Document Reference Number 101228245

Revision 001

Sizewell C Project

Construction Water Discharge Activity Permit Application

CWDA-18 PERMIT APPLICATION SUPPORTING DOCUMENT

DOCUMENT CONTROL

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REVISION HISTORY

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1 NON-TECHNICAL SUMMARY

1.1 Purpose of this Document

This technical supporting document accompanies the application for a Construction Water Discharge Activity (CWDA) environmental permit which is required for the proposed discharging and dewatering activities which are needed to support the initial enabling construction works to be undertaken for the development of the Sizewell C (SZC) power station, hereby referred to as the 'proposed development'. The development itself and associated schemes are subject to the SZC (Nuclear Generating Station) Development Consent Order 2022 (referred to throughout this document as the 'DCO').

Enabling construction works began in 2022. The early construction phase is now due to commence, during which rainfall-dependent surface water and groundwater, that may be encountered during certain activities, will need to be managed accordingly. Where these sources cannot be infiltrated back to ground, the surface and groundwater encountered must be managed and treated appropriately before it can be discharged back into a receiving watercourse or to ground (as will be the case for one of the proposed discharging activities within this permit application). This is to ensure that the risk of any pollution from associated construction activities is avoided or minimised as far as possible through treatment.

As per the Environmental Permitting (England & Wales) Regulations 2016[1], as amended (the "EPR16"), an environmental permit from the Environment Agency (EA) is required for the proposed discharge activities. This document has therefore been prepared and submitted as part of the permit application and explains, in detail, the nature of the proposed water discharge activities to be undertaken during the early construction phase of the proposed development, including any treatment measures that are proposed to be implemented. Specifically, this permit application relates to the discharging / dewatering activities anticipated to be undertaken in the first 12-24 months of the wider construction programme for the proposed development. A subsequent permit variation or separate application is intended to be made for any additional discharge activities which are identified as required as design and construction sequencing works continue to progress.

1.2 Site Description

The site of the proposed development is centred at UK National Grid Reference (NGR) TM 47355 64128. It is located on the Suffolk coast, approximately mid-way between Felixstowe and Lowestoft, to the north-east of the town of Leiston. The site address being used for the construction works is Sizewell B power station, near Leiston, Suffolk, IP16 4UR (as the nearest operational facility).

This permit application relates to the following areas of the site:

- Main Construction Area (MCA);

[1] https://www.legislation.gov.uk/uksi/2016/1154/contents

- Temporary Construction Area (TCA);
- Ancillary Construction Area (ACA);
- The Green Rail Route (GRR); and
- Associated Development 6 (AD6).

The MCA, TCA, ACA and GRR are classified as falling within the Main Development Site (MDS), while AD6 is an area located to the west of the MDS comprising a separate highway and bridleway scheme which is required to support the proposed development. The specific construction and proposed discharging activities that will be taking part in these parts of the site are explained in more detail within **Section 3** of this supporting document. There are a number of statutory designated sites that the site falls within, or within close proximity to. These are explained in more detail in **Section 2.2** of this supporting document.

1.3 Proposed Water Discharge and Groundwater Activities

As described above, there is a requirement to ensure that rainfall-dependent surface water run-off and any groundwater that is encountered (for example from excavations or piling operations) is managed appropriately so as not to cause any pollution. Due to the size of the proposed development and the required construction activities, which are summarised in more detail within this supporting document, several discharge points are needed. These are referred to as 'outlets' throughout the remainder of this document, each with its own reference number. There are nine discharge activities, and corresponding outlets, in total within this permit application. These comprise outlets to receiving surface watercourses with one exception which comprises a proposed discharge outlet to ground / groundwater (the Sizewell Foreshore). Each of the proposed discharge activities and outlets are described in further detail throughout this supporting document (namely **Sections 3 and 4**).

In summary, the proposed discharge / dewatering activities and associated outlets included within the scope of this water discharge activity permit application are limited to the following:

- Discharge of rainfall-dependent surface water run-off and groundwater from the MCA to the Sizewell Foreshore via a Temporary Marine Outfall (TMO) at Outlet EO1.
- Discharge of groundwater to surface water from dewatering activities required for the installation of a crossing over the Sizewell Marshes Site of Special Scientific Interest (SSSI) at Outlet DWO1 to the Leiston Drain.
- Discharge of rainfall-dependent surface water run-off from the northern section of the TCA to an unnamed ditch running into Water Management Board (WMB) drain (DRN163G0101) at Outlet O5 (via the Marsh Harrier Habitat).
- Discharge of rainfall-dependent surface water run-off and potentially groundwater (from shallow excavations) from Associated Development (AD) 6 to the Leiston Drain at Outlets O6a, O6b and O6c.

- Discharge of rainfall-dependent surface water run-off from the ACA Water Management Zone (WMZ) basin to the Sizewell Drain at Outlet O7.

- Discharge of rainfall-dependent surface water run-off and potentially groundwater (from shallow excavations) at AD6 to an upstream section of the Leiston Drain (referred to as 'Upstream Leiston Drain') at Outlet O8a.

- Discharge of rainfall-dependent surface water run-off from WMZ 8 at Outlet O8 to the Leiston Drain.

Relevant site drawings have been included either within this document or as appendices (which show more detail) to show the location of each proposed discharge outlet. Below is an overall layout drawing which shows the location of all of the above-proposed discharge outlets across the site. The red line in the below drawing demarcates the DCO Red Line Boundary (which marks the boundary of the proposed development from a planning perspective). All proposed discharge activities within this application are to take place within the DCO Red Line Boundary. The below drawing is also included as **Appendix B** to this technical supporting document for clearer detail.

