water drainage system for that part (including management and maintenance arrangements, means of pollution control, and a programme of construction and implementation) have been submitted to and approved by Suffolk County Council in its capacity as the Lead Local Flood Authority and the drainage authority, following consultation with the Environment Agency, the relevant Statutory Nature Conservation Body, the relevant Internal Drainage Board and the sewerage undertaker. (3) The details of the foul water drainage system and the surface water drainage system must be based on sustainable drainage principles and must be in accordance with the Drainage Strategy. (4) Any approved foul water drainage system or surface water drainage system must be constructed and maintained in accordance with the approved details.	**Background** SCC, as the statutory body for surface water drainage, consider it would be preferable if it was the discharging authority for the surface water element of this requirement. **Previously requested amendments** The amendments to Requirement 5, which SCC has previously requested from the Applicant, are set out as options 1 and 2 in this Annex. In its final draft DCO, the Applicant amended Requirement 5 so that the undertaker must consult with SCC before submitting details under Requirement 5(1). SCC considers this amendment as a step in the right direction; however, as statutory body for surface water drainage, SCC considers that it would be best placed to discharge the surface water element. It is noted that the Drainage Strategy submitted at Deadline 10 was not in a satisfactory state, and SCC requests that the Secretary of State, before making a decision on the Order, should consult SCC and the Applicant about the Drainage Strategy.

	5. Project wide: Surface and foul water drainage – option 2 Replace Requirement 5 with: No part of the authorised development (save for Work No. 1B, 1C, 4A(c), 9(b), 10(b), 11, 12, 13(b), 14, 15, 16 or 17) may be commenced until details of the surface and foul water drainage systems for that part (including projected volume and flow rates, management and maintenance arrangements, means of pollution control, sewage treatment works and a programme of construction and implementation) have been submitted to and approved by East Suffolk Council, following consultation with the Environment Agency, the relevant Statutory Nature Conservation Body, the sewerage undertaker and East Suffolk Internal Drainage Board. (1) Following approval pursuant to (1) above, the undertaker must, as soon as possible, provide details of the approved surface water drainage system to Suffolk County Council. (2) The surface and foul water drainage systems must be based on sustainable drainage principles and must be in accordance with the Drainage Strategy. (3) Any approved surface and foul water drainage system must be constructed and maintained in accordance with the approved details. (4) Details of the surface and foul water drainage system must not be submitted to East Suffolk Council for approval pursuant to (1) above until Suffolk County Council, in its capacity as the Lead Flood Authority and the drainage authority, has approved the additional details in support of the Drainage Strategy. (5) The additional details referred to in (5) above must include information (consistent with national and local policy and based upon best practice and guidance) in respect of the surface water mitigation to be provided, and its location.	

Req. 5 (Project wide: foul water drainage): **Drafting amendments surface and foul water drainage**	**If Requirement 5 is not amended per option 1 or option 2, add the following in Requirement 5:** "(5) Schedule 25 (procedure for approvals, consents and appeals) applies in relation to cases where an endorsement is sought under paragraph (2) as it applies to cases where an application for an agreement is made to a discharging authority, with the following modifications— (a) references to the discharging authority mean Suffolk County Council in its capacity as the Lead Local Flood Authority and the drainage authority; (b) references to the day on which an application is received mean the day on which details are provided under paragraph (2); (c) any fees payable under paragraph 3 are payable by the undertaker."	If Requirement 5 is not amended per option 1 or option 2, SCC requests it is amended as shown. Requirement 5, as drafted by the Applicant, requires SCC to "endorse" certain information and these amendments ensure that such endorsement falls within the approvals etc. regime in Schedule 25.
Req. 5 (Project wide: surface and foul water drainage): **Amendments to proposed new Req 5(1)**	**If Requirement 5 is not amended per option 1 or option 2, and either an updated drainage strategy still does not meet the needs of statutory bodies, or no updated drainage strategy is provided:** (1) No part of the authorised development may be commenced until a final drainage strategy has ~~following consultation with the Lead Local Flood Authority,~~ been submitted to and approved by ~~East Suffolk Council~~ the Lead Local Flood Authority. The final drainage strategy must be in general accordance with the Drainage Strategy and must ensure that the details of the surface and foul water drainage system for each part of the authorised development are consistent with the level of information expected for a Reserved Matters or Discharge of Conditions application, as shown in the table contained on pages 9 and 10 of the Suffolk Flood Risk Management Strategy, Appendix A – Sustainable Drainage Systems (SuDS) a Local Design Guide) or such other document as may be agreed by the Lead Local Flood Authority.	If Requirement 5 is not amended per option 1 or option 2, and either an updated drainage strategy still does not meet the needs of statutory bodies, or no updated drainage strategy is provided, SCC requests these amendments to Requirement 5.

Schedule 14 **(Traffic Regulation Measures)**	In Schedule 14, under the heading "Temporary traffic regulation measures" insert the following note: "Note: Where the undertaker has exercised the power to impose a temporary traffic regulation order ("TTRO") relating to speed limits on any of the specific sections of road identified below, the undertaker must change that speed limit back to the speed limit which applied immediately before the TTRO came into force after the relevant work associated with the TTRO has been decommissioned".	SCC considers the speed limit which applies in respect of a section of road before any TTRO is made should apply after the works associated with the TTRO have been decommissioned. It is reasonable that the burden and cost for arranging for this to be done should fall on the undertaker and not on SCC.

APPENDIX C: CONSIDERATION OF MATERIALITY OF THE ENVIRONMENT TRUST

1. When the Environment Deed was first proposed by the Applicant, it was envisaged by SCC that it would be capable, in principle, of being a material consideration that could be taken into account as an element of offsetting for the residual impacts of the proposal on the natural environment and the AONB. SCC's submissions at Deadline 8 (REP8-185, Agenda Item 3(b)) were formulated on that basis.
2. However, in its final form SCC recognises that the Environment Deed provides a funding regime for achieving environmental measures that at the present time are too diffuse and non-specific for it to be clearly demonstrated that those measures, taken as a whole, necessarily would be reasonably related to those residual impacts.
3. SCC has considered that the flexibility of the funding regime, allowing an iterative and evolving response to environmental issues arising over the life of the proposals is one of its virtues and strengths, as is the inclusion of a wide range of stakeholders in its work. However, SCC recognises that a consequence of that flexibility is that it could not be robustly demonstrated at the present time that all of the funds would necessarily be devoted to measures that are reasonably related to offsetting the residual impacts of the project, so as to satisfy the legal tests (as explained by the Supreme Court in R Wright v Resilient Energy Severndale Ltd & Forest of Dean District Council [2019] UKSC 53) in order for there to be no doubt that the Environment Deed (as now executed) was a material consideration.
4. Consequently, taking a cautious approach, SCC does not invite the ExA or the Secretary of State to have regard to the Environment Deed in their evaluation of the proposals and does not consider, for that reason, that it needed to be submitted to the Examination. That said, SCC confidently expects that the greater proportion of the funds will in practice be devoted to measures which in whole or in part offset residual impacts and that SCC will be able to use its role within the entity to promote that outcome. SCC is also confident that the scale of the funds available will make a meaningful contribution to addressing those residual impacts.

33. Together Against Sizewell C – 22 February 2022

From:	Together Against Sizewell C
To:	SizewellC
Subject:	Sizewell C Planning Application-post D10 submission
Date:	22 February 2022 11:27:21
Attachments:	mapiaogbifaiidap.png TASC post D10 response re ONR 22Feb2022.pdf

[redacted]

TOGETHER AGAINST SIZEWELL C

[redacted] Hubbard's Hill, Peasenhall,Saxmundham, Suffolk

Dear Sizewell C Team,

Please find attached TASC's post D10 document in respect of submissions made by the ONR, which TASC understand will be passed on to the Secretary of State with the planning inspectorate's recommendation.

Please acknowledge receipt.

Best wishes

Chris Wilson

Together Against Sizewell C

TASC Post-Deadline 10 Submission TASC IP no. 20026424 February 2022

Post D10 comments on DCO submissions by the ONR (reference REP2-160, REP7-150 and REP8-168)

1. Further to our D10 submission, REP10-432, TASC remain concerned that the submissions made by the ONR, to the Planning inspectorate (PINS) regarding NNB GenCo's (the Applicant's) nuclear site licence application, give the impression that there are not likely to be any hurdles to the Sizewell C (SZC) licencing process (for example the ONR's Written Representation REP2-160 states in the conclusion: *"Although our site licence assessments are ongoing, we have not so far identified any shortcomings that might prevent the grant of a nuclear site licence to NNB GenCo in due course, or to subsequently permit the commencement of nuclear construction"*). In the ONR's response to PINS question ExQ1 CC.1.33 [REP2-159] they state: *"Our aim is to be in a position to grant such a licence by mid-2020"* so clearly the ONR do not anticipate a situation that would mean that a licence will not be granted, even though major safety issues remain outstanding at the close of the DCO examination. This is hardly reassuring from an organisation that claims "*The Office for Nuclear Regulation's mission is to protect society by securing safe nuclear operations"*

2. A recent planning application lodged with East Suffolk Council (ESC) by the applicant, has, in TASC's opinion, highlighted the disparity between the comments made by the ONR in the DCO process and the possibility that exists whereby the Applicant, at this late stage, cannot demonstrate Sizewell C can be safely constructed. The planning application in question (DC/22/0078/FUL) hereinafter referred to as 'the Geotechnical Trials' is titled:
   "Planning application seeking full planning permission for the geotechnical trials for the enabling works of the proposed Sizewell C power station. These works comprise (i) up to 16 ground anchor trials, in 5 locations up to 0.95 ha with a further 0.09 ha for welfare compound, 1.04 ha in total (of which 0.54 ha is above ground) and (ii) deep soil mixing trial area comprising a total area of 0.52 ha, together with welfare and compound areas to support the works and access."

3. These works are essentially to determine whether the cut-off wall needed to build Sizewell C safely can be constructed in such difficult terrain. If these trials fail to establish ground anchors and soil mixing as being capable of supporting the construction of the cut-off wall, then this could potentially mean that Sizewell C

cannot be safely built. TASC, therefore contest the statement by the ONR that they are not aware of any reasons why the Applicants may not be granted a Nuclear Site Licence (NSL). If the cut-off wall cannot be built safely then it is hard to see how SZC could be constructed without putting workers and residents at risk.

4. The planning application documents contain many references to these geotechnical trials being 'critical' or 'crucial' to the Sizewell C project, as demonstrated by the following examples extracted from its planning statement:-

(i) Para 3.2.6: *"The Sizewell C geotechnical trials are **a vital element** of the Sizewell C Project…"*

(ii) Para 3.3.1: *"The anchor design is **a critical part** in the overall scheme design and **it is crucial** to demonstrate the anchors technical and practical viability."*

(iii) Para 8.1.2: *"The anchor design is **critical part** in the overall scheme design and it **is crucial** to* demonstrate the anchors technical and practical viability", and from the Habitat Regulation Assessment:-

(iv) Para 2.2.1: *"The anchor design is **a critical part in the overall scheme design** and **it is crucial** to demonstrate the anchors' technical and practical viability."*

5. This ground improvement work was anticipated in the DCO planning application (for example, see para 2.2.1.3 in the September 2021 DCO document 8.4K [REP7-036]). NNB blamed 'difficult soil conditions' for additional costs and time delays at Hinkley C so learned experience from there should have resulted in these works being carried out as preliminary works before the DCO application was submitted. Works anticipated in the DCO application, can hardly be labelled as unexpected or exceptional. Perhaps it is pure incompetence by the developer that these proposals were not included in the DCO application, or it could be a deliberate ploy by the applicant to avoid public scrutiny by the Planning Inspectorate, statutory consultees and Interested Parties, of information that will provide a critical understanding of the suitability and safety issues relating to Sizewell C's ground conditions.

6. The Geotechnical Trials application is also of interest in several aspects including:-
   • It confirms TASC's point made in previous representations that essential site characterization had not been carried out sufficiently to inform foundation work on SZC, some of which involves a curtain wall in what is essentially a marsh.
   • That the Applicant's site licence application to the ONR was also potentially premature, in that information was missing.
   • According to IAEA siting guidance STI/PUB/1565 (iaea.org) this work should have been carried out prior to identification of the site as a potential site in the existing EN6.

7. In TASC's view, the Geotechnical Trials, in only being planned now after more than a decade of being aware of the need to assess the ground conditions, demonstrates the way the Applicant is lurching from one last-minute crisis action to another, especially following, as it does, the fiasco surrounding the lack of potable water to build and potentially operate SZC that became the subject of much attention at the end of the DCO examination, with that following on from many previous changes to the original DCO application. None of this paints the applicant's competency to manage such a huge project in such a sensitive area, in a positive light. Indeed, when one considers the problems EDF have experienced building Flamanville 3 in France,

the poor state of repair of EDF's fleet of reactors in France and the problems now being experienced by the partially EDF owned Taishan 1 EPR reactor, it is hard to believe anyone could have faith in EDF's competency.

8. ONR's responses to PINS questions ExQ3 at Deadline 8 24th September 2021 [REP8-168]
   In response to question R.3.1, the ONR state in part (ii) in respect of the need for a desalination plant: *" We have examined the proposed change and do not consider that there are any implications for licensing or timetable"*, and in part (iii): *"There is no specific Licence Condition covering the requirement for a reliable water supply."* These statements seem to conflict with the ONR's statement in their correspondence HPGE202110052 to TASC member M J Taylor [IP no. 20025871] (supplied to PINS on 21st December 2021):-
   "As part of this licensing assessment several key areas are currently under consideration. These are whether:
   …. • there is adequate cooling capability for all normal and fault conditions; " This latter statement makes complete sense as it would be ludicrous for the SZC project to receive a site licence and/or DCO consent that leads to construction starting before there is a guaranteed supply of potable water available for the start of operation. At close of the DCO examination there was no evidence that a guaranteed supply of potable water would be available for the 60 years of operation plus the decommissioning period. Purely on the consumption of mains water alone, Sizewell C is not sustainable.

9. In response to ExQ3 R.3.2, which refers to TASC's questions in our document REP6-076, the ONR state that, in respect of **Taishan fuel failures**, they will *"continue to engage with the relevant regulatory authorities in China, Finland, and France, for example through the Multinational Design Evaluation Programme (MDEP) or directly, to ensure we all have a consistent understanding and discuss any learning for all the EPRs"* giving the impression that there is a regular and up to date dialogue with the Chinese authorities about the EPR's woes in Taishan. This is at odds with the ONR's answer two or three months later, in January 2022, to a FOI request (ref : EIR 202112003) in which they say the ONR *"holds no information relating to design flaws regarding Taishan, or indeed any information that suggests this claimed design flaw has or may impact either Hinkley Point C or Sizewell C"*-
   [redacted] This hardly gives confidence that our nuclear regulator is on top of an issue that could mean the UK commit taxpayers' money to a £20bn white elephant project, Sizewell C. According to paragraph 28 of the ONR's document 'Licencing nuclear installations', part of the ONR's procedures regarding a new site include *'where appropriate draw on advice from overseas regulators'.* Despite the potentially severe implications of the problems at Taishan for Sizewell C and Hinkley Point C projects, TASC are concerned that there is inadequate communication with the Chinese regulators, contrary to the ONR's stated procedures.

10. In a further response to ExQ3 R.3.2 the ONR have commented on TASC's concerns regarding the problem with reported **Primary circuit vibrations**, advising *that "Analysis indicates that the vibration behaviour results from a complex resonance phenomena and modification of the design of the affected piping is not considered as a viable option as this might generate undesirable consequences. Consequently, the vendor has recommended a damping option to reduce the vibrations to an acceptable level. Preliminary feedback from two EPR plants has confirmed that the damping mechanisms are effective in reducing the vibrations such that the impact on the operation through life is acceptably low."* So, the ONR is confirming that the EPR reactor design destined for Sizewell C is flawed and rather than make the developer correct the problem to remove any risk before the first spade is put in the ground, the ONR are happy for EDF/NNB to apply a sticking plaster (presumably a cheaper 'solution' for the developer) to the problem. Bearing in mind that EDF are not going to build any more of this EPR design in France and are developing the EPR2 design for any future French projects, why are our regulators not insisting this problem is fixed in the UK?

11. <u>Flood risk assessment (FRA)</u>
    In REP2-159, in answer to ExQ1 R.1.10, the ONR advise *"The spent fuel encapsulation facility is not required until the spent fuel is retrieved from the Interim Spent Fuel Store (ISFS) and repackage for disposal to the GDF (>100 years after operations)"* So, with SZC expected to operate until 2095, the ONR are saying they expect spent fuel being on the SZC site until the 2190s. TASC cannot therefore understand why the ONR are happy to accept the Applicant's FRA which claims the site can only be kept safe up to 2140. TASC support the submissions made by Mr Nick Scarr (IP no. 20025524) that question the methodology of the FRA as well as pointing out the inadequacies of only assessing the flood risk up to 2140, especially because the ONR's own advice to TASC anticipates spent fuel remaining on site for decades after 2140. And then there is the need to keep the site safe until it is fully decommissioned.
12. During the second session of ISH 11 Chris Wilson for TASC raised the matter of the inadequacy of the 2140 timeline. In response Mr Hansen for the Applicant said (see transcript, EV-196 at 26.33) *"our work in terms of flood risk assessment on the main development site has taken 2140 as the point at which all spent fuel will have been removed from the site."* At 27.36 the Planning Inspectorate asked : *"If your FRA is on the basis that the spent fuel and so on will be removed by 2140? How are you securing that?"* At 27.51 Mr Philpott for the Applicant responded: *"… I shall agree to take that away. And we'll come back to in writing."* TASC note that neither of the Applicant's documents submitted in relation to ISH 11 (REP8-125 and REP8-121) appear to have any reference or answer to PINS' question. TASC query whether this matter has been resolved to PINS satisfaction-where has the commitment to spent fuel being removed from the SZC site by 2140 been secured in the draft DCO?

13. <u>Competency/Organisational structure</u>
    Under the ONR's Licence Conditions it states: *"Licence Condition 36: Organisational capability The licensee shall provide and maintain adequate financial and human*

resources to ensure the safe operation of the licensed site." TASC written rep REP2-481j 'REVIEW OF APPLICANT'S FUNDING STATEMENT (DCO DOCUMENTS APP-066 & AS-011)' set out many reasons why there can be no confidence in the Applicant's financial standing and therefore no confidence in its ability to fund a suitable organisational structure. In addition, there are grave concerns about EDF's ability to build new EPR reactors (reference Flamanville 3 being over a decade late, with welding and quality control problems, costing four times its original budget) calling EDF's competence as a developer into question. EDF France have major financial issues with its recently published 2021 financial statements showing net financial debt of €43 billion and this does not include provision for a major refurbishment programme or for reactor decommissioning costs in France, which have been estimated as costing between €40-100 billion.

14. <u>Conclusion</u>

    TASC considers that the above issues highlight the ONR's apparent lack of concern about the Applicant's abilities to complete this project safely and to manage its operations and own affairs properly for the full lifetime of the SZC project. Bearing in mind the ONR's primary remit: "*The Office for Nuclear Regulation's mission is to protect society by securing safe nuclear operations",* TASC would expect the ONR to have communicated such matters to the Planning Inspectorate.

[redacted], Hubbard's Hill, Peasenhall, Saxmundham, Suffolk [redacted]

34. S.A.G.E – 23 February 2022

SoS/PINSFinLtr for 28th Feb 22

S.A.G.E. (Suffolk Community Monitoring Group)

IP No 20026009

to: National Infrastructure Planning Inspectorate, EDF Sizewell C Case Team.

from: Regan Scott, S.A.G.E. Convener *email* – [redacted]@gmail.com

23.2.2022

Commentary on Six post-Examination Principal Issues

We write to suggest that six areas of material consideration have emerged since the close of the Inspection hearings, and ask for these comments to be forwarded with your Inspection Recommendations to the Secretary of State.

This representation supplements the basic themes we have pursued throughout the SZC planning process – not least in 16 written submissions and many live contributions. These have been based on fundamental planning principles and issues, and most notably 'changed circumstances' of policy and law, the role of the closely associated matter of 'combined and cumulative impacts' and HRA/IROPI and the duty to seek mitigation and alternatives. The orientation has been about conformity with public policy and compliance with regulation.

We also urged a wide Examination agenda of Principal Issues reflecting what might be termed a planning algorithm: namely that the questions about the SZC project concerned its suitability to Suffolk and the site, it necessity and its sustainability. The sum of the algorithm would be the balance of positives and negatives – and the unresolveds and unknowns - and their respective weightings in the setting of the project's conformity to policy and law.

1 **Bedrock Trials - EDF's local planning application (App: DC/22/0078FUL, planning@eastsuffolk.gov.uk))**

This application, notified 17th January, 2022, and made to East Suffolk Council Planning Committee is for geotechnical trials of the bedrock

beneath the SZC site and an anticipated need for steel struts to support the deep foundation perimeter wall.

Our letter of comment to ESC Planning Committee (see ESC archive above for ours and many others) suggests that while the trial may or may not be a local planning matter, it has come as a shock that such fundamental investigations have been so delayed without explanation with now more than a decade to carry out this obvious work. However, we suggest that what matters in the planning process is not the permission itself but the results of these geotechnical trials. We believe the trial results should be published as appropriate assessments with full engineering proposals, not just engineering sketches, for public consultation. We further note that the Inspectors received multiple representations that the engineering plans for the Beach Landing Facility and marine pier were utterly unprofessional, an issue which may not have been resolved at close of public Inspection.

Secondly, we suggest that the bedrock issue should now be seen as an unresolved Principal Issue during Examination and be regarded at this stage of the process as an unknown/potential negative until it has produced acceptable results and engineering proposals. It constitutes a systemic/structural issue which should have been dealt with during Examination. Adequate professional resources exist within the impacted communities to offer views on results and proposals, as evidenced during the Hearings. An obvious concern is that the proposed supporting struts for the massive perimeter containment shield may need to penetrate the sand dunes outside the site and therefore be exposed to coastal change dynamics.

2 The Aquind decision (BEIS 20th January, 2022)

We suggest that the **r**ejection of a whole important energy infrastructure project on the basis of inadequate consideration of an alternative route for the UK/France energy interconnector has shown that the tilted balance of National Policy Statements (standard and IROPI qualified) has only a limited weight, being overriden by the imperative of a comprehensive consideration of alternatives, a matter which we note has been further developed in the Vanguard

redetermination (see below). This diminution of the NPS tilted balance is, we suggest, notwithstanding the promulgation of the interesting but unreasoned doctrine of 'exceptional necessity'. We further note that the SoS Decision encompasses the principle of "potential" alternatives, a matter to which we return below.

If "potentiality" engages with consideration of alternative projects, as a planning principle it would be reasonable to also apply it to consideration of combined and cumulative impacts.

3 Marsh Harrier Update News and the IROPI Trigger

EDF's Newletter Update (2.2022) has declared that marsh harriers – and otters – "have returned" to Aldhurst Farm.

This development has consderable imolications for the EDF request for IROPI on the very narrow ground of the loss of a small amount of Minsmere resident marsh harriers' foraging. This would be from the small parcel of the SSSI required for the permament accesss road to the proposed site, and also for the wider foraging loss during the lengthy constructon period which EDF nevertheless regards a temporary/transitional.

The disturbancee of the MH is the sole receptor cited after assessment for a significant negative HRA impact on Minsmere, a matter which was , not surprisingly, strongly contested during the Examination.

The marsh harriers – not a licensable protected species as are the ottters – are claimed to have "returned" – or maybe arrived anew - on what was agricutural land - to EDF's creation of the Aldhurst farm nature terrain. It would therefore seem that the MHs have had no problem in finding adequate foraging, and notably well in advance of any construction works. While there are many detailed matters about MH protection, breeding and foraging and compensatory terrains for both breeeding and foraging, the essential point is that the trigger for IROPI would now seem to be redundant, or, to pursue the trigger metaphor, to have fallen off.

It follows that without IROPI, the SZC project will default to consideration by the standards of ordinary SEA/EIA, NPSs and authoritative public policy, and as we mention below, the primary and

overarching sustainability duties in PA2008 Part 2, **10,** Clauses 1,2, and 3 (a) and (b), on which we drew in our representations to the ExA.

In support of our view that IROPI is now likely to be redundant, and that the EDF claim needs in any case is to be subject to a new consultation on a new assessment of Aldhurst farm. It may be worth noting that we expressed concern about the narrowness of the marsh harrier IROPI trigger during the Inspection, and that the Inspectors in their RIES invited EDF to reconsider their IROPI case. This advice was not, apparently, taken up by EDF in the due time. It was not clear whether the ExA's advice was likely to lead to the withdrawal of IROPI, or, equally, to its enhancement by including disturbance impacts for the many other protected fauna and flora at Minsmere. Our view was that the initial basic impact assessment for Minsmere was defective, particularly in respect of the precautionary principle and the likely length of the construction period being anything from a hardly credible 8 years to 12 or 15 years, engaging likely breeding impacts, for example, of many generations of fauna.

Another feature of Aquind reasoning is also of interest. It concerns EDF's overly rapid ascent to IROPI, and the narrow basis on which the search for mitigatory alternatives for the MHs and maybe many more species, was conducted. Aquind's very broad approach to alternatives – all practicable and potential altenative projects - suggests that the HRA process on Minsmere needs to be revisited. Was therefore no aternatuve oter than reaching for what can be assumed they regarded as the cover of IROPI ? That stratagem wasEDF's to choose, but in seeeking to assess it we have ben mindful of mainstream lega commentary to the effect that IROPI can be a "high hurdle". EDF 's approach has, however, been far too narrow to reflect the likely scale of disturbance(s) to Minsmere.

If however, IROPI is upheld, we note (below) a further possible authority in Vanguard on the need for overall coherence to be achieved for nature assets in IROPI compensation proposals. This formulation appears to update early legal commentaries on the nature of HRA compensation.

4 Vanguard's redetermination and the policy rehearsals by the SoS.

The SoS's Vanguard decision (BEIS 11th February) to redetermine the onshoring of Vattenfal's offshore wind farm can be seen as a landmark decision of wider importance than the overriding of a judicial review and some minor new conditionalities for a national infrastructure DCO application.

Three areas are of particular interest, namely the rehearsal of the Government's three tests for consenting IROPI compensation (BEIS Letter: 5.10, p 40), the authority established about fully assessing the combined and cumulative impacts of a project and thirdly the establishment of a new 2035 energy supply target date for climate change mitigation.

Vanguard sets out the requirement that if IROPI applies, the compensatory measures must themselves ensure that the overall coherence of the national site network is maintained. Two points arise: first, that Minsmere, after 70 years as the apex of the RSPB achievement might be regarded as the national network, including its microhistory of the rescue and recovery programme for the marsh harrier from an extinction baseline.

Secondy, an holistic approach might be in line with the case law authority of Navitas Bay – historic coastal landscape, international heritage site, and more recently, the judicial review of the road proposals at Stonehenge.

The shortcomings of the combined and cumulative impact assessment in the Vanguard judicial review may also carry implications for EDF's DCO case. It is reasoned that it impeded achievement of the energy supply target set by Government for 2035. In this new situation, a go-ahead for Sizewell C might be seen as crowding out alternatives on the Energy Coast East which would be capable of reaching this carbon target more rapidly, at lesss cost and more securely.

5 New Nuclear Funding and project management issues

At a Suffolk Parishes meeting at Snape, on February 4th, the BEIS spokesperson revealed in answer to a question about future ownership and funding of SZC that BEIS would be conducting its own FID. The SoS had visited SCZ only days before and had announced a Government "boost" for SZC which on examination turned out to be what can only be

described as a liquidity loan, maybe to fill an anticipated cash gap if China's CGN withdraws from the current development phase of SZC.

We further note that the Treasury's estimates in Autumn 2021 allocating up to £1.7 billion of support for at least one more large scale nuclear plant deliverable by 2035 has taken the form of an estimate over several years, detailed in the Appendices as an initial four year flow of quite modest sums. While this is a new allocation, it falls far short of a real contribution to a project currently without any overall secure funding, a parent in France very short of capital and competing projects lining up at much less than the currently estimated £22bn for SZC.

These funding developments can be regarded as new, along with the Nuclear Levy Bill passing through Parliament currently, and the intention to develop this paving measure into a statutary instrument.

While these are matters for Government, and subject to necessary public consultation, we suggest that they engage with the SZC project likely insecurity, alongside the emerging concern about corporate responsbility for such a massive project being in the hands of a licensee which is declared in the draft DCO to wish to retain no more than a minority interest in SZC. There are now, with this DCO declaration, implications for project governance and Deeds of Obligation. The public narrative about the RAB model of funding has obscured real concerns about how such a massive and intentionlly long life project might be able to survive in a secure and satisfactory way if majority private ownership by investors rules the expenditure roost. The same goes for the proposed RAB levy for consumers, bearing the construction risk with no guarantee of lower SZC enegy prices available on the market and no voices. And no mechanism proposed to date for the restitution of the levies should the project fail, for whatever of many reasons that might occur.
This constitutes a special financial prospectus, rare in the nuclear field and where tried in the USA, unsucccessful leaving only the options of nn-completion or closure or state capture.

