The Sizewell C Project

9.28 Comments on Written Representations - Appendices

Revision: 1.0

Applicable Regulation: Regulation 5(2)(q)

PINS Reference Number: EN010012

June 2021

Planning Act 2008

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

SizewellC
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EDF CGN

CONTENTS

APPENDIX A EVIDENCE OF AGREEMENT WITH TWO VILLAGE BYPASS LANDOWNER

[redacted]

From: [redacted]
Sent: 06 May 2021 14:59
To: [redacted]
Cc:
Subject: Two village bypass - Heads of Terms
Attachments: 20210429_1608_EML_Sam Jennings_Hope_Cobbold_HoTs_Confirmation.pdf; 20210415_191934_PLN_INFO_471.1 - H-C Flood Land.pdf

Hi [redacted]

Please find attached correspondence acknowledging of the signing of the Heads of Terms for two village bypass including for the "flood land".

Through the signing of the Heads, SZC has an option to call for the grant of Rights to Flood from the landowner to flood the area edged red on the attached.

The legal agreement grant rights to SZC in perpetuity including:
1) the right for SZC to raise, lower or alter the Flood Land so as to increase/decrease its volumetric water storage capacity;
2) the right in perpetuity for SZC to increase without limitation and compensation to the Landowner (or Occupiers/Tenants), the depth, duration, flow and frequency of flooding on the Flood Land.

The Landowner agrees and undertakes:
1) not to cause or permit or suffer to be done anything that is likely to interfere with the Works or the exercise of the Rights.
2) not to cause or permit or suffer to be done anything which may materially affect (whether by tending to diminish or to increase) the free passage and flow of water over any part of the Flood Land and in particular (but without prejudice to the generality of the foregoing) not without the consent in writing of SZC (or the Environment Agency) to tip or remove soil or any other material on or from the Flood Land so as to materially raise or lower the level thereof or otherwise alter the Flood Land or to do any other thing which may damage, harm or interfere with the exercise of the SZC Rights
3) not without the consent in writing of SZC (or the Environment Agency) to erect or cause or permit to be erected any building or structure or permanent apparatus whatsoever on or over the Flood Land
4) not to do cause or permit or suffer to be done on the Flood Land anything which:
a) materially reduces the capacity of the Flood Land as a flood plain; or
b) is likely to cause pollution of flood waters and in particular not to store any manure heaps fertilisers agricultural chemicals poisons fuel or waste materials.
c) obstructs or materially interferes with the free flow of water over the Flood Land.
PROVIDED THAT nothing in the above clauses shall prevent the Landowner or his tenants from grazing animals or growing forage crops or arable crops on the Easement Land or from carrying on normal agricultural operations or acts of good husbandry and estate management (including fencing hedging and ditching) not materially affecting the free passage and flow of water over the Property as aforesaid.

When the time comes, SZC will call for the Option based upon the updated modelling outputs (i.e. alongside detailed design) and acquire the rights for what we need. The red line on the attached is deliberately thrown wider than the original model outputs.

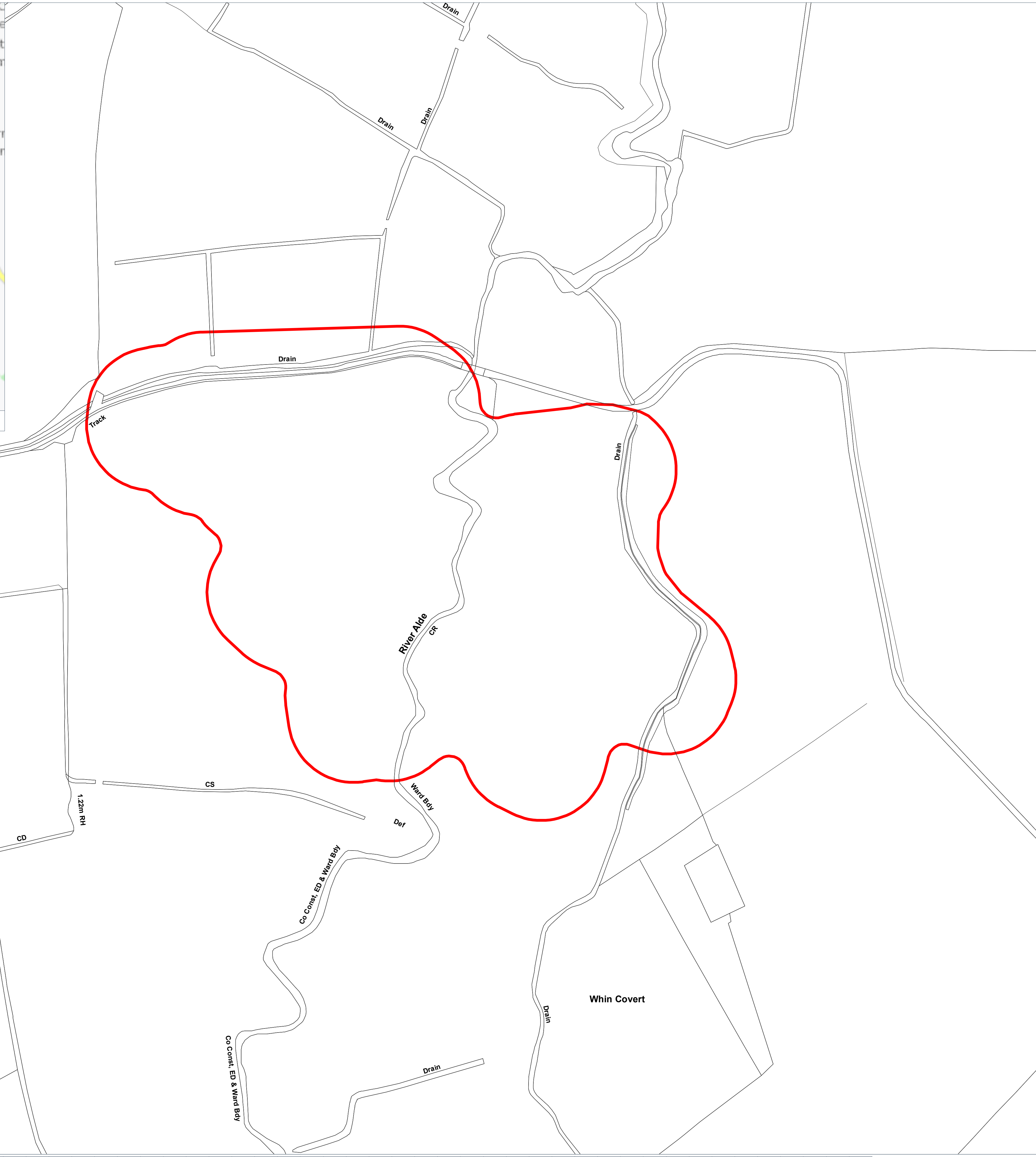
I trust that this provides sufficient evidence / comfort to the Environment Agency that we have secured agreement with the landowner. I would be grateful if you could confirm in writing if you feel this is sufficient to close out this issue and for subsequent representation on the Statement of Common Ground and in correspondence with PINS, where relevant.