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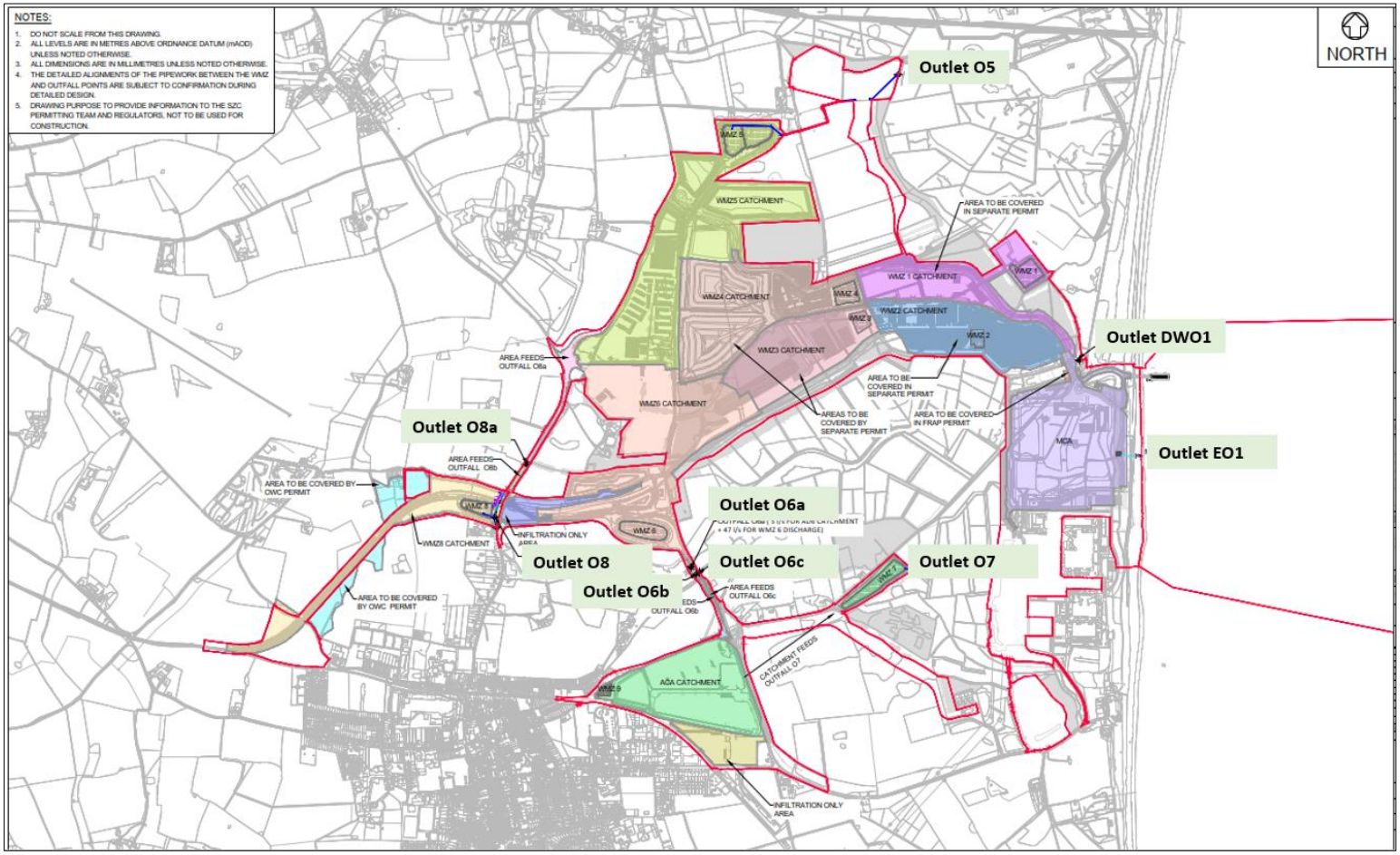
Figure 1 - CWDA-18 Outlet Layout Drawing



Risk assessments have been undertaken, as per the relevant GOV.UK Guidance, to support the proposed discharge activities and to assess any impacts to the receiving receptors. Requirements for abstraction licences, flood risk activity permits (FRAPs) and / or ordinary watercourse consents are being addressed separately and are considered excluded from the scope of this application.

1.4 Discharge Treatment Strategy

A Drainage Strategy for the proposed development was submitted and approved as part of the DCO stage of the project. The latest version (April 2022, Revision 2.0) of this is entitled 'SZC Co.'s Response to the Secretary of State's Request for Further Information dated 18 March 2022: **Appendix 3** – The Drainage Strategy[2] (refer to **Appendix Q**). The Strategy is split into 12 parts, and each is available online via the Planning Inspectorate for England (PINS) database. This document set out the initial proposals for the management of surface water and groundwater during the construction phase of the proposed development. As this is publicly available information, it has not been repeated in full within this permit application supporting document, relevant sections have been referenced throughout and footnotes are included however to help ease of access.

In summary, the principal drainage methodology being applied to the construction works is to mimic existing water run-off patterns where possible and follow the conventional Construction Industry Research and Information Association (CIRIA) Sustainable Drainage Systems (SuDS) hierarchy[3] (which is considered industry best practice for management of run-off to surface and groundwater). Infiltration will be used for early works where no treatment or discharge is required (as agreed with the Lead Local Flood Authority and Suffolk County Council). This allows surface water run-off to infiltrate to ground over a period of time, thus reducing run-off volumes during rainfall events (which reduces flood risk). It also helps to reduce attenuation storage volume requirements on site and can replenish local aquifers through deep infiltration and act to support local river base flows and wetland systems via shallow infiltration processes. This is considered particularly important for this location due to the proximity of the Sizewell Marshes SSSI and other surrounding sensitive ecological receptors.

This permit application relates specifically to those activities where reliance upon SuDS methods and infiltration on its own is not suitable, and / or where surface water run-off or groundwater is required to be treated prior to discharge. Where treatment is required, the proposed pollution control and treatment methods that will be incorporated into the management of the discharge activities are explained in **Section 5** of this supporting document. Final treatment strategies will be dependent upon site specific conditions (i.e., availability of space) and any permit requirements that may be set, for example in relation to specified water quality limits. To help inform suitable treatment methods, a Surface Water Baselining Assessment has been undertaken as part of this permit application which has provided suggested water quality limits with regards to certain parameters. Again, the final treatment methods to be implemented will consider these alongside any additional limits that might be set for each discharge activity stream.

[2] EN010012-010766-SZC - Appendix 3 - Part 1.pdf (planninginspectorate.gov.uk)

[3] Item Detail (ciria.org)

It is anticipated that the treatment of surface water run-off and groundwater may involve pH correction (via the use of carbon dioxide when dealing with aspects such as concrete), and suspended solids settlement with additional treatment through the use of dosing (flocculation and coagulation), where necessary for finer particles. Additional treatment measures, or alternative disposal options, may also be required in some cases for management of groundwater that is to be dewatered in certain parts of the site (explained further in **Section 5** of this supporting document).

In terms of managing water discharge volumes and flow rates; most of the discharge volumes are rainfall dependent so will be intermittent in nature and vary depending on weather conditions. Flow rates are in accordance with the greenfield run-off rates approved within the DCO application, where required (as per Section 3.0.13 of the Drainage Strategy[2]). The rates therefore provided within this application are the discharge rates from each outlet which have been calculated based on meeting the required greenfield run-off rates for the proposed development. In addition to the rainfall dependent surface water run-off, there will also be some quantities of groundwater to be discharged as part of certain discharge streams. Anticipated volumes of the dewatering have been calculated to inform the proposed maximum discharge volumes and flow rates for these particular discharge streams too. This is explained in further detail within **Section 4** of this supporting document.

Please note that any drawings and / or other supporting information that has been provided as appendices to support this permit application only include the location of treatment systems if they are known at this stage. These will be dependent upon the exact conditions that are set in the permit itself, in terms of water quality limits to be met, which will therefore affect aspects such as the number of treatment plants required. Furthermore, contractors, once appointed, may need to confirm exact locations depending on site specific characteristics. The same premise applies to the location of proposed monitoring and sampling point locations, as described further in **Section 7** of this supporting document.