The national policy goal of energy security fom this project, with this funding model and ownership struture is a principal question. It occurs to us that a broad definition of akternatuves might well come into play above and beyond standard planning considerations under the overriding imperative of national energy security. We suggest that the Vanguard redetermination authority for quashing likely impediments to public policy aims – that is, energy security - needs to be applied to the SZC project's business model and funding regime. In these respects, of course, SZC is a profoundly different project to Hinkley Point C, which can best be seen as a Government secured project, with a guaranteed profit stream from a high CFD, and appretoy funds to complete construction. HPC might be described a state guaranted quasi monopoly: SZC would be a market financed venture into a rapidly changing, highly charged and uncertain energy market. That prospect invites its capability to deliver energy security – and value for public and consumer money – to be considered as a full planning issue and to constitute a substantial part of any reasoning undertaken by the SoS after the Inspectors' Recommendation.

A final point is that BEIS's separate FID should be published and, on the RAB levy, consulted on to interested parties. If planning is required to be transparent, so too should project finance where it is evidently going to impact the public policy goal of energy security.

> N.B. It may be appropriate here to note that EDF have revised their Statement of Reasons and now recognise the Review process of NPS EN1 and 6 as material considerations, and that the Review process is likely to engage the current policy narrative as set out in the Net Zero Strategy, Chapter 3, paras 38-40, which, incidentally, can be read as depassing the EN6 requirement of 7 out of 8 new nuclear site options. Counting two projects at Wylfa and one at Trasfynnyd and an ccasional mention of a new nuclear hub at Moorside, there is a real prospect of deliverable alternatives to SZC's already outdated EPR. France is well advanced in its designs for the "more manageable" EPR 2, and several countries are pursuing large scale SMR projects with energy storage linkage in parallel to the UK.

6 COP 26 and the UK's enacted 2035 carbon budget target

On this matter we refer, quite simply, to the public policy and lawful new post COP26 target of a 78% reduction in carbon emissions by 2035, as announced by BEIS – Press Statement on the UK's Sixth Carbon Budget, 20th April 2021, and slated to be law by the end of June 2021. We suggest that the SZC project will be unable to contribute positively to this public goal because of the need to offset its construction footprint. We are of the view that EDF has not presented a full and satisfactory carbon account of this project in these sites and at this time, despite the parent company offering granual carbon footprinting sevices to its commercial clients. While this failing was an Examination issue we raise it now for consideration as an important unresolved principal issue.

Some conclusions

- **That the policy context, particularly in respect of project alternatives and potential alternatives, constitutes a changed circumstance of considerable weight which has not been substantively addressed by EDF and deserves the fullest consideration in the coming SoS decision about SZC.**

- **alternative projects, of large nuclear scale, capable of energy security, deliverability and market flexibility and energy storage integration, and likely to attract responsible funding, are now available and deserve consideration under "changed circumstances" since the SZC EPR project was commenced. "Potential" projects also deserve full consideration.**

- **in line with the Inspectors' already published RIES report, with its repeated advice to EDF about revising their IROPI case – that is, the very narrow, minor IROPI trigger for marsh harrier foraging – has rendered the IROPI case redundant with the "return" of marsh harriers to Aldhurst Farm as just announced.**

- **the HRA on Minsmere should be reconsidered for likely negative impacts on its integrity as a nature and public heritage asset**

equivalent to Stonehenge in the recent judicial review and the South Downs landscape designated by the United Nations in the Navitas Bay case.

- **if IROPI were to be refused, the original planning narrative posed by Suffolk County Council and East Suffolk District – the McGregor Report - on the standard basis of LIA should be granted great weight. This well established view is that the project's evident EIS/EIA negatives outweigh the positives and that there remain very sustantial unresolved issues about the project.**

  This unresolved list should carry very substantial negative planning weight. The list now needs to be supplemented by the new trials of the bedrock/geo-stability of the site. It would join the unresolved (aspirational) rail transport issues, the water supply issue for construction and especially for the 60 year operating life, the very limited site size, the impracticability of the road infrastructure, the multiple combined and cumulative developments which are flagged daily in the local media – e.g. the triple sites for the new Felixstowe freeport and extensive new housing developments; the capabilities of future management and equally the discharging authoritiies (SCC and ESC) given the declared aim of EDF to retain only a minority management interest in the project; and, perhaps finally, the parlous, precarious and continuing financial condition of a parent company in France unable to fund its own energy transition without substantial new state funding.

- **that funding is a public interest issue and that after the Nuclear Levy Bill and promised SI, the BEIS FID should be consulted on with interested parties before the disbursement of any large scale public fundng for this, and, indeed, any other new nuclear projects.**

- **that the new climate change imperative date of 2035 and its consequent policies be applied to the outstanding issue of the carbon footprint of this roject, at this time and in this place and circumstance, and that proportionate weight be given to any net gain after offsetting of the construction footprint, and in comparison to deliverable and potential alternative large scale nuclear projects and renewable energy projects. The start of annual auctions for offshore and onshore wind farms and prospect of gnew gas capacity linked to CCUS facilities reinforcs the point that SZC is unlikely to be able to contribute positively in appropriate time tocarbon reduction targets in the energy sector.**

- **that these principal issues – material considerations – as currently understood are sufficiently substantial to support the view that the project is not likely to be of sufficient standard to enable the SoS to perform his/her strong statutary duty of contributing to sustainability (PA2008, Part 2, Chapter 10).**

- **and that the project does not otherwise conform to public policy and law, being unsuitable for Suffolk and the site, and not necessary given practicable and potential alternatives and is further unsustainable in respect of value for money, energy security, likely lifetime redundancy, design challenges and the likely impact on precious national environment and nature assets.**

ends

35. Northumbrian Water Limited – 23 February 2022

From: [redacted]
To: SizewellC
Subject: RE: Update on WINEP Modelling
Date: 23 February 2022 16:30:50
Attachments: 231122 2SZC update letter from NWL.pdf

Dear Sian,

Sizewell C

Please find attached a final update letter from Northumbrian Water. The letter discusses the progress of the WINEP investigations and effect of the same on supplying water to the project.

Please could you pass a copy of the letter to the Secretary of State.

Kind regards,

Emma

Emma Conwell
Senior Associate

Walker Morris LLP
33 Wellington Street, Leeds, LS1 4DL

[redacted]

From: SizewellC [mailto:sizewellc@planninginspectorate.gov.uk]
Sent: 15 October 2021 16:37
To: Emma Conwell <[redacted]@walkermorris.co.uk>
Cc: SizewellC <sizewellc@planninginspectorate.gov.uk>
Subject: RE: Update on WINEP Modelling

Dear Ms Conwell

Thank you for your email however as the Examination has closed I cannot pass this to the Examining Authority. It will be passed to the Secretary of State with the Examining Authority's recommendation report.

Kind regards

Siân Evans
Case Manager
National Infrastructure Planning
The Planning Inspectorate
0303 444 5671/ 07407 878448 / Helpline: 0303 444 5000
Email: sian.evans@planninginspectorate.gov.uk

Web: https://infrastructure.planninginspectorate.gov.uk (National Infrastructure Planning)
Web: www.gov.uk/government/organisation/planning-inspectorate (The Planning

Inspectorate)

Twitter: @PINSgov

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From: Emma Conwell [redacted]@walkermorris.co.uk>
Sent: 15 October 2021 16:08
To: SizewellC <sizewellc@planninginspectorate.gov.uk>
Subject: Update on WINEP Modelling

Dear Sirs/Madam

Whilst I appreciate that the Inquiry has now ran its course, I thought it might assist the Authority to have an update on the NWL's WINEP modelling timeline. This was stated in submissions to be expected to conclude by mid-October. The timeline for this has now changed.

NWL held a meeting with Wood Consultants who are completing the WINEP investigations. NWL and Wood have identified further work which needs to be completed before the WINEP can conclude. This will require a further meeting with the EA which is provisionally scheduled for w/c 1 November 2021. However, the WINEP modelling is complex making it very difficult to suggest an absolute deadline for finalising and signing off WINEP investigations and reports.

I trust this assists the Authority.

Kind regards,

Emma

Emma Conwell
Senior Associate

Walker Morris LLP
33 Wellington Street, Leeds, LS1 4DL

[redacted]

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DPC:76616c646f72

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BS1 6PN

Our ref AEO/EFC/NOR01691.8

Your ref EN010012

23 February 2022

Dear Sirs

Application by NNB Generation Company (SZC) Limited for an Order Granting Development Consent for The Sizewell C Project

Update from Water Authority on water supply issues

1. We write on behalf of Northumbrian Water Limited ("**NWL**"). As you will be aware, a number of statements have been submitted by NWL to date regarding water supply to Sizewell C ("the **Project**"). We write to provide an update on the latest position in respect of water supply.

2. As discussed at length during the Examination Hearings, NWL were unable to say with any certainty if it would be able to supply the Project's long-term water demand for the commissioning and operational phase from the River Waveney, in its Northern Central Water Resource Zone. This uncertainty stemmed largely from the ongoing WINEP investigations.

3. It was explained that the WINEP investigations would inform the capacity of the current supply system and whether any additional infrastructure would be required to supply the Project.

4. It had already been established, during the course of the examination, that NWL was unable to supply the Project's water demand during construction, which gave rise to NNB Generation Company (SZC) Limited's proposals for a temporary desalination plant.

5. We also remind the Examining Authority that NNB Generation Company (SZC) Limited (SZC Co.) has rescinded any rights to force NWL to supply water to the construction phase of the Project (see SoCG agreed on 8th October 2021, including the Protective Provisions at Appendix B).

6. Whilst the WINEP investigations have not concluded, they are now at an advanced stage and demonstrate that NWL will <u>not</u> be able to supply all forecast household and non-household demand, including the Project's long-term demand, from existing water resources. NWL will therefore need to identify new water resources to meet the forecast demand.

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7. For the commissioning and operational phases of the Project, NWL has therefore included an annual average demand of 2.2Ml/d and a peak daily demand of 2.8Ml/d from 2032 in its Essex & Suffolk Water (ESW) Water Resources Management Plan 2024 (WRMP24) demand forecast, as requested by SZC Co. The WRMP24 baseline supply demand balance forecast for the ESW Suffolk Supply Area is for there to be a supply deficit under a 1 in 500 year drought resilience scenario from 2030. Therefore, new demand management and supply side schemes will be required in order to meet all forecast demand in the ESW Suffolk supply area including that of the Project's long term supply.

8. In addition to demand management options (e.g. leakage reduction from water company and customer side networks, compulsory metering of household customers and water efficiency schemes), NWL is also appraising options including but not limited to:

    a. an import from Anglian Water although due to insufficient capacity in Anglian Water's strategic network, this is likely to be dependent on an export from ESW's Essex Water Resource Zone which is also forecast to be in supply deficit and therefore will require new supply side schemes;
    b. nitrate removal at Barsham WTWs to reduce raw water quality driven water treatment works outage;
    c. effluent reuse and desalination (both using reverse osmosis technology); and
    d. longer term (post-2035) winter storage reservoirs.

    The option types and sizes that will be included in the ESW draft WRMP24 final plan (to be submitted to Defra by 3 October 2022) will in part depend on the final outcome of the WINEP investigations on NWL's River Waveney abstraction licence.

9. NWL reiterates its commitment to provide the Project's long-term supply, although it is unlikely to be available until the late 2020s at the earliest, despite use by NWL of reasonable endeavours to establish the supply as soon as possible, and there is significant risk that it could take longer. For the avoidance of doubt, any such supply provided by NWL is reliant on:

    a. The finalisation (including funding for) new supply schemes to meet the future mains water demands in Suffolk, including the Project;
    b. All new supply-side infrastructure required to supply the SZC power station is commissioned and operational; and
    c. The completion of a Section 55 Agreement under the Water Industry Act 1991.

10. It is emphasised that the costs approval process involving OFWAT, which has been explained in detail in our previous correspondence, will need to conclude prior to the installation of any such additional infrastructure. Any new supply schemes will need to be identified in NWL's Water Resources Management Plan 2024.

11. We hope that the above update allows the Secretary of State to make an informed decision with regards to water supply issues discussed to date. It is unlikely that any further updates will be forthcoming prior to the proposed decision date.

12. Please kindly provide a copy of this letter to the Secretary of State and confirm receipt of the same.

13. This letter has also been shared with NNB Generation Company (SZC) Limited.

    Yours faithfully,

Temple Quay House
2 The Square
Bristol

BS1 6PN

Walker Morris LLP

36. Theberton and Eastbridge Parish Council, Stop Sizewell C and Minsmere Levels Stakeholders Group – 23 February 2022

From:	[redacted]@gmail.com
To:	SizewellC
Cc:	beisip@gov.uk
Subject:	Sizewell C Post Examination Submission
Date:	23 February 2022 17:44:34
Attachments:	SZC Soil Mixing and Anchor Trials.pdf

Please find attached a submission relating to the Sizewell C Development Consent Order application.

The submission is sent on behalf of;

- Theberton and Eastbridge Parish Council
- Stop Sizewell C and
- Minsmere Levels Stakeholders Group

I understand that this will be forwarded to the Secretary of State BEIS along with the Examining Authority's report.

Please confirm receipt of this document and it's forwarding with the Examining Authority's report.

Regards,

Paul Collins
Cllr, Theberton and Eastbridge Parish Council
Chair, Stop Sizewell C
Co-secretary Minsmere Levels Stakeholders Group

[redacted]
Bakers Hill
Eastbridge
Leiston
Suffolk
[redacted]
Home: [redacted]
Mob: [redacted]

Late Soil Mixing and Ground Anchor Trials at Sizewell C

East Suffolk Planning Applications DC/21/5408/EIA and DC/22/0078/FUL

On behalf of the following Interested Parties:

Theberton & Eastbridge Parish Council
Stop Sizewell C and
Minsmere Levels Stakeholders Group

In our previous submission to the Planning Inspectorate, after the close of the examination, which will accompany their report to the Secretary of State regarding the Sizewell C project, "***Summary of Concerns and Objections to the Sizewell C Development Consent Order Application***" we made some references to the two planning applications detailed above. This document will expand our concerns regarding these applications.

The results of these trials and a fully elaborated solution to the issues of ground suitability and stability should have been determined during the Sizewell C consultation period and included in the DCO Application.

We are concerned that whilst the ground anchor trials are distributed around the interior of the proposed platform, the soil mixing trial is located only at an area close to the Sizewell Marsh SSSI and within the proposed cut-off wall boundary.

One of the most critical areas for ground improvement is below the Hard Coastal Defence Feature, to the east of Bent Hills. However, there is no plan to engage in a test of this area despite the ground makeup being very different to that at the currently proposed test site, as evidenced in APP-289 of the Sizewell C DCO Application.

So, it will remain unknown whether the soil mixing trials will lead to a satisfactory solution for ground strengthening of the Hard Coastal Defence Feature which might avoid slumping and/or lateral collapse, over the operational and decommissioning lifetime of the power station.

The proposed trial to examine the area is scheduled to start in April 2022. According to the Applicant, results will not be available for 6 months following commencement of works.

So, **results will not be available for the Secretary of State to consider within the time limits set for determination of the DCO Application on 25th May 2022**. Indeed, the trials will be less than a third of the way through.

As this trial is being conducted outside of the DCO examination period, there will also be no opportunity for scrutiny by Interested Parties, several of whom have expertise in ground improvement design and engineering, including for coastal protection schemes. They, and others, expressed serious concerns regarding the lack of design detail, including ground improvement, for the Hard Coastal Defence during the consultation and examination stages of the Sizewell C DCO Application and responses from the Applicant were still outstanding at the time the examination closed.

We are concerned at the potential for significant damage to the coastline across Sizewell Bay should any Hard Coastal Defence Feature collapse, after failure of ground improvement, and the consequential impacts that might occur to the existing Sizewell B operation, which has its cooling waters intake and outfall very close to shore when compared to those proposed for Sizewell C.

As a minimum we believe that an Environmental Impact Assessment under Schedule 3 of The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (TCPR) should be carried out, and an Environmental Statement submitted before this matter is considered any further. Additional Soil Mixing Trials should be planned directly below the proposed Hard Coastal Defence Feature and **the results should be made available for scrutiny before any formal decision is made regarding the DCO Application.**

We have objected to the [redacted] application submitted by Ms. Carly Vince of Sizewell C, the Applicant, and are concerned as to the legitimacy and depth of scrutiny in the determination of [redacted] Scoping Opinion for this application. Details are given below.

East Suffolk Council, being in receipt of both the scoping opinion request and latterly the full application, is placed in an invidious position of having to determine the application outside of the encompassing National Strategic Infrastructure Planning environment applicable at Sizewell C.

This is an abuse of process by the Applicant and yet one further example of under-provision of information during the consultation and examination stages of the Sizewell C project.

Scoping Report Request [redacted]

In the case of the determination of [redacted] and the need for an Environmental Impact Assessment, the Applicant has proposed that because Planning Practice Guidance states that "*exploratory deep drilling on its own is unlikely to require Environmental Impact Assessment*" plus examination of Schedule 3 of TCPR, the need for an Environmental Impact Assessment is not met.

East Suffolk Council has concluded the same.

However, having accepted that the project should be assessed as a TCPR Schedule 2 drilling development and that the 1ha area is exceeded, then looking at Schedule 3, there are significant areas where there are likely impacts and, in our opinion, should have required an Environmental Impact Assessment.

The Applicant has not evidenced in its scoping opinion request that potential impacts are unlikely or of an insignificant nature.

There is an over-reliance by both the Applicant and East Suffolk Council on deferring all potential impacts to the Outline Construction Environment Management Plan (oCEMP), without sufficient evidence presented to support such an approach.

In the Decision, for [redacted] East Suffolk Council states clearly that "*During the works, there is potential for indirect adverse effects to surface water and groundwater receptors from changes to local drainage patterns, site runoff (including sediment from ground disturbance) and spillages of materials and chemicals*", yet the East Suffolk Council assessment then ignores this potential, deferring all considerations to the oCEMP.

In reviewing the decision with respect to **Schedule 3, 2.- (1) The environmental sensitivity of geographical areas likely to be affected by development must be considered…** sub-item **(c)(i) "wetlands, riparian areas, river mouths"** is assessed by East Suffolk Council as "**Not applicable**".

However, Sizewell Marsh SSSI is within 10 metres of the soil mixing test site and Sizewell Drain a similar distance. Whilst the test area itself may not be wetland, Sizewell Marsh SSSI is a wetland with significant wet woodland, fen meadow and reed bed and two significant drains close to this test site, and is supported by the definition of riparian *"relating to wetlands adjacent to rivers and streams"*. All these areas within the Sizewell Marsh SSSI are "***likely to be affected"*** by this

development and, given their proximity, should be the subject of a thorough Environmental Impact Assessment and Environmental Statement.

In deciding that sub-item (c)(i) is "**Not applicable**", and no Environmental Impact Assessment is required, East Suffolk Council has lost sight of the fact that the soil mixing trials accompanying the ground anchor (drilling) trials - within the environmentally sensitive area of the AONB and within 10 metres of the Sizewell Marsh SSSI and Sizewell Drain, with their functional connection to the Minsmere and Walberswick Heaths and Marshes SSSI with its overlapping SPA, SAC and Ramsar designations - are at risk of significant effects through both surface and groundwater impacts.

In support of the above statement, it is relevant to note that in the Sizewell C DCO application (REP7-036), the Applicant states that "*an environmental sheet pile barrier will be needed to protect the SSSI prior to ground improvement works progressing"* close to this location. Whilst Sizewell C does propose a surface drainage channel to protect against surface run-off, there is no deeper protection proposed for this work and Sizewell C offers no evidence that, contrary to its DCO statements, such deep protection is not necessary.

In considering item **(c)(v) European sites and other areas classified or protected under national legislation** East Suffolk Council states "*The site lies within an AONB and adjacent to a SSSI.*", which ignores the fact that it is also within a hundred metres of a second SSSI site with SPA, SAC and Ramsar designations as referred to above.

Also, the fact that the Environment Agency, Natural England, Suffolk Coast & Heaths AONB and Water Management Alliance/Inland Drainage Board were not consulted for the scoping opinion is a gross omission for this scoping opinion request.

The only respondents to the application were Suffolk County Council Archeological Services and the Suffolk Fire and Rescue Service and this application had been decided before many local organisations, Parish Councils and interested parties to the Sizewell C DCO Application were even aware of it.

Soil Mixing and Ground Anchor Testing Application [redacted]

We are concerned that, as this work will be carried out in parallel with the SZB Relocation development [redacted], insufficient assessment of cumulative impacts, from these two projects, on the adjacent protected areas has been made or considered.

We also question why the soil mixing trials are not also examining the area east of Bent Hills where the Sizewell C Hard Coastal Defence Feature is planned to be constructed. As evidenced in APP-289 of the Sizewell C DCO Application, the proposed trial area has very different characteristics to the area where the Hard Coastal Defence is to be built. So even after the trial is complete and results known, we will be none-the-wiser as to whether the ground below the Hard Coastal Defence Feature can be appropriately strengthened.

The proposed timing of these works overlaps with the Sizewell B Relocation project, the breeding times for the bird population and the emergence from hibernation of the reptile population. The fact that this development is also significantly distant, from the Sizewell B Relocation, and extends the overall impact on Sizewell Marsh SSSI by disturbing foraging by avian protected species as well as the bat population. This increase in cumulative impact on protected species in the area is not properly assessed by the Applicant, a point that has been similarly raised by both RSPB and Suffolk Wildlife Trust.

As [redacted] application stands, it should be refused, and the [redacted] scoping opinion reconsidered whilst also engaging those environmental consultees referred to earlier before the application is considered further.

37. Suffolk Coastal Friends of the Earth – 24 February 2022

Friends of the Earth
Suffolk Coastal

The Sizewell C Project EN010012

Interested Party ID: 20025904

Comments on our Statement of Common Ground presented at Deadline 10:

Loss of and risks to rare and uncommon plants of Suffolk Shingle Beaches County Wildlife Site (CWS) due to inadequate plans for the restoration of Sizewell Beach.

Rachel Fulcher, B.A. Hons, MPhil

1. Background

Our members remain deeply concerned about the lack of proper plans to preserve the flora of Suffolk Shingle Beaches County Wildlife Site, after the proposed complete removal of much of Sizewell beach for the building of sea defences and marine engineering works.

During discussions concerning our Statement of Common Ground, we made it clear to Sizewell C Co that simple storage of substrate for later use on the rock armour of the new defences was not an adequate technical approach. Many of the plants, including important ones that have built up large populations, but also the rare ones, such as Sea Pea (*Lathyrus japonicus*) and Yellow Horned Poppy (*Glaucium flavum*), would not survive. Moreover, it was not at all clear in the plans where the substrate would be stored, for how long and under what conditions. We requested that a scientific and evidence-based detailed plan be followed, along the lines of the work carried out by the Central Electricity Generating Board and subsequently Nuclear Electric to preserve the plants in front of Sizewell B station. We were promised by the Sizewell C Project Team, with agreement from the ecologist, that this would be put in hand and that we would be kept informed.

At the next SoCG discussion we raised the matter again, but it seemed to have been 'forgotten'. However, further detail was promised at Deadline 8. We were very disappointed, therefore, to discover that nothing more was forthcoming. When our SoCG was finally produced by the Applicant at Deadline10 there was an acknowledgement under paragraph 7 as follows:

> *We acknowledge that further information has been requested on the handling and storage of shingle containing the seedbank for the existing vegetation that is to be used in restoration.* (REP10-120.)

This is a misrepresentation of the promised commitment. Subsequently we have been in email communication with the SZC Project Team, reminding them of their promise:

> *Steve Mannings promised that the company would look into a more scientific approach, along the lines of the restoration of the beach in front of SZB, when detailed work to preserve the seeds was carried out with the help of UEA* [University of East Anglia] – *including freeze drying.*
> (Fulcher, 15/12/21)

In their response of 06/01/22, the SZC Project Team refer us to the Terrestrial Ecology Monitoring & Mitigation Plan (TEMMP) secured under Requirement 4. (REP10-090.) Under paragraph 3.2.23 of this document there is the following statement:

> *The surface sediments will be retained and stockpiled for later use in habitat re-establishment. Once the coastal defences have been completed, coastal dune and vegetated shingle habitats will be re-established over them using a similar approach as was used in the 1980s for Sizewell B.*

We learn from this, that 'sediments' will be 'stockpiled', but no further information is given concerning storage conditions and length of time. It is also not clear what is meant by 'sediments'. Would this be the thick layer of turf with seeds, corms etc? As for the necessary work to be carried out *before* removal of substrate, there is no mention at all. It seems that, despite reference to the approach used for Sizewell B vegetation restoration, the Applicant is in fact taking no notice of the essential research carried out at that time in cooperation with UEA, which involved very careful gathering and storage of seeds and the potting up of plants *ex-situ*.

2. The beach restoration work carried out for Sizewell B

Details of this work are fully explained by A.J. Davy of the University of East Anglia. Professor Anthony Davy states:

> *Areas of different species or shingle texture would best be stored and re-used separately to achieve authentic and enduring results…. Large mounds of material result in deep burial of most of the seeds and the creation of potentially adverse conditions for seed survival. (Davy, 2002.)*

It is clear from this that piling up of the substrate somewhere unspecified is likely to result in a poor outcome. Indeed, rather than one large pile, areas should be divided up according to the different species present and the types of shingle supporting them. He also recommends 'a mosaic of substrates (with more or less sand mixed with coarser shingle)' which 'promotes diversity in the vegetation'.

Our own ecological adviser agrees and says in an email communication:

> *The beach is a range of micro-habitats and the surface material would need to be kept in separate heaps and spread out in certain ways to stand any chance over 12 years. They should use the horticultural techniques used previously [for SZB]… with attention to shingle sizes.* (Langton, 18/01/22.)

Has Sizewell C Co plotted these micro-habitats and carried out a detailed survey of the beach flora? The answer is 'no'.

Conditions of storage are also important. Professor Davy and his colleague, C.A. Walmsley, demonstrated that 'the use of low temperature and humidity storage conditions [for seeds] ensured the retention of sufficient viability for plant stock production in most species'. Nowhere in SZC Co's documents do we find any reference to storage conditions.

As regards the effects of seed ageing, Walmsley and Davy found that 'seed viability declined significantly with increasing age in all species, except *R. crispus'*. The question, therefore, is how long would the Sizewell C substrate be stored for? We are not told. We learn that establishment of the vegetation is presumed to be by Year 12 (REP10-090, T. 3.2), yet clearance of the beach for the marine landing facilities and new defences is to be 'at an early stage' (REP10-090, para. 3.2.23). We can conclude, therefore, that the piled substrate could be left for at least a decade, resulting in poor germination for most species.

Of particular interest is the research by Walmsley & Davy (1997) into the effectiveness of raising plants from stored seed that was indigenous to the site. Six species were selected 'to counter erosion and assist the development of a more complex and natural community'. They discovered that the use of container-grown plants to establish shingle vegetation resulted in 'low mortality, with rapid plant growth'. (Walmsley & Davy, 1997.) We also learn from their research that establishing perennials in this way gives extra stability, due to their deep roots and far-reaching rhizomes, that act to bind the shingle together. This leads to more opportunities for annuals to find suitable places for growth.

Professor Davy continues in relation to container-grown plants: 'Position on the beach profile (especially proximity to the influence of the sea) and substrate composition may greatly affect their eventual success.' (Davy, 2002.) Yet there are no such considerations in the Applicant's plans.

Nowhere do we see in Sizewell C Co's proposals any mention of gathering seed, its careful storage, nor of any proposals to plant these up in containers for later transfer to the beach. The Sizewell B research also showed that germination was greatly enhanced when the seeds were scarified. We can only presume that because all of this work is labour-intensive the company is not prepared to find the extra funds, despite the evidence that such an approach would greatly enhance the success of the restoration.

3. Recommendations

It is extremely disappointing that the Applicant, despite claims to the contrary, has little intention of following the guidance developed during research for the restoration

of the beach fronting Sizewell B. Friends of the Earth would like to see the following put in place:

- Comprehensive, up-to-date survey/mapping of the beach flora, to include plotting of micro-habitats (e.g. lichen dune habitat).
- Careful collection of seeds and plants as appropriate prior to removal of the shingle and dunes.
- Division of substrate into separate piles at suitable thicknesses and aspect, according to shingle size and original position on the beach.
- Correct storage of seeds to prolong their viability, bearing in mind temperature and humidity and the usefulness of freeze-drying, as practised at Sizewell B.
- Scarification of selected seeds to promote germination.
- Distribution of substrate on the new defences, retaining the original profile as far as possible and bearing in mind the various micro-habitats to be recreated.
- Planting up of perennials at an appropriate date, before planting out on the beach in optimal positions, taking into account the needs of individual species.
- Contingency planning for failures and learning.
- Regular monitoring and maintenance will be crucial to optimise success. We see that the Applicant has at least set out such plans within the TEMMP (REP10-090) and that this is secured under DCO Requirement 4.