Regards, [redacted]

Note: We consider this information commercially sensitive and we are sharing it with you in confidence, if you are required to share this information please notify us first.

[redacted] BSc (Hons) MSc DipM MCIWEM C.WEM
DCO Technical Lead – Surface Water and Groundwater; Flood Risk Assessment; Drainage
Sizewell C Nuclear Development
Tel: +[redacted]

Location Plan 0 125 250 500 750 Metres Scale: 1:20000



Site Plan 0 70 140 280 420 560 700 Metres Scale: 1:2500

Drawing Location: C:\Users\Jowita.Pietrzynska\Dalcour Maclaren\SZC Local Property Consultancy Service - Geomatics\01 DM Plans\20210415_191934_PLN_INFO_471.1.mxd

DALCOUR MACLAREN

Key:

Flood Land - 19.06 Acres

Title Number - SK208243 & SK267263

Notes:

Flood land area extent based on the drawing "Fluvial Modelling Difference Between Baseline and With Scheme Flood Depth For 1 In 100-Year Event With 35% For Climate Change Allowance", drawing number "Figure 69", dated February 2020

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

Interest:
The Executors of the [redacted]

Location:
Land south east of Main Road, Saxmundham, IP17 1LF

Coords: 635,775 259,491

Scheme Name:
Sizewell C NNB

Drawing Name:
Information Plan - Flood Land Information Plan

Drawing No: 191934_PLN_INFO_471.1_C

Rev	Date	Description
-	14.04.2021	First Issue
A	20.01.2021	Adding Buffer
B	23.04.2021	Adding area
C	28.04.2021	Amneded Flood Buffer Locaiton

Drawn:	JP/LM
Approved:	TL
Sheet No:	1 of 1
Sheet Size:	A3

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[redacted]

From: [redacted]
Sent: 29 April 2021 15:08
To: [redacted]
Cc:
Subject: EDF - Sizewell C - Two Village Bypass - Glemham Hall Signed HOTs
Attachments: EDF SZC Hope Cobbold Glemham HOTs Signed CAL 30.04.21.pdf

Hi [redacted]

Further to your email below, please find attached Heads of Terms which have been signed today by Charles Loyd who is head of Strutt & Parkers Ipswich office and is an Executor of the late Philip William Hope Cobbolds Glemham Hall Estate.

For my file, please can you acknowledge receipt.

Kind Regards

[redacted] **MRICS FAAV**
Consultant
Eastern Land Management Department
Strutt & Parker, The Stables, Wherstead Park, Ipswich IP9 2BJ
[redacted] | Office: 01473 214841

From: [redacted]
Sent: 29 April 2021 12:53
To: [redacted]
Cc:
Su

Hi [redacted]

Please now see attached an updated set of HOTs in addition to a plan relation to the 'flood land' adjacent to the proposed new River Alde bridge.

I trust this all makes sense, however please le [redacted] or I know if you have any queries in relation to this at all.

Kind regards,
[redacted]

APPENDIX B MECHANISMS OF CHANGE IN GROUNDWATER IN THE SIZEWELL MARSHES SSSI

CONTENTS

PLATES

1 MECHANISMS OF CHANGE IN GROUNDWATER IN THE SIZEWELL MARSHES SSSI

1.1 Introduction

1.1.1 This paper summarises the key findings and evidence relating to the predicted effects of Sizewell C on the water environment in Sizewell Marshes Site of Special Scientific Interest (SSSI).

1.1.2 Its purpose is to summarise in a single place the considerable volume of evidence presented in the DCO application and signpost to key parts of the application where the evidence is presented in more detail. To address specific concerns raised by stakeholders in REP2-506 some of the previously submitted evidence has been presented in Sankey diagrams to illustrate the water balance within Sizewell Marshes SSSI.

1.1.3 The focus of this paper is on the hydrogeological and hydrological aspects. As such it considers both the movement of water through the system and changes in hydrochemistry associated with altering the contribution of different water sources, which is a key concern to some stakeholders.

1.1.4 The paper's focus is the effects of construction dewatering within the cut-off wall and the realignment of the Sizewell Drain. These are the two aspects of the development that result in a predicted change in the water environment of the Sizewell Marshes SSSI. Discernible predicted change occurs during the construction phase. Following the construction period the predicted conditions in the water environment of the Sizewell Marshes SSSI are indistinguishable from baseline conditions.

1.2 Conceptualisation of groundwater and surface water system

a) Hydrogeology

1.2.1 The water environment in Sizewell Marshes is a function of the interaction between surface water, rainfall and groundwater. This interaction reflects the ground conditions within the SSSI, and its immediate environs. The geological setting is described in detail in Section 6.2 of APP-304. It can be briefly summarised in the Sizewell Marshes SSSI as peat overlying Crag, overlying London Clay overlying Chalk.

1.2.2 Surface water flows into the Sizewell Marshes SSSI to the east of Lover's Lane in a watercourse known as Leiston Drain. Leiston Drain receives treated effluent from the Leiston Wastewater Treatment Works, approximately 250m upstream of Sizewell Marshes SSSI.

1.2.3 The Sizewell Marshes SSSI contains a series of interconnected drainage ditch systems through which surface water flows (Drawing 5129919/SZC/009 in APP-304). Surface water leaves the SSSI in the east/north-east via the Sizewell Drain and Leiston Drain. Sizewell Drain connects into Leiston Drain in the north-eastern corner of Sizewell Marshes SSSI which ultimately discharges to sea via the Minsmere Sluice at Minsmere. The role the Minsmere Sluice plays in controlling the local surface water system has been described (Section *1.3 e* of APP-309).

1.2.4 The Sizewell Marshes SSSI is a low energy surface water system, characterised by low flow velocities. During storm events flow rates increase as runoff passes through the drain network. The flat topography, wetland land use and interconnected drainage network means that a typical storm response is characterised by a short duration increase in water levels and modest increases in absolute velocity (Appendix 19E in APP-309).

1.2.5 The flat topography means that much of the marshes is inundated when Leiston Drain is at bankfull water levels. This may occur following extreme rainfall, extreme tidal conditions or as a consequence of constrictions in the watercourse caused, for example, by vegetation growth and siltation.

1.2.6 Rainfall contributes to the Sizewell Marshes by direct recharge (within the SSSI footprint) and by storm run-off from the surrounding area.

1.2.7 Shallow groundwater in the wider area around the SSSI is within the superficial Crag deposits, which extend 10s of metres below ground level. The Crag groundwater system is separated from deeper groundwater in the Chalk by a substantial thickness of London Clay, which prevents the free vertical movement of water (Section 6.3.11 of APP-304).