1.5 Environmental Management Measures

Extensive upfront communication and regulatory engagement has been undertaken with the EA, as the regulator responsible for determining water discharge activity permits, in relation to this specific permit application. Additional engagement has been undertaken with other stakeholders as necessary to inform the supporting risk assessments and exercises that have been undertaken as part of the permit application process. These are included as appendices to this document. The risk assessments undertaken have addressed the source-pathways-receptors likely to be present on site and have also considered whether there is the potential for any specific pollutants and / or hazardous substances to be present within the discharge itself. Details of specific management measures have been included where known.

All discharge activities will be subject to the requirements of the SZC Environmental Management System (EMS) that will be applied on site. This will ensure that there are effective processes and / or procedures in place regarding management of the discharge and treatment activities on site. As part of the management requirements, water quality monitoring and sampling will be undertaken to ensure that the discharge activities are not resulting in pollution. A summary of the SZC EMS has been included within this technical supporting document further below (**Section 8**).

1.6 Provision of Additional Information

Sufficient information is contained within this technical supporting document to support the permit application being made. However, it has been identified throughout the document in relevant sections where information may still be subject to change, for example due to final detailed design specifications yet to be released, or where construction sequencing information is required once contractors have been appointed. This information will be made available to the EA throughout the permit determination process as and when it becomes available and as requested. This has been highlighted to the EA during the Pre-Application stage.

1.7 Key Definitions

The below table includes the acronyms used throughout this supporting document.

Acronym	Definition
ACA	Ancillary Construction Area
AD6	Associated Development 6
BOD	Biological Oxygen Demand
BR19	Bridleway 19
CDO	Combined Drainage Outfall
CEMP	Construction Environmental Management Plan
CFA	Continuous Flight Auger
CIRIA	Construction Industry Research and Information Association
COSHH	Control of Substances Hazardous to Health
CRoW	Countryside and Rights of Way
CWDA	Construction Water Discharge Activity
DCO	Development Consent Order
DWS	Drinking Water Standards
EA	Environment Agency
EDRMS	Electronic Document and Records Management System
EMMP	Environmental Management and Monitoring Plans
EMS	Environmental Management System
EPR 16	Environmental Permitting Regulations
EQS	Environmental Quality Standards
FEH	Flood Estimation Handbook
FSR	Flood Studies Report
FRAP	Flood Risk Activity Permit
GRR	Green Rail Route
HGV	Heavy Goods Vehicle
HWRC	Household Waste Recycling Centre
HRA	Habitats Risk Assessment
IMS	Integrated Management System
LOD	Limit of Detection
LSE	Likely Significant Effects
MCA	Main Construction Area
MCERTS	EA Monitoring Certification Scheme
MDS	Main Development Site
MHWS	Mean High Water Spring Tides
MLWS	Mean Low Water Spring Tides

MRV	Minimum Reporting Values
NGR	National Grid Reference
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PINS	Planning Inspectorate for England
RAMS	Risk Assessments Method Statements
RPS	Regulatory Position Statement
SIA	Simple Index Approach
SPA	Special Protection Area
SSMP	Subject Specific Management Plans
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SZC	Sizewell C
TCA	Temporary Construction Area
TMO	Temporary Marine Outfall
UKAS	United Kingdom Accreditation Service
WFD	Water Framework Directive
WMB	Water Management Board
WMZ	Water Management Zone

1.8 Appendices

Ref	Title	Document Reference	Summary
A	Appendix A - Environmental Permit Application Forms	101219356	Required GOV.UK application forms to support permit application.
B	Appendix B – CWDA-18 Outlet Locations Drawing	101222357	Design drawing showing the location of all discharge outlets included within the scope of this permit application.
C	Appendix C – Outlet EO1 Drawing	101222360	Design drawing showing current design of Outlet EO1.
D	Appendix D – Outlet DWO1 Drawing	101222363	Design drawing showing current design of Outlet DWO1.
E	Appendix E – WMZ 5 Drawing	101222365	Design drawing showing current design of Outlet WMZ 5.
F	Appendix F – Outlet O5 Drawing	101222367	Design drawing showing current design of Outlet O5.
G	Appendix G – Outlet O6a, O6b and O6c Drawing	101222371	Design drawing showing current design of Outlet O6a.

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Ref	Title	Document Reference	Summary
H	Appendix H – Outlet O7 Drawing	101222378	Design drawing showing current design of Outlet O7.
I	Appendix I – Outlet O8 Drawing	101222379	Design drawing showing current design of Outlet O8.
J	Appendix J – Outlet O8a Drawing	101222432	Design drawing showing current design of Outlet O8a.
K	Appendix K – Habitats Regulation Assessment (HRA) and Countryside Rights of Way (CRoW) Assessment	101222443	Supporting assessments required as per GOV.UK permit application requirements.
L	Appendix L - Bespoke Environmental Risk Assessment	101222447	Supporting assessments required as per GOV.UK permit application requirements.
M	Appendix M – Inflow and Discharge H1 Assessments: SSSI Crossing Dewatering	101222451	Supporting assessments required as per GOV.UK permit application requirements.
N	Appendix N – Dewatering Discharge Risk Assessment AD6 Leiston Drain Crossing	101222809	Supporting assessments required as per GOV.UK permit application requirements.
O	Appendix O – TMO Groundwater Discharge Risk Assessment: Temporary Marine Outfall	101222813	Supporting assessments required as per GOV.UK permit application requirements.
	Appendix O - Groundwater Discharge Risk Assessment: Temporary Marine Outfall: Appendix A - Drawings	101241605	Drawings supporting the Groundwater Discharge Risk Assessment: Temporary Marine Outfall.
P	Appendix P – Surface Water Baselining Assessment	101222822	Supporting assessments required as per GOV.UK permit application requirements.
	Appendix P - Surface Water Baselining Assessment - Appendix A: Quality Data Summary	101244135	Document supporting the surface water baseline assessment.
	Appendix P - Surface Water Baselining Assessment - Appendix A2: Surface Water Quality Data	101244141	Document supporting the surface water baseline assessment.
	Appendix P - Surface Water Baselining Assessment - Appendix B: mBAT Assessment	101244142	Document supporting the surface water baseline assessment.
	Appendix P - Surface Water Baselining Assessment - Appendix B2: mBAT Assessment Data	101244146	Document supporting the surface water baseline assessment.
	Appendix P - Surface Water Baselining Assessment - Appendix C: EQS Screening	101244147	Document supporting the surface water baseline assessment.

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Ref	Title	Document Reference	Summary
	Appendix P - Surface Water Baselining Assessment - Appendix C2: EQS Screening Data	101244153	Document supporting the surface water baseline assessment.
	Appendix P - Surface Water Baselining Assessment - Appendix D: Flow and Q95 Data	101244155	Document supporting the surface water baseline assessment.
	Appendix P - Surface Water Baselining Assessment - Appendix E.2 Dosing Information from specialist contractor	101244158	Document supporting the surface water baseline assessment.
	Appendix P - Surface Water Baselining Assessment - Appendix E.3 Example Chemical Dosing Safety Data Sheets	101244160	Document supporting the surface water baseline assessment.
Q	Appendix Q – DCO Drainage Strategy Extract	101253794	Extract from the Development Consent Order Drainage Strategy to support Section 4 of this document.