4. Conclusion

Lack of attention by the Applicant to all the comprehensive research work carried out by UEA, under the auspices of the C.E.G.B. and subsequently Nuclear Electric, indicates that the restoration of Sizewell Beach is unlikely to be successful.

All in all, we have the impression that Sizewell C Co will store the substrate in a pile, spread it over the new defences and then trust that some sort of mitigation can be put in place when the plants fail to grow or thrive. This is very poor practice, and likely to result in considerable loss of biodiversity in this area of East Suffolk.

If the Sizewell C project has to go ahead, then our members want to see commitment from the Applicant to the funding of the proper restoration of Sizewell Beach, following best practice and the recommendations of Professor Davy and colleagues from the University of East Anglia.

Sizewell beach is a vital and irreplaceable part of Suffolk Shingle Beaches County Wildlife Site, known not only for its rare plants, but also for its outstanding assemblages of invertebrates, of high conservation value and deemed to be of National Importance (REP10-090, para. 4.2.1). These cannot thrive without the plants on which both the larvae and adults depend. Provision for invertebrates in this area should also be the subject of a detailed report and plan.

Particularly worrying is the Applicant's following statement from APP-224, paragraph 14.7.190;

> *The loss of an area of vegetated shingle and sand dune associated with the construction of the new sea defences would be regarded as permanent and non-reversible. This needs to be set in the context of habitat erosion by natural processes due to predicted sea level rise.*

Is this then why there is apparently so little commitment to proper and thorough restoration of the beach, due to the belief that it will be lost anyway in due course through natural processes? It should be pointed out that planting, particularly of perennials, will help to reduce erosion. What the Applicant fails to spell out is the fact that the new defences will cause coastal squeeze and prevent roll-back, whereby the shingle and dunes would normally naturally replenish themselves. This is yet another very sound reason why the Sizewell C application must be refused.

REFERENCES

Davy, A. J., 2002. 'Research on Restoring Shingle Vegetation.' In J. Hatcher (ed.) *Proceedings from the Coastal Vegetated Shingle Workshop*, pp. 9-13, W. Sussex Vegetated Shingle Project, Chichester.
Fulcher, R., 15/12/21. Email communication to the SZC Project Team.
Langton, T., 18/01/22. Email communication to Suffolk Coastal FOE.
Walmsley, C.A. & Davy, A.J., 1997. 'The Restoration of Coastal Shingle Vegetation: effects of substrate on the establishment of container-grown plants.' *J. of Applied Ecology:* 34, 154-165.

38. NNB Generation Company (SZC) Limited – 24 February 2022

Mr Leigh
Department for Business, Energy and Industrial Strategy
1 Victoria Street
London.
SW 1H 0ET

24 February 2022

Dear Mr Leigh,

Application by NNB Generation Company (SZC) Limited (SZC Co.) for an Order Granting Development Consent for The Sizewell C Project (PINS' Ref. EN010012)

Further to the close of the examination the Office for Nuclear Regulation (ONR) has considered the wording of Requirement 6 of draft Development Consent Order (Doc Ref. REP10-009), which states:

"Project wide: Emergency planning
(1) No less than 18 weeks prior to the commencement of the authorised development a construction emergency plan must be submitted to and agreed by Suffolk County Council in its capacity as emergency planning authority following consultation with Suffolk Constabulary and the East of England Ambulance Service Trust.
(2) If agreement pursuant to paragraph (1) is not reached within 4 weeks of the date on which the plan was submitted then both parties must refer the matter to the Office of Nuclear Regulation for their decision.
(3) The construction emergency plan must include:
(i) details of the undertaker's construction site emergency arrangement for the SZC construction works; and
(ii) details of the undertaker's arrangements for interfacing with Sizewell B in an emergency.
(4) The construction emergency plan must be implemented as agreed with Suffolk County Council or, if relevant, in accordance with the decision of the Office for Nuclear Regulation."

The ONR has advised that it cannot issue '*a decision*', as the law places such a legal duty on the '*relevant local authority*' (in this case Suffolk County Council (SCC)). Therefore, the ONR's remit can only be advisory under the Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPPIR) [redacted]

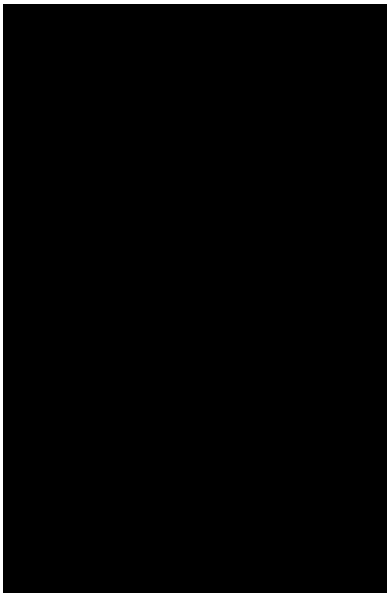
SZC Co. has worked with the ONR and SCC in light of the above to identify wording that would be agreeable to all parties. It is jointly requested that draft Requirement 6 is amended as follows:

"Project wide: Emergency planning
(1) No less than 18 weeks prior to the commencement of the authorised development a construction emergency plan must be submitted to and agreed by Suffolk County Council in its capacity as emergency planning authority following consultation with the Office for Nuclear Regulation and Sizewell Emergency Planning Consultative Committee or Suffolk Resilience Forum as appropriate.
(2) The construction emergency plan must include:
(i) details of the undertaker's construction site emergency arrangement for the SZC construction works; and
(ii) details of the undertaker's arrangements for interfacing with Sizewell B in an emergency.
(3) The construction emergency plan must be implemented as agreed with Suffolk County Council."

In the event of failure to determine the application to discharge the requirement by SCC, SZC Co. could use the appeals procedure detailed in Schedule 25 of the dDCO. In such an instance the Secretary of State would appoint an appropriate person to make a decision in relation to this requirement. We do not consider any drafting is required to Schedule 25 in light of the amendments sought to Requirement 6 of the dDCO.

The organisations who are signatories to this letter respectfully request the Secretary of State amends the wording of Requirement 6 as part of its determination of the application.

Yours sincerely,



Carly Vince - Chief Planning Officer, SZC Co.

Shane Turner – Head of EPR Regulation, ONR

Mark Ash - Executive Director of Growth Highways and Infrastructure, SCC

Philip Ridley – Head of Planning, East Suffolk Council

c.c. Siân Evans – Planning Inspectorate

Position Statement – Sizewell C Drainage Strategy Update

Signature Sheet

This Position Statement is agreed between SZC Co. and SCC the day specified below.

Signed:	[redacted]
Print Name:	Mark Ash
Job Title:	Executive Director of Growth, Highways and Infrastructure
Date:	24 February 2022
Duly authorised for and on behalf of Suffolk County Council	

Signed:	[redacted]
Print Name:	Carly Vince
Job Title:	Chief Planning Officer
Date:	24 February 2022
Duly authorised for and on behalf of SZC Co.	

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1.0 Background

The purpose of this document is to record the current position of NNB Generation Company (SZC) Limited (SZC Co.) and Suffolk County Council (SCC), hereafter referred to as 'the Parties', in relation to drainage. The Drainage Strategy is a 'Level 1' control document to be certified under the Sizewell C Development Consent Order (DCO), if granted.

In the Deadline 10 Statement of Common Ground [REP10-101, Ref. SOCG_8.64] both Parties agreed an acceptable drainage strategy must:

- Demonstrate that the proposals provide for effective drainage of all development sites;
- Demonstrate that the proposals do not increase off-site surface water flood risk; and
- Demonstrate that the proposals do not increase the risk of surface water pollution.

There was disagreement between the two parties in the Statement of Common Ground as SCC considered that the submitted Drainage Strategy did not deliver the objectives set out above and stated that it was not a suitable document to be certified by the Secretary of State. SCC's position was, and continues to be, that for it to support the Level 1 Drainage Strategy, further information must be included to be consistent with that of an outline planning application, in general accordance with the table included on pages 9 & 10 of the "Suffolk Flood Risk Management Strategy, Appendix A – Sustainable Drainage Systems (SuDS) A Local Design Guide". Following Issue Specific Hearing (ISH) 11, the Parties agreed an 'Action Plan' to engage further on an updated version of the Drainage Strategy to this effect, but it was not possible to complete this before close of the examination. Both Parties committed to further engagement to reach common ground.

2.0 Progress Update

On 7th December 2022, SZC Co. held a workshop with SCC and East Suffolk Internal Drainage Board, to kick-off a programme of further engagement to complete the Action Plan and produce the Drainage Strategy Update to underpin the future submissions in respect of Requirement 5, Project wide: Surface and foul water drainage (as currently drafted in the draft Development Consent Order [REP10-009]). The Environment Agency was also invited to attend by SZC Co. if they wished, although it does not have any concerns in relation to drainage. All four Parties have since met on a regular basis.

The Action Plan has been updated from time to time, with the agreement of all Parties, to reflect progress made, and discuss technical matters arising. The current version of the Action Plan (Rev 7) was issued on 16/02/2022. See **Appendix 1**.

During the course of this engagement, SZC Co. has shared a number of draft deliverables with the Parties for review and comment. These deliverables, which comprise 'building blocks' for the Drainage Strategy Update, have been produced to establish common ground with stakeholders on the specific areas of concern identified in the Action Plan. The final such deliverable, providing further information on the proposed Two Village Bypass, was shared with stakeholders on 16/02/2022. SCC returned comments on all deliverables by 22/02/2022.

The Comments log was issued to stakeholders on 18/02/2022 and updated to incorporate all stakeholder comments received on 22/02/2022. The version updated to respond to stakeholders' comments is included at **Appendix 2**.

3.0 Position of the Parties

3.1 SZC Co. & SCC

Both Parties agree that:

- Significant progress has been made to build common ground in relation to the Drainage Strategy for the SZC Project and to address many of the outstanding areas of concern.

- Additional information has now been provided to SCC for all proposed works locations, as recorded in the Action Plan (Rev 7) (**Appendix 1**) and the Comments Log (**Appendix 2**). SCC are continuing to review this information and provide comments back to SZC Co. for further consideration, review and amendment. These comments will be captured in the Comment Log for action in the Drainage Strategy.

- Whilst there has been no considerable change to the overall approach, there have been important improvements to the Drainage Strategy, including changes to and clarifications of the principles applied at certain locations.

In relation to the Drainage Strategy Update, the following matters are not agreed between the parties:

SZC Co's position	**SCC's position**
SZC Co.'s position is that it is not necessary to submit the Drainage Strategy Update to the Secretary of State (SoS) for Business, Energy & Industrial Strategy (BEIS) because Requirement 5 of the draft DCO [REP10-009] places a 'Grampian style' condition on the development for an updated Drainage Strategy to be approved by East Suffolk Council (subject to	SCC considers that the Applicant's Drainage Strategy submitted at Deadline 10 is not acceptable as a certified control document (as set out [REP10-210]). This is because the document does not demonstrate that the primary surface water drainage mitigation is suitable, sufficient, and deliverable within the Order Limits and

consultation with SCC in its capacity as the Lead Local Flood Authority). Furthermore, the information provided will ensure that the Drainage Strategy Update would be 'in general accordance with the Drainage Strategy', as necessitated by Requirement 5 of the draft DCO [REP10-009]. SZC Co. has started to prepare a draft version of the Drainage Strategy Update. It is intending to submit the draft to the Parties on or before 11/03/2022 for their review and feedback. Stakeholders are likely to require at least two weeks to respond, meaning that the final Drainage Strategy Update is likely to be available in mid-April.	in accordance with national and local policy, best practice and guidance. SCC acknowledges the significant progress made in developing the Drainage Strategy, in close collaboration between SZC Co., SCC and other stakeholders, since the close of Examination. However, SCC is disappointed that the Applicant is not intending to submit an updated Drainage Strategy to the Secretary of State. With the additional work undertaken by the Applicant since the close of Examination, an updated Drainage Strategy could readily be produced and submitted by the Applicant, which would allow the Secretary of State to replace the inadequate document of Deadline 10 with an acceptable certified control document. SCC urges the Secretary of State to request the submission of an updated drainage strategy. With regard to Requirement 5, as set out in SCC's final position statement [REP10-210], SCC has asked that this requirement be amended so that SCC, as the LLFA, is the discharging authority for surface water drainage. This change would reflect SCC's statutory responsibility for surface water drainage and would provide assurance that impacts and related risks to surface water drainage and flooding are discharged by the most relevant and competent authority. However, this change in and of itself would not be sufficient to overcome the inadequateness of the submitted Drainage Strategy, but rather would ensure that once a satisfactory Drainage Strategy is in place, the detailed discharge of its requirements is fully and properly considered.

3.2 SZC Co. & East Suffolk Internal Drainage Board

Both Parties agree that:

- A minimum 6m wide, flat access track will be provided by SZC Co. along the full length of the diverted Sizewell Drain (Eastern side) and that any 'stepped'

bank profiling will be undertaken on the opposite bank (Western side) to this access track; and

Whilst East Suffolk Internal Drainage Board would prefer to see more surface water discharged to land drains as opposed to the sea, it has been fully engaged on all relevant matters relating to the Drainage Strategy Update. It is proposed that only water from a modified WMZ 8 (Outside the Nuclear Island) would discharge to the Sizewell Drain on a permanent basis.

Appendix 1 - Action Plan

Sizewell C – Drainage Strategy – Action Plan
Version: 07 (Updated Plan 16th February 2022)
Date: 11/02/2022 – Final 16th February 2022
Parties: SZC Co., ESC, SCC, ESIDB, EA

A	B	C	D	E	F	G	H	I	J	K
				At Examination end	**Post Examination**					
No.	**Area**	**Issue identified**	**Actions**	**Deliverable**	**Deliverable / Ref. No.**	**Delivery Plan**	**Deliverable owner**	**Date**	**Date issued**	**RAG / Comment**
1	Control Document	Drainage Strategy needs to be tied legally together with Technical Notes.	Reach agreement between SZC Co. and SCC on the degree of reliance on and relationship between the Drainage Strategy and series of supplementary technical notes, including the information to be provided through the subsequent Actions in this document.	Technical notes appended to D10 Drainage Strategy. Requirement 5 redrafted to enable final drainage strategy to be agreed post Examination.	Overarching Final Drainage Strategy to be release as Pre-commencement Condition aligned to requirement 5.		SZC Co	March for BEIS submission Draft 11th March		
2a	Infiltration Figures - MDS	2021 Results need to have a location plan so they can be reviewed.	SZC Co. to: 1. Provide Table of 2021 Results and 2021 Plan. 2. Show reason for chosen infiltration value from all results available (all sites). 3. Additional item: provide overlay plan of infiltration values and WMZs.	1. 2021 results and location plan provided <u>informally</u> to SCC and ESIDB. 2. Justification for choice of infiltration rate provided within D10 **Drainage Strategy Annex 2A.5: Explanatory Technical Note**. 3. Infiltration / WMZ overlay provided in different formats within D10 **Drainage Strategy** as **Annex 2A.2: Location of Geotechnical Investigations on MDS and Infiltration Testing Confidence** and within **Annex 2A.3: Main Development Site Water Management Zone Summary**.	No further action required. Volume of infiltration data, query if PINS would want this information and hence in public domain. - SZC CO	Discuss with PINS the submission of the route infiltration data Confirmed, only submission into SoS Determination Period available	SZC Co (SM)	10/12/2021	06/01/2022 CV confirmed	PINS may not accept further data or be able to Confirmation, PINS will not accept further data, only additional submissions to be made are into SoS Determination

A	B	C	D	E	F	G	H	I	J	K
				At Examination end	Post Examination					
No.	Area	Issue identified	Actions	Deliverable	Deliverable / Ref. No.	Delivery Plan	Deliverable owner	Date	Date issued	RAG / Comment
2b	Infiltration Figures – AD sites	Includes additional test results for TVBP and Yoxford. Includes existing geotechnical reports for FMF, NP&R, GRR and SP&R.	SZC Co. to: 1. Supply existing reports with available values for 2VB, Yoxford, FMF, NPR, SPR and GRR. 2. Supply any new infiltration data for FMF, NPR, GRR and SPR.	1. Infiltration test results provided informally for 2VB and Yoxford. Existing infiltration summaries for FMF, NPR and SPR provided in D10 **Drainage Strategy** within **Annexes 2A.8, 2A.6 and 2A.7**. 2. Not progressed.	Formal provision of reports in column E, as Annexes to final Drainage Strategy. Provide infiltration test results for GRR as Annex to final Drainage Strategy. Provide any new, quality assured infiltration test results for all AD sites as Annex to final Drainage Strategy.	Provide GI data where this has been used to inform an updated design note. Source investigation data to be incorporated. Overall Drainage Strategy to include references and annex's to incorporate	WSP (DL)	16/02/2022	16/02/2022 with last report issue	Data will be included in updated design notes and GI reports provided in full
3a	Choice of treatment Indices for pollution control - MDS.	Index for Pond used rather than Basin in ACA. Other Zones can have simplified approach.	SZC Co. to: 1. Review ACA result and revise, as necessary. 2. Complete WMZ1 as further example. 3. Complete other zones using simplified approach – worst pollution source with least treatment route.	1. ACA analysis revised within D10 **Drainage Strategy Annex 2A.5: Explanatory Technical Note**. 2. WMZ1 assessment provided in D10 **Drainage Strategy** as **Annex 2A.15: WMZ1 Surface Water Treatment Assessment**. 3. Simplified assessment provided in D10 **Drainage Strategy** as **Annex 2A.5: Explanatory Technical Note**.	Integration with filter strips and whole system	Review of actions items 3a, 4 and 5 in combination to attain the treatment indices for the system	Atkins (MS)	14/01/2022	14/01/2022 SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000010 rev 1, SZC-EW0320-ATK-XX-000-XXXXXX-DRW-CCD-000010 rev 1, SZC-EW0320-ATK-XX-000-XXXXXX-DRW-CCD-000038 rev 2	SCC comments received, IDB no comments, With SZC Co to update

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				At Examination end	Post Examination					
No.	Area	Issue identified	Actions	Deliverable	Deliverable / Ref. No.	Delivery Plan	Deliverable owner	Date	Date issued	RAG / Comment
3b	Choice of treatment Indices for pollution control – AD sites.	Excludes roads which have HEWRAT assessments.	1. Undertake pollution assessment for FMF. 2. Undertake pollution assessments for NPR, SPR, GRR.	1. Assessment provided informally to SCC for FMF. 2. Assessment provided informally to SCC for NPR. Not progressed for SPR and GRR.	Include pollution assessments for NPR, SPR, FMF and GRR within updated Annexes 2A.6, 2A.7, 2A.8 and 2A.12 to final Drainage Strategy.	Part 1 – Pollution assessments to be released prior to deadline 1 – Picked up in individual sites Part 2 – cancelled, all in part 1 reports	WSP (DL)	Part 1 11/02/2022 Part 2 N/A	16/02/2022 with last report	Pollution assessments to be added as part of updated design notes.
4	Perimeter Swale space availability - MDS.	Swales may need to be large on MDS. Reassurance that space is available.	SZC Co. to: 1. Set out overview of space available on plan. 2. Provide indicative dimensions and sections. 3. Compare to SCC design standards	1. Plan provided in D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note**. 2. Outline dimensions provided in D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note**. Design sections not progressed. 3. Not progressed.	Indicative swale design sections presented in Explanatory Technical Note. Comparison to SCC design standard (CIRIA SuDS Manual), within updated Annex 2A.5 to final Drainage Strategy. Inclusion of Hierarchy	Make comparison of swale space allocation to that most likely required by the CIRIA SuDS Manual after Detailed Design. Including an update to doc Annex 2A.5 to final Drainage Strategy.	Atkins (MS)	14/01/2022	14/01/2022 SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000010 rev 1, SZC-EW0320-ATK-XX-000-XXXXXX-DRW-CCD-000010 rev 1, SZC-EW0320-ATK-XX-000-XXXXXX-DRW-CCD-000038 rev 2	SCC comments received, IDB no comments, With SZC Co to update

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				At Examination end	Post Examination					
No.	Area	Issue identified	Actions	Deliverable	Deliverable / Ref. No.	Delivery Plan	Deliverable owner	Date	Date issued	RAG / Comment
5	Confirmation of treatment in the MDS WMZ Basins.	Confirm that the proposed basins can give the required treatment as part of the overall discharge requirement.	SZC Co. to confirm basin treatment design criteria and reference Hinkley C design for comparison.	Explanation provided within D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note** and **Annex 2A.15: WMZ1 Surface Water Treatment Assessment**.	Update to technical note and treatment assessment for system	As per item 3a	Atkins (MS)	14/01/2022	14/01/2022 SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000010 rev 1, SZC-EW0320-ATK-XX-000-XXXXXX-DRW-CCD-000010 rev 1, SZC-EW0320-ATK-XX-000-XXXXXX-DRW-CCD-000038 rev 2	SCC comments received, IDB no comments, With SZC Co to update
6	Calculation of impermeable / permeable areas on MDS.	Clarification of the derivation of Catchment Area percentage runoffs	SZC Co. / SCC to hold Technical Meeting to resolve methodology. Meeting held 21st September between Technical experts and clarifications presented. SZC Co to provide: plan/table showing breakdown of PIMP, PR calculations in each WMZ area.	Explanation provided within D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note**.	Provide updated Annex 2A.5 within final Drainage Strategy including justification for PIMP values.	Updated Annex 2A.5 within final Drainage Strategy to include justifications for PIMP values.	Atkins (MS)	21/01/2022	Released in each area note.	SCC Comments received
7	Review of original hydrological catchments.	Need to understand original topography to be clear on approach.	SZC Co. to provide baseline (e.g. topographical plan) for natural drainage routes and WMZ catchments / outfalls. Simple overlay and comparison of existing catchments (LiDAR) to proposed WMZs.	Provided within D10 **Drainage Strategy** as **Annex 2A.13: Comparison of MDS Baseline Topography and WMZ Catchments**.	Soft explanatory note to explain determine catchment to support Annex 2A.13 Label to WMZ5 for flood to be removed.	Use current catchment description, update narrative and inc in catchment narrative note	Atkins (MS)	17/12/2021 Revised issue 21/01/2022	Hydrological info issued 17/12/2021 SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000009 rev 1	SCC Comment received 06/01/2022

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				At Examination end	Post Examination					
No.	Area	Issue identified	Actions	Deliverable	Deliverable / Ref. No.	Delivery Plan	Deliverable owner	Date	Date issued	RAG / Comment
8	Basin Sizes. Half Drain Times are long. West ACA risk	Are basins capable of accepting a follow on 1:10 storm within 24 hours. Urban risk present in West ACA.	SZC Co. to: 1. Provide data table of basin sizes demonstrating: available basin volumes, 1:100 volume +CC, drain times, spare volumes, 1:10 storm volumes, depths (water and total), discharge rate, side slope, base area, freeboard area, factors of safety (where applicable). 2. Demonstrate that West ACA could comply with 24-hour half drain rule. 3. Pump failure for 24-hour for West ACA demonstrated (i.e. zero pump rate for 24-hours). 4. Produce plan to show all outfalls from each WMZ and table of how/where basins empty. 5. Provide explanatory note on WMZ7, 8 and 9 discharges.	1. Assessment within D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note**. 2. Partial assessment within D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note**. 3. Partial assessment within D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note**. 4. Plans included within D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note**. 5. Partial explanation within D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note**.	Provide updated Annex 2A.5 within final Drainage Strategy including: (i) revised assessment / sizing of West ACA basin for both 24-hour half drain and pump failure; and (ii) enhanced description on WMZ7, 8 and 9 discharges (refer to ESIDB SoCG and liaise with ESIDB).	Remodel West ACA basin and provide drawings. Develop diagrams prior to workshop Hold workshop with ESIDB regarding WMZ 7, 8 and 9, and update Annex 2A.5 within final Drainage Strategy with outcome. Clarity on flows and schematic of scenarios.. Technical Note on WMZ7, 8 and 9	Atkins (MS)	Part i ACA – 21/01/2022 Part ii 28/01/2021	Sketches issued 17/12/2021 SZC-EW0300-ATK-XX-000-XXXXXX-PRE-CCD-000001 rev 1	SCC Comment received 06/01/2022

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				At Examination end	Post Examination					
No.	Area	Issue identified	Actions	Deliverable	Deliverable / Ref. No.	Delivery Plan	Deliverable owner	Date	Date issued	RAG / Comment
9	Further information for Campus, Sports Pitches, non-nuclear island operational drainage.	Demonstration of drainage strategy.	SZC Co. to provide explanatory drainage design notes on: 1. Campus; 2. Sports pitches; and 3. Non-nuclear island operational drainage (e.g. Goose Hill car park).	1. Partial explanation within D10 **Drainage Strategy** within **Annex 2A.5: Explanatory Technical Note**. 2. Partial explanation within D10 **Drainage Strategy** at section 5.1(a). 3. Not progressed.	Develop operational drainage strategy technical note for Campus. Description of approach for Goose Hill car park described in Explanatory Technical Note.	Develop a concept design for the Campus Area (AD5), Initial Source Control to enable intent, then the development of a hydraulic model. Develop a Technical Note of Design and Strategy. Short statement on the Leiston Sports Pitch impact on the current situation against baseline Statement around all areas outside of the NSL drainage requirement. Mark up of Perm Plot Plan extent of drainage outside of Nuclear Site License (NSL) to be provided.	Campus - Atkins (MS) Sports Pitches – SZC Eng Operational – SZC Eng	Break Deliverable in 2 Part 1 – 21/01/2022 Campus intent Part 2 – Statements (inc sports pitch and ops) 28/01/2022 Part 3 – End Mar 2022 Campus hydraulic modelling 3 months from tasking. Campus Input layout to be agreed at tasking. (Excluding 2 weeks at Christmas)	Part 1 Campus issued 17/12/2021 SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000007 rev 1 Leiston statement update sent 11/02/2022	Further work to sports pitches and operational drainage requested. Review of available info and narrative to be created. SCC Comment on campus note of 17/12/2021 received 06/01/2022

A	B	C	D	E	F	G	H	I	J	K
				At Examination end	Post Examination					
No.	Area	Issue identified	Actions	Deliverable	Deliverable / Ref. No.	Delivery Plan	Deliverable owner	Date	Date issued	RAG / Comment
10	Northern Park & Ride	Lack of evidence for the proposed outfall to two ditches e.g. levels, connection within or outfall beyond Order Limits. Calculations required for the entire site for the proposed surface water drainage strategy. Methodology used to determine Qbar runoff rate is not agreed by SCC, as stated in SCC's response to REP6-024 [REP7-157].	1. SZC to provide evidence and confirm availability of Outfall under A12. (5 l/s if no Inf.) located within the red line boundary. 2. SZC to provide existing topographic survey showing fall in ground level from basin locations to watercourses at the boundary 3. SZC/SCC to hold technical meeting to discuss issues with a view to reaching agreement, informed by supporting information.	1. Email correspondence providing evidence. 2. Email correspondence providing evidence. 3. Meeting held.	Update Annex 2A.6: Northern Park and Ride Drainage Design Note as part of final Drainage Strategy.	Incorporate data sent informally in report, and update the source control volume requirements to be split between basins in designated areas.	WSP (DL)	21/01/2022	31/01/2022	Source control modelling validation requirements agreed in meeting 7th Dec 2021 and incorp in report
11	Southern Park & Ride	Below ground attenuation is not compliant with Local Plan Policy SCLP9.6, Only FSR rainfall (least conservative) has been applied to calculations. No climate change allowance has been modelled.	1. SZC Co. provide explanation why temporary underground storage is reasonable. 2. Pump fail storage capacity 3. SZC/SCC to hold technical meeting to discuss issues with a view to reaching agreement, informed by supporting information.	1. Note provided informally to SCC on basis for underground storage approach. 2. Not progressed. 3. Meeting held.	Update Annex 2A.7: Southern Park and Ride Drainage Design Note as part of final Drainage Strategy.	Obtain 2021 infiltration data, review current drainage strategy based on new data, and update. Part 1 Drawing and hi level modelling and cut back report Part 2 Calc and report	WSP (DL)	Part 1 11/02/2022 Part 2 N/A	11/02/2022	Updated modelling to be incorp in updated drainage note SCC Comments as follows