1.2.8 Within Sizewell Marshes there is a distinct groundwater system in the peat deposits, which occurs predominantly in an area where the upper surface of the Crag is locally depressed, creating a ‘bowl’. Crag groundwater flows towards the sea at a regional scale. On reaching the upgradient (western) side of Sizewell Marshes a proportion will enter the peat.

1.2.9 The Crag groundwater levels around the SSSI are slightly higher than those in the peat. This means there is potential for groundwater within the Crag beneath the SSSI to migrate upwards into the peat. However, there is no evidence for free movement of groundwater upwards from the Crag due to the nature of the peat deposits, and the presence of other low permeability deposits beneath the peat within the SSSI (Section 6.3.11 of APP-304). These act to limit the movement of water between the Crag and the peat.

1.2.10 Given the proximity of the site to the sea it is possible to observe the influence of tides in the Crag groundwater system (Section 6.3.5.2 of APP-

304). However no tidal variation is observed in the peat (Section 6.3.11 of APP-304). This demonstrates there is a low degree of hydraulic continuity between these groundwater bodies.

1.2.11 In contrast, there is close correlation between surface water levels in the drain network in Sizewell Marshes and the peat groundwater. This demonstrates a high degree of hydraulic continuity between the two (Section 6.3.3.1 of APP-304). It is noted that during maintenance works on the Minsmere Sluice in 2014, in which water levels within Leiston Drain were temporarily modified, there was a strong response in the peat groundwater within Sizewell Marshes (Section 6.3.3 of APP-304). This serves to further demonstrate the high degree of continuity between surface water and peat groundwater. A similar response was not observed in the Crag groundwater.

b) Hydrochemistry

1.2.12 The interaction of the different water sources within Sizewell Marshes SSSI influences the baseline water chemistry of the peat groundwater, which in turn influences the distribution of ecological assemblages across the site.

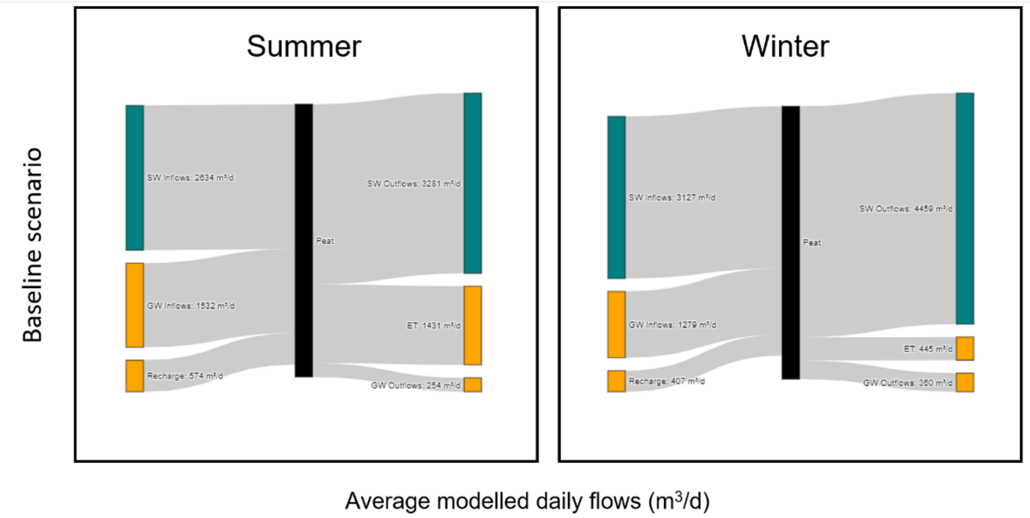
1.2.13 A review and analysis of records for Sizewell Marshes SSSI showed there is reasonable correlation between variations in hydrochemistry in the drainage network and groundwater within the peat and the ecological assemblages present (Sections 6.5.2.3 and 6.5.2.4 of APP-304).

1.2.14 There is no evidence for variations in the hydrochemistry of the peat to be controlled predominantly by interaction with Crag groundwater.

1.2.15 The hydrochemistry data was used to inform the conceptual understanding of the Sizewell Marshes SSSI. This includes the role surface water and Crag groundwater play in the functioning of the water environment within the SSSI. The review of newly collected monitoring data is still ongoing, and continues to support the conceptualisation set out in APP-304.

1.2.16 The proportional contribution that Crag groundwater and surface water make to the water balance within Sizewell Marshes SSSI is shown in the following charts. The Crag groundwater contribution is a combination of inflow at the sides and base of the peat. These charts are representative of the winter and summer periods, defined as April to September and October to March, respectively.

Plate 1 Sizewell Marshes SSSI water balance proportional flows under baseline conditions.



1.2.17 It can be seen that there is significant natural variation in the relative contribution of Crag groundwater and surface water between winter and summer months. Throughout the year surface water inflows provide the largest proportional contribution of water entering the Sizewell Marshes.

1.2.18 There is a significant increase in surface water outflows in the winter months relative to surface water inflows. This is a result of the peat groundwater levels being close to, or at, ground level within the SSSI during this period. This causes more water to enter the drainage network within the Sizewell Marshes. There is less contribution from Crag groundwater during the winter months indicating this is not driving the high peat groundwater levels. This is supported by site observations that high peat groundwater levels correspond with high water levels within Leiston Drain.

c) Conceptualisation

1.2.19 Prior to the collection of data to assess the impacts of the proposed Sizewell C development there was a different conceptualisation of the Sizewell Marshes SSSI. This was a long-held understanding (documented in the Sizewell Marshes Water Level Management Plan (Environment Agency, 1996)) that was broadly supported by the limited evidence available at the time. The previous understanding was that there was an upwelling of Crag groundwater from depth. This Crag groundwater was thought to displace shallow recharge from surface water into the peat. It was conceived of as a one-way system with groundwater flowing up from the Crag and exiting via the surface water drains within the SSSI. This is not supported by the monitoring and modelling evidence that has been compiled by SZC Co.

1.2.20 The evidence submitted with the DCO application (APP-304) presents a revised understanding. This is based on extensive baseline monitoring over the past seven years. The revised conceptualisation was tested and refined during the development of the numerical model built, calibrated and validated for use in ecohydrological assessment in consultation with the Environment Agency and Natural England. There is evidence for a degree of movement of Crag groundwater into the peat, however the upward movement of Crag groundwater is limited by ground conditions in and beneath the SSSI (Section 7.1.2 of APP-304). By far the dominant source of groundwater within the peat is surface water.

1.3 Numerical model representation of groundwater and surface water system

1.3.1 The numerical model represents groundwater in the Crag, peat and other superficial deposits. The model also dynamically represents surface water within the Sizewell Marshes SSSI. This model was refined over several years with the close involvement of stakeholders. The numerical model development process that was followed is detailed in (APP-298).

1.3.2 During development of the model a series of calibration targets were agreed with the Environment Agency and Natural England. These targets determine how closely the modelled water levels and flows match observed, real world data.