2 INTRODUCTION AND CONTEXT

2.1 Description of Proposed Development

The site is centred at NGR TM 47355 64128 in East Suffolk, on the Suffolk Coast, approximately halfway between Felixstowe and Lowestoft, to the north-east of the town of Leiston. It is located to the north of the existing Sizewell B power station, the address for which is currently being used for the proposed development, as described above.

A full description of the proposed development, including details on how it will operate once built, is available publicly online. In summary, and for the purposes of informing the reader of this document, the proposed development comprises two main elements from a construction perspective:

- The Main Development Site (MDS): to include aspects such as the reactor buildings, turbine halls, cooling and drainage water infrastructure, interim waste / fuel storage, operational service centre and offices and electricity transmission equipment. The MDS comprises the Main Construction Area (MCA), the Temporary Construction Area (TCA) and the Ancillary Construction Area (ACA).
- Associated development (AD) sites: including Darsham Park and Ride, Wickham Market Park and Ride, a Freight Management Facility and improvements to rail / highways infrastructure including the Sizewell Link Road, Two Village Bypass, Yoxford Roundabout, AD6 Road Scheme (which forms part of this permit application) and Leiston Branch Line upgrades.

The areas to which this permit application relates to include: the MCA, the TCA, the ACA and AD6.

Main Construction area (MCA): The MCA comprises the main platform for the proposed development. It is located to the east of the MDS, along the Sizewell Foreshore. Sizewell Marshes SSSI is located to the west of the MCA.

Temporary Construction area (TCA): The TCA comprises the area of land located primarily to the north and west of the MCA and to the north of Sizewell Marshes SSSI. Construction sequencing and therefore drainage requirements and associated water discharging activities are still being finalised within the TCA, therefore only part of this area is included within the scope of the discharging activities in this permit application.

Ancillary Construction Area (ACA): The ACA is isolated from the rest of the MDS and is located immediately north-east of the town of Leiston. Currently, the ACA is a greenfield site used for agriculture. The area comprises approximately 30 ha. It is bounded by Valley Road to the north, Lover's Lane to the east, King George's Avenue to the south and an existing railway line along the western boundary, beyond which the Eastlands Industrial Estate is located. Note that the DCO and associated planning documents refer to the ACA as Land East of Eastlands Industrial Estate.

Green Rail Route and Water Management Zone 8: The GRR forms part of the proposed development to the west and south of the MDS and AD6. This comprises an area of land to be used for the development of the GRR which is to be used during the construction phase for the transportation and delivery of materials to / from the site.

Associated development 6 (AD6): AD6 refers to 'Associated Development 6' which forms part of the proposed development but is considered separate from the MDS. This part of the project is located to the west of the MCA and Sizewell Marshes SSSI. It comprises a new highway scheme and roundabout which will form an integral route for both construction and operational phase traffic.

Sections 3 below describes in more detail the construction activities to be undertaken in each of the above areas and the associated discharging requirements.

Figure 2 below shows the Sizewell C MDS site boundary (DCO red line boundary) while **Figure 3** show the MDS proposed construction layout (incorporating the MCA, TCA and ACA subject to this application). The blue squares outlined **Figure 2** show the location of the proposed Water Management Zones (WMZs). **Figure 4** shows the extent of the AD6 construction works, which will take place to the west of the MDS. The boundary extent of the works is outlined in green.

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Figure 2 - Main Development Site Red Line Boundary