A	B	C	D	E	F	G	H	I	J	K
				At Examination end	Post Examination					
No.	Area	Issue identified	Actions	Deliverable	Deliverable / Ref. No.	Delivery Plan	Deliverable owner	Date	Date issued	RAG / Comment
12	Freight Management Facility	Below ground attenuation is not compliant with Local Plan Policy SCLP9.6, Only FSR rainfall (least conservative) has been applied to calculations. No climate change allowance has been modelled.	1. SZC Co. provide explanation why temporary underground storage is reasonable. 2. SZC/SCC to hold technical meeting to discuss issues with a view to reaching agreement, informed by supporting information. 3. Open discussions with adjacent landowner (Home Farms) as to potential receipt of excess surface water.	1. Note provided informally to SCC on basis for underground storage approach. 2. Meeting held. 3. Not progressed.	Update Annex 2A.8: Freight Management Facility Drainage Design Note as part of final Drainage Strategy. Use output above as basis to open discussion with landowner.		WSP (DL)	21/01/2022	21/01/2022	SCC have indicated likely acceptance of underground storage providing some surface level SuDS pollution measures are incorporated. Landowner opportunity discussion to be held at design stage if SCC reject underground storage. Comments received Review of space for rain garden
13	Sizewell link road.	SCC concern with swales at the base of embankments rather than at the top.	1. SZC Co. to hold discussion with SCC to resolve this issue or design to be modified to move swales to top of embankment at future stage. 2. Informed by cross sections. 3. Additional item: Provide updated calculations.	1. Email correspondence provided. 2. Shown on preliminary design drawings and in technical note provided. 3. Not provided.	SZC Co. to update Annex 2A.9: Sizewell Link Road Preliminary Drainage Design Note, including cross sections and calculations note, as part of final Drainage Strategy.	SCC to review and respond to information provided. Agree design criteria governing location of swale.	WSP (DL)	09/02/2022	11/02/2022	No SZC action pending SCC response on swale location

A	B	C	D	E	F	G	H	I	J	K
				At Examination end	Post Examination					
No.	Area	Issue identified	Actions	Deliverable	Deliverable / Ref. No.	Delivery Plan	Deliverable owner	Date	Date issued	RAG / Comment
14	Two Village Bypass infiltration Basin 2 East of River Alde Embankment	Positioning of basin further from the highway to be adopted and separated by the farm access track. High infiltration rate could indicate a direct connectivity to the aquifer which could cause water quality issues.	SZC Co. to: 1. Hold meeting with SCC to understand nature of concerns. 2. Review proposed position of basin and demonstrate that it works hydraulically and that there is no alternative to the alignment of the farm access track. 3. Provide data / evidence relating to basin and aquifer. 4. Additional item: Resolve potential discrepancy between GI infiltration data and input data to modelling.	1. Meeting held. 2. Email correspondence and information provided to SCC, including proposed embankment materials. 3. Email correspondence and information provided to SCC. 4. Not provided.	Update Annex 2A.11: Two Village Bypass Preliminary Drainage Design Note as part of final Drainage Strategy. To include clarification on infiltration input data.	Hold technical meeting to resolve basin location disagreement. Updated hydraulic modelling using updated infiltration rates Engagement with EA on Borehole soakaway	WSP (DL)	11/02/2022	16/02/2022	Hydraulic Update
15	Yoxford roundabout (new item)	Deep infiltration – SCC will not consider design solution until EA has approved a 'deep infiltration' approach.	SZC Co. to: 1. Provide additional information on basin and berm design, including potential for tree planting. 2. Describe alternative solution to avoid 'deep infiltration' design.	1. Email correspondence and information provided to SCC. 2. Provided in email correspondence.	Update Annex 2A.10: Yoxford Roundabout Updated Drainage Strategy as part of final Drainage Strategy.	Liaise with EA over potential design constraints to basin depth. Subject to above outcome, develop alternative option (e.g. pumping or gravity). EA Meeting held on 12/01/2022	WSP (DL)	11/02/2022	11/02/2022	EA Engagement agreed

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				At Examination end	Post Examination					
No.	Area	Issue identified	Actions	Deliverable	Deliverable / Ref. No.	Delivery Plan	Deliverable owner	Date	Date issued	RAG / Comment
16	Green rail route (new item)	No drainage technical note provided to support the Drainage Strategy.	SZC Co. to: 1. Provide drainage technical note to support the Drainage Strategy.	1. **Annex 2A.12: Green Rail Route Drainage Design Note** provided within D10 **Drainage Strategy**.	Update Annex 2A.12: Green Rail Route Drainage Design Note as part of final Drainage Strategy.	Resolve residual issues on storage volumes in respect to 1 in 100 +CC storm. Part 1 Preliminary Design, initial modelling, PIMP note for rail Part 2 Detailed modelling and update	WSP (DL) / Atkins (MS)	Part 1 11/02/2022 Part N/A	11/02/2022	Hydraulic modelling is required for demonstrate a viable solution.
17	AD6 – MDS Highways	SCC commentary on Examination submission to be confirmed	SCC to: 1. Provide review comments on items REP10-030, REP10-031 and REP10-032submitted	1. **Submissions made into PINS and to SCC of information that was not reviewed due to timescales**	SCC comments on submissions REP10-030, REP10-031 and REP10-032 Update of Technical Report	Receive comments Update report	DCC (MW) WSP(DL)	17/12/21 11/02/2022	Issued email 16/12/2021 SCC (MW) Comments received 04/01/2022 Reissued 11/02/2022	SCC undertaking review of info submitted. SCC clarification of 13th Jan 2022 to be discussed at next progress meeting

Appendix 2 - Comments Sheet

Sizewell C Site Establishment Active Surveillance comments — WBS EW0320 Document 2022

WBS	Action Nos	Action Plan Ref.	Document Number	Item Description/ reference	Comment	Raised by	Date Raised	Actionee	Model update require	Open/ Closed	Cat	Comment Response	Action	Other Notes/Comment
EW0320	1	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P01	Technical Note - Campus Outline Drainage Strategy	As previously discussed, you need to include the results of relevant infiltration testing. This should include raw test results and not just a summary. Any testing not compliant with BRE365 should be identified	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	No	Closed	1	Infiltration testing results to be provided	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000007
EW0320	2	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P01	Technical Note - Campus Outline Drainage Strategy	The modelled structure uses an infiltration basin with a porosity of 40%. It's not clear why a permeable pavement structure hasn't been modelled. Permeable pavement structures have a standard porosity of 30%. Therefore, you either need to model at 30%, or justify your use of 40%. I can't see this would cause you many problems given the plan area and depths you have to play with, but you still need to demonstrate this	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	Yes	Closed	1	Porosity to be changed to 30%.	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000007
EW0320	3	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P01	Technical Note - Campus Outline Drainage Strategy	Calculations show circa 80% of your water discharging through infiltration and 20% discharging through positive discharge. Given the numbers you state of your storage footprint (58000m2) vs your total paved area (97004m2), I think it's fair to say that so long as you achieve acceptable infiltration rates across the site, you won't have a problem infiltrating all of your surface water, through an increase in storage footprint. The potential problem will arise if infiltration were to fail. From the notes I have, you don't have any infiltration testing to full BRE365 methodology for the Campus site, with most testing undertaken in boreholes. I don't know if you have any more recent testing? If not, given you're so close to the infiltration threshold, with non-compliant testing, I would say there's a reasonable chance that at least part of your site is unable to infiltrate. The absolute worst-case scenario would be no acceptable infiltration rate being achieved across the site. As this is the worst case, I'll need to see how you would manage this, at least at a high level with source control calcs, an identified method of storage and demonstration that you have sufficient space for such storage	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	Yes	Closed	1	No infiltration across the site will be assumed at this stage until infiltration testing proves otherwise, and management/storage of source control volumes to be provided.	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000007
EW0320	4	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P01	Technical Note - Campus Outline Drainage Strategy	I'm not keen on accepting a hybrid approach for this site. Either infiltration only with a high level overflow to CDO for events >1 100+CC, or attenuation and discharge only. The reason for this is the site is slightly more removed from the watercourse it is proposed to discharge to. WMZ's that utilise the hybrid approach are generally located directly adjacent to the ordinary watercourse they discharge to. For the attenuation and discharge only option, I would be content for you to keep this vague at the moment, subject to future modelling, it could with go to WMZ6, CDO or another location based on modelling results	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	Yes	Closed	1	No infiltration across the site will be assumed at this stage until infiltration testing proves otherwise, and management/storage of source control volumes to be provided.	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000007
EW0320	5	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P01	Technical Note - Campus Outline Drainage Strategy	I recall the car park being multi-storey. Is this still the case? If so, I'm not entirely sure how permeable paving would work, either for interception, treatment or storage of surface water	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	No	Closed	1	Comment noted - car partk is double storey - roofed. Permeable paving for the multi-storey car park removed and taken as a roof area instead. Flows from the car park roof attenuated in sub-surface attenuation storage.	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000007
EW0320	6	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P01	Technical Note - Campus Outline Drainage Strategy	As per comment on previous sites, need to justify PIMP values proposed, particularly 90% for roads	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	Yes	Closed	1	Roads PIMP taken as 100%, and total PIMP updated across the site.	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000007
EW0320	7	7	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000009 P01	Technical Note - Topographical Catchment Narrative	The appended drawings are more or less ineligible due to the PDF quality. I've read through the document text and this makes sense and ties up with other information I already have, but it would be appreciated if you could reissue with the drawing problems resolved	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	No	Closed	1	Drawings were reprovided as individual files.	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000009
EW0320	8	7	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000009 P01	Technical Note - Topographical Catchment Narrative - 1.2.4	WMZ 4 is stated as draining to E04 but the area of WMZ 4 looks to mainly be covered by Early Catchment 3a & 3b, with Early Catchment 4 (which discharges to EO4) looking to comprise part of WMZ 6. Please clarify. The text on the drawing isn't clear (as above), so I may have interpreted incorrectly	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	No	Closed	1	Comments noted and wording changed to clarify.	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000009
EW0320	9	7	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000009 P01	Technical Note - Topographical Catchment Narrative - 1.2.6	See point 4 in response to Campus above. Yes, this is part of the same catchment, but it's quite far away and naturally there would be a great deal of interception/detention in localised depressions before discharging into the Leiston Drain	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	No	Closed	1	Comments noted and wording changed to clarify.	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000009
EW0320	10	7	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000009 P01	Technical Note - Topographical Catchment Narrative	I think it would be worth noting, potentially as part of the summary that outfall locations and rates are subject to change based on future hydraulic modelling. All discharges will need to be modelled as part of the wider catchment to ensure they are not increasing flood risk. The most critical element of this would be the environmental impact so future engagement with environmental stakeholders to determine discharge rates and locations will also be key and should be acknowledged here.	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	No	Closed	1	Comments noted and wording changed to clarify.	Updated and submitted in Rev 2 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000009
EW0320	11	8b	SZC-EW0320-ATK-XX-000-XXXXXX-PRE-CCD-000001 P01	MCA Surface Water Drainage Phasing - Meeting Slides	It's useful to understand the principles you intend to apply at this location throughout construction. However, unlike the rest of the MDS, I am less concerned by the drainage strategy in this area given the availability of the TMO and CDO. I also appreciate that construction will need to be flexible in these areas, hence the indicative attenuation basins shown rather than more detailed information. The only aspect that requires more information in this area is the discharges to the Sizewell Drain, what these are, when they will be used, how they're calculated, associated areas for surface water storage prior to these discharges etc. I know Yvonne at the IDB has been pushing for greater understanding of this.	Matt Williams - SCC	06/01/2022	Michael Sheridan - ATK	No	Closed	1	Further detail to be provided on future technical note WMZs 7, 8, 9 Suface Water Discharges SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000016	No changes to meeting slides. Comments reflected in technical note SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000016. Submitted in Rev 1 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000016
EW0320	12	8b	SZC-EW0320-ATK-XX-000-XXXXXX-PRE-CCD-000001 P01	MCA Surface Water Drainage Phasing - Meeting Slides	6m minimum maintenance strip with additional space needed for turning if access is not provided at both the northern and southern boundaries	Yvonne Smith - IDB	21/01/2022	Michael Sheridan - ATK	Yes	Closed	2	Comment noted - Maintenance strip will be coordinated with the permanent works team.	Maintenance strip requirement to be coordinated with the permanent works team.	
EW0320	13	8b	SZC-EW0320-ATK-XX-000-XXXXXX-PRE-CCD-000001 P01	MCA Surface Water Drainage Phasing - Meeting Slides	Max discharges expected through outfalls O4 and O7. – More information on exactly what is draining through outfall 07. What size impermeable, rough plan would be useful. You currently indicate that both "overland flows" and "SZB transferred drainage area" will go through here, but have no reference to what either of those entails.	Yvonne Smith - IDB	21/01/2022	Michael Sheridan - ATK	Yes	Closed	2	WMZ 8 in a slightly reduced form is to discharge through O14. O17 is to drain the SZB overland flows up until the SZC sea tunnels are operational.	Discussion with permanent works team required to determine areas contributing from SZB.	
EW0320	14	8b	SZC-EW0320-ATK-XX-000-XXXXXX-PRE-CCD-000001 P01	MCA Surface Water Drainage Phasing - Meeting Slides	Likely storage volumes required and indicative space for these/where these might be accommodated (specifically I do not want them anywhere within the above mentioned maintenance strip).	Yvonne Smith - IDB	21/01/2022	Michael Sheridan - ATK	Yes	Closed	2	Comment noted - No storage to be provided within maintenance strip but rather within the WMZ 8 area. Agreement with an increased Greenfield Runoff rate could assist in reducing the required volume.	Final storage position to be identified.	
EW0320	15	3	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000010 P01	Technical Note - Surface Water Drainage Treatment Narrative	Our agreement would come with a slight caveat as you state, 'provisional hydraulic modelling carried out indicates that the flows generated will be controlled within the swale sizes proposed'. This hydraulic modelling has not been provided to SCC, we would therefore highlight that we have not seen any evidence to support this, however, if at detailed design the swales were not large enough, the size would simply need to be increased, which is ultimately a project risk. Of course, if you have the hydraulic modelling readily available (even if only preliminary), it could address this minor concern.	Matt Williams - SCC	24/01/2022	Michael Sheridan - ATK	Yes	Closed	1	Comment noted. No further action required at this stage.	No further action required.	
EW0320	16	8b	SZC-EW0300-XX-000-XXXXXX-PRE-CCD-000001 P01	Presentation - MCA Surface Water Drainage Phasing - Meeting Slides	other to point out that you are currently indicating multiple discharges into the sizewell drain from WMZ 8 however my understanding from other discussions was that there are only 2 proposed outfalls from WMZ 8 (and SZB).	Yvonne smith - SCC	25/01/2022	Michael Sheridan - ATK	No	Closed	1	Comment noted - Only 2 outfalls proposed to Sizewell Drian. Updated to reflect only two proposed outfalls.	Updated and submitted in Rev 1 (link adjacent)	SZC-EW0320-ATK-XX-000-XXXXXX-NOT-CCD-000016
EW0320	17	12	-	Report - Freight Management Facility Drainage Design Note	I don't entirely support the methodologies used for calculating adequate storage. The use of average infiltration rates in particular will not draw support from SCC. However, I also note the additional infiltration testing that was undertaken in 2021 which demonstrates good infiltration across the site, often in exceedance of the design rate you have used based on the results of 2019 testing. Whilst the 2021 testing is slightly deeper than we would like, it is not of a depth to cause significant concern	Matt Williams - SCC	31/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 21/01/2022 Comment noted but no update required	No further action required.	
EW0320	18	12	-	Report - Freight Management Facility Drainage Design Note	The main outstanding concern SCC have for FMF is in relation to treatment. The document makes multiple references to the use of bioremediation areas in order to supplement proposed treatment and to provide a natural form of treatment, as opposed to the 'mechanical heavy' treatment train previously proposed. Appendix B does not make any acknowledgement of the space requirements of bioretention features and Appendix E does not include these features in a pollution assessment. This approach does not have SCC support. The current pollution assessment in Appendix E uses indices for 3 pieces of infrastructure without supporting evidence of the values used. The indices for the underground storage tank are particularly questionable as I have never seen anyone claim that such a feature delivers any form of treatment. There is a brief reference to bioretention in the conclusion, but again, this is insufficient.	Matt Williams - SCC	31/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 21/01/2022 Comment noted	Show location of bioremediation infrastucture on layout plans Confirm sizes and demonstrate available space Add bioremediation to Appendix E calculations Provide manufacturers certification of indices values	
EW0320	19	12	-	Report - Freight Management Facility Drainage Design Note - 7.1.12	document acknowledges SCC's position, subject to the inclusion of bioretention in the treatment train, this position remains unchanged	Matt Williams - SCC	31/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 21/01/2022 Comment noted but no update required	No further action required.	
EW0320	20	12	-	Report - Freight Management Facility Drainage Design Note	Calculations for Option 2 have a water depth of 1.142m but the crates are only 0.6m	Matt Williams - SCC	31/01/2022	Derek Lord - WSP	Yes	Closed	2	Report issued 21/01/2022 Comment noted	Recheck calculation and amend as necessary	
EW0320	21	12	-	Report - Freight Management Facility Drainage Design Note	Water depths stated on drawing in Appendix B do not match calculations in Appendix C	Matt Williams - SCC	31/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 21/01/2022 Comment noted	Recheck calculation and ammend as necessary	
EW0320	22	12	-	Report - Freight Management Facility Drainage Design Note	Section 10 and 11.1.2 refer to Lowestoft Road, I assume this should be Felixstowe Road	Matt Williams - SCC	31/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 21/01/2022 Comment noted	Correct location name in text	
EW0320	23	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P02	Technical Note - Campus Outline Drainage Strategy	Generally, the principles are agreed if infiltration isn't possible. However, I'd like a greater emphasis in the conclusion that infiltration potential will be explored further at detailed design. Only 5 infiltration tests have been completed across a 20+ha site, with most of those tests not being compliant with BRE365 methodology. As such, there's a lot more testing that needs to be done before infiltration is ruled out on this site. I'm content that you have the space available for an infiltration solution if it's proven possible and this should still be considered the primary means of surface water disposal, until categorically ruled out through more extensive testing.	Matt Williams - SCC	31/01/2022	Michael Sheridan - ATK	Yes	Closed	2	It is recognised that further infiltration testing is necessary to conclude if infiltration alone should be considered as the primary means of surface water disposal.	No further action on the document.	
EW0320	24	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P02	Technical Note - Campus Outline Drainage Strategy	If infiltration isn't possible, or is only partly possible, I'm content that you have demonstrated there is a feasible alternative means of surface water disposal, although we'll need to discuss discharge rates, locations and how this works with other discharges as part of detailed design. Given the catchment is fairly removed from any ordinary watercourses, I'd be slightly more wary of just giving you another discharge from this catchment, I'd rather see it pass through a WMZ at the already agreed rate, but we can discuss this at detailed design	Matt Williams - SCC	31/01/2022	Michael Sheridan - ATK	Yes	Closed	5	Comment noted. Discharge rates and outfall locations are to be developed in agreement with SCC as part of detailed design. No further action on document	No further action on document. Actions to be carried into Detailed Design	
EW0320	25	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P02	Technical Note - Campus Outline Drainage Strategy	Half drain times should be applied to both infiltration and attenuation systems. The principle is relevant, regardless of discharge method. I'm content you have the space to account for this if needed at detailed design	Matt Williams - SCC	31/01/2022	Michael Sheridan - ATK	Yes	Closed	2	Comment noted. To be developed in Detailed Design.	No further action on document. Action to be carried into Detailed Design.	
EW0320	26	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P02	Technical Note - Campus Outline Drainage Strategy	I think page 41 of the report has been included in error	Matt Williams - SCC	31/01/2022	Michael Sheridan - ATK	No	Closed	2	Comment noted - Page 41 was included as error	Content on Page 41 to be removed.	

EW0320	27	9a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000007 P02	Technical Note - Campus Outline Drainage Strategy	I am currently waiting to hear back from Leigh Parratt RE Cv values. I will update you on this aspect when I hear back from her.	Matt Williams - SCC 31/01/2022	Matt Williams - SCC	No	Closed	1	No further action required following email from Matt Williams - SCC received on 04/02/2022. "To confirm, Leigh was happy with this so no further comments to previous email issued 31/01/22."	None
EW0320	28	6	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000012 P01	Technical Note - PIMP Values - Section 2	states 'there is a variety of finishes across the proposed construction site and the PIMP values assigned have been those commonly accepted within the industry'. For roads and roof areas I certainly agree that 100% is widely accepted. Could you provide any justification or evidence to support the PIMP values used for unpaved and soft areas please? As I'm sure you can appreciate, we don't have many developments like this in Suffolk so it may just be that this is something we haven't come across that you regularly encounter.	Matt Williams - SCC 31/01/2022	Michael Sheridan - ATK	No	Closed	2	The PIMP values that were accepted at Hinkley C planning were Roads 100%, Compounds 90%, Stockpiles 50% and Sloping areas 26%. Our assessment broadly matches these values. The Stockpiles at SZC are part sloping and part flat topped, with the material being stored being more permeable than the Hinkley clay based material. In our assessment the 30% figure for the SZC stockpiles reflects these differences.	None
EW0320	29	6	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000012 P01	Technical Note - PIMP Values - Section 2	Later it is stated 'the calculated PIMP values in this assessment will be adopted unless significant changes in the catchment area definition are identified through design development'. I assume this relates only to this stage of design and upon detailed design, when more is understood about the catchment, more detailed analysis will be undertaken? We wouldn't be content using these PIMP values for detailed design.	Matt Williams - SCC 31/01/2022	Michael Sheridan - ATK	No	Closed	2	Comment noted - more detailed analysis of catchments and their areas will be undertaken during Detailed Design.	No further action on document. Action to be carried into Detailed Design.
EW0320	30	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	The current Annex contains a description of the strategy with no supporting information such as suitably scaled plans, sections and supporting calculations.	Matt Williams - SCC 16/12/2021	Derek Lord - WSP	No	Closed	2	Drainage Statement issued 11/02/22 Comment addressed	Plans are provided in Drainage Statement
EW0320	31	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	You essentially put forward two options. Option 1 being discharge to intercepting watercourses (O9 & O10) and the Abbey Road infiltration basin. You need to demonstrate you have suitable land at each attenuation location, with supporting plans and calculations	Matt Williams - SCC 16/12/2021	Derek Lord - WSP	No	Closed	2	Drainage Statement issued 11/02/22 Comment addressed	Location of attenuation basin at Abbey Road is shown on drawing Storage volume calculation provided on the basis of Option 2 representing worst case Possible use of Option 1 with attenuated discharge to watercourse 09 and 10 to be considered at detailed design
EW0320	32	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	Option 2 is required if levels do not allow you to discharge to the intercepting watercourses. Is there a risk that by the time the furthest point reaches the Abbey Road infiltration basin (as a worst case scenario) that it could be lower than the basin invert? If so, would pumping be required? If so, the appropriate assessment will need to be undertaken and it may be more suitable to keep the catchments separate and pump into the intercepting watercourses. Will need to discuss further if this is the case	Matt Williams - SCC 16/12/2021	Derek Lord - WSP	No	Closed	2	Drainage Statement issued 11/02/22 Comment addressed	Based on new infiltration data Option 2 assumes no infiltration and discharge to Leiston Drain/Abbey Road is not permitted. Intention to pump up to TCA and discharge to Outfall 6 to be developed at detailed design
EW0320	33	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	A discharge rate of 5l/s is proposed to discharge into the adjacent watercourse at Abbey Road as a worst-case scenario. Given the existing surface water flood risk here we need to be a bit careful. What is the greenfield runoff rate from your area of works (not entire red line boundary) into this watercourse at the moment? If it's less than 5l/s, then you'd technically be proposing an increase in SW flood risk in an area of high risk – which we wouldn't support. The need for this discharge is stated to be due to a lack of space, as previously stated by SCC, this is not an approach we would support	Matt Williams - SCC 16/12/2021	Derek Lord - WSP	No	Closed	2	Drainage Statement issued 11/02/22 Comment addressed	As above no discharge into Leiston Drain at Abbey Road is proposed
EW0320	34	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	Is the basin now proposed on the east side of Abbey Road rather than west, or is this in addition to the west basin?	Matt Williams - SCC 16/12/2021	Derek Lord - WSP	No	Closed	2	Drainage Statement issued 11/02/22 Comment addressed	This is an infiltration basin for AD6 Lovers Lane highway runoff upsized to accept GRR runoff from section between Abbey Road and Secondary Site Access Road level crossing
EW0320	35	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	Flows east of Abbey Road are said to be dealt with by WMZs. I don't recall seeing additional areas being allowed for in the relevant WMZ designs? Again, do levels support this approach or will any pumping be required?	Matt Williams - SCC 16/12/2021	Derek Lord - WSP	No	Closed	2	Drainage Statement issued 11/02/22 Comment addressed	As above section to the west of the SSAR level crossing drains by gravity to AD6 infiltration basin GRR to east is included in TCA drainage and not covered in this Drainage Statement
EW0320	36	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	You state that infiltration is likely at the NR junction. I wouldn't agree with this statement. There has been a recent development by Persimmon just east of the junction you refer to. This development struggled to infiltrate their surface water, and with no other available alternative, had to resort to deep infiltration through boreholes. At the moment you've not set out any firm proposals to manage and dispose of this surface water. With the above in mind RE likelihood of infiltration, you'll need to identify your options and demonstrate deliverability within your order limits.	Matt Williams - SCC 16/12/2021	Derek Lord - WSP	No	Closed	2	Drainage Statement issued 11/02/22 Comment addressed	As above swale/filter drain will collect runoff between junction with existing branch line and Abbey Road with assumption of zero infiltrationand all flow discharging into ther Abbey Road west attenuation basin
EW0320	37	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	There's a mention of needing to divert a watercourse that the green rail route will intersect whilst in cutting. Connecting this to the Abbey Road watercourse has the potential to increase surface water flood risk. You'll need to have a think about this. It will certainly require detailed hydraulic modelling at detailed design. But ahead of that, you'll need to have a think about what mitigation could be implemented to ensure there is no increase in offsite flood risk and ensure you have the available land to deliver this	Matt Williams - SCC 16/12/2021	Derek Lord - WSP	No	Closed	2	Drainage Statement issued 11/02/22 Comment addressed	Base on updated data diversion of the existing watercourse Outfall 09 location will not be required. Watercourse to be culverted beneath railway.
EW0320	38	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	There's a mention of the Abbey Road basin being adapted by SZC and adopted by Suffolk Highways post-development.	Matt Williams - SCC 16/12/2021	Steve Merry - SCC	No	Closed	1	Comment noted.	
EW0320	39	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	Other points which you would be expecting are the need to justify the PIMP you're using and to provide your GI to justify the infiltration rate used (I know this has been included in the MDS assessment, but it needs to be included here, along with any other GI for green rail route). Have you undertaken any groundwater monitoring at Abbey Road? This area is fairly critical to your drainage strategy, whichever option you choose, so it would be good to get an idea of any GW concerns at an early stage. Other design criteria such as which FoS you're using also need to be agreed given the infiltration basin location and adjacent residential properties	Matt Williams - SCC 16/12/2021	Derek Lord - WSP	No	Closed	2	Drainage Statement issued 11/02/22 Comment addressed	The calculations assume a PIMP of 100% in order to provide a conservative assessment. GI report for GRR is now available. Extracts for infiltration testing and strata provided
EW0320	40	17	-	Drainage strategy - AD6 - Table 1	Where have these figures come from and how were they calculated? I assume these figures are m3/s, but this isn't stated.	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed		Report issued 11/02/2022 Comment noted	Catchment runoff calcuations using FEH Units m3/s added to table
EW0320	41	17	-	Drainage strategy - AD6 - Section 5.1.8	This doesn't match up with Table 1	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Now aligned
EW0320	42	17	-	Drainage strategy - AD6 - Section 6.1.3	Reference and provide relevant testing results. Table 2 is noted, but you should provide raw testing results to support this	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Full data provided in Appendix A
EW0320	43	17	-	Drainage strategy - AD6 - Section Table 2	TH301 – Not compliant with BRE365	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Accepted that only 2 tests were done and BRE365 requires 3 but does confirm viability of infiltration
EW0320	44	17	-	Drainage strategy - AD6 - Section 8.1.2	Underground storage stated. Aren't these areas hoped to be adopted by SCC Highways, who are unlikely to adopt below ground drainage?	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Clarification Underground storage is the filter drains and back up soakaway manholes, not storage tanks
EW0320	45	17	-	Drainage strategy - AD6 - Section 8.1.6	Proposed discharge rate? Yet to be agreed. If 5l/s, what impact could this have on existing downstream surface water flood risk depths, extents, likelihood and subsequent consequences? Answered in part by 8.1.9	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Set as minimum practical rate and will be a reduction on current situation
EW0320	46	17	-	Drainage strategy - AD6	Plate 10 – Total depths and water depths exceed CIRIA SuDS Manual guidance – justify. Depth of water during 1 1+CC exceeds recommended maximum for surface water treatment, has any treatment assessment been undertaken? Suggest CIRIA Simple Index for this location – Will need to agree suitable pollution hazard level but given use, my initial thought would be high, highly frequented lorry approach	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Basin subject to HEWRAT assessment and passed
EW0320	47	17	-	Drainage strategy - AD6 - Section 8.1.21	Queries previously raised RE the referenced infiltration basin, has this been sized to accommodate this area as well?	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	The section of Abbey Road which is modified to accommodate the level crossing and Lovers Lane diversion will discharge to Leiston Drain as it currently does. Thre will be a net reduction since the current Lovers Lane also discharges to Leiston Drain and will be removed.
EW0320	48	17	-	Drainage strategy- AD6	Plate 11 – I've raised this query previously, but I'm not entirely sure exactly what area this basin serves and the infiltration rate is yet to be agreed	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	5	Report issued 11/02/2022 Comment noted,	Assume you mean Plate 10 The infiltration basin drains the new length of Lovers Lane and adjacent BW19 plus GRR between Abbey Road and SSARoad Infiltration test data included in Appendix A
EW0320	49	17	-	Drainage strategy - AD6 - Section 8.1.25	Basin volume increased by 463m3 but storage volume in Plate 12 is stated as 379m3? Need to understand the basin function in both SZC construction and post-construction scenarios	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	As stated either the basin can be reduced in size after removal of GRR or retained at full volume giving greater flood prtection for exceedence rainfall
EW0320	50	17	-	Drainage strategy AD6 - Section 8.1.38	Assume access and road have no flow controls if draining straight into carrier drain?	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	This is the existing and unalterd length of Lovers Lane which basically drains by overland flow down the hill and over the edge at Leiston Drain
EW0320	51	17	-	Drainage strategy- AD6	I'm not sure on the extent of local widening at the HWRC, I know at Foxhall we've had to look at the drainage due to local widening at the HWRC. Will leave you to comment on whether you think the extent of widening here requires a look at the drainage or whether you're content	Matt Williams - SCC 04/01/2022	Steve Merry - SCC	No	Closed	2	Comment noted.	
EW0320	52	17	-	Drainage strategy - AD6 - Section 8.1.42	Again, draining highway surface water to crated systems. Not sure on acceptability from a highways perspective. Even if not proposed for adoption (8.1.43), is this then public highway draining to a privately maintainable system?	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Now 8.1.47. Entrance drains to swale and then into the ACA. None of this is adopted by SCC.
EW0320	53	17	-	Drainage strategy - AD6 - Section 9.1.1	Are these Figure references part of the DCO submission? If so, please provide full references to the submission documents	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Will need to check references