1.3.3 A key calibration criterion that was agreed with both parties was that modelled (baseline) groundwater levels within the Sizewell Marshes should be within 10cm of observed data (Section *3.3 a)* of APP-298). This value was based on ecological sensitivities within the SSSI and the need for the model to be able to predict change at a suitable scale to meaningfully inform ecological appraisal of changes in the water environment. The numerical model was calibrated to within 10cm of observed data in the Sizewell Marshes. This close alignment with observed data means that in scenario modelling the degree of predicted change is measured relative to a representative baseline i.e. a predicted change of 5cm in the numerical model is equivalent to a real world change of 5cm from baseline conditions.

1.3.4 The Environment Agency has reviewed the numerical model (RR-0373). They consider it to be appropriate for use in the context of predicting change associated with the development as stated in paragraph 4.0 of REP2-135.

1.3.5 A series of paired numerical model scenarios were run in order to allow the relative change in the water environment associated with the proposed development to be assessed. These comprised a baseline model run, representing present day conditions with no development, and a development scenario. The development scenario included representations of all activities with the potential to change the water environment. Details of the model runs are presented in Sections 3 and 4 of APP-298.

1.3.6 The baseline and development scenarios were run for a series of predicted future climatic conditions to provide a robust assessment of potential climate change, as agreed with the Environment Agency. The climatic inputs were generated from the published UKCP18 data. Details are provided in Section 4.3 of APP-298.

1.3.7 The results of the numerical model are presented graphically in Figures 19A.75 to 19A.111 of APP-301 and APP-302, and the key findings are summarised below.

1.4 Nature of predicted change

1.4.1 There is a small degree of change predicted in both the Crag and peat groundwater systems during the construction period as outlined below. The predicted change shows seasonal variability, with a greater degree of change predicted in the winter months during construction. Following construction there is no discernible change from baseline conditions.

1.4.2 Contour plots showing the maximum predicted change in the construction and operation assessment period were included in the ES submitted in support of the May 2020 DCO application (Figures 19A.90 and 19A.96 of APP-301 and APP-302). These plots are a 'snapshot' of the point in time with the greatest predicted magnitude of change, and show that this is likely to occur in winter months, early in the construction programme (see below). The predicted change for summer months in the early construction programme, and all year round later in the construction programme, are less than shown on these figures. Therefore, these figures represent the likely maximum (i.e. worst-case) predicted change in groundwater levels.

1.4.3 The maximum predicted change in groundwater levels occurs approximately 2-3 years after the start of construction. This is during December 2024 in the numerical model timeline and coincides with the peak dewatering activity within the cut-off wall. The contour plots (Figures 19A.96 and 19A.99 of APP-302) are a snapshot of this point in time. The predicted change is less than 10cm beneath the western part of the Sizewell Marshes, furthest away from the Main Construction Area (MCA) and less than 50cm beneath the eastern part of Sizewell Marshes which lies adjacent/closest to the MCA. While the overall predicted change is small, the magnitude and extent of the predicted change is more pronounced in the Crag (Figure 19A.99 of APP-302).

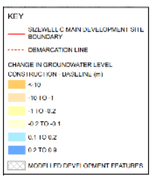
1.4.4 The majority of the peat groundwater levels in the Sizewell Marshes, at the time of maximum change, in winter 2024, are predicted to be within 10cm of baseline conditions. Changes of more than 10cm in the peat groundwater levels at this time are limited to the centre of individual fields in the eastern part of the SSSI (Figure 19A.96 of APP-302).

1.4.5 At the time of maximum predicted change in Crag and peat groundwater levels in winter 2024, there is still upward movement of groundwater from the Crag. Due to the small magnitude of change in both the Crag and peat groundwater levels there is not a significant reduction in upward movement. This implies no significant effects on the hydrochemistry of peat groundwater given the proportional change in the water balance.

1.4.6 To inform the eco-hydrological assessment (APP-224), variation in the water environment throughout the year and between years also needs to be considered. Plots of change in groundwater levels, surface water levels, and flow over time have been produced for observation points within the Sizewell Marshes (Figures 19A.85 to 19A.111 of APP-301 and APP-302).

1.4.7 These plots show that the relatively small degree of change within the peat is more pronounced in the first three years of construction. The magnitude of change then reduces during the rest of the construction period. The predicted degree of change in the peat reduces to close to zero during operation. The predicted change relative to baseline conditions is smaller than the natural seasonal variation observed in peat groundwater levels.

1.4.8 Contour plots showing the maximum predicted difference in Crag and peat groundwater levels in winter 2024 and summer 2025 have been produced. These present the point of maximum predicted change in winter 2024, and the following summer. This coincides with the period of greatest construction drawdown of groundwater. These contour plots are presented below. Predicted changes in water levels outside the Sizewell Marshes SSSI are associated with other aspects of the development with different mechanisms of change.



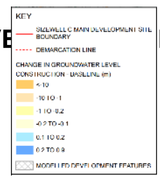
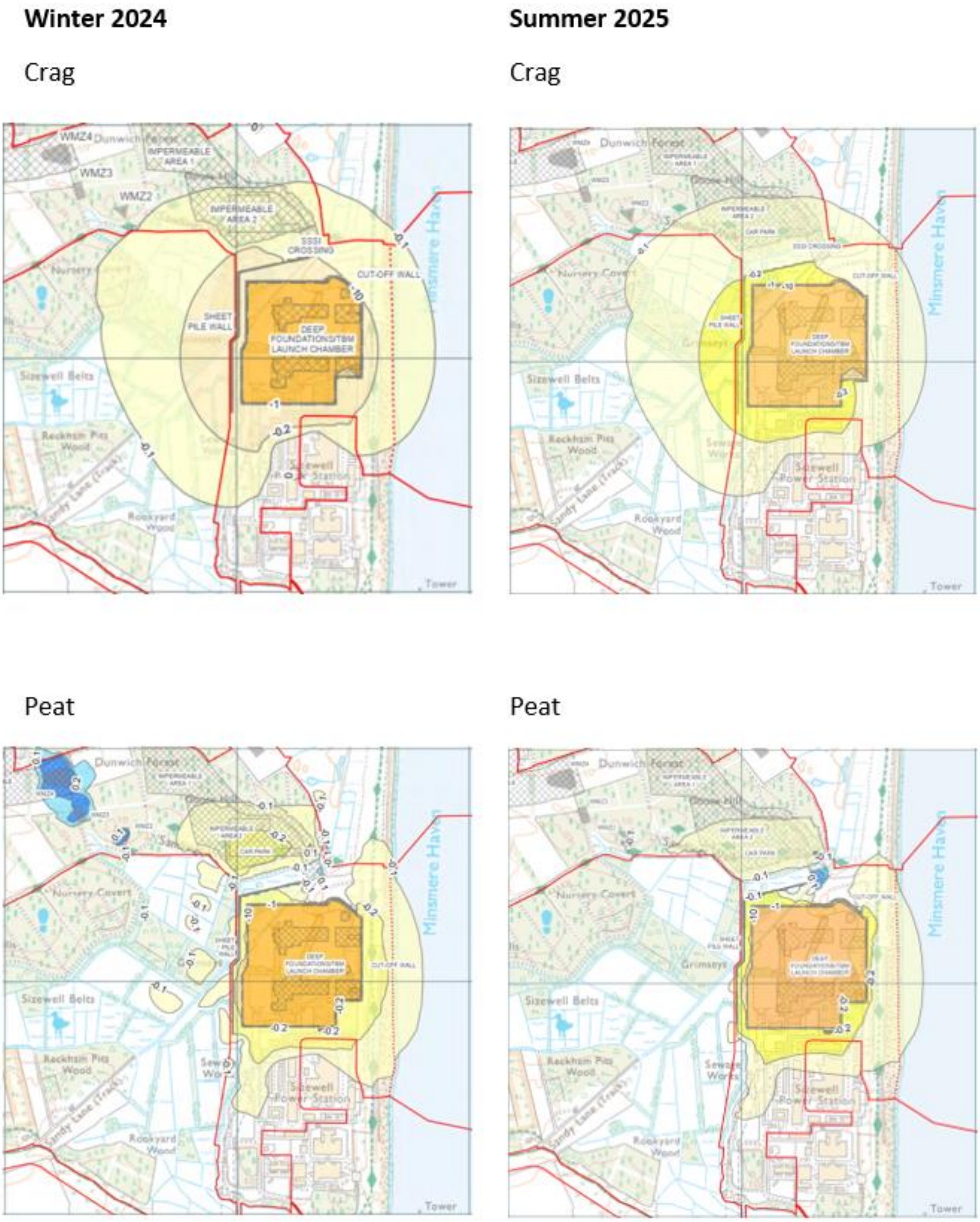