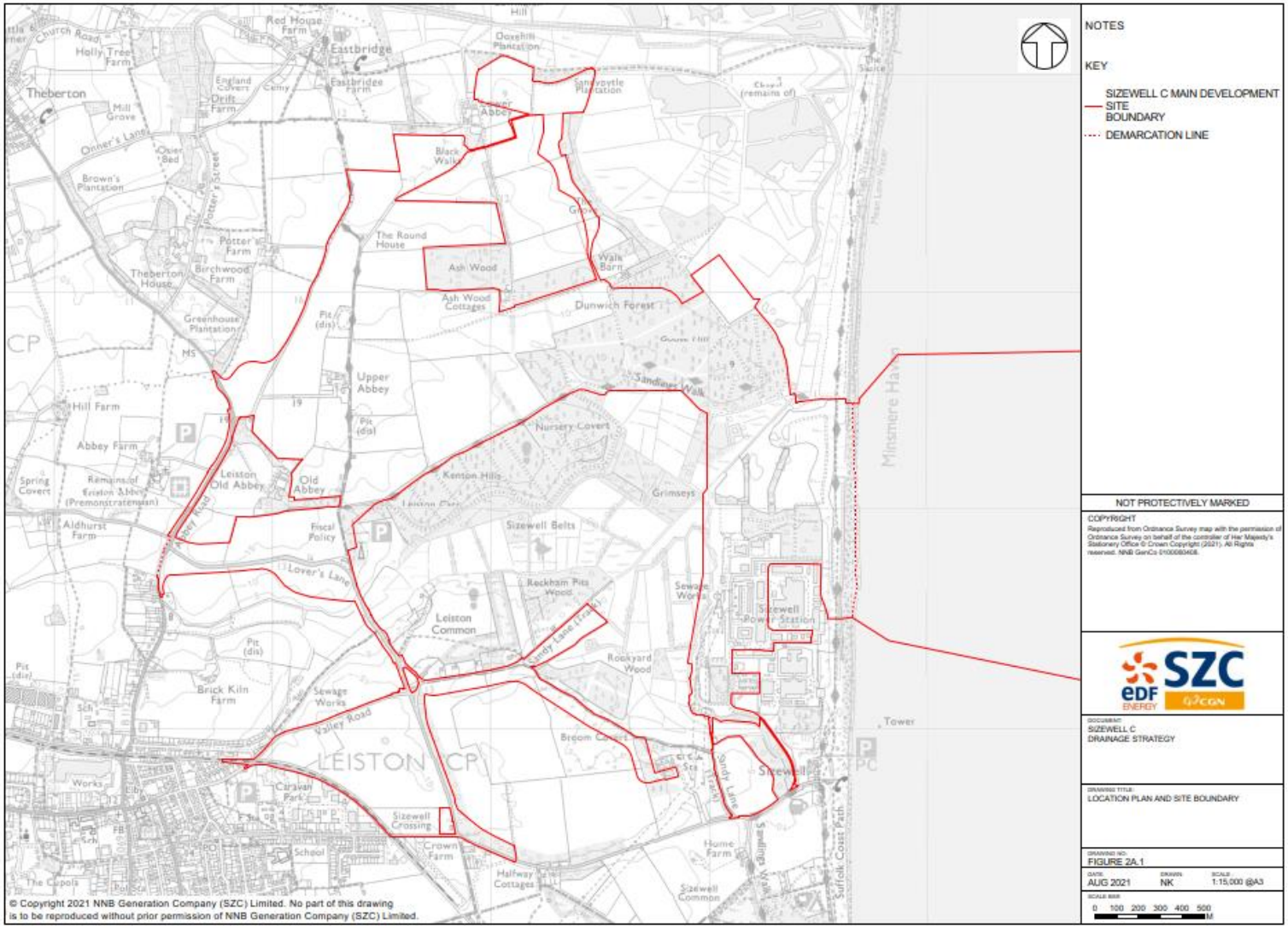


Figure 3 - MDS Construction Area Layout

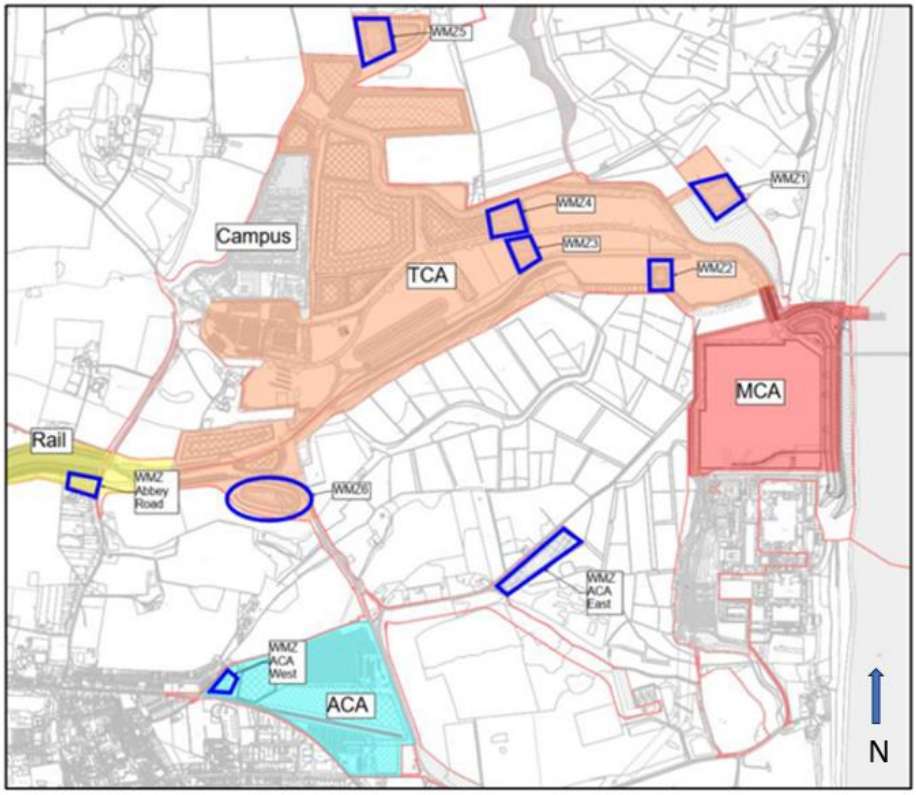


Figure 4 - AD6 Scheme Location Overview

2.2 Site Setting and Surroundings

The proposed development is located to the north of the existing Sizewell B facility on the Suffolk coastline. In terms of the setting and surroundings, the majority of the MDS and immediate surrounding areas (comprising the Associated Development works) comprises agricultural land, with the area surrounding the site of the proposed development being predominantly rural in nature. In terms of the wider environmental setting, there are several statutory environmental designations within proximity to the site. The impacts of the proposed development and associated construction works on the site settings and surroundings have therefore been considered at length in the relevant DCO chapters produced as part of planning requirements for the project. A Habitats Regulations Assessment (HRA) has also been undertaken alongside a Countryside and Rights of Way (CRoW) assessment to support this environmental permit application. These are contained in full in **Appendix K** to this technical supporting document and have considered the potential risks and impacts from the proposed water discharge activities specifically. The approaches to the assessments undertaken are outlined in more detail within **Section 6** of this supporting document.

In summary, the main statutory environmental designations that either fall within the site, or are in close proximity to the site, are summarised below:

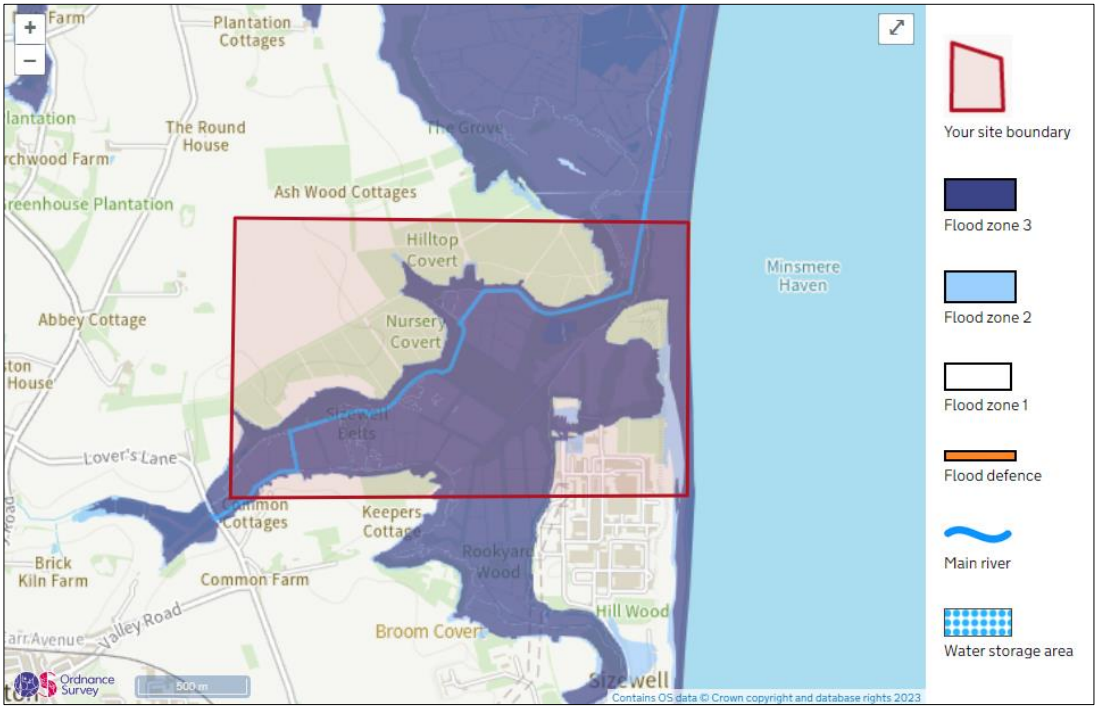
- Sizewell Marshes SSSI, about which 6 hectare falls within the MDS.
- Suffolk Coast and Heaths Area of Outstanding Natural Beauty (which the site falls within) and National Character Area, which is a predominantly low-lying landscape characterised by productive agricultural areas.
- Minsmere-Walberswick Heaths SSSI, Special Area of Conservation and Ramsar site.
- Leiston-Aldeburgh SSSI and Sandlings Special Protection Area (SPA) (to the south of the proposed development).
- Outer Thames Estuary Special Protection Area SPA.