EW0320	54	17	-	Drainage strategy - AD6 - Section 9.1.2	1 100 + 35% is fluvial, we request 1 100 + 40% for pluvial (see attached) – the pluvial level is not referenced in this document	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Since the level is set at the lowest level of Lovers Lane and this acts as an embankment crest flood levels can't exceed the low point level
EW0320	55	17	-	Drainage strategy - AD6 - Section 9.1.5	FYI – boardwalk deck	Matt Williams - SCC 04/01/2022	Steve Merry - SCC	No	Closed	1		
EW0320	56	17	-	Drainage strategy - AD6 - Section 10.1.2	Established how? Likewise for 10.1.3	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	Catchment runoff calcuations using FEH The low spot with pond noted during site visit and matches SWFM
EW0320	57	17	-	Drainage strategy - AD6 - Section 10.1.5	Again uses 35% for pluvial, not 40% for fluvial	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	FRA modelling for DCO gives a lower water level for fluvial than the SWMP pluvial
EW0320	58	17	-	Drainage strategy - AD6 - Section 10.1.6	OK, but you need to demonstrate that your development will not increase this existing flood risk in terms of extent, depth or likelihood. The following paragraphs in terms of potential betterment are noted, but there are a few unknowns around this so we need to work on the worst case scenario at this stage	Matt Williams - SCC 04/01/2022	Derek Lord - WSP	No	Closed	2	Report issued 11/02/2022 Comment noted,	More detailed modelling will be undertaken at detailed design stage but parts of the upstream catchment will be attenuated down to 5 l/s and the existing Lovers Lane will be removed so it is apparent that there will not be an increase in flood risk.
EW0320	59	8a	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000013 P01	Technical Note - ACA West Explanatory Note	SCC LLFA fully support the information contained in this document. As the document alludes to, what you've presented should be considered a worst-case scenario and hopefully we can work to refine this at detailed design, but my thanks for demonstrating that you can accommodate the worst-case scenario	Matt Williams - SCC 03/02/2022	Michael Sheridan - ATK	No	Closed	1	Comment noted, no further action required.	None
EW0320	60	8b	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000016 P01	Technical Note - WMZs 7, 8, 9 Surface Water Discharges	Section 1.2 refers to O14 discharging flows from WMZ7. I think this is a typo as 1.2.1 refers to a 5l/s discharge through O14 from WMZ 8 at 1l/s/ha. However, the paragraph beneath Table 1-2 then refers to WMZ8 discharging through O17, again, I assume this is a typo and should be O14?	Matt Williams - SCC 03/02/2022	Michael Sheridan - ATK	No	Closed	2	Comment noted. Two typo's identified. Section 1.2, paragraph 3, should state 'O14 is proposed to discharge the flows from WMZ8'. Paragraph below Table 1-2 should state 'discharge from WMZ8 into the Sizewell Drain through O14…'	Document to be updated as per below Section 1.2, paragraph 3, should state 'O14 is proposed to discharge the flows from WMZ8'. Paragraph below Table 1-2 should state 'discharge from WMZ8 into the Sizewell Drain through O14…'
EW0320	61	8b	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000016 P01	Technical Note - WMZs 7, 8, 9 Surface Water Discharges	Assuming the above are typos, the most confusing aspect is the following 5 stages which all detail all 3 WMZs discharging to sea, with no mention at any point of any discharge to O14 (or O17 for that matter). Which leaves me questioning what the earlier reference to a discharge through O14 is referring to and how this will be facilitated.	Matt Williams - SCC 03/02/2022	Michael Sheridan - ATK	No	Closed	2	Discharges to O14 and O17 are outlined to show the maximum flows that may be discharged to Sizewell Drain. Given the flow rates are small, the document stresses that discharge to the sea is justified and presents a better solution for water management.	None.
EW0320	62	8b	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000016 P01	Technical Note - WMZs 7, 8, 9 Surface Water Discharges	From an LLFA perspective, my main focus is surface water flood risk and associated pollution. In that sense, I have no concerns as your proposals seek to treat surface water and discharge to sea. However, I must flag that other stakeholders may raise concerns RE the removal of flows from Sizewell Drain and the potential environmental impacts of this. Any changes to the surface water drainage strategy to address such concerns would ultimately come back to SCC for further consideration as part of the surface water drainage strategy.	Matt Williams - SCC 03/02/2022	Michael Sheridan - ATK	No	Closed	2	The WMZ 8 area with a slightly reduced area will represent the permanent catchment discharging to the Sizewell Drain.	This represents the area outside NSL.
EW0320	63	8b	SZC-EW0320-XX-000-XXXXXX-NOT-CCD-000016 P01	Technical Note - WMZs 7, 8, 9 Surface Water Discharges	SCC reserve comment on Stage 5 (1.4.5) RE SZC plant operation.	Matt Williams - SCC 03/02/2022	Michael Sheridan - ATK	No	Closed	2	Comment noted, no further action required.	None
EW0320	64	9b	-	Report - Drainage intent statement for Sports Pitches and Non-Nuclear Island Operational Drainage	Sports pitches are proposed for either infiltration or positive discharge. Infiltration has not been proven at this location. Whilst the intention to limit offsite discharges to greenfield runoff rates is supported, a location for this discharge has not been identified, therefore the feasibility of this option cannot be supported at this stage.	Matt Williams - SCC 03/02/2022	Michael Sheridan - ATK	No	Closed	2	Infiltration is proposed for the sports pitches. These potentially can have a storage volume of 530 m3 based upon the minimum acceptable SCC infiltration rate (5mm/hr.). Anglian Water have confirmed there is no opportunity to discharge to the local Combine Sewerage system.	Infiltration testing to take place during Detailed Design. Identification of storage requirement at this stage. Further possible discharge options include non-potable supplies to the Local Sports Centre or Local Allotments. A possible deep infiltration solution is available into the deep crag aquifer.
EW0320	65	9b	-	Report - Drainage intent statement for Sports Pitches and Non-Nuclear Island Operational Drainage	Agreed grass pitches can be excluded from consideration, other pitches will require drainage.	Matt Williams - SCC 03/02/2022	Michael Sheridan - ATK	No	Closed	2	Comment Noted.	None
EW0320	66	9b	-	Report - Drainage intent statement for Sports Pitches and Non-Nuclear Island Operational Drainage	Drainage outside of NSL – Whilst I'd like to see more information, these areas are either small or have an obvious means of surface water disposal (car park through permeable paving to infiltrate, or (whilst not stated) if infiltration isn't possible it's obvious to conclude a discharge to the adjacent watercourse would be feasible	Matt Williams - SCC 03/02/2022	Michael Sheridan - ATK	No	Closed	2	Comment noted.	Infiltration within car park and possible discharge to nearby watercourse.
EW0320	67	9b	-	Report - Drainage intent statement for Sports Pitches and Non-Nuclear Island Operational Drainage	In short, drainage outside of NSL can be agreed in principle but sports pitches don't have an obvious solution still.	Matt Williams - SCC 03/02/2022	Michael Sheridan - ATK	No	Closed	2	Comment noted. See item 64 above.	None
				Road schemes [REP5-120, Appendix F, G & H]								
EW0320	68	13	-	Appendix F Sizewell Link Road Preliminary Drainage Design Statement Rev2	The general principles of surface water drainage for the road schemes (Two Village Bypass, Sizewell Link Road and Yoxford Roundabout) and agreed between SZC Co and SCC.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2	SLR rev 3 issued 09/02/22	MW confirmed in meeting 16/02/22 that SLR reviewed and only minor comments to return
EW0320	69	13	-		the details required to confirm that the drainage strategies are deliverable within the Order Limits, whilst complying with national and local policy, best practice and guidance (in order to be eligible for adoption by SCC Highways) have not been provided to SCC. Design assumptions, such as maximum water depths, maximum basin depths, side slope gradients, factors of safety and maintenance requirements has not been provided to SCC to confirm agreement, any forthcoming design which does comply with SCC requirements will not be accepted. We are therefore unable to confirm that the proposed drainage strategies deliver suitable and sufficient mitigation.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		Full set of drainage drawings issued at preliminary design show all drainage infrastructure located within red line boundary Details of attenuation basin parameters are provided in Appendix B and in text Also provided MicroDrainage calculations shown in previously issued Hydraulic Modelling Report
EW0320	70	13	-		Final results of infiltration testing, used for design, have not been provided.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		Site testing logs issued in October 2020 showing that infiltration is not viable so alternative of attenuation and discharge to watercourse was agreed prior to start of preliminary design
EW0320	71	13	-		Results of pollution assessments have not been provided.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		Provided in Pollution Assessment Report July 2021
EW0320	72	13	-		The location of roadside swales when the road is at grade, in cutting and on embankment is not clear. Indicative sections should be provided for each of the schemes (multiple if necessary) to demonstrate where the swales will be located in each scenario and the size of the proposed swale. Some of the current proposals locate swales at the bottom of embankments, proposing runoff flows down the embankment prior to entering the swale. SCC have been clear that this arrangement will not be acceptable due to the risk of scour this approach could present to the embankment and the swale.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		Arrangements for draining of SLR embankments agreed at SCC/SZC meeting on 20/01/22 Details of agreement stated in 13.1.15
EW0320	73	13	-		It has not been demonstrated that positive outfalls (where required) are located within the Order Limits.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		All outfalls are shown within the red line boundary on layout drawings issue at preliminary design
EW0320	74	13	-		It is proposed that SCC adopt 50m either side of the proposed watercourse crossings on Sizewell Link Road. This is not a standard approach and SCC do not intend to adopt watercourses 50m either side of the crossing.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		This is not correct, SCC will adopt the outfalls and headwalls, but not the watercourses clear of the culvert crossings
EW0320	75	14	-	Appendix G Two Village Bypass Preliminary Drainage Design Statement Rev2	The general principles of surface water drainage for the road schemes (Two Village Bypass, Sizewell Link Road and Yoxford Roundabout) and agreed between SZC Co and SCC.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2	TVB rev 3 issued16/02/22	
EW0320	76	14	-		the details required to confirm that the drainage strategies are deliverable within the Order Limits, whilst complying with national and local policy, best practice and guidance (in order to be eligible for adoption by SCC Highways) have not been provided to SCC. Design assumptions, such as maximum water depths, maximum basin depths, side slope gradients, factors of safety and maintenance requirements has not been provided to SCC to confirm agreement, any forthcoming design which does comply with SCC requirements will not be accepted. We are therefore unable to confirm that the proposed drainage strategies deliver suitable and sufficient mitigation.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		Full set of drainage drawings issued at preliminary design show all drainage infrastructure located within red line boundary Details of attenuation basin parameters are provided in Appendix B and in text Also provided MicroDrainage calculations shown in previously issued Hydraulic Modelling Report
EW0320	77	14	-		Final results of infiltration testing, used for design, have not been provided.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		Provided in Appendix A
EW0320	78	14	-		Results of pollution assessments have not been provided.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		Provided in Appendix B
EW0320	79	14	-		Results of groundwater monitoring at proposed infiltration basin adjacent River Alde (east) have not been provided. High infiltration rates have led to concerns RE potential continuity with groundwater. Alternative option not proposed if groundwater does present a problem.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		Provided in Appendix A Concern re groundwater noted but basin is at the top of the slope above the river Alde floodplain Concern re high infiltration rate confirmed to be addressed by lining the basin bed
EW0320	80	14	-		It has not been demonstrated that positive outfalls (where required) are located within the Order Limits.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		Only one outfall for A12 west roundabout northern arm. Shown within the red line boundary on layout drawings within report Plate 12
EW0320	81	14	-		Ideally, we would like to see the same level of information for Two Village Bypass as for the Sizewell Link Road and Yoxford. The document should include, but not be limited to •Drainage plans •Indicative sections •Calculations •Dimensioned plans of proposed basins to demonstrate there is sufficient space in the Order Limits •Supporting results of infiltration testing •Pollution assessment	Matt Williams - SCC 09/02/2022	Derek Lord - WSP	No	Closed	2		Report revision 3 addresses list
EW0320	82	15	-	Appendix H Yoxford Roundabout Preliminary Drainage Design Statement Rev2	The general principles of surface water drainage for the road schemes (Two Village Bypass, Sizewell Link Road and Yoxford Roundabout) and agreed between SZC Co and SCC.	Matt Williams - SCC 08/09/2021	Derek Lord - WSP	No	Closed	2		

EW0320	83	15	-		the details required to confirm that the drainage strategies are deliverable within the Order Limits, whilst complying with national and local policy, best practice and guidance (in order to be eligible for adoption by SCC Highways) have not been provided to SCC. Design assumptions, such as maximum water depths, maximum basin depths, side slope gradients, factors of safety and maintenance requirements has not been provided to SCC to confirm agreement, any forthcoming design which does comply with SCC requirements will not be accepted. We are therefore unable to confirm that the proposed drainage strategies deliver suitable and sufficient mitigation.	Matt Williams - SCC	08/09/2021	Derek Lord - WSP	No	Closed	2		Full set of drainage drawings issued at preliminary design show all drainage infrastructure located within red line boundary Details of attenuation basin parameters are provided in Appendix B and in text Also provided MicroDrainage calculations shown in previously issued Hydraulic Modelling Report
EW0320	84	15	-		Final results of infiltration testing, used for design, have not been provided.	Matt Williams - SCC	08/09/2021	Derek Lord - WSP	No	Closed	2		Provided in Appendix A
EW0320	85	15	-		Results of pollution assessments have not been provided.	Matt Williams - SCC	08/09/2021	Derek Lord - WSP	No	Closed	2		Provided in Appendix B
EW0320	86	15	-		It has not been demonstrated that positive outfalls (where required) are located within the Order Limits.	Matt Williams - SCC	08/09/2021	Derek Lord - WSP	No	Closed	2		One outfall is now required for the A12 roundabout northern arm discharging to the river Yox as agreed with SCC and EA on 12/01/22 The river Yox forms the red line boundary.
EW0320	87	10	-	Northern P&R	Table 1 – Provide greenfield runoff calcs to support Qbar rate 7.1.10 – Basin depth and maximum water depth would leave freeboard <300mm, but I note you have additional space available 10.1.6 – Please note that length of culverting should be minimised through good design 11.1.6 & 11.1.7 – Provide greenfield runoff calcs to support stated rates 11.1.7 – Whilst SCC guidance does permit discharge at 1 100, we prefer Qbar. If you want to use 1 100, you need to implement the Long-Term Storage method to manage additional runoff volume. Not quite as simple as simply matching 1 100 rate. July 2021 testing – I note the test which achieved infiltration was at significant depth so wouldn't be accepted anyway. Happy to proceed on the basis the site has no infiltration Appendix B – Main Site – OK, especially given no storage in permeable surfacing has been accounted for A12 – At 16.2l/s discharge, you need 1,063m3 storage but have only demonstrated 800m3. As per earlier comment, your discharge rate would be less than 16.2l/s using LTS so your attenuation requirement will be larger than stated. Whilst I appreciate the area marked red could be available for storage, I can't estimate how much storage this would provide. Current design would result in flooding to the A12 in excess of 200m3 which we would regard as significant - @Steve Merry FYI Appendix F - 5l/s discharge rate for A12 should be amended based on above	Matt Williams - SCC	09/02/2022	Derek Lord - WSP	No	Closed	2	Comments noted.	Greenfield calcs and basin dimensions to be clarified. Storage areas to be clarified.
EW0320	88	9	-	Report - Drainage intent statement for Sports Pitches and Non-Nuclear Island Operational Drainage	Leiston Sports Pitches The secondary option is still reliant on unproven infiltration. If infiltration testing returns a failed result, there is no method of surface water disposal. I think the best thing you can do now is demonstrate you have sufficient space for attenuation requirements above and beyond the 1 100+40% rainfall event and you will explore options for water re-use at the adjacent leisure centre, academy and primary school. All of these locations have a demand for non-potable water usage. You would need to clarify this demand, but I expect the non-potable demand of these sites far exceeds the surface water generated by your proposed development, which could therefore act as a positive outfall. This is far from conventional, and I wouldn't expect you to do any detailed work on this at this stage given time constraints, but it would at least give you a method of surface water disposal if infiltration fails. It could even be the most preferable regardless of infiltration results, but I appreciate the associated costs. A simple statement at this stage would be sufficient.	Matt Williams - SCC	18/02/2022	Michael Sheridan - ATK	No	Closed	2	Infiltration is proposed for the sports pitches. These potentially can have a storage volume of 530 m3 based upon the minimum acceptable SCC infiltration rate (5mm/hr.). Anglian Water have confirmed there is no opportunity to dicscharge to the local Combine Sewerage system.	Infiltration testing is to take place during Detailed Design. Storage requirement if requirement can be placed within the sports area. Further possible discharge options include non-potable supplies to the Local Sports Centre or Local Allotments. A possible deep infiltration solution is also available into the deep crag aquifer. Th
EW0320	89	15	-	Appendix H Yoxford Roundabout Preliminary Drainage Design Statement Rev2	Only potential criticism is the lack of corresponding plan for the calculations. Always difficult to interpret calcs without a plan! That being said, we wouldn't expect Network calcs at this stage usually, so you've gone a step further than needed there, which is appreciated.	Matt Williams - SCC	18/02/2022	Derek Lord - WSP	No	Closed	2	Preliminary Design Layout drawing is available	Include drawing in update
EW0320	90	13	-	Appendix F Sizewell Link Road Preliminary Drainage Design Statement Rev3	9.1.14 only identifies ordinary watercourse crossing at 250m and 750m but there is also an ordinary watercourse at chainage 950m, from memory of our site visit. The road crosses the watercourse at a skewed angle due to which it is unlikely a simple culvert will be feasible. You'll most likely need to diver the watercourse either side for a short distance to facilitate a short, direct crossing. Appendix A – 4.1.4, a point SCC has made previously, there is no reason for SCC to adopt the 50m upstream and downstream of culverts if the road is adopted – not an LLFA point but I expect Steve Merry will pick up on this too Appendix B – I've worked through this and noted some particularly deep basins and water depths, but likewise some well-designed basins with shallow water depths. I note you state these will be revisited as part of detailed design and there is space to increase basin sizes, but that isn't the case for all basins (SLR-AB-09). Some basins also have insufficient freeboard, some only just short (SLR-AB-37) and some very short (SLR-AB-10a & SLR-AB-26). There looks to be an error on SLR-AB-33. Not suggesting any further changes, but comments to note for future design iterations Query – Any reason the calculations have been removed? These were provided previously and it's good that you've included a summary for each basin, but you still need to support this with a demonstration (i.e. calculations). This is a significant road scheme, we cannot support a drainage strategy that has no calculations to support it. Indeed, we wouldn't recommend approval of any size development at Outline that doesn't submit calculations. Plan areas could be inferred from calculations previously but no longer any information on this	Matt Williams - SCC	18/02/2022	Derek Lord - WSP	No	Closed	2	9.1.14 relates to land west of the railway and the one at 950 m is east The reference is to land take within which the watercourse works will be undertaken. It does not imply that the 50 m length of watercourse upstream and downstream of culverts will be adopted by SCC . Land is returned to landownewr if not required for adoption Comment agreed Calculations were not provided for Drainage Strategy but were provided for Preliminary Design review and commented upon by SCC	Review land drain LD1, 2 and 3 taking into account SCC comment on skew Appendix A is a previously issued DCO document so should not be changed tn . Can clarify ownershiop expectations in report Calculations and layout plans can be added as an Appendix. Any comments on calculations to be addressed at detailed design stage as agreed in SCC comment
EW0320	91	16	-	Drainage Strategy Annex 2A.12 - Green Route rail	3.3 is a repeat of 3.2 5.5 states an infiltration rate achieved of 1.06x10-4 (381.6mm/hr). It looks like this is what you have used for the design of the east basin. If you're going to use this rate, you need to support it with the results of testing as it's a magnitude of 10 higher than the nearby rate which you have evidenced in AD6-TH305 of 1.05x10-5 (37.44mm/hr). Also, using the highest of two rates from tests close to one another isn't the conservative approach encouraged by SCC LLFA or national guidance. Your calculations for this basin also utilise an offsite discharge through a hydrobrake at 2.2l/s in the critical event, but this is not mentioned in Section 8 or shown in Plate 5? Hydrobrake and basin invert levels do not correspond with Plate 5. Plate 5 contains some errors. The basin invert and top levels are consistent but the predicted maximum water levels look wrong and don't match the calculations provided in Appendix F. The calcs in Appendix F show a volume of 463m3 storage provided. This accords with AD6 Technical Note, but 8.1.26 of this document states that an 'additional 463m3' is required. So, should it be 463m3 in addition to the volumes already required, in which case you need more than the 463m3 modelled? Table 4 of AD6 Technical Note only notes a 'storage volume top of bank' of 383m3. The information contained in AD6 Technical Note and GRR Technical Note in relation to the basin East of Abbey Road should be the same as it is serving both areas, but there's no consistency and I can't say with any certainty what the cumulative attenuation volume requirements are, let alone confirm that sufficient attenuation is provided. The plans provided in both documents aren't consistent either. Approach for area west of Abbey Road with no outfall is conservative and leaves options for infiltration or pumping to MDS WMZs. Good.	Matt Williams - SCC	18/02/2022	Derek Lord - WSP	No	Closed	2	Error agreed The value is qviability of infiltration but is not BRE3w65 confirmed . The AD6 is BRE365 hence used. The calculations are used to get a high level estimate of volume required for GRR runoff which will discharge into the AD6 infitration basin Plate 5 not in error as provides the AD6 performmance not trhe Source Control calculations in Appendix F As stated on Plate 5 a volume of 463 m3 is provided in the AD6 basin for GRR runoff	This drainage statement is to be replaced by an update to the original report iossued for DCOThe intergration of AD6 and GRR will be cross referenced to avoid any ambiguity
EW0320	92	17	-	Drainage strategy - AD6	2.1.3 appears to have been taken straight from Freight Management Facility Technical Note without any changes Table 1 – Where have these numbers come from and how have they been calculated. I'm not expecting to see a full set of supporting calculations, but some context is needed Table 2 – TH301 is a fail. Supporting logs show 25% was not reached on Test 1 or 2 and therefore Test 3 was not undertaken. Note BRE365 compliant 7.1.3 – Note that generally SCC would expect to see 10mm/hr for infiltration only to be a suitable means of surface water disposal, as previously stated and as implemented on SPR DCO 8.1.1 – Formatting error 8.1.2 – Reference to underground storage discouraged Table 3 – Provide supporting calculations Table 4 – Provide supporting calculations. Note comments on Green Rail Route above and lack of consistency for this basin.	Matt Williams - SCC	18/02/2022	Derek Lord - WSP	No	Closed	2	Agreed its standard across all reports. Flow rates calculated based on assessment of catchment extent using FEH data Agreed not full BRE365 compliant but does indicate some infitration capacity Noteds clarification of SCC position Agreed Clarification this is not a referenc e to underground storage in tanks but storage in underground filter draons, their trenches and manholes pending infiltration. Calculations are available for both basins	Allow for in update Provide calculatiosn as appendix