Plate 2 Crag and peat groundwater level contour plots.



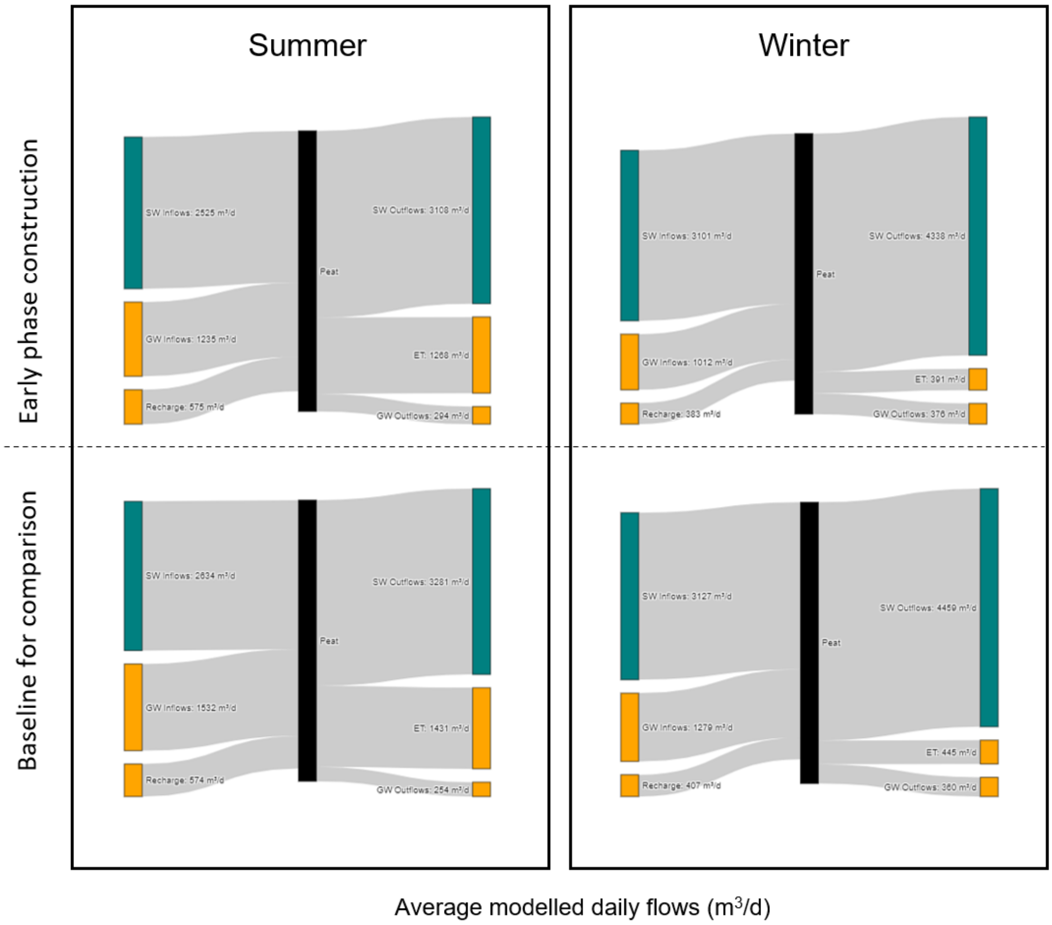
1.4.9 The contour plots show that the reduction in Crag groundwater levels is similar in magnitude and extent in winter and summer months.

1.4.10 The plots show that in summer 2025 there is a very limited area of peat with a reduction in groundwater levels of 10cm or more. This means the depth to the water table from the ground surface is less than 10cm greater relative to baseline conditions across the vast majority of the SSSI.

1.4.11 There are only two small areas predicted to experience a change of more than 10cm, which are located in the extreme eastern extent of Sizewell Marshes SSSI. The vast majority of peat groundwater in the SSSI is predicted to be within 10cm of baseline conditions during summer 2025.

1.4.12 At the time of maximum change in Crag and peat groundwater levels in summer months, there is still a predicted upward movement of groundwater from the Crag to the peat as previously highlighted. The proportional contribution of Crag groundwater and surface water is shown below, along with other elements of the water balance within Sizewell Marshes SSSI.

Plate 3 Sizewell Marshes SSSI water balance proportional flows during early construction.



1.4.13 There is a slight predicted reduction in proportional inflow of Crag groundwater during early construction relative to baseline conditions. The small reduction in Crag groundwater inflow is not offset by an increase in water from another source. There is a small predicted reduction in evapotranspirative loss during early construction. This is more apparent in the summer months. This is related to the small degree of lowering of the peat groundwater levels (less than 10cm change from baseline) within the Sizewell Marshes. The remainder of the water balance components, including surface water inflows and outflows, are comparable in both summer and winter months for baseline and development model runs.