The site for the proposed development lies within a Flood Risk Zone, with parts falling within Flood Risk Zone 3, which is described as having a higher probability of flooding from rivers and the sea. Parts of the site are protected by existing flood defences. A separate Flood Risk Assessment was completed as part of the DCO stage (Volume 5.2 Main Development Site Flood Risk Assessment, May 2020, PINS Reference Number EN010012[4]), and this has been used to inform both construction and operational design elements of both the construction and operation of the proposed development. The extent of the Flood Risk Zone is

[4] MDS FRA Draft V1 (planninginspectorate.gov.uk)

shown in **Figure 5** below. Separate FRAPs have been / will be applied for where required (outside the scope of this permit application).

Figure 5 – Flood Risk Designation



The underlying geology and hydrogeology of the site was considered extensively during the DCO process and outlined in the supporting Environment Statement (6.3 Volume 2 Main Development Site Chapter 19 Groundwater and Surface Water, PINS Reference number EN010012[5]), which is publicly available information. In summary, the proposed development is sited upon a bedrock geology of Crag formation underlain by Chalk, with superficial geology comprising marine beach deposits, tidal flat deposits, Lowestoft formation, peat deposits and made ground (within the MCA platform area). It is located on a Secondary A aquifer (superficial) and Secondary (Undifferentiated) aquifer. The Crag and Chalk bedrock aquifers are classified as Principal aquifers. There are no groundwater source protection zones within the vicinity of the MCA, however parts of the proposed works in the ACA and within the AD6 scheme of works fall within a Groundwater Source Protection Zone III.

Other key features and receptors that have been considered either within the DCO and / or the assessments undertaken to support this permit application include (but are not limited to) the following:

- Minsmere to Walberswick SPA;
- Existing Sizewell B power station facilities;

[5] EN010012-001912-SZC_Bk6_ES_V2_Ch19_Groundwater_and_Surface_Water.pdf (planninginspectorate.gov.uk)

- Watercourses in the area, including the Leiston Drain (part designated as a main river) and Sizewell Drain (ordinary watercourse);
- Plantation woodland associated with Dunwich Forest / Goose Hill, which is also designated as Sizewell Levels and Associated Areas County Wildlife Site (CWS) and Coronation Wood;
- Sizewell Beach and Suffolk Coast Path, including the Suffolk Shingle Beaches CWS ;
- Thames Estuary SPA and the southern North Sea SAC and the Suffolk Coastal waterbody;
- Existing properties, including the Upper Abbey Farm and the Round House;
- Existing roads, including Lover's Lane, B1122 Abbey Road, Valley Road and King George's Avenue; and
- An extensive network of Public Rights of Way, including Sandlings Walk, bridleway E-363/019/0 ('Bridleway 19') and Sandy Lane.

The environmental risk assessments undertaken to support this permit application are summarised in **Section 6** of this technical supporting document and are provided, in full, as appendices.

2.3 Construction Phasing of Works

Work to construct SZC power station will take place under the DCO granted by the Planning Inspectorate. Construction is anticipated to take between 9-12 years and will be undertaken in phases, each of which will likely require associated discharge and / or dewatering activities and therefore new permit application(s) and / or permit variations. Phasing and construction sequencing, particularly for the later years of the full construction period, is still on-going, therefore this permit application has been developed to support the discharging activities required in the 'early' construction phase only. This is to support the enabling works which are required for the later construction activities to take place, namely the works necessary to prepare the MDS (e.g., main civil works and marine works construction). For ease of reference, this permit application is being referred to as the 'early CWDA-18 application'. CWDA-18 is a project permit reference while the term early is being used to indicate that the discharges are anticipated to be required within the first 12-24 months (approximately) of the construction period. Any discharge activities identified as being required outside of this period will be applied for separately or submitted as a variation to the permit.

The below table has been included within this permit application to provide context only in terms of what likely activities will be taking place across the proposed development in the early years of construction. More detail on the specific activities leading to the requirement for discharging to take place are set out in **Section 3** below. Proposed construction activities that have the potential to impact upon the proposed discharging arrangements have been considered in the environmental risk assessments undertaken to support this permit application.

This permit application does not relate to any aspects of the commissioning, operational and / or decommissioning phase(s) of the proposed development.

Table 1 Early Construction Activities

Construction Phase	Construction Site Area	Summary of Construction Works to take place
Phase 1: Site establishment and preparation of earthworks (Years 1-2) General site clearance across main development and installation of security fencing.	Main Construction Area (MCA)	Establishment of construction area (main platform) Initial coastal defence feature constructed Layout of construction roads Installation of desalination plant and associated infrastructure Re-alignment of Sizewell Drain Installation of cut-off wall platform and cut-off wall Construction of combined drainage outfall (CDO) Construction of SSSI crossing Development of Sizewell B relocated facilities
	Temporary Construction Area (TCA)	Excavation of borrow pits Installation of acoustic mitigation and security fencing Stockpiling of excavated material Laying out of construction roads and parking Realignment of Lovers Lane and relocation of B1122 junction Southern earth bund construction
	Ancillary Construction Area (ACA)	Vehicular access onto Valley Road / Lovers Lane / King Georges Avenue Creation and use of caravan park Development of rail and associated infrastructure Logistic compound developed and operational Park and ride developed and operational Freight management facility developed and operational Storage and stockpiling of material Installation of acoustic mitigation and security fencing
	Other	AD6 construction works for Main Development Site roundabout and junction realignments Creation of water resource storage area Planting of wetland habitat Installation of underground water pipe
Phase 2: Main Site Earthworks and Completion of Temporary Infrastructure (Years 1-4)	MCA	Excavation of unsuitable material within the cut-off wall and backfilling Development of National Grid infrastructure Construction of the beach landing facility Marine infrastructure construction continues
	TCA	Temporary facilities and temporary railway track and associated infrastructure Excavation and backfilling of borrow pits Stockpiling of excavated materials Accommodation campus and associated infrastructure constructed and operational Realignment of Eastbridge Road Vehicular access onto the B1122 Site entrance hub developed and operational Realignment of Lovers Lane Kenton Hills car park upgraded

		Vehicular access onto lover's lane.
	ACA	Construction related operations continue

2.4 Regulatory Context

In accordance with the EPR16, as amended, a bespoke construction water discharge activity (CWDA) permit will need to be obtained for the proposed discharging activities to take place as part of the early construction works for the proposed development. Under Schedule 21[6] of the EPR, 16 the definition of the activity being applied for is 'the discharge or entry to inland freshwaters of trade effluent', as the discharge will consist of rainfall-dependent surface water run-off and groundwater.