EW0320	93	11	-	Southern Park and Ride	Southern Catchment WTP217, which has been used for design purposes, is not compliant with BRE365. Only one test was undertaken, with the subsequent two tests failing to reach 25% and therefore not achieving an infiltration rate. The design for the southern catchment is entirely reliant on the first result from WTP217 which was 2.94x10-5 (105.84mm/hr). We cannot accept a design which is entirely reliant on results of non-compliant BRE365 testing, also noting that the first test which you've used for design would be a massive overestimation compared to the subsequent two results, had they reached 25%. Also, worth noting that WTP01 & WTP03 failed as this gives further context to the above, although I note the recorded geology differs I'm not entirely sure what a 'crate basin' is, as shown in Appendix C. Northern catchment Looks acceptable in principle as the infiltration potential is proven at this location Pollution mitigation I don't think it's accurate to compare this to Northern Park and Ride. Northern Park and Ride discharges through multiple swales and basins before discharging through a positive outfall. At this location there's the potential for infiltration straight to ground without adequate treatment. It looks like most areas are proposed to pass from either swale or permeable paving and then into attenuation basins. Permeable paving shouldn't be an issue but the swales may need to be lined, especially along the access roads. This shouldn't be a problem as I note the calcs don't allow infiltration from these features anyway Plan in Appendix C still notes pumping station	Matt Williams - SCC	18/02/2022	Derek Lord - WSP	No	Closed	2	Agreed that results are not BRE365 compliant but do show that infiltration does occur. Underground storage tank but the model uses oversized pipes	Propose to allow for 2 options and update. Option 1 orignal pumping option Option 2 gravity option subject to futher validation of infiltration in the souith west of the site
EW0320	94		-	Highways Schemes	This is relevant to all highway schemes. Swales have been reduced in depth and side slopes slackened off to avoid the need for VRS. The shallower swale depths will silt up quicker which will require more regular maintenance. Steve is content for deeper swales with steeper side slopes (max 1 3, ideally 1 4) to be included without a need for VRS. The key thing at this stage is ensuring there is adequate space for detailed design to intercept flows from the carriageways served.	Matt Williams - SCC	21/02/2022	Derek Lord - WSP	No	Closed	2	Application of DMRB would imply the requirement for VRS if depth of swale is increased. If SCC as adopting authority is happy to remove the VRS requirement this could be done as a departure from standards	Discuss this issue with SCC and get agreed positiuon
EW0320	95	14	-	Appendix G Two Village Bypass Preliminary Drainage Design Statement Rev3	Plate 10 Infiltration rate stated 0.11239m/hr (112.39mm/hr) Relevant test in Appendix A TVTH201 Result of TVTH201 60.12mm/hr Plate 14 Infiltration rate stated 0.82005m/hr (820.05mm/hr) Relevant test in Appendix A TVTH212A Result of TVTH212A 363.6mm/hr Plate 16 Infiltration rate stated 0.12611m/hr (126.11mm/hr) Relevant test in Appendix A TVTH211 Result of TVTH211 149.76mm/hr	Matt Williams - SCC	22/02/2022	Derek Lord - WSP	No	Closed	2	The values in the Plates are those applicable at preliminary design. The change to the more conservative Fugro infiltration rates is confirmed in10.1.5	None
EW0320	96	14	-		8.1.4 – As per email on 21/02/2022 @ 13 44, when road is at grade or in cutting, shallow swales not required. Also, this isn't reflected in calculations, thus any storage in swale could be overestimated. 8.1.18 – Infiltration through swales has not been evidenced through the results of infiltration testing along the corridor. Assuming that infiltration is available along the entire corridor at the same rate as achieved at the location of the proposed infiltration basins is not a conservative approach and is likely to underestimate the required land take of the proposed infiltration basins. Worth noting that BGS mapping identifies Lowestoft Formation along a significant part of the proposed route, where infiltration should not be expected. 10.1.3 – The lower values, which SCC agreed would be used, as stated, should be used at this stage of design development	Matt Williams - SCC	22/02/2022	Derek Lord - WSP	No	Closed	2	Application of DMRB would imply the requirement for VRS if depth of swale is increased. If SCC as adopting authority is happy to remove the VRS requirement this could be done as a departure from standards. Infiltration viability is proven at the receiving infiltration basins. The infiltration test results do show that for the portion of TVBP which is in cutting to thew north of Hill Farm Road, infiltration is not viable. However the swale/filter drain has a faulting gradient towards the A12 north east roundabout and hence runoff will be conveyed to basin 2 The hydraulic modelling results provided in Appendix C do use the lower Fugro infiltration rates .	SCC to confirm a departure removing the requirement for VRS will be granted prior to commencement of Detailed Design. Hydraulic modelling will be updated and optimised as part of Detailed Design
EW0320	97	14	-		Appendix A – It's not possible to use the plans that contain the locations of test results without context of the proposed scheme overlaid	Matt Williams - SCC	22/02/2022	Derek Lord - WSP	No	Closed	2	Comments noted.	A plan showing test locations with the scheme layout will be added to Appendix A
EW0320	98	14	-		Network 1 Infiltration rate used of 60.12mm/hr. This conflicts with Plate 10 but uses the right infiltration rate as far as SCC are concerned. Basin levels and modelled flood levels are different to that contained in Plate 10. Infiltration basin DS/PN is N1-1.010 with a weir overflow of 8.622m. Given this is an infiltration basin, I wouldn't expect to see any flow through this pipe but during 1 100+40% it is discharging at 12l/s. This is not in accordance with the proposed drainage strategy and does not represent the required attenuation volumes. In addition to the above, despite the offsite discharge, there is a cumulative flood volume of 96.661m3. This is a significant volume and I don't expect @Steve Merry would be content with this being retained on the road. Given the location next to the River Alde, it's likely this water would find its way to the river, thus increasing offsite flood risk, which is not something SCC can support.	Matt Williams - SCC	22/02/2022	Derek Lord - WSP	No	Closed	2	Comments noted.	As noted in the report Section 8 describes the position at the time of submission of the Appendix for Examination. Section 10 and the Appendices provide updated results. Issue discussed by Matt Williams and Derek Lord by phone on 24 February. SCC would like to see a simple Source Control calculation to validate the size of basins 1, 2 and 3 since this will produce a conservation volume requirement. Evidence that the basin with required size will fit within available space will also be provided. Agreed that SCC do not require updating of full hydraulic model prior to detailed design if source control output is provided.
EW0320	99	14	-		Network 2 No comments as subject to change as per 8.1.10 of the report. Not ideal but I agree with the principles outlined in 8.1.10 and given the small area I'm content to leave this until detailed design	Matt Williams - SCC	22/02/2022	Derek Lord - WSP	No	Closed	2	Comment noted.	Action as per Network1 above
EW0320	100	14	-		Network 3 Infiltration rate of 522mm/hr used. This conflicts with both Plate 14 and the results of TVTH212A. Where has this infiltration rate come from? Below comments are based on this aspect being addressed Basin levels and modelled flood levels are different to that contained in the relevant plate. This network model is very detailed, including losses through complex structures (swale/filter drains). Notwithstanding the comments made above in response to 8.1.18, if you're going to have a model with this much detail, you'll need to support it with plans and sections, this would include catchment extent, drainage strategy plans, swale and basin plans and sections. Without this information, we can't accept upstream losses. Whilst you haven't undertaken infiltration testing along the route away from proposed infiltration basins, I note there are trial pits. I would suggest there's some form of assessment of soil type in these trial pits, compared against that found at the infiltration test location to determine if the soil type is the same and therefore the infiltration rate achieved at TVTH212A may be suitable to be used elsewhere. But again, highlighting the point made in response to 8.1.18, this is not a conservative approach. Swale base infiltration rate wouldn't be natural soils so not correct to use same infiltration rate as for the filter drain. Any swales sections and plans should also reflect the use of V-notch weirs, which are also modelled At this stage we don't have the GI information to be modelling upstream losses to this extent, hence we usually only require source control calculations as this would demonstrate a worst-case scenario for attenuation requirements based on the limited GI undertaken to date. The current approach taken isn't very conservative in terms of attenuation volumes required and there's no justification for such an approach Cumulative flood volume of 44.46m3 for 1 100+40%. See comments on flood volumes in Network 1	Matt Williams - SCC	22/02/2022	Derek Lord - WSP	No	Closed	2	Comments noted.	Action as per Network1 above
EW0320	101	14	-		Network 4 No comment as modelled network is not what is proposed	Matt Williams - SCC	22/02/2022	Derek Lord - WSP	No	Closed	2	Comment noted.	Action as per Network1 above
EW0320	102	14	-		Network 5 Infiltration rate of 117mm/hr used. This conflicts with both Plate 16 and the results of TVTH 211. Where has this infiltration rate come from? Below comments are based on this aspect being addressed Technical comments similar to those as for Network 3 as similar level of detail provided DS/PN showing a pipe flow of 14.3l/s for 1 100+40%. Same issue as for Network 1 as this looks to be providing a positive discharge offsite and therefore not modelling as an infiltration only system Cumulative flood volumes of 86.37m3 for 1 100+40%. See comments on flood volumes in Network 1	Matt Williams - SCC	22/02/2022	Derek Lord - WSP	No	Closed	2	Comment accepted.	Action as per Network1 above
EW0320	103	14	-		Appendix D Confirm that invert levels, top levels, 1 100+40% levels and freeboard levels align with current calcs	Matt Williams - SCC	22/02/2022	Derek Lord - WSP	No	Closed	2	Comment accepted.	Action as per Network1 above

39. S.A.G.E – 25 February 2022

From: [redacted]
To: SizewellC
Subject: Fwd: Post Examination Representation
Date: 25 February 2022 10:41:30
Attachments: SoSPINSfinltr222.docx

Please find repeat submission as email to szc@planninginspectorate.gov.uk returned address not known.

---------- Forwarded message ---------
From: **Regan Scott** [redacted]
Date: Thu, Feb 24, 2022 at 10:13 AM
Subject: Post Examination Representation
To: <szc@planninginspectorate.gov.uk>

Please find attached our S.A.G.E. contribution on issues of concern arising after Examination closure.

With thanks, Regan Scott for S.A.G.E.

SoS/PINSFinLtr for 28th Feb 22

S.A.G.E. (Suffolk Community Monitoring Group)

IP No 20026009

to: National Infrastructure Planning Inspectorate, EDF Sizewell C Case Team.

from: Regan Scott, S.A.G.E. Convener *email* – [redacted]

23.2.2022

Commentary on Six post-Examination Principal Issues

We write to suggest that six areas of material consideration have emerged since the close of the Inspection hearings, and ask for these comments to be forwarded with your Inspection Recommendations to the Secretary of State.

This representation supplements the basic themes we have pursued throughout the SZC planning process – not least in 16 written submissions and many live contributions. These have been based on fundamental planning principles and issues, and most notably 'changed circumstances' of policy and law, the role of the closely associated matter of 'combined and cumulative impacts' and HRA/IROPI and the duty to seek mitigation and alternatives. The orientation has been about conformity with public policy and compliance with regulation.

We also urged a wide Examination agenda of Principal Issues reflecting what might be termed a planning algorithm: namely that the questions about the SZC project concerned its suitability to Suffolk and the site, it necessity and its sustainability. The sum of the algorithm would be the balance of positives and negatives – and the unresolveds and unknowns - and their respective weightings in the setting of the project's conformity to policy and law.

1 **Bedrock Trials - EDF's local planning application (App: DC/22/0078FUL, planning@eastsuffolk.gov.uk))**

This application, notified 17th January, 2022, and made to East Suffolk Council Planning Committee is for geotechnical trials of the bedrock

beneath the SZC site and an anticipated need for steel struts to support the deep foundation perimeter wall.

Our letter of comment to ESC Planning Committee (see ESC archive above for ours and many others) suggests that while the trial may or may not be a local planning matter, it has come as a shock that such fundamental investigations have been so delayed without explanation with now more than a decade to carry out this obvious work. However, we suggest that what matters in the planning process is not the permission itself but the results of these geotechnical trials. We believe the trial results should be published as appropriate assessments with full engineering proposals, not just engineering sketches, for public consultation. We further note that the Inspectors received multiple representations that the engineering plans for the Beach Landing Facility and marine pier were utterly unprofessional, an issue which may not have been resolved at close of public Inspection.

Secondly, we suggest that the bedrock issue should now be seen as an unresolved Principal Issue during Examination and be regarded at this stage of the process as an unknown/potential negative until it has produced acceptable results and engineering proposals. It constitutes a systemic/structural issue which should have been dealt with during Examination. Adequate professional resources exist within the impacted communities to offer views on results and proposals, as evidenced during the Hearings. An obvious concern is that the proposed supporting struts for the massive perimeter containment shield may need to penetrate the sand dunes outside the site and therefore be exposed to coastal change dynamics.

2 The Aquind decision (BEIS 20th January, 2022)

We suggest that the **r**ejection of a whole important energy infrastructure project on the basis of inadequate consideration of an alternative route for the UK/France energy interconnector has shown that the tilted balance of National Policy Statements (standard and IROPI qualified) has only a limited weight, being overriden by the imperative of a comprehensive consideration of alternatives, a matter which we note has been further developed in the Vanguard

redetermination (see below). This diminution of the NPS tilted balance is, we suggest, notwithstanding the promulgation of the interesting but unreasoned doctrine of 'exceptional necessity'. We further note that the SoS Decision encompasses the principle of "potential" alternatives, a matter to which we return below.

If "potentiality" engages with consideration of alternative projects, as a planning principle it would be reasonable to also apply it to consideration of combined and cumulative impacts.

3 Marsh Harrier Update News and the IROPI Trigger

EDF's Newletter Update (2.2022) has declared that marsh harriers – and otters – "have returned" to Aldhurst Farm.

This development has consderable imolications for the EDF request for IROPI on the very narrow ground of the loss of a small amount of Minsmere resident marsh harriers' foraging. This would be from the small parcel of the SSSI required for the permament accesss road to the proposed site, and also for the wider foraging loss during the lengthy constructon period which EDF nevertheless regards a temporary/transitional.

The disturbancee of the MH is the sole receptor cited after assessment for a significant negative HRA impact on Minsmere, a matter which was , not surprisingly, strongly contested during the Examination.

The marsh harriers – not a licensable protected species as are the ottters – are claimed to have "returned" – or maybe arrived anew - on what was agricutural land - to EDF's creation of the Aldhurst farm nature terrain. It would therefore seem that the MHs have had no problem in finding adequate foraging, and notably well in advance of any construction works. While there are many detailed matters about MH protection, breeding and foraging and compensatory terrains for both breeeding and foraging, the essential point is that the trigger for IROPI would now seem to be redundant, or, to pursue the trigger metaphor, to have fallen off.

It follows that without IROPI, the SZC project will default to consideration by the standards of ordinary SEA/EIA, NPSs and authoritative public policy, and as we mention below, the primary and

overarching sustainability duties in PA2008 Part 2, **10,** Clauses 1,2, and 3 (a) and (b), on which we drew in our representations to the ExA.

In support of our view that IROPI is now likely to be redundant, and that the EDF claim needs in any case is to be subject to a new consultation on a new assessment of Aldhurst farm. It may be worth noting that we expressed concern about the narrowness of the marsh harrier IROPI trigger during the Inspection, and that the Inspectors in their RIES invited EDF to reconsider their IROPI case. This advice was not, apparently, taken up by EDF in the due time. It was not clear whether the ExA's advice was likely to lead to the withdrawal of IROPI, or, equally, to its enhancement by including disturbance impacts for the many other protected fauna and flora at Minsmere. Our view was that the initial basic impact assessment for Minsmere was defective, particularly in respect of the precautionary principle and the likely length of the construction period being anything from a hardly credible 8 years to 12 or 15 years, engaging likely breeding impacts, for example, of many generations of fauna.

Another feature of Aquind reasoning is also of interest. It concerns EDF's overly rapid ascent to IROPI, and the narrow basis on which the search for mitigatory alternatives for the MHs and maybe many more species, was conducted. Aquind's very broad approach to alternatives – all practicable and potential altenative projects - suggests that the HRA process on Minsmere needs to be revisited. Was therefore no aternatuve oter than reaching for what can be assumed they regarded as the cover of IROPI ? That stratagem wasEDF's to choose, but in seeeking to assess it we have ben mindful of mainstream lega commentary to the effect that IROPI can be a "high hurdle". EDF 's approach has, however, been far too narrow to reflect the likely scale of disturbance(s) to Minsmere.

If however, IROPI is upheld, we note (below) a further possible authority in Vanguard on the need for overall coherence to be achieved for nature assets in IROPI compensation proposals. This formulation appears to update early legal commentaries on the nature of HRA compensation.

4 Vanguard's redetermination and the policy rehearsals by the SoS.

The SoS's Vanguard decision (BEIS 11th February) to redetermine the onshoring of Vattenfal's offshore wind farm can be seen as a landmark decision of wider importance than the overriding of a judicial review and some minor new conditionalities for a national infrastructure DCO application.

Three areas are of particular interest, namely the rehearsal of the Government's three tests for consenting IROPI compensation (BEIS Letter: 5.10, p 40), the authority established about fully assessing the combined and cumulative impacts of a project and thirdly the establishment of a new 2035 energy supply target date for climate change mitigation.

Vanguard sets out the requirement that if IROPI applies, the compensatory measures must themselves ensure that the overall coherence of the national site network is maintained. Two points arise: first, that Minsmere, after 70 years as the apex of the RSPB achievement might be regarded as the national network, including its microhistory of the rescue and recovery programme for the marsh harrier from an extinction baseline.

Secondy, an holistic approach might be in line with the case law authority of Navitas Bay – historic coastal landscape, international heritage site, and more recently, the judicial review of the road proposals at Stonehenge.

The shortcomings of the combined and cumulative impact assessment in the Vanguard judicial review may also carry implications for EDF's DCO case. It is reasoned that it impeded achievement of the energy supply target set by Government for 2035. In this new situation, a go-ahead for Sizewell C might be seen as crowding out alternatives on the Energy Coast East which would be capable of reaching this carbon target more rapidly, at lesss cost and more securely.

5 New Nuclear Funding and project management issues

At a Suffolk Parishes meeting at Snape, on February 4th, the BEIS spokesperson revealed in answer to a question about future ownership and funding of SZC that BEIS would be conducting its own FID. The SoS had visited SCZ only days before and had announced a Government "boost" for SZC which on examination turned out to be what can only be

described as a liquidity loan, maybe to fill an anticipated cash gap if China's CGN withdraws from the current development phase of SZC.

We further note that the Treasury's estimates in Autumn 2021 allocating up to £1.7 billion of support for at least one more large scale nuclear plant deliverable by 2035 has taken the form of an estimate over several years, detailed in the Appendices as an initial four year flow of quite modest sums. While this is a new allocation, it falls far short of a real contribution to a project currently without any overall secure funding, a parent in France very short of capital and competing projects lining up at much less than the currently estimated £22bn for SZC.

These funding developments can be regarded as new, along with the Nuclear Levy Bill passing through Parliament currently, and the intention to develop this paving measure into a statutary instrument.

While these are matters for Government, and subject to necessary public consultation, we suggest that they engage with the SZC project likely insecurity, alongside the emerging concern about corporate responsbility for such a massive project being in the hands of a licensee which is declared in the draft DCO to wish to retain no more than a minority interest in SZC. There are now, with this DCO declaration, implications for project governance and Deeds of Obligation. The public narrative about the RAB model of funding has obscured real concerns about how such a massive and intentionlly long life project might be able to survive in a secure and satisfactory way if majority private ownership by investors rules the expenditure roost. The same goes for the proposed RAB levy for consumers, bearing the construction risk with no guarantee of lower SZC enegy prices available on the market and no voices. And no mechanism proposed to date for the restitution of the levies should the project fail, for whatever of many reasons that might occur.
This constitutes a special financial prospectus, rare in the nuclear field and where tried in the USA, unsucccessful leaving only the options of nn-completion or closure or state capture.

The national policy goal of energy security fom this project, with this funding model and ownership struture is a principal question. It occurs to us that a broad definition of akternatuves might well come into play above and beyond standard planning considerations under the overriding imperative of national energy security. We suggest that the Vanguard redetermination authority for quashing likely impediments to public policy aims – that is, energy security - needs to be applied to the SZC project's business model and funding regime. In these respects, of course, SZC is a profoundly different project to Hinkley Point C, which can best be seen as a Government secured project, with a guaranteed profit stream from a high CFD, and appretoy funds to complete construction. HPC might be described a state guaranted quasi monopoly: SZC would be a market financed venture into a rapidly changing, highly charged and uncertain energy market. That prospect invites its capability to deliver energy security – and value for public and consumer money – to be considered as a full planning issue and to constitute a substantial part of any reasoning undertaken by the SoS after the Inspectors' Recommendation.

A final point is that BEIS's separate FID should be published and, on the RAB levy, consulted on to interested parties. If planning is required to be transparent, so too should project finance where it is evidently going to impact the public policy goal of energy security.

> N.B. It may be appropriate here to note that EDF have revised their Statement of Reasons and now recognise the Review process of NPS EN1 and 6 as material considerations, and that the Review process is likely to engage the current policy narrative as set out in the Net Zero Strategy, Chapter 3, paras 38-40, which, incidentally, can be read as depassing the EN6 requirement of 7 out of 8 new nuclear site options. Counting two projects at Wylfa and one at Trasfynnyd and an ccasional mention of a new nuclear hub at Moorside, there is a real prospect of deliverable alternatives to SZC's already outdated EPR. France is well advanced in its designs for the "more manageable" EPR 2, and several countries are pursuing large scale SMR projects with energy storage linkage in parallel to the UK.

6 COP 26 and the UK's enacted 2035 carbon budget target

On this matter we refer, quite simply, to the public policy and lawful new post COP26 target of a 78% reduction in carbon emissions by 2035, as announced by BEIS – Press Statement on the UK's Sixth Carbon Budget, 20th April 2021, and slated to be law by the end of June 2021. We suggest that the SZC project will be unable to contribute positively to this public goal because of the need to offset its construction footprint. We are of the view that EDF has not presented a full and satisfactory carbon account of this project in these sites and at this time, despite the parent company offering granual carbon footprinting sevices to its commercial clients. While this failing was an Examination issue we raise it now for consideration as an important unresolved principal issue.

Some conclusions

- **That the policy context, particularly in respect of project alternatives and potential alternatives, constitutes a changed circumstance of considerable weight which has not been substantively addressed by EDF and deserves the fullest consideration in the coming SoS decision about SZC.**

- **alternative projects, of large nuclear scale, capable of energy security, deliverability and market flexibility and energy storage integration, and likely to attract responsible funding, are now available and deserve consideration under "changed circumstances" since the SZC EPR project was commenced. "Potential" projects also deserve full consideration.**

- **in line with the Inspectors' already published RIES report, with its repeated advice to EDF about revising their IROPI case – that is, the very narrow, minor IROPI trigger for marsh harrier foraging – has rendered the IROPI case redundant with the "return" of marsh harriers to Aldhurst Farm as just announced.**

- **the HRA on Minsmere should be reconsidered for likely negative impacts on its integrity as a nature and public heritage asset**

equivalent to Stonehenge in the recent judicial review and the South Downs landscape designated by the United Nations in the Navitas Bay case.

- **if IROPI were to be refused, the original planning narrative posed by Suffolk County Council and East Suffolk District – the McGregor Report - on the standard basis of LIA should be granted great weight. This well established view is that the project's evident EIS/EIA negatives outweigh the positives and that there remain very sustantial unresolved issues about the project.**

  This unresolved list should carry very substantial negative planning weight. The list now needs to be supplemented by the new trials of the bedrock/geo-stability of the site. It would join the unresolved (aspirational) rail transport issues, the water supply issue for construction and especially for the 60 year operating life, the very limited site size, the impracticability of the road infrastructure, the multiple combined and cumulative developments which are flagged daily in the local media – e.g. the triple sites for the new Felixstowe freeport and extensive new housing developments; the capabilities of future management and equally the discharging authoritiies (SCC and ESC) given the declared aim of EDF to retain only a minority management interest in the project; and, perhaps finally, the parlous, precarious and continuing financial condition of a parent company in France unable to fund its own energy transition without substantial new state funding.

- **that funding is a public interest issue and that after the Nuclear Levy Bill and promised SI, the BEIS FID should be consulted on with interested parties before the disbursement of any large scale public fundng for this, and, indeed, any other new nuclear projects.**

- **that the new climate change imperative date of 2035 and its consequent policies be applied to the outstanding issue of the carbon footprint of this roject, at this time and in this place and circumstance, and that proportionate weight be given to any net gain after offsetting of the construction footprint, and in comparison to deliverable and potential alternative large scale nuclear projects and renewable energy projects. The start of annual auctions for offshore and onshore wind farms and prospect of gnew gas capacity linked to CCUS facilities reinforcs the point that SZC is unlikely to be able to contribute positively in appropriate time tocarbon reduction targets in the energy sector.**

- **that these principal issues – material considerations – as currently understood are sufficiently substantial to support the view that the project is not likely to be of sufficient standard to enable the SoS to perform his/her strong statutary duty of contributing to sustainability (PA2008, Part 2, Chapter 10).**

- **and that the project does not otherwise conform to public policy and law, being unsuitable for Suffolk and the site, and not necessary given practicable and potential alternatives and is further unsustainable in respect of value for money, energy security, likely lifetime redundancy, design challenges and the likely impact on precious national environment and nature assets.**

ends

40. John Sutherell – 25 February 2022

From: JOHN SUTHERELL [redacted]
Sent: 25 February 2022 17:43
To: SizewellC <sizewellc@planninginspectorate.gov.uk>
Subject: Sizewell C Application : DC/22/0078/FUL to ESC for Ground Condition Survey

Dear Ladies and Gentlemen of the PINS Sizewell C team,

I am all too aware that you will have delivered your report to the S of S today and therefore I will write on this subject direct to BEISS. However, in view of the care and thoroughness with which you conducted your examination, under considerable difficulties, you should be made aware of the applicant making a submission to ESC to carry out geotechnical trials on ground conditions at the proposed site before your report is delivered and pre-empting the decision by the S of S.

During your investigation there was considerable discussion on the suitability of the site for this major construction. Concerns were raised about the suitability of the ground on which the Power station and its Hardened Sea Defences would stand. The applicant was not only robust in their contention that the site was suitable, but argued for reports relating to this subject not to be made public on grounds of commercial confidentiality. The fact that they now propose (as explained in their own recent newsletter to residents) to conduct trials to understand `how best to install ground anchors to provide support to the cut-off wall' and conduct `deep soil mixing trials to ensure that all areas of ground on the main site are strong enough for the foundation of earthworks' is a cause of not inconsiderable local concern and further undermines confidence in the applicant. This proposal has also raised questions on the exact location of the trials, whether they include the under-pinning of the Hardened Sea Defences and the impact of these substantial trials on the sensitive local environment. It brings yet another element of risk to this already high risk project

These questions are being asked of ESC planning department to whom the application is being made, but this new development begs the question as to why the applicant had not conducted these important trials before (or even during) their application to PINS for your scrutiny. It also begs the question of whether the S of S will be made aware of the results before he makes a decision and whether the results will be made public. It also seems to call into question the coherence and integrity of the planning process which you and your team have worked so hard for many months to conduct in a fair and transparent manner.

Yours sincerely,

John Sutherell

IP Number 20026479

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41. G I Bickers – 25 February 2022

From: Graham Bickers [redacted]
Sent: 25 February 2022 21:45
To: SizewellC <sizewellc@planninginspectorate.gov.uk>
Subject: Sizewell C Matters in Regard to Deadline 10 for the Attention of Secretary of State (Reference 20026345)

Dear Sirs. Re Property Price Support Scheme

There appears to be no link on the site to upload to the Sizeweell C site for the SOS

I have therefore require 5 attached documents, which includes a letter below to be lodged and sent to the SOS

You will note this has been sent by the Deadline date being Friday 25th February 2022

Please confirm you have received these and that they have been passed onto the SOS for energy

Thank you in anticipation

Yours Faithfully

G I Bickers

G I Bickers
[redacted]

23rd February 2022 **My Reference 20026345**

Zwasi Kwarteng (Secretary of State for Business and Energy)

Dear Sir,

Re: - Sizewell C Matters in Regard To Deadline 10 to be sent to the SOS for Business and Energy

You may recall at the Ipswich Suffolk Business Club meeting you kindly gave of your valuable time to a lunchtime meeting in November 2021 Thank you for that.

A number of questions were asked including mine in respect of your promise to 'Levelling Up' matters of unfairness.

In my question I brought to your attention a matter in respect of EDF's total unfairness and disregard for the inequality between the two respective Property Price Support Schemes (PPSS) One being offered to those living within 2 kilometres of Hinkley C development site and then a derisory PPSS offered to the residents of Eastbridge and Theberton, who will be living squarely at the coalface of the development and within 2 kilometres of the Development Footprint suffering the resulting cumulative impacts. The scheme barely offers any support outside the development site footprint or around the proposed Theberton by-pass only properties in the main owned by EDF ! would benefit (Copies of both schemes are attached)

As the PPSS from EDF for Sizewell is so vague in identifying the area it covers, in relationship to the community / properties, I have overlaid their proposed area's within their PPSS (hatched green) onto the Development working areas on Plan 3 (attached) the radius of 2 kilometres takes in the majority of Theberton & Eastbridge.

The PPSS scheme for Sizewell C was clearly within the Heads Of Terms Section 106 /Deed of Obligation (DOO) May 2020 and we still await a clear answer as to why EDF were allowed to remove this from DOO Nov 2020. EDF for whatever reason were allowed to make the PPSS a voluntary scheme at Hinkley. However **please note** they withdrew the scheme at an early stage, leaving residents vulnerable and unable to use the PPSS they had been promised. That is why we were initially pleased it was within the Heads of Terms of the DOO, which would have protected our community against impact and blighting to property values.

EDF have said they will relook at the scheme. Since 2021 they continue to kick this matter into the long grass in the hope they can get this permission over the line, without financial commitment to a legally binding PPSS that is at least comparable to Hinkley. This being a scheme which was less than adequate, only covered properties purchased prior to the Initial Announcement of Hinkley C in 2008 with a DCO application in 2011 (gap of 3 years). For Sizewell C the gap is even greater (9years) with an Initial Announcement date of 2011 and a DCO application in 2020. People purchasing rely on Local Searches through their solicitors to establish developments application/ approvals that may effect their decision to purchase, so for Sizewell C those searches

were not in the public domain until 2020. Given the time line between Initial Announcement and DCO application, Eligibility Dates under EDF's PPSS, also require looking at.

We confirm only pressure from our Parish Council (Theberton & Eastbridge), East Suffolk Council and Therese Coffey MP have forced EDF back to the table, but EDF continue with their smoke screen tactics.

We still await a revised document, originally promised by December2021. However given the feed back the Parish Council are receiving, it is clear their intention even with improvements to the original derisory PPSS will be a pale shadow of that which was given to Hinkley residents, being highly restrictive in those that will qualify. That can not be fair as Sizewell C in their words "We are Replicating Hinkley", so why are they not replicating the PPSS, as the level of impact and effect on residents in that area have already been accepted by EDF in making such a scheme available. Also clearly the impacts are more substantial in Suffolk given the proximity of the Parish to infrastructure of the Development, which will include 5000 + workers living at the bottom of our road

Should consent be given to build Sizewell C we fear unless the government steps in, holding EDF legally accountable for the Decrease in relevant property prices as assessed and covered by Mr David Knights MRICS in his letter to the Parish Council (attached). We as a community will be financially underpinning the cost of building Sizewell C. and also financially supporting the French Government together with the Chinese who are both at the moment Stakeholders. We never asked for Sizewell and certainly did not agree to become their Bankers / Stakeholders. Therefore their present actions, will result in us being unable to move or buy comparable properties elsewhere, if we so choose.

As with Hinkley PPSS, EDF as proven, will walk away from any voluntary scheme offered, so it is imperative the government, makes this consent conditional (if given) upon EDF agreeing a legally binding PPSS.

As a Government you have pledged to "Level Matters Up" This is a clear and obvious example of that need. Can you please insure this happens?