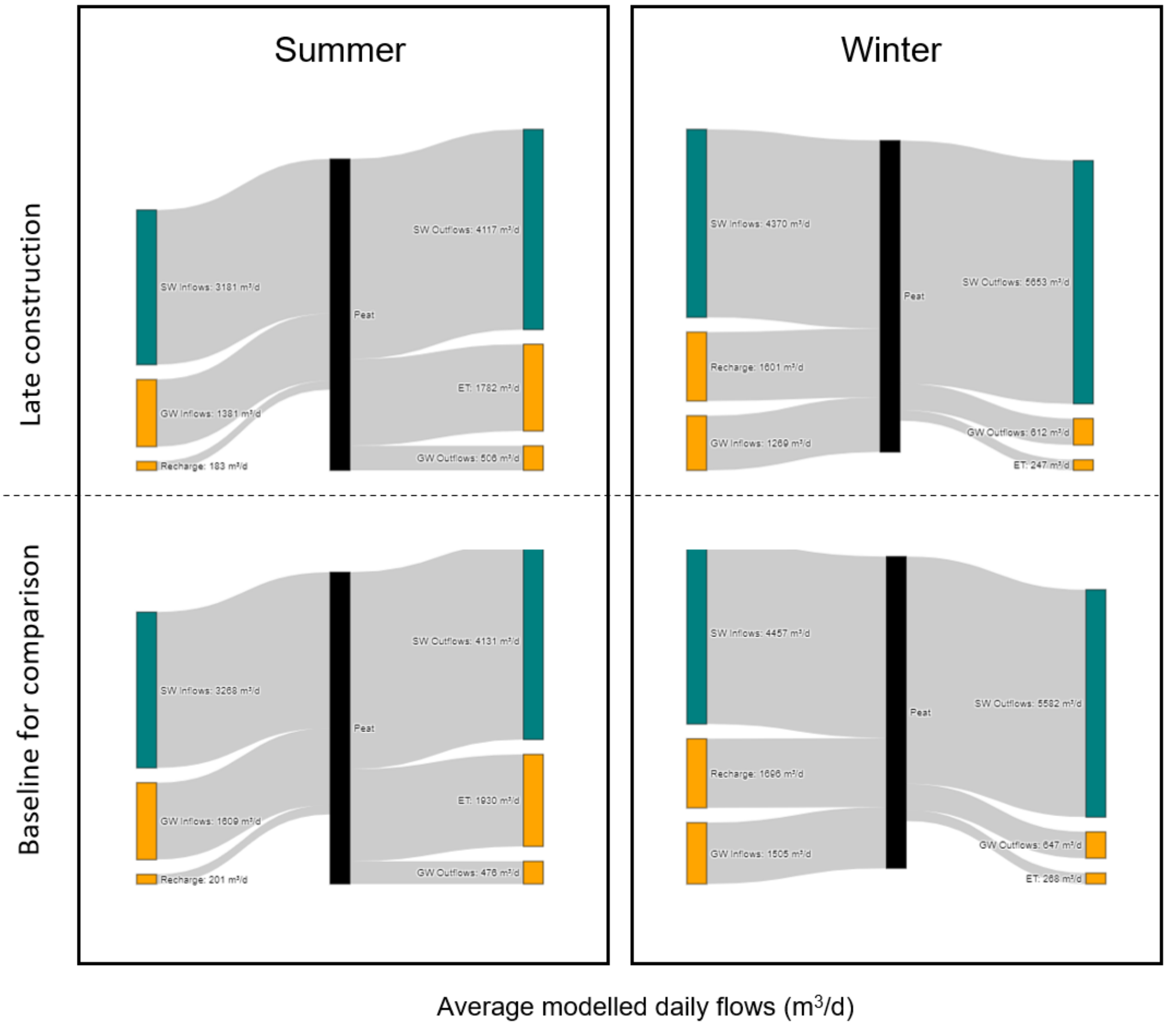
1.4.14 The majority of the surface water levels and flows within the Sizewell Marshes are comparable between baseline and development model runs through the year (Figures 19A.91 to 19A.93, 19A.100 to 19A.102, and 19A.109 to 19A.111 in APP-301 and APP-302). This indicates that there is little or no change in surface water behaviour across the majority of the SSSI during the construction and operation period.

1.4.15 The exception is in the Sizewell Drain at the downstream end of the Sizewell Marshes. Here, there is a small increase in the maximum predicted flow rate, and the frequency at which it occurs. This is associated with the realigned Sizewell Drain (see Section 1.5b below). There is little or no change predicted in the Leiston Drain, downstream of the SSSI.

1.4.16 The influence of tide-locking and flow reversal associated with the operation of the Minsmere Sluice (Section *1.3 e)* of APP-309 is also observed in the Sizewell Drain at the downstream end of the SSSI.

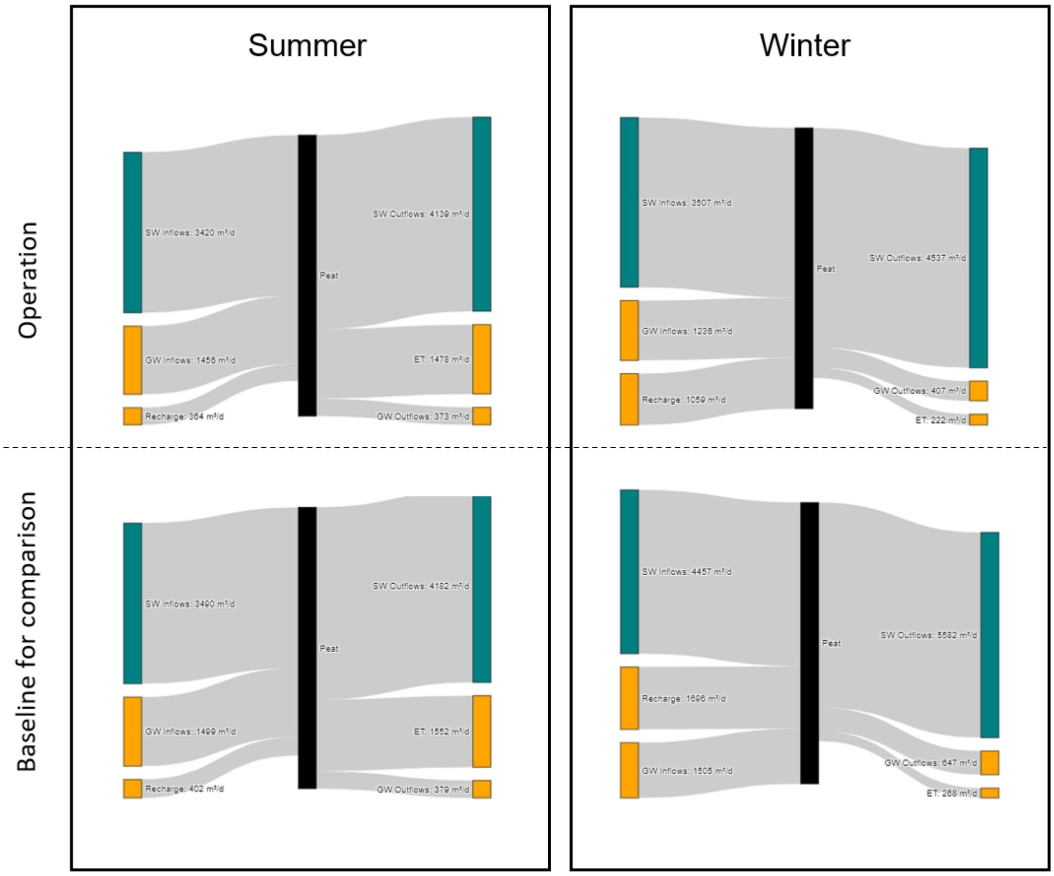
1.4.17 Due to the changing climatic conditions in the late construction and operation periods baseline charts have also been produced for these time periods for comparison.