The water discharge activities to be undertaken are described in detail within **Section 4** of this technical supporting document. The discharges will be made from nine outlets and will comprise either treated surface water run-off or groundwater, or both, from various parts of the construction site (as described above). The receiving watercourses for the discharge of treated surface water and potential groundwater include the Leiston Drain (main river), Sizewell Belts (a tributary of Sizewell Drain), Upstream Leiston Drain (ordinary watercourse by Aldhurst Farm), and an unnamed WMB-adopted ditch to the north of the proposed development. The Sizewell Foreshore will also receive treated surface water run-off and groundwater from the MCA via one of the nine outlets.

Separate types of licences, including ordinary watercourse consents, abstraction licences, and FRAPs, may also be required for the proposed activities to take place during the construction phases of the proposed development. These are beyond the scope of this application and have been / will be applied for separately with the relevant environmental regulators.

The 'temporary dewatering from excavations to surface water' Regulatory Position Statement (RPS 261) is not applicable to some of the proposed discharge activities as they will last longer than three consecutive months, they are within 500 m upstream of a SSSI, and it does not apply to discharges to ground or groundwater. This may however be used for other discharging activities on site but only in cases where all conditions within the RPS can be met. Records will be maintained on site where the RPS has been used.

The groundwater exclusions listed on the GOV.UK website[7] have also been reviewed as part of assessing the need for this permit application. None of these are considered to apply specifically to the activities included within the application. Some may apply to other activities being undertaken however.

The activities being applied for under the EPR16 therefore comprise:

- 1.3.13 – Trade effluent and / or non-sewage effluent and / or rainfall related discharges to surface or groundwater with a volume greater than 5m^3/day (not requiring specific substances assessment); and
- 1.3.14 – Trade effluent and / or non-sewage effluent and / or rainfall related discharges to surface water or groundwater requiring specific substances assessment (any volume).

[6] https://www.legislation.gov.uk/uksi/2016/1154/schedule/21

[7] https://www.gov.uk/government/publications/groundwater-activity-exclusions-from-environmental-permits/groundwater-activity-exclusions-from-environmental-permits

CWDA-18 PERMIT APPLICATION SUPPORTING DOCUMENT

As part of the development of the water discharge activity permit application and this supporting document, the following GOV.UK and other best practice guidance has been followed:

- GOV.UK guidance Discharges to surface water and groundwater: environmental permits[8]
- GOV.UK guidance Risk assessments for your environmental permit[9]
- GOV.UK guidance Surface water pollution risk assessment for your environmental permit[10]
- GOV.UK guidance Groundwater risk assessment for your environmental permit[11]
- The EA's approach to groundwater protection February 2018 Version 1.2[12]
- Environmental Permitting Guidance Groundwater Activities December 2010 Version 1.0[13]
- The Ciria SuDS Manual 2015[14]
- GOV.UK guidance Temporary dewatering from excavations to surface water: RPS 261[15]
- GOV.UK guidance Groundwater activity exclusions from environmental permits[7]

In addition to this supporting document, the following application forms have been completed (please refer to **Appendix A**):

- Part A About you
- Part B2 New bespoke permit
- Part B6 Bespoke water discharge activity (including **Appendix 3 and 5** to B6)
- Part F1 Charges and declarations

Part B6.5 has not been completed as the discharge will constitute more than 20m^3/day on average.

The company applying for the permit, and who will act as 'legal operator' are Sizewell C Ltd.

[8] https://www.gov.uk/guidance/discharges-to-surface-water-and-groundwater-environmental-permits

[9] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

[10] https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit

[11] Groundwater risk assessment for your environmental permit - GOV.UK (www.gov.uk)

[12] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692989/Envirnment-Agency-approach-to-groundwater-protection.pdf

[13] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69474/pb13555-ep-groundwater-activities-101221.pdf

[14] https://www.ciria.org/ItemDetail?iProductCode=C753F&Category=FREEPUBS

[15] https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water

2.4.1 Duly Making Information

The below section outlines the questions from the above-mentioned application forms and pinpoints which section of this supporting technical document (where relevant) contains information to support the duly making process. The application forms themselves also signpost relevant sections of this document.

Table 2 - Duly Making Information

Application Form Question Reference	Location of Required Information within Permit Application
Part A About You	Refer to application form only.
Part B2 New bespoke permit	
Question 1 About the permit	Refer to application form only.
Question 2 About the site	2a. Refer to application form. 2b. Water discharge activity and groundwater discharge activity (however the EA form only allows one option to be selected). See Section 4.3 below for all activities being applied for. 2c. Not applicable. 2d., 2e., 2f., 2g. – Refer to application form. 2g. Not applicable.
Question 3 – Your ability as an operator	3a. 3b. 3c. Not applicable. 3d. Refer to application form and Section 8 below.
Question 4 – Consultation	N/A to water discharge activities.
Question 5 – Supporting information	5a. Refer to Appendices B-J. Only information currently available at the time of writing the application has been included. Therefore, some aspects may not be included where they are still subject to final design and contractor appointment. This will be provided to the EA once known. 5b. Not applicable (applies to installations, waste operations and mining waste operations only). 5c. Section 1 (above). 5d. Not applicable to water discharge / groundwater activities.
Question 6 – Environmental Risk Assessment	See Section 6 below.
Part B6 New bespoke water discharge activity	
Question 1 – About the effluent	Table 1 See Section 4.3 below. 1a. and 1.b See Section 4.3 below.

	1c. Refer to application form only. 1d. We have secured option agreements with the majority of landowners affected by the project, within the DCO order limits. To undertake enabling/ intrusive works the option agreements will be exercised which will result in acquiring the freehold or leasehold of the land. This will be aligned to the delivery programme requirements. All required permissions are expected to be in place at the time of discharge and no discharge or dewatering activities will take place until permissions are secured.
Question 2 – About the effluent – how long will you need to discharge the effluent for?	2a. – 2d. Refer to Sections 4.4 through to 4.12 below for proposed discharge start dates and anticipated durations. These differ for each discharge activity. The earliest anticipated discharge start date has been referenced on the application form itself. The discharge activities will also all have different end dates. These will be notified to the EA as construction sequencing is further understood and as works progress. Only some of the discharge outlets are required for the full construction period while others are only required for shorter-term durations. The discharge will be intermittent as it is rainfall-derived and dependent upon when groundwater dewatering activities take place in some locations.
Question 3 – How much do you want to discharge?	3a. Not applicable as the discharge does not relate to a discharge of sewage effluent containing rainwater. 3b. Refer to sections 4.4. through to 4.12 below. The maximum volumes of discharge differ for each proposed activity. The anticipated **maximum** volumes of discharge have been provided within this application. 3c. – 3f. Refer to Sections 4.4. through to 4.12 below. As with anticipated discharge volumes, the rates for the proposed discharge and groundwater activities vary depending on the discharge stream. The **maximum** flow rates and means of how flow will be controlled are provided.
Q4 – Intermittent Sewage Discharges	Not applicable.
Q5 – Should your discharge be made to foul sewer?	Refer to application form and Section 4.2.1 below.
Q6 – Should your effluent be treated?	6a. Refer to application form. 6b. Refer to application form and Section 5 below. 6c. Refer to application form and Section 7 below.
Q7 – What will be in the effluent?	7a. No – Refer to application form.