Thank you

Yours Faithfully

[redacted]

G I Bickers

Resident of Eastbridge

CC Therese Coffey MP
Michael Gove MP (Levelling Up Minister)
East Suffolk Council
Suffolk County Council

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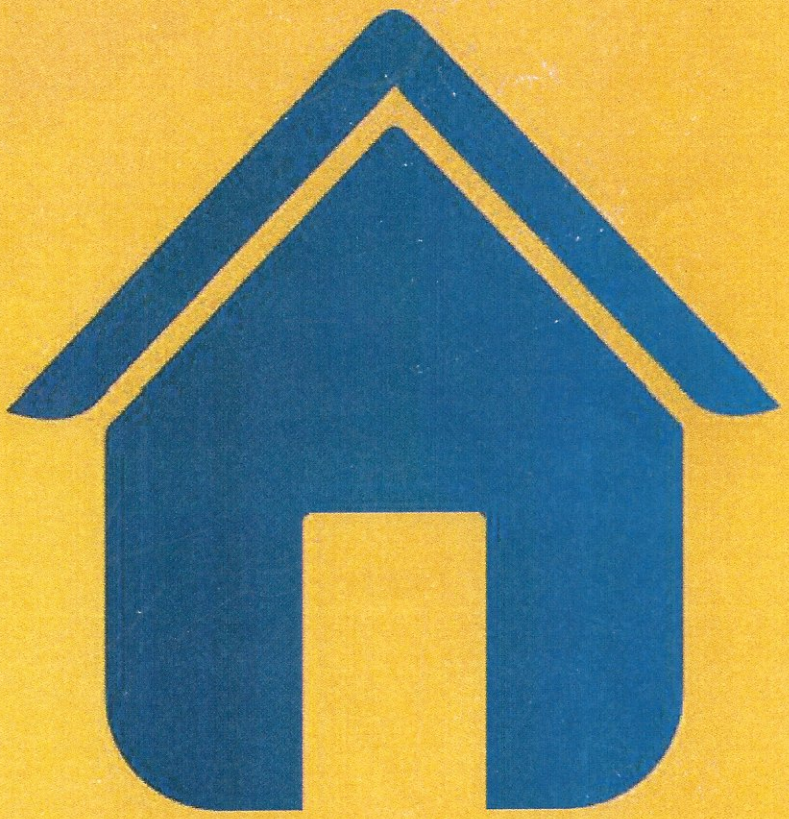
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41. G I Bickers – 25 February 2022

Attachment 1

Main Site Neighbourhood **Support** Scheme

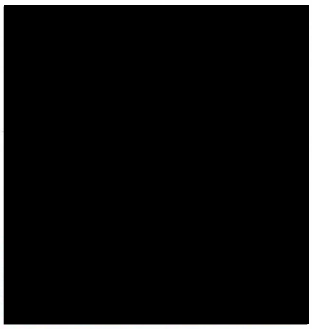


Hinkley Point C

Save today. Save tomorrow.

EDF ENERGY

Foreword



May 2011

As part of EDF Energy's proposals for a new nuclear power station at Hinkley Point, we have developed the Main Site Neighbourhood Support Scheme which comprises a Property Price Support Scheme and a Noise Insulation Scheme.

EDF Energy has developed these voluntary schemes following consultation with our neighbours, residents and local authorities. We do recognise that the immediate vicinity of the Hinkley Point C site is a rural area which will be affected by the duration and proximity of the construction works for the new power station, should its development be approved. In developing the detail of the schemes we have taken into account the questions, concerns and suggestions we received from residents and local authorities during consultation.

If you are the owner of a property within the eligible area (boundary map is included), we would like to offer you our assistance should you wish to either sell your property or make noise insulation improvements to your windows. We hope that you won't want to move house, but if you do we will try to make it easier for you.

This booklet explains the details of the schemes, as well as how they have been shaped by the contributions we have received.

The schemes will become effective should West Somerset Council approve our site preparatory works application which we submitted in 2010. If we obtain approval, the schemes are likely to continue until the construction of Hinkley Point C is complete and you will be eligible to apply at any time during this period. We will review the schemes as we progress, and a full review will be conducted within the next five years.

We do appreciate the uncertainty that the planning process for Hinkley Point C brings. To help minimise this we are committed to visiting homes to explain our schemes in full.

I hope very much that you will feel that the support we are offering is fair and responsible and helps demonstrate our commitment to being a good neighbour.



Richard Mayson
Director of Planning & External Affairs

Our consultation

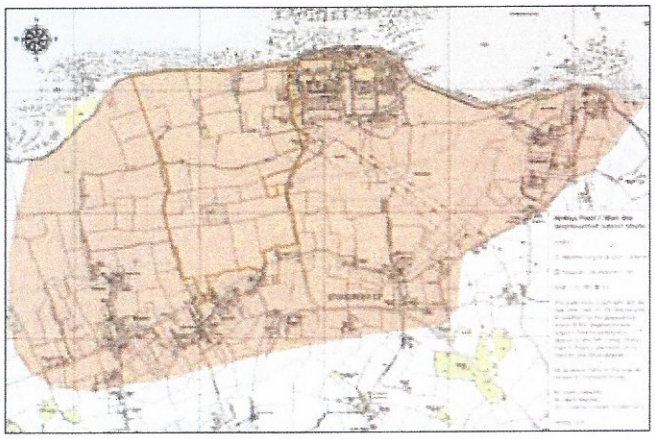
We initially consulted for a period of four weeks in September 2010, and at the request of local people this was extended by three weeks. Our consultation aimed to develop schemes which further reduced any residual impacts of site preparation on local residents in Shurton, Burton, Knighton and Wick.

The suggestions we made in the consultation material were generally well received and we are grateful to everyone who gave time to respond.

We take our responsibilities towards our neighbours very seriously and we have taken note of all the comments. In response, we have added some new, improved elements to the schemes:

- For those wishing to move away we have committed to paying a lump sum of £5,000 to help with the costs of moving.
- We have removed the need for "hardship" to be demonstrated.
- We have added Stolford to the hamlets covered by the schemes.

The boundary



Map of area with boundary – please see large version at the back of document

The scheme boundary includes the hamlets directly neighbouring the proposed Hinkley Point C site.

In setting the boundary we were mindful of the duration of the construction period, the proximity to the site of the proposed power station and the rural nature of these neighbouring hamlets.

Property Price Support Scheme

EDF Energy will offer home owners within the boundary the difference between the **'without Hinkley Point C'** value and the **'with Hinkley Point C'** value when they sell their property, plus a sum of £5,000. This amount is included to provide assistance for those eligible home owners who want to move away.

We will make the payment once the property sale is complete and we have received confirmation from your solicitor.

EDF Energy has developed this voluntary scheme – it is not required to do so by law or policy and is subject to contract. EDF Energy therefore reserves the right of final decision in cases of dispute, having consulted with the home owner and the appointed valuers.



Eligibility criteria

You are eligible for the Property Price Support Scheme if your dwelling is within the boundary and you have owned the property since October 2008, when EDF Energy announced its intentions for Hinkley Point C.

AND

On the date when you sell your property you are:

- the owner-occupier of the residential property or an agricultural property with a dwelling on it; or
- a long-term leaseholder with at least three years left on your lease.

AND

- you have lived in the property for at least the last six consecutive months and the property has not been empty for more than 12 months since October 2008.

We will verify eligibility at the point when the home owner chooses to sell their home.

How it works

Stage 1 – Valuing your property

Step 1: If your dwelling is within the boundary and you choose to participate in the scheme, you should complete and send back the attached form.

Step 2: If West Somerset Council grants permission for site preparatory works, the scheme becomes effective.

Step 3: EDF Energy's RICS qualified valuer visits your property to assess what the value of your property was in September 2008, before EDF Energy announced its intentions for Hinkley Point C.

Step 4: If you wish, you can also appoint your own RICS qualified valuer, using EDF Energy's formal basis of instructions. EDF Energy will pay your valuer's reasonable costs.

Step 5: Copies of the valuations will be sent to EDF Energy and the home owner.

Step 6: If the valuations are within 10% of each other then the agreed September 2008 value will be the average of the two valuations. If the difference between the two valuations is more than 10%, we will arrange a third valuation and the agreed September 2008 value will be the average of the closest two.

Step 7: EDF Energy will issue notification of the agreed September 2008 value to the home owner.

Stage 2 – Selling your property

Step 1: At the time you choose to sell your property, we will apply the land registry Somerset index link to the agreed September 2008 value to calculate what your property would have been worth today **'without Hinkley Point C'**.

Step 2: EDF Energy will then ask both valuers to calculate what your property is actually worth today **'with Hinkley Point C'**. If the values are within 10% of each other the average will be the agreed 'with Hinkley Point C' value. If the difference between the two valuations is more than 10%, we will arrange a third valuation and the agreed 'with Hinkley point C' value will be the average of the closest two.

Step 3: EDF Energy will notify the home owner of the difference between the 'without Hinkley Point C' value and 'with Hinkley Point C' value and offer to pay this amount if the property is professionally marketed and sold within the next 6 months. EDF Energy will commit to make this payment regardless of the actual sale price. If the property is sold more than 6 months after the offer is issued, the valuation may need to be updated.

Step 4: Once your solicitor has confirmed to EDF Energy that the sale of your property is complete and your property is vacated, EDF Energy will pay the difference between the 'without Hinkley Point C' value and 'with Hinkley Point C' amount offered plus £5,000.

RICS = Royal Institution of Chartered Surveyors

Worked example

Stage 1 – Valuing your property

EDF Energy's valuer and your own valuer assess what your property was worth in September 2008:

EDF Energy's September 2008 Valuation: £320,000
Your September 2008 Valuation: £300,000

If there is a 10% or less difference we take the average of the two valuations. Therefore, in this example the September 2008 valuation would be £310,000.

Stage 2 – Selling your property

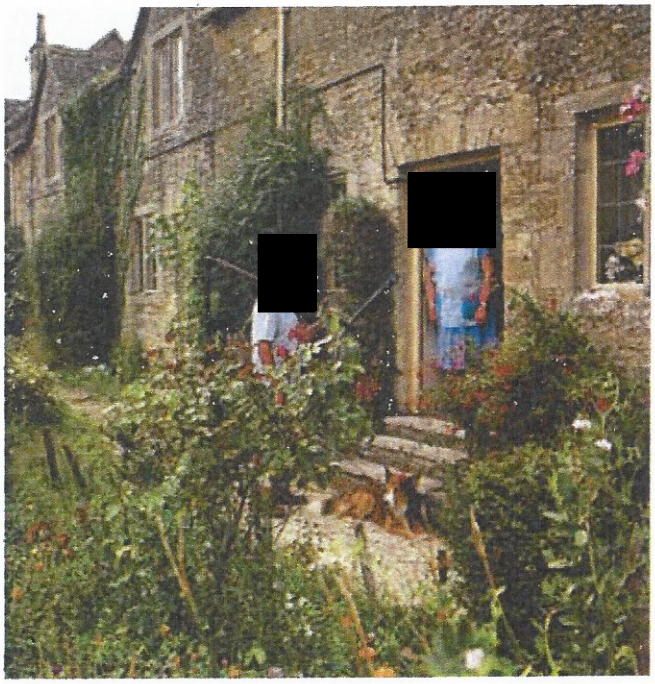
If you choose to sell your property, we will apply the current Somerset index link (currently at 91% in May 2011) to the September 2008 valuation to determine what your property would have been worth today 'without Hinkley Point C':

In our example, the 'without Hinkley Point C' value will be calculated as:

£310,000 x 91% = £282,100

We will then ask the same valuers to state what your property is actually worth today 'with Hinkley Point C'. If there is a 10% or less difference, the average of the two valuations is the agreed 'with Hinkley Point C' value:

EDF Energy Valuation 'with Hinkley Point C': £280,000
Your Valuation 'with Hinkley Point C': £260,000



In our example the 'with Hinkley Point C' value is therefore £270,000.

We will commit to paying the difference between the 'with Hinkley Point C' value and the 'without Hinkley Point C' value upon completion of the sale of the property. In our example, this would be calculated as:

£282,100 - £270,000 = £12,100

EDF Energy will pay £12,100 (plus £5,000 for moving costs) once the sale is completed and we have received confirmation from your solicitor.

Property Price Support Scheme Application Form

Please complete and return this tear-off slip to EDF Energy, 14 King Square, Bridgwater, TA6 3DG.

This form registers your interest in the scheme. It does not commit you to take part. Please use BLOCK CAPITALS.

Name .....

.....

Address .....

.....

.....

.....

Postcode .....

Home tel .....

Work tel .....

Mobile .....

Who is the registered home owner (if different from above)?

Name .....

.....

Address .....

.....

.....

.....

Postcode .....

Home tel .....

Work tel .....

Mobile .....

Is the property leasehold ☐ or freehold ☐?

Signature .....

Date .....

Property Price Support Q & A

Question:

1. When will you value my property?

Answer:

If West Somerset Council approves the application for site preparatory works we will engage RICS surveyors to begin valuations of eligible properties whose owners choose to participate in the scheme.

Question:

2. When does the scheme start and finish?

Answer:

Upon a request from an eligible home owner, we will visit your property to explain the details of the schemes. However the scheme will not officially commence until planning approval is given for the site preparatory works. The scheme is likely to continue until the construction of Hinkley Point C is complete and you will be eligible to apply during this period. We will review the scheme as we progress, a full review will be conducted within the next 5 years.

Question:

3. Who will conduct the third valuation?

Answer:

We will endeavour to engage the local district valuer to carry out this valuation.

Question:

4. What is index linking?

Answer:

This is a recognised method of accurately calculating the average change in property values over time. Details of index linking and the current Somerset index link can be obtained from www.landregistry.gov.uk/house-prices.

Question:

5. Why in the worked example has the property price dropped?

Answer:

According to the Land Registry, since 2008 property prices generally, across Somerset and the UK, have fallen. This reality is reflected in our worked example.

Question:

6. When can I apply to this scheme?

Answer:

You can apply to this scheme at any time whilst the scheme is open. We will write to residents and give six months notice in advance of the scheme closing.

Question:

7. What if I can't sell my home?

Answer:

The Property Price Support Scheme is designed to support eligible home owners who want to move. If, however, you cannot sell your property, you may make an application for EDF Energy to purchase it. Any such applications will be dealt with on a case-by-case basis at EDF Energy's discretion. EDF Energy must be satisfied home owners have made reasonable efforts to sell the property at a fair price and that the inability to sell is caused by Hinkley Point C. Before applying to EDF Energy you must have actively marketed your property, with at least one recognised estate agent, for a minimum of six consecutive months. If you decide to rent your property and are having difficulty in doing so, EDF Energy will also consider renting properties from home owners.

Noise Insulation Scheme

Within our planning application for site preparatory works, we are confident that we have taken every opportunity to avoid and reduce possible noise impacts as far as possible. However, even though noise levels will be tightly controlled and monitored on-site, there will be increased noise levels if construction begins.

You can choose

This Noise Insulation Scheme has been designed to offer choice and flexibility to meet different people's needs.

You can choose from:

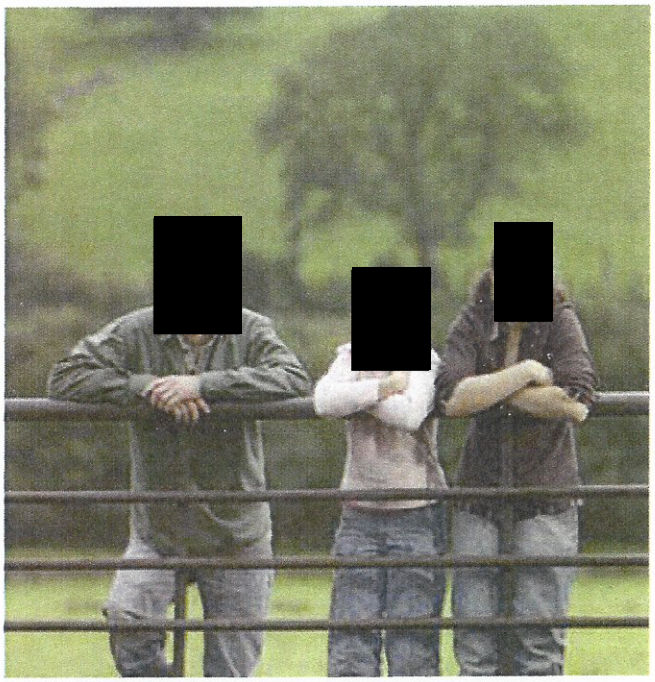
- Free secondary glazing to fit existing windows; or
- Free double glazed PVC-U replacement windows/ appropriate replacement windows for existing listed buildings.

The offer would be subject to confirmation by a qualified surveyor that your property would benefit from the Noise Insulation Scheme. This will largely depend on the age and quality of the existing windows.

If planning permission is required for replacement windows, as in the case of listed buildings, you must gain such permission if you wish to participate in this scheme. We will then endeavour to provide suitable replacement windows after the required planning permission is granted.

Only one application per property will be accepted for the duration of the Noise Insulation Scheme.

Eligibility criteria



Eligibility will be based on proof of ownership and consent of the home owner.

The property must benefit from improved noise insulation for an application to be successful. The offer is not available to commercial property or agricultural buildings as this is a residential noise insulation scheme.

EDF Energy has developed this voluntary scheme – it is not required to do so by law or policy. EDF Energy therefore reserves the right of final decision in cases of dispute, having consulted with the home owner and the appointed surveyor.

How it works

Step 1: The home owner chooses to apply for noise insulation improvements and sends back the attached form with relevant details.

Step 2: If West Somerset Council grants permission for site preparatory works, the scheme becomes effective.

Step 3: An EDF Energy appointed surveyor will visit your property to assess whether it would benefit from the Noise Insulation Scheme.

Step 4: If your property would benefit then a contract between EDF Energy's appointed glazing contractor and the home owner will be agreed.

Step 5: The glazing contractor and the home owner arrange for installation to take place.

Step 6: Once installation is complete, EDF Energy will pay the glazing contractor.



Noise Insulation Scheme Q & A

Question:

1. What about light and dust issues?

Answer:

We are confident that any light and dust will be controlled on-site. Should any unanticipated circumstances arise during construction, we will act appropriately and promptly.

Question:

2. What about windows for listed buildings?

Answer:

We will appoint glaziers who can fit windows for listed buildings, but home owners are responsible for gaining planning permission where required.

Question:

3. Can I take cash instead of windows as I've just installed new windows?

Answer:

No. There will be no cash payments made to home owners.

Question:

4. I would like loft insulation. Is this offered?

Answer:

Loft insulation is not included as it only provides noise mitigation where overhead noise exists such as aircraft noise.

Question:

5. Is my conservatory included?

Answer:

Conservatories are not included in the offer nor are out-houses, garden sheds or garages.

Question:

6. Are all my windows included?

Answer:

We are not setting a limit on the number of windows, it will be determined when the surveyor assesses which of your existing windows would benefit.

Question:

7. When can I apply to this scheme?

Answer:

You can apply to this scheme at any time whilst the scheme is open. We will write to residents and give six months notice in advance of the scheme closing.

Noise Insulation Scheme Application Form

Please complete and return this tear-off slip to EDF Energy, 14 King Square, Bridgwater, TA6 3DG.

This form registers your interest in the scheme, it does not commit you to take part. Please use BLOCK CAPITALS.

Name .....

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Address .....

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.....

.....

Postcode .....

Home tel .....

Work tel .....

Mobile .....

Who is the registered home owner (if different from above)?

Name .....

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Address .....

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Postcode .....

Home tel .....

Work tel .....

Mobile .....

Is the property leasehold ☐ or freehold ☐?

Signature .....

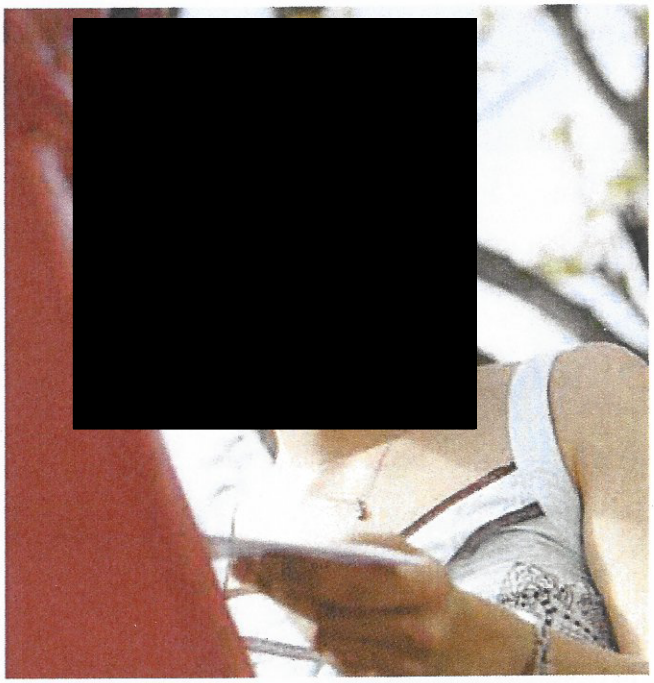
Date .....

Next steps

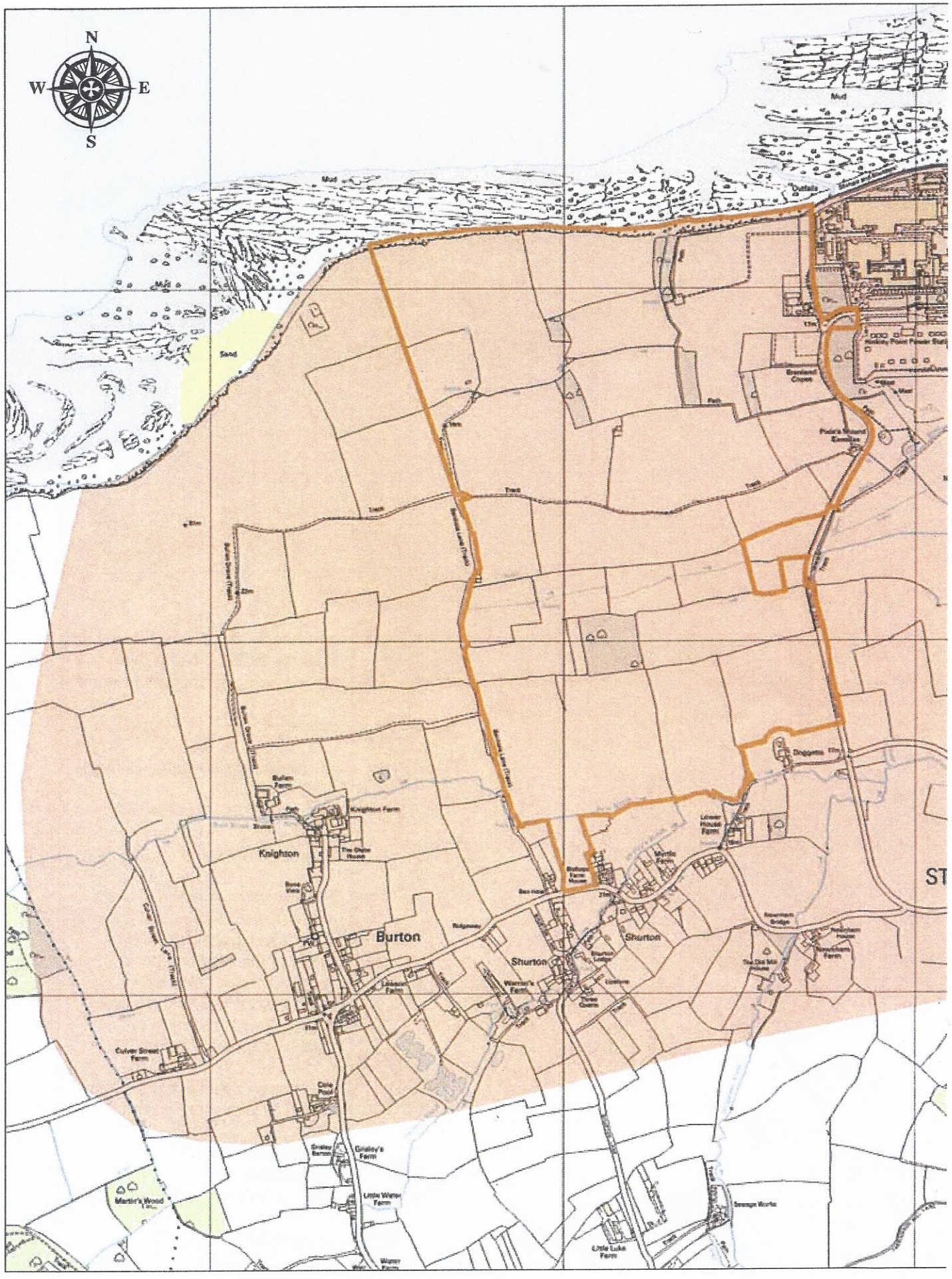
Should you wish to participate in either of the schemes, please register your interest by simply completing the attached form and sending it to 14 King Square, Bridgwater, TA4 1BG. We will make contact to discuss your individual requirements and agree how to proceed. We look forward to hearing from you.

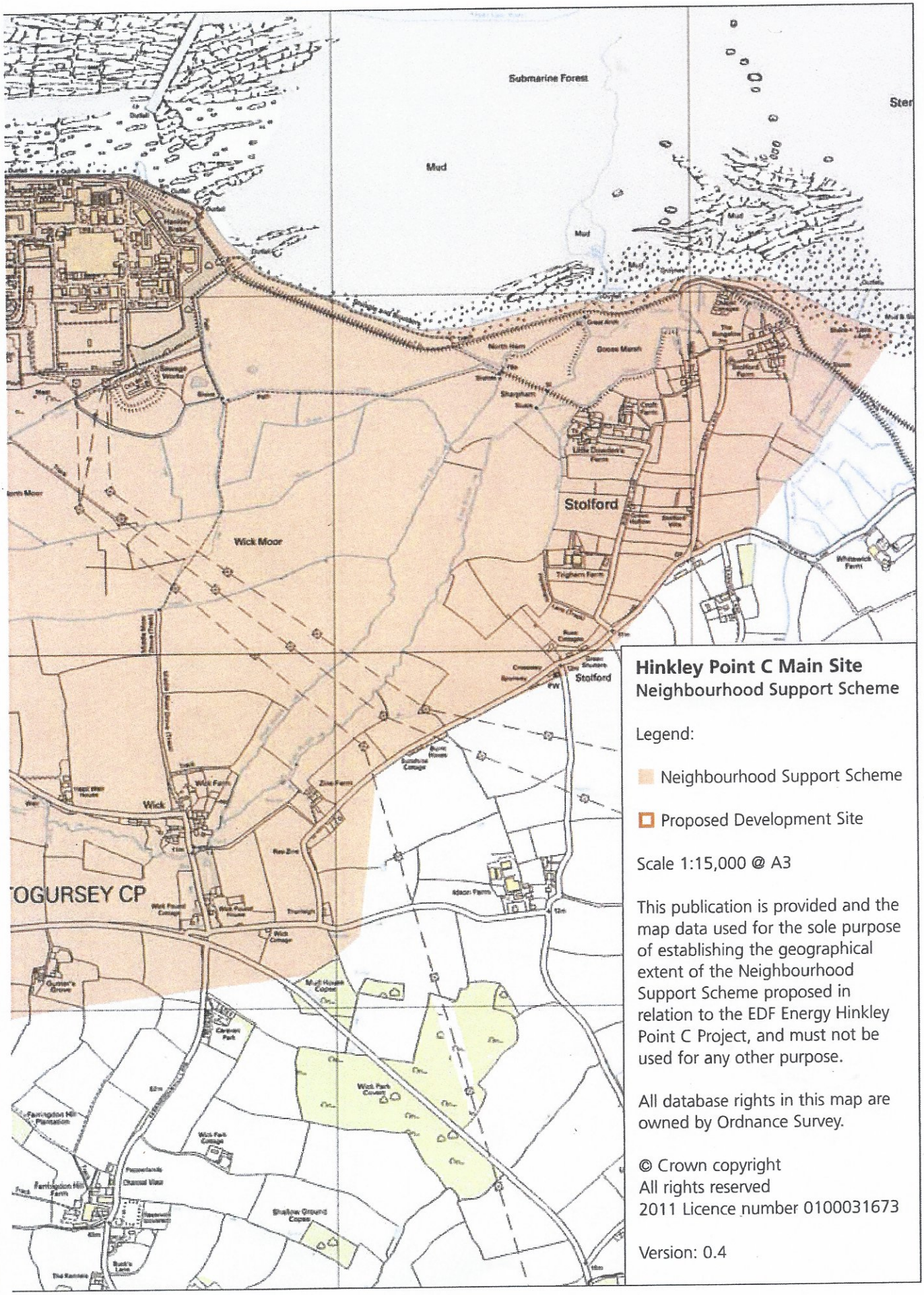
If you have any questions about either scheme or would like a home visit, please contact the EDF Energy 24hr free phone number 0800 096 9650. This number will connect you to the EDF Energy office in King Square, Bridgwater during weekday office hours and divert you to our 24hr contact centre outside of these hours.