Plate 4 Sizewell Marshes SSSI water balance proportional flows during late construction.



1.4.18 The predicted change during late construction shows a similar pattern to that in early construction i.e. a small reduction in Crag groundwater inflow and evapotranspirative loss. During late construction the predicted change is a smaller proportion of the overall water balance.

Plate 5 Sizewell Marshes SSSI water balance proportional flows during operation.



Average modelled daily flows (m^3/d)

1.4.19 The proportional flows for all elements of the water balance are comparable between the operation and baseline model runs in both winter and summer months.

1.5 Mechanisms of change

1.5.1 The predicted changes in the water environment are limited, in the context of the Sizewell Marshes SSSI, but it is important to understand what is causing them.

1.5.2 The two drivers of the predicted changes are the construction dewatering within the cut-off wall, and the realignment of the Sizewell Drain adjacent to the development site (Appendix 19C in APP-309). Each is considered in turn below.

a) Construction dewatering

1.5.3 During construction there is a need to lower water levels within the cut-off wall to allow safe excavation and provide a dry working environment. This is achieved by using a series of abstraction wells within the cut-off wall to pump out groundwater. This is the same approach as was used during construction of Sizewell B. The proposed Sizewell C development also includes a sheet pile wall at the base of the platform to prevent slumping and displacement of peat, which is reported as having occurred during construction of Sizewell B that may have caused local hydrological effects.

1.5.4 As water is pumped out the pressure is lowered around the abstraction wells, causing groundwater from the surrounding area to flow towards the well. The distance over which the pumping causes groundwater to be lowered depends on how much water is pumped out, and how freely groundwater can move through the ground.

1.5.5 In the absence of a cut-off wall groundwater levels beneath the SSSI would be lowered to a similar level to that within the cut-off wall. The low permeability of the cut-off wall prevents the free movement of groundwater into the excavation, limiting the volume of water that needs to be pumped out. This also limits the reduction in groundwater levels outside the cut-off wall. The proposed cut off wall and sheet pile wall are primary mitigation.

1.5.6 While the cut-off wall will prevent free movement of water, it is impossible to construct a truly impervious structure. This means there will be a very low rate of movement of groundwater through the cut-off wall. This will result in a slight lowering of groundwater levels outside the cut-off wall. This can be seen in the predicted Crag groundwater levels (Figures 19A.90, 19A.99, and 19A.108 in APP-301 and APP-302), which shows a slight reduction in predicted groundwater levels radiating from the cut-off wall.

1.5.7 Predicted changes in water levels within Sizewell Marshes do not arise from construction activities outside the redline boundary (i.e. the ground conditions outside the cut-off wall do not change during the construction and operation period). The change in water level inside the cut-off wall controls the predicted change in Crag groundwater levels beneath the SSSI. It is a response to the difference in water level inside the cut-off wall and an associated change in water pressure.

1.5.8 The maximum reduction of groundwater levels outside the cut-off wall occurs at the start of construction. This is when the groundwater levels inside the cut-off wall are reduced to their lowest level. The maximum predicted drawdown in the Crag outside the cut-off wall occurs at the same time as the maximum dewatering within the cut-off wall.

1.5.9 As the construction progresses the degree of dewatering reduces. This allows groundwater levels inside the cut-off wall to rise back towards natural levels. This reduces the difference in pressure relative to the ground outside the cut-off wall. This results in less change in groundwater levels outside the cut-off wall later in the construction programme. This can be seen in the model results showing predicted change over time (Figures 19A.85, 19A.86, 19A.88, 19A.89, 19A.94, 19A.95, 19A.97, 19A.98, 19A.103, 19A.104, 19A.106, and 19A.107 in APP-301 and APP-302).

1.5.10 A similar effect occurs in the peat, however the response is much weaker and much less uniform than in the Crag. This is a result of the interaction between peat groundwater and surface water within the SSSI, and the release of water from storage in the peat as explained below.

1.5.11 Peat is a compressible medium. This means that when there is a change in pressure water is initially released from storage in the structure of the peat (analogous to a sponge). This allows small changes in pressure to be accommodated without an observable change in groundwater level. If there is a sufficiently large change of pressure then groundwater levels will change, in a similar fashion to that seen in the Crag.

1.5.12 Additionally, there is a strong degree of connectivity between surface water drains and peat groundwater in the Sizewell Marshes and vice versa. This means changes in peat groundwater level caused by the pressure difference across the cut-off wall will cause small-scale flows from adjacent drains within the SSSI as water is redistributed. This results in the greatest predicted changes being in the centre of fields, away from drains. This is visible in the peat plot for December 2024, which shows small-scale reductions in fields to the west of the cut-off (Figure 19A.96 of APP-302).

1.5.13 The release of peat groundwater from storage and recharge from surface water offsets some of the reduction in peat groundwater levels close to the cut-off wall by redistributing water within Sizewell Marshes. This balancing of water within the peat groundwater and surface water systems within Sizewell Marshes is a pre-existing and naturally occurring mechanism that already dominates the characteristics of the peat groundwater in the SSSI.

b) Realignment of Sizewell Drain

1.5.14 The construction programme includes the realignment of the Sizewell Drain (Appendix 19C in APP-309).

1.5.15 While it is possible to realign the Sizewell Drain to directly mimic its existing flow characteristics this would require a greater land take within the SSSI. During the planning of the realignment a design philosophy was adopted in consultation with stakeholders that minimised the loss of Fen Meadow habitat.

1.5.16 The proposed realignment of the drain is therefore shorter, straighter and of a more uniform design than the current Sizewell Drain. This will allow surface water to discharge from the Sizewell Marshes more freely to the Minsmere Sluice. In order to replicate the existing flow regime within the Sizewell Drain the realigned drain will incorporate one, or more, control structures. These have not been represented in the numerical model because the impact without them was not assessed as significant.

1.5.17 A phased approach was taken to representing the development, in accordance with numerical modelling best practice. The proposed control structure(s) on the realigned Sizewell Drain were therefore not modelled.