We will be holding a public meeting for eligible residents of Shurton, Burton, Knighton, Wick and Stolford at the Hinkley Point C Offices (formerly Hinkley Point B Training and Induction Centre) on 7 June 2011 6.30-7.30pm where our team will help with any questions you may have.



The Boundary





Hinkley Point C Main Site
Neighbourhood Support Scheme

Legend:

Neighbourhood Support Scheme

Proposed Development Site

Scale 1:15,000 @ A3

This publication is provided and the map data used for the sole purpose of establishing the geographical extent of the Neighbourhood Support Scheme proposed in relation to the EDF Energy Hinkley Point C Project, and must not be used for any other purpose.

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Version: 0.4

The Boundary

The scheme boundary includes the hamlets directly neighbouring the proposed Hinkley Point C site. In setting the boundary we were mindful of the duration of the construction period, the proximity to the site of the proposed power station and the rural nature of these neighbouring hamlets.

Please fold out to see large boundary map.

41. G I Bickers – 25 February 2022

Attachment 2

Sizewell C

Doing the power of good for Britain

EDF CGN



Property Price Support Scheme

AUGUST 2020

Sizewell C
Doing the power of good for Britain

EDF CGN

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Foreword

We recognise that homes within the immediate vicinity of the Sizewell C proposals may be affected by the length and proximity of the construction works for the new power station and associated works, should its development be consented. For this reason we have developed a voluntary Property Price Support Scheme (PPSS), although we are not required by law or planning policy to do so.

In developing the PPSS, we have taken into account the questions, concerns and suggestions we received from residents and homeowners during consultation, as well as considering our experience from Hinkley Point C. This booklet explains the details of the scheme.

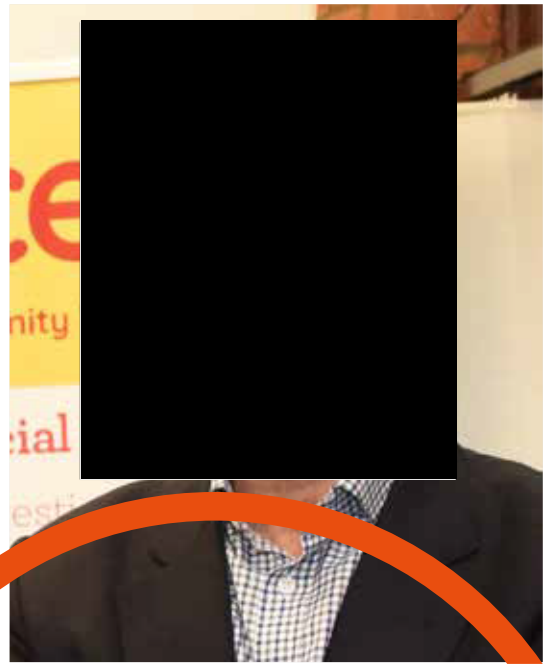
If you are the owner of a property within the areas shown on the boundary maps on pages 6-11, we are prepared to offer assistance should you wish to sell your property. We hope you won't feel you need to move house, but if you do, we will try to make it easier for you.

We appreciate the uncertainty the planning process for Sizewell C brings, so we are making our team available to visit eligible homeowners to explain the PPSS in full. We will review the Property Price Support Scheme periodically and undertake a full review five years from the effective date.

I very much hope that you feel the support we are offering is fair and responsible, and encourage you to get in touch using the form at the back of this booklet should you wish to learn more about the PPSS.

Humphrey Cadoux-Hudson

Managing Director



One of the overarching aims for EDF's development of proposals for Sizewell C is limiting or mitigating adverse effects of construction on local people.

The boundary

The PPSS boundary includes properties within the immediate vicinity of the current Sizewell C redline boundary where, based on our proposals, properties may be impacted. In setting the boundary we were mindful of the duration of the construction period, the proximity to the proposed works and the rural nature of the areas surrounding these neighbouring properties.

Property Price Support Scheme

EDF will offer homeowners within the PPSS boundary an 'Assistance Payment' up to the difference between the 'without Sizewell C' value and the 'with Sizewell C' value when they sell their property. This 'Assistance Payment' will be paid once we have received confirmation from your solicitor that the property sale is in completion.

EDF has voluntarily developed this scheme. We are not required to do so by law or policy and it is subject to contract. EDF therefore reserves the right of final decision in cases of dispute, having consulted with the homeowner and the appointed valuers.

Eligibility criteria

You are eligible for the PPSS if your property is within the boundary and you owned the property prior to the scheme announcement date (see Table 1),

AND on the date when you sell the property you:

- are the owner of the residential property and it is your principle private residence
- do not have a wider property interest being acquired by EDF in relation to Sizewell C;

AND

- have lived in the property continuously for at least the last six consecutive months prior to applying for the PPSS.

Table 1: Scheme announcement dates

Area	Proposal	Scheme Announcement Date	Page
1	Main development site	19 July 2011	6
2	Land east of Eastlands Industrial Estate	21 November 2012	6
3	Sizewell link road (Theberton Bypass)	4 January 2019	7-8
4	Two village bypass	23 November 2016	9
5	Northern park and ride	21 November 2012	10
6	Green rail route	21 November 2012	11

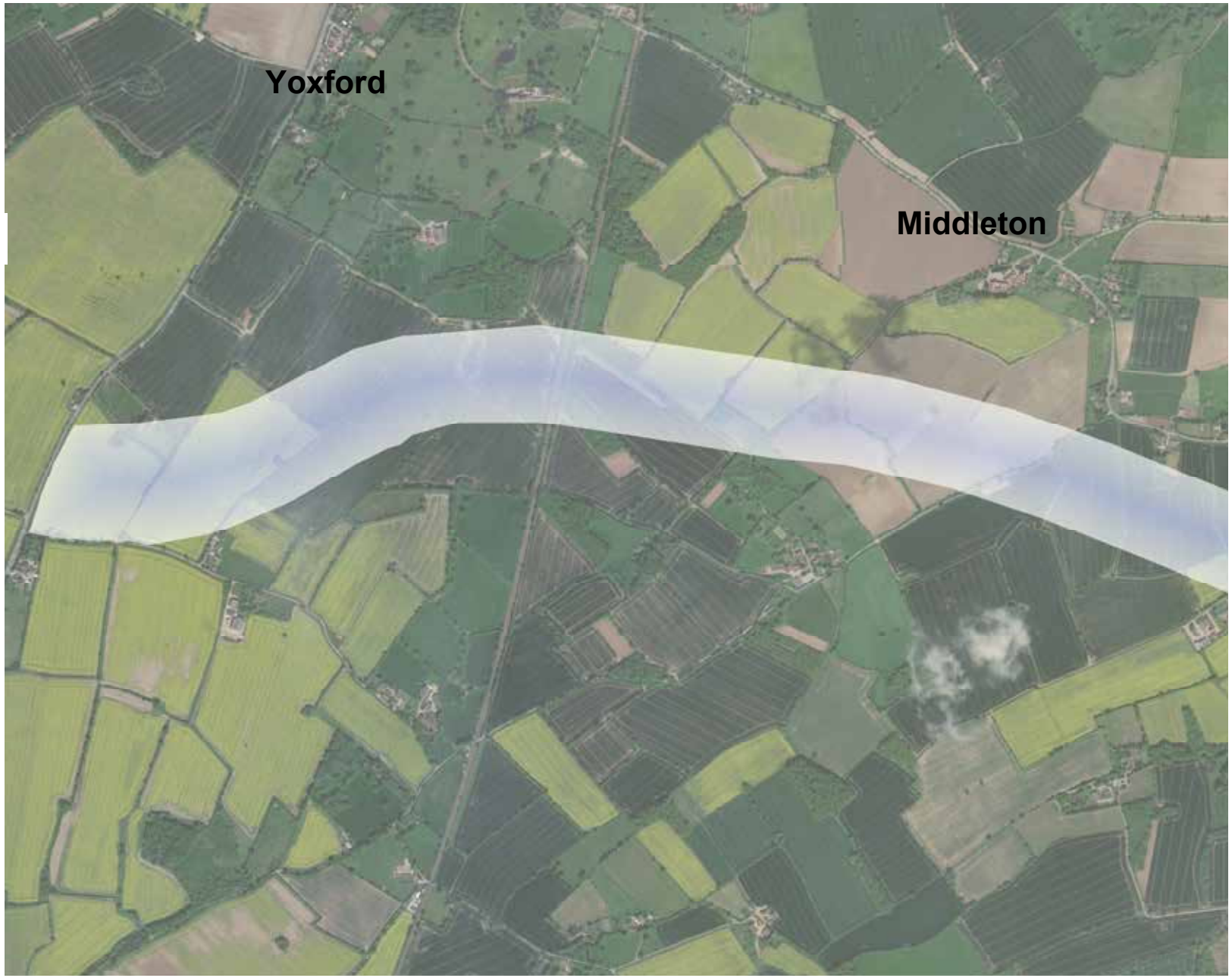


1. 1 - Main Development Site
2. 2 - Sizewell Link Road 1
3. 3 - Sizewell Link Road 2
4. 4 - Two Village Bypass
5. 5 - Northern Park and Ride
6. 6 - Green Rail Route



1

Main development site and Land east of Eastlands Industrial Estate



2

Sizewell link road 1



3

Sizewell link road 2



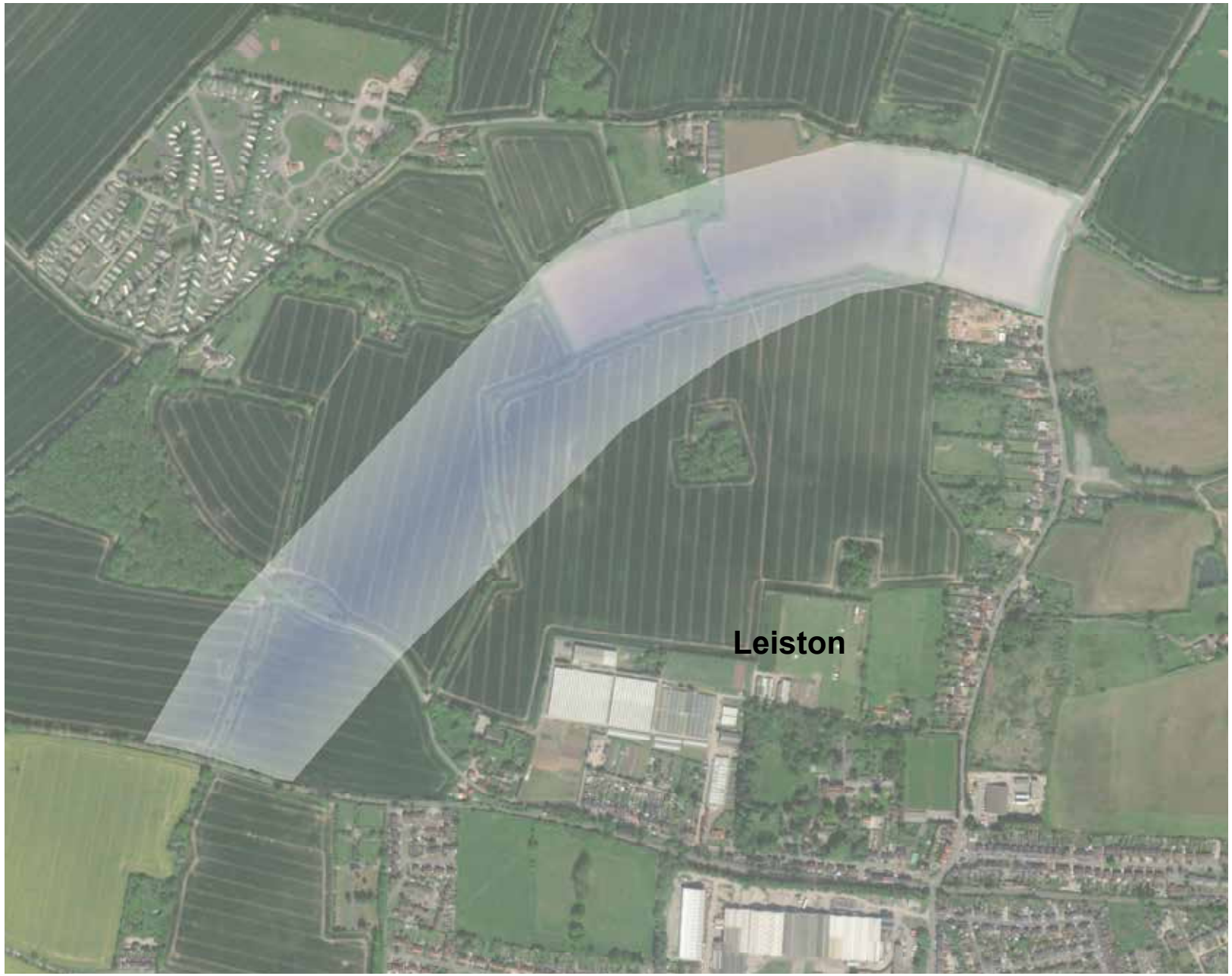
4

Two village bypass



5

Northern park and ride



6

Green rail route

How it works

STAGE 1
Valuing your property

STEP 1
If your property is within the boundary and you choose to participate in the PPSS, you should complete and send back the attached form to SZC-NNB@dalcourmaclaren.com.

STEP 2
A member of the PPSS team will then confirm receipt of the application and begin reviewing it for eligibility. You will then be informed whether the application is accepted or not.

STEP 3
If you meet all criteria, the PPSS team will arrange for an independent RICS registered valuer to visit your property and assess the value of your property in a scenario 'without Sizewell C' and the value of your property today 'with Sizewell C'.

STEP 4
If you wish, you can request a second valuation and appoint an RICS registered valuer yourself from the schemes panel of independent registered valuers, using EDF's formal basis of instructions. EDF will pay the cost of this valuation.

STEP 5
Copies of the valuations will be sent to you and the PPSS team.

STEP 6
If two valuations are completed and the difference between the two exceeds 10%, we will arrange a third valuation and the agreed 'with and without Sizewell C' values will be the average of the closest two.

STEP 7
The PPSS team will issue notification of the 'with and without Sizewell C' value to you. The difference in these values will be the maximum Assistance Payment that will be offered.

Following notification from EDF on the values, Stage 2 below sets out the next steps on selling your property.

STAGE 2
Selling your property

STEP 1
You would be required to market the property with a reputable estate agent based on the agreed 'with Sizewell C' value.

STEP 2
If the property is sold more than 12 months after the offer is issued, the valuation will need to be updated.

STEP 3
Once your solicitor has confirmed to us that the sale of your property is complete, EDF will pay the difference between the 'without Sizewell C' value and the sale price, up to the maximum value of the 'Assistance Payment'.

Property Price Support Scheme Q&A

1. When will you value my property?

When the Planning Inspectorate accepts our application for development consent for examination, we will engage with independent RICS registered valuers to begin valuations of eligible properties whose owners choose to participate in the scheme.

2. When does the scheme start and finish?

The scheme will officially commence when the Planning Inspectorate accepts our application for development consent for examination. The scheme will initially run for five years, at which time it will be subject to review to ensure the scheme objectives are being met.

3. Who will conduct the third valuation?

We will endeavour to engage the local district valuer to carry out this valuation, however we may need to appoint another third party RICS registered valuer.

4. When can I apply to this scheme?

You can apply to this scheme at any time whilst the scheme remains open. We will write to residents and give six months' notice in advance of the scheme closing.

5. What if I can't sell my property at the 'with Sizewell C' value

The 'with and without Sizewell C' values are the most accurate way of assessing the impact of our proposals. There will of course be other market factors which influence the transactional property market and this is not something that EDF can mitigate.

6. Who will pay my moving costs

You will be responsible for covering your own costs associated with selling and moving house.

7. What are my alternatives to this scheme if I want to sell my property?

This is a voluntary scheme which is not required by law or planning policy. Homeowners will need to seek advice on other alternatives available to them.

Next Steps

Should you wish to participate in the PPSS, please register your interest by completing the application form provided and sending to SZC-NNB@dalcourmaclaren.com or by hardcopy to the Sizewell C Information office, 48-50 High Street, Leiston, IP16 4EW

After receipt of this, we will make contact to confirm receipt before reviewing the application.

We look forward to hearing from you.

If you have any questions about the scheme, please contact the EDF information line during normal office hours on 0800 197 6102 and we will ensure your question is passed to the relevant person.

For information about how EDF will handle your personal information please see our Privacy Notice, which is available via the following link https://www.edfenergy.com/privacy/thirdparty

Glossary of Terms

Property Price Support Scheme (PPSS) - EDF's voluntary scheme to support homeowners within the immediate vicinity of the Sizewell C proposals where EDF believes property values may be impacted by the proposals.

PPSS - the area identified by the blue shading on the plans on pages 6-11 within which homeowners may apply to the scheme.

Development Consent Order - means by which planning permission is granted for a Nationally Significant Infrastructure Project such as Sizewell C.

Sizewell C redline boundary - land within which consent for construction would be sought and compulsory powers requested.

'Without Sizewell C' value - value of the property if Sizewell C was not proposed.

'With Sizewell C' value - value of the property with the Sizewell C proposals.

Scheme announcement date - the date on which the scheme was first published for consultation.

RICS registered valuer - valuer who is a member of the Royal Institute of Chartered Surveyors.

EDF - NNB Generation Company (SZC) Limited has been formed as a separate company (Company No 9284825) to finance and construct Sizewell C. It is currently a joint venture company between EDF and China General Nuclear Power Corporation (CGN). EDF will seek additional shareholders in NNB Generation Company (SZC) Limited and is currently in discussion with UK pension funds. NNB Generation Company (SZC) Limited is referred to in this document as EDF.

Sizewell C

Doing the power of good for Britain

EDF CGN



edfenergy.com

NNB Generation Company (SZC) Limited,
90 Whitfield Street, London, England W1T 4EZ

Registered in England and Wales.

Company registration number 09284825

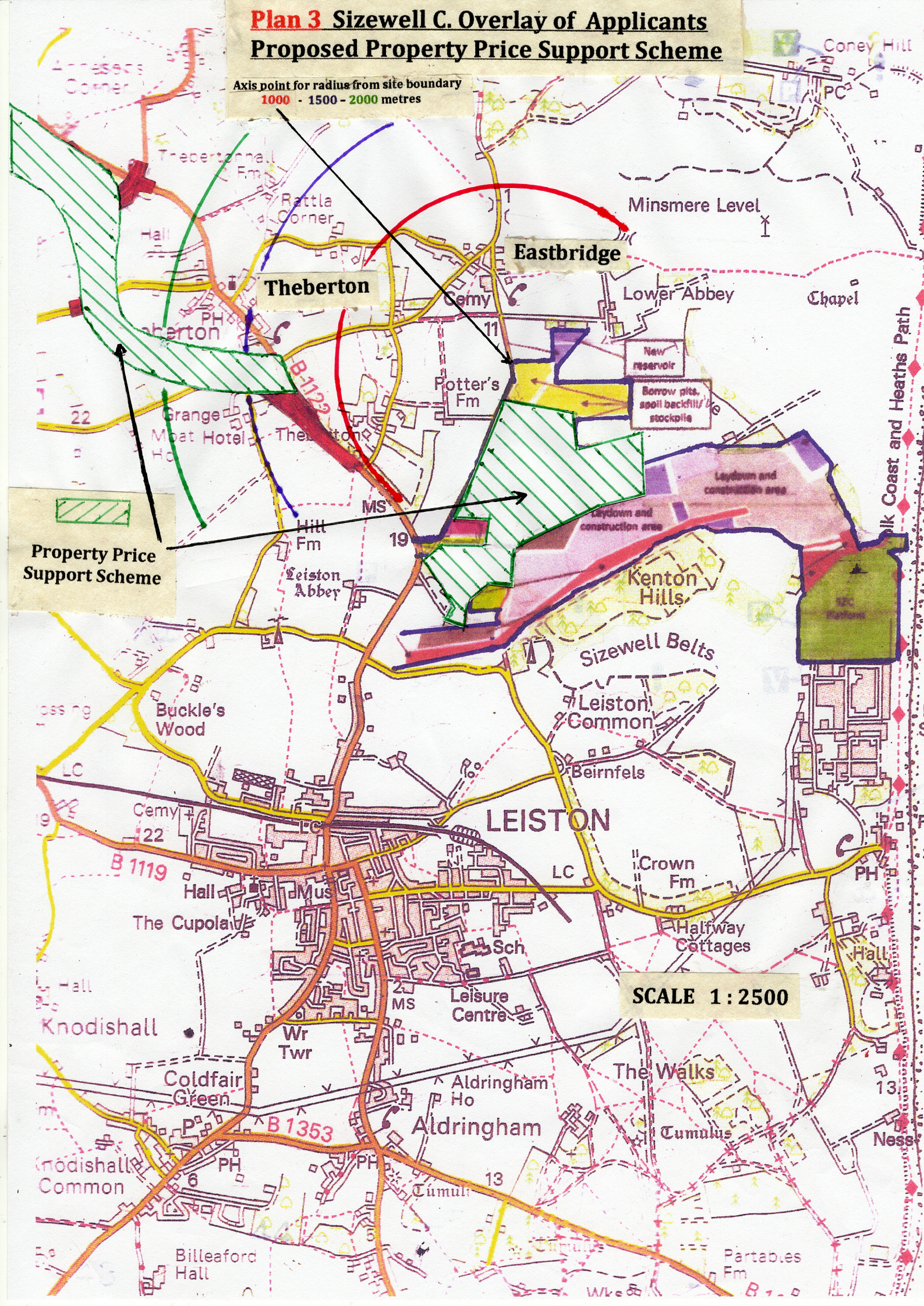
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41. G I Bickers – 25 February 2022

Attachment 3

Plan 3 Sizewell C. Overlay of Applicants Proposed Property Price Support Scheme



41. G I Bickers – 25 February 2022

Attachment 4

D.H. KNIGHTS MRICS
CHARTERED SURVEYOR AND VALUER

David Brown

[redacted]
E: [redacted]

DHK/KK/1127

9th July 2021

Theberton & Eastbridge Parish Council
c/o Cllr Mr G Bickers
[redacted]

Dear Sirs

RE: Potential Property Blight

I have been asked by the Theberton & Eastbridge Parish Council to advise upon the potential impact of Sizewell C upon the local community in the event of the government giving consent for its development. It is anticipated that work may commence in 2022 and continue for 10-12 years.

I am an RICS Registered Valuer and a member of the Royal Institution of Chartered Surveyors since 1978 with over 40 years' experience in general property valuation matters. I have worked as a surveyor specialising in valuations of both commercial and residential property and running a local estate agency practice for the last 25 years. In the last few years I have carried out an increasing amount of work for various local authorities.

I have had conversations with a number of estate agents involved in the development of Hinkley Point since 2012 and have been advised that, due to the impact of the scheme, owners within approximately 1 mile of the power station were financially compensated for all or a number of issues including noise, visual impact, air and light pollution and general disturbance and disruption associated with the build programme.

If properties could not be sold at market value after a period of 6 months, I understand EDF purchased the affected properties at full market value.

Other properties I understand had mitigation measures provided with double glazing etc.New leisure facilities were also provided for the surrounding villages such as playing fields, village halls etc.

I see there being no difference in the problems likely to be created by the development of Sizewell C. In fact, there are early signs of some form of blight as some properties in the

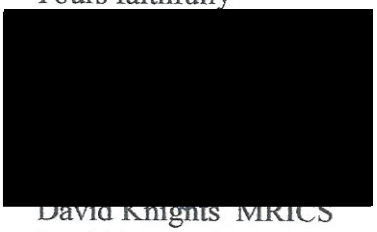
immediate area have already been affected by the threat of Sizewell C with a resultant affect upon value.

Accepting in the main that prices have continued to rise in the two villages as the general housing market has reacted to government initiatives such as the stamp duty holiday and the impetus generated by demand over the Covid period you need to consider this within the context of what has happened in the immediate area. You need to consider if property prices have increased at the same rate as elsewhere in the region particularly since EDF announced they were proceeding and put in place a Consultation Process in 2013. Therefore , I think it is important that I continue to assess the impact upon prices as we move forward from this initial date.

Given the impact upon values in the immediate area around Hinkley, which includes a number of villages, you as a group need to press EDF to recognise this may potentially be a serious issue which could continue to evolve within the immediate area of Theberton and Eastbridge and in particular if permission is finally granted by the Government for Sizewell C.

I will continue building an evidence based appraisal of values as we move forward so as to advise the Parish Council over the coming months maintaining a watching brief with regard to sale activity within the two villages.

Yours faithfully



David Knights MRICS
David Brown

41. G I Bickers – 25 February 2022

Attachment 5

G I Bickers
[redacted]

23rd February 2022 **My Reference 20026345**

Zwasi Kwarteng (Secretary of State for Business and Energy)

Dear Sir,

Re: - Sizewell C Matters in Regard To Deadline 10 to be sent to the SOS for Business and Energy

You may recall at the Ipswich Suffolk Business Club meeting you kindly gave of your valuable time to a lunchtime meeting in November 2021 Thank you for that.

A number of questions were asked including mine in respect of your promise to 'Levelling Up' matters of unfairness.

In my question I brought to your attention a matter in respect of EDF's total unfairness and disregard for the inequality between the two respective Property Price Support Schemes (PPSS) One being offered to those living within 2 kilometres of Hinkley C development site and then a derisory PPSS offered to the residents of Eastbridge and Theberton, who will be living squarely at the coalface of the development and within 2 kilometres of the Development Footprint suffering the resulting cumulative impacts. The scheme barely offers any support outside the development site footprint or around the proposed Theberton by-pass only properties in the main owned by EDF ! would benefit (Copies of both schemes are attached)

As the PPSS from EDF for Sizewell is so vague in identifying the area it covers, in relationship to the community / properties, I have overlaid their proposed area's within their PPSS (hatched green) onto the Development working areas on Plan 3 (attached) the radius of 2 kilometres takes in the majority of Theberton & Eastbridge.

The PPSS scheme for Sizewell C was clearly within the Heads Of Terms Section 106 /Deed of Obligation (DOO) May 2020 and we still await a clear answer as to why EDF were allowed to remove this from DOO Nov 2020. EDF for whatever reason were allowed to make the PPSS a voluntary scheme at Hinkley. However **please note** they withdrew the scheme at an early stage, leaving residents vulnerable and unable to use the PPSS they had been promised. That is why we were initially pleased it was within the Heads of Terms of the DOO, which would have protected our community against impact and blighting to property values.

EDF have said they will relook at the scheme. Since 2021 they continue to kick this matter into the long grass in the hope they can get this permission over the line, without financial commitment to a legally binding PPSS that is at least comparable to Hinkley. This being a scheme which was less than adequate, only covered properties purchased prior to the Initial Announcement of Hinkley C in 2008 with a DCO application in 2011 (gap of 3 years). For Sizewell C the gap is even greater (9years) with an Initial Announcement date of 2011 and a DCO application in 2020. People purchasing rely on Local Searches through their solicitors to establish developments application/ approvals that may effect their decision to purchase, so for Sizewell C those searches

were not in the public domain until 2020. Given the time line between Initial Announcement and DCO application, Eligibility Dates under EDF's PPSS, also require looking at.

We confirm only pressure from our Parish Council (Theberton & Eastbridge), East Suffolk Council and Therese Coffey MP have forced EDF back to the table, but EDF continue with their smoke screen tactics.

We still await a revised document, originally promised by December2021. However given the feed back the Parish Council are receiving, it is clear their intention even with improvements to the original derisory PPSS will be a pale shadow of that which was given to Hinkley residents, being highly restrictive in those that will qualify. That can not be fair as Sizewell C in their words "We are Replicating Hinkley", so why are they not replicating the PPSS, as the level of impact and effect on residents in that area have already been accepted by EDF in making such a scheme available. Also clearly the impacts are more substantial in Suffolk given the proximity of the Parish to infrastructure of the Development, which will include 5000 + workers living at the bottom of our road

Should consent be given to build Sizewell C we fear unless the government steps in, holding EDF legally accountable for the Decrease in relevant property prices as assessed and covered by Mr David Knights MRICS in his letter to the Parish Council (attached). We as a community will be financially underpinning the cost of building Sizewell C. and also financially supporting the French Government together with the Chinese who are both at the moment Stakeholders. We never asked for Sizewell and certainly did not agree to become their Bankers / Stakeholders. Therefore their present actions, will result in us being unable to move or buy comparable properties elsewhere, if we so choose.

As with Hinkley PPSS, EDF as proven, will walk away from any voluntary scheme offered, so it is imperative the government, makes this consent conditional (if given) upon EDF agreeing a legally binding PPSS.

As a Government you have pledged to "Level Matters Up" This is a clear and obvious example of that need. Can you please insure this happens?

Thank you

Yours Faithfully

[redacted]

GT Bickers

Resident of Eastbridge

CC Therese Coffey MP
Michael Gove MP (Levelling Up Minister)
East Suffolk Council
Suffolk County Council