1.5.18 There is a strong link between surface water and peat groundwater in the SSSI as previously explained in this note (see also Section 6.4.4 of APP-304). This means the realigned drain also influences peat groundwater levels in the eastern, downstream, end of the Sizewell Marshes.

1.5.19 During construction there is a small change predicted in the peat groundwater levels in response to the dewatering within the cut-off wall (Figures 19A.85, 19A.86, 19A.94, 19A.95, 19A.103, and 19A.104 in APP-301 and APP-302). These changes are more pronounced in the winter months. The realigned Sizewell Drain will also modify the response of the peat groundwater close to the cut-off wall as it allows surface water to discharge more freely.

1.5.20 This is apparent in the difference between the winter 2024 and summer 2025 peat groundwater contours. In winter, when water levels and flows are higher, there is a greater response noted in the peat groundwater. In summer the rates of discharge in the Sizewell Drain are lower as less water is moving through the system. This results in the realigned drain exerting less influence, and the degree of change being lower relative to the winter months.

1.5.21 Following completion of construction dewatering there is no discernible change predicted in peat groundwater levels around the realigned Sizewell Drain. Peat groundwater levels during operation are comparable to baseline conditions.

1.6 Management of change

1.6.1 A small change in peat groundwater levels is predicted in the eastern part of the Sizewell Marshes SSSI during construction. The predicted change can be addressed using standard water level management techniques.

1.6.2 As noted above, and shown on Figures 19A.85, 19A.86, 19A.94, 19A.95, 19A.103, and 19A.104 in APP-301 and APP-302, the predicted change is greater in the winter months early in the construction programme. This results from a combination of effects from dewatering within the cut-off wall and water being able to discharge more freely from the Sizewell Drain. This is a seasonal effect that would be unaffected by any change in programme.

1.6.3 The use of control structures, which are already deployed across the SSSI and in Aldhurst farm, will reduce the rate at which water can discharge from the realigned Sizewell Drain. Control structures are included in the design of the realigned Sizewell Drain (Appendix 19C in APP-309) for this purpose. It is intended that control structures with 'fine tuning' capability will be used.

1.6.4 By using such control structures to restrict the rate of discharge from the realigned Sizewell Drain, it will be possible to mitigate the effects of Sizewell C to maintain water levels within the SSSI in line with baseline conditions.

1.6.5 The introduction of the proposed control structure(s) at the downstream end of the Sizewell Marshes also offers increased resilience to future changes in climatic conditions by increasing flexibility for conservation management.

1.7 Summary

1.7.1 The water environment in the Sizewell Marshes is a function of the interaction between surface water, rainfall and groundwater. This interaction reflects the ground conditions within the SSSI, and its immediate environs.

1.7.2 Prior to the collection of evidence to support the proposed development there was a historical conceptualisation of the Sizewell Marshes SSSI. It was conceived of as a one-way system with groundwater flowing up from the Crag and exiting via the surface water drains within the SSSI.

1.7.3 The evidence submitted with the DCO application in May 2020 indicates that this is not the case. Although there is some limited movement of Crag groundwater into the peat, a strong degree of control is exerted on peat groundwater levels by the surface water system. This conceptualisation was agreed with stakeholders during workshops held prior to the DCO application submission.

1.7.4 Following agreement of the initial conceptualisation of the groundwater and surface water flow regime a numerical model was constructed to inform assessment of potential change associated with the development. The conceptualisation submitted with the DCO application formed the basis for the numerical model, which was refined over several years with the close involvement of stakeholders.

1.7.5 The Environment Agency has reviewed the numerical model. They consider it to be appropriate for use in the context of predicting change associated with the development.

1.7.6 The numerical model predicts a small degree of change in both the Crag and peat groundwater systems during the construction period. While the predicted change is small, the magnitude and extent of the change is more pronounced in the Crag.

1.7.7 The maximum predicted change occurs during winter months. At this time the majority of the peat groundwater levels in the Sizewell Marshes are within 10cm of baseline conditions.

1.7.8 The predicted change in Crag groundwater levels is relatively consistent throughout the year. The predicted change in peat groundwater levels is more pronounced in winter months. There is still predicted movement of groundwater from the Crag into the peat during both summer and winter months.

1.7.9 The predicted degree of change within both the Crag and the peat groundwater is small. This means the depth to the water table from the ground surface is less than 10cm greater relative to baseline conditions across the vast majority of the SSSI throughout the construction and operational phases.

1.7.10 The majority of the surface water levels and flows within Sizewell Marshes SSSI are comparable between baseline and development model runs through the year. This indicates that there is little or no change in surface water behaviour across the majority of the SSSI during the construction and operation period. The exception is in the Sizewell Drain at the downstream end of the Sizewell Marshes. Here, there is a small increase in the maximum predicted flow rate, and the frequency at which it occurs.

1.7.11 The relatively small degree of predicted change is more pronounced in the first 2-3 years of construction. The magnitude of change is lower still during the rest of the construction phase. Peat groundwater levels during operation are assessed to be comparable with baseline conditions.

1.7.12 The two drivers of the predicted changes are the construction dewatering within the cut-off wall, and the realignment of the Sizewell Drain adjacent to the development site.

1.7.13 During construction there is a need to lower water levels within the cut-off wall. While the cut-off wall will prevent free movement of water, it is impossible to construct a truly impervious structure. This means there will be a very low rate of movement of groundwater through the cut-off wall.

This will result in a slight lowering of groundwater levels outside the cut-off wall.

1.7.14 The construction programme includes the realignment of the Sizewell Drain. During the planning of the realignment a design philosophy was adopted in consultation with stakeholders that minimised the loss of Fen Meadow habitat. The proposed realignment of the drain is therefore shorter and straighter than the current Sizewell Drain. This allows surface water to discharge from the Sizewell Marshes more freely to the Minsmere Sluice.

1.7.15 The use of control structures, which are already deployed across the SSSI to manage water levels, will restrict the rate of discharge from the realigned Sizewell Drain. This will allow the existing flow regime within the Sizewell Drain to be replicated. New control structures were not incorporated into the numerical model as the degree of predicted change without them was so small.

1.7.16 During construction there is a small change predicted in the peat groundwater levels in response to the dewatering within the cut-off wall. The realigned Sizewell Drain will also modify the response of the peat groundwater close to the cut-off wall as it allows surface water to discharge more freely.

1.7.17 During construction and operation there is no significant change to the proportional flows of Crag groundwater, surface water and release of water from storage in the peat. This means there is no mechanism to change the hydrochemistry of the groundwater within the Sizewell Marshes SSSI.

1.7.18 Following completion of construction dewatering there is no discernible change predicted in peat groundwater levels around the realigned Sizewell Drain. Peat groundwater levels during operation are comparable to baseline conditions.

1.7.19 The small predicted change in groundwater levels in the eastern portion of the SSSI will be addressed using the proposed new water control structures.

1.7.20 The proposed control structures would also provide increased resilience for managing water levels in response to future changes in climatic conditions.