	7b. No - Refer to application form. 7c. Yes – Refer to Section 6 below supporting Environmental Risk Assessments in Appendices K-P. 7d. No – Refer to application form. 7e. Refer to Sections 5 and 6 below supporting Environmental Risk Assessments in Appendices K-P. 7f. and 7g. Refer to application form and Section 5.3.7 below.
Q8 – Environmental risk assessments and modelling	8a. and 8b. Not applicable. 8c. and 8d. Refer to Section 6 below and **Appendices M, N and O**. 8e. Refer to Section 6 below. 8f. Refer to Section 6 below and **Appendix L**.
Q9 – Monitoring arrangements	9a. Not applicable. 9b. See Section 7 below. This contains the NGR for each discharge stream effluent sampling point. 9c. No – refer to application form. 9d. See Section 7 below. Flow monitoring requirements expected to be confirmed upon determination of permit. NGRs cannot be provided until this is confirmed if required. Refer specifically to Section 7.3 and 7.4. 9e. 9f. 9g. No – refer to application form. 9h. Refer to **Appendices B-J**. 9i. Yes – refer to application form.
Q10 – Where will the effluent discharge too?	10a. Refer to Section 4 below. Discharge will be made to non-tidal river **and** onto land. 10b. Yes – see Section 4 below. 10c. Refer to Appendices B to J.
Appendices to Part B6:	For Discharge Stream A, **Appendix 3** has been completed (Discharges onto land). For Discharge Streams B-I, **Appendix 5** has been completed (Discharges to non-tidal river, stream or canal)
Part F1 – Charges and declarations	Based on the activity references, which have been confirmed with the EA during the Pre-Application stages, the fee for the permit application amounts to £45,396.50. Alternative payment arrangements have been made (as identified on the application form – see added text). These again have been agreed with the EA during Pre-Application stages.

2.4.2 Pre-Application Regulatory Engagement

Pre-application discussions and regulatory engagement sessions have taken place to support this permit application. The permit reference for these discussions is EPR/RP3820SH/A001 (allocated 23/11/2023). These have involved meetings with EA officers within the National Permitting Centre and associated departments including Ground and Water and the SZC Project Team to ensure that the scope and supporting information associated with this application meets all the relevant regulatory requirements. Records of engagement sessions have been maintained throughout the preparation for this permit application. The Pre-Application discussions have helped to ensure that all the required information is contained within the permit application and this supporting document.

3 SCOPE OF PERMIT APPLICATION

This section of the supporting document outlines the construction activities that are anticipated to take place in the early construction phases and parts of the site subject to this permit application. It seeks to provide context to the proposed discharge activities and associated management and treatment requirements. Final designs are still in development and construction contractors have yet to be appointed in some cases, therefore, the below information has been based on draft construction methodologies, through early contractor involvement, and design information available at this stage of the project and may, therefore, be subject to some degree of change. The EA, and other regulators, will be kept informed of any design or other project-related information changes that could impact upon the proposed discharge activities within the scope of this permit application, as necessary. However, the discharge locations and receiving receptors are not anticipated to change.

The construction programme (from a surface water / groundwater management perspective) will be split into an early enabling works phase, and then a longer-term construction phase. The enabling works are required to prepare the site for the main construction works associated with the proposed development to take place (e.g., earthworks, topsoil stripping, access routes, material storage). This permit application relates to discharges which are expected to be required as part of the enabling works during the first two years (approximately) on site. Some of the discharge activities will be required to extend beyond the first two years, while others are likely to take much less time. More information on anticipated discharging durations is included in **Section 4** below.

3.1.1 Permit Application Scope

The scope of this permit application includes the below discharge / dewatering activities only:

- Discharge of rainfall-dependent surface water run-off and groundwater from the MCA to the Sizewell Foreshore via a TTMO) at Outlet EO1.
- Discharge of groundwater to surface water (Leiston Drain) from dewatering activities required for the installation of a crossing over the Sizewell Marshes SSSI at Outlet DWO1.
- Discharge of rainfall-dependent surface water run-off from the northern section of the TCA to an unnamed ditch running into WMB drain (DRN163G0101) at Outlet O5 (via the Marsh Harrier Habitat).
- Discharge of rainfall-dependent surface water run-off and groundwater (from overbridge piling and shallow excavations) from AD6 to the Leiston Drain watercourse at Outlets O6a, O6b and O6c.
- Discharge of rainfall-dependent surface water run-off from the ACA Water Management Zone (WMZ) basin to the Sizewell Drain (via Sizewell Belts tributary) at Outlet O7.
- Discharge of rainfall-dependent surface water run-off and potentially groundwater (from shallow excavations) at AD6 to an upstream section of the Leiston Drain (referred to as 'Upstream Leiston Drain') at Outlet O8a.
- Discharge of rainfall-dependent surface water run-off from WMZ 8 at Outlet O8 to the Leiston Drain.

Each of the above-listed activities are explained in more detail below. Some of the above outlets that are included in the scope of this application will also be used as part of the second, longer phase of construction. This has been identified in **Section 4** further below, where known at this stage.

3.1.2 Discharges Excluded from this Permit Application

Future water discharge activity permits (in addition to this application) will be required to support construction of the proposed development, or potential variations to this permit (if successfully determined). These have not all been included within the scope of this permit application as they are not required until later phases of construction and therefore only limited design and construction sequencing information is currently available. The future activities that may also require permitting from a water discharge activity include:

- Additional construction-related surface water run-off discharges associated with the rest of the TCA and MDS (not anticipated to be required until after the initial 18-24 months of construction)
- Groundwater dewatering associated with the installation of the CDO in the MCA and cut off wall.
- Foul water discharges from welfare facilities. These will be tankered off-site during the early construction phases and as such are not considered within the scope of this permit application; however, this could change in the future and they may be required to discharge to surface water (following treatment at on-site package treatment works facilities).
- Commissioning related discharges for the proposed development.

Operational phase discharges are excluded from the scope of this permit application.

3.1.3 Source of Planned Discharges

The below sections describe the construction works taking place in the area of the proposed discharge activities while **Section 4** summarises each proposed discharge activity in more detail with regards to the effluent characteristics. The two below bullet points provide a very high-level description of the sources of planned discharges covered in this permit application:

- Site drainage – comprising rainfall-dependent surface water run-off from construction areas, including for example temporary or permanent hardstanding, stockpile areas, fuel and chemical storage areas, vehicle and plant parking areas.
- Groundwater dewatering – certain discharge streams will contain quantities of groundwater, encountered either through activities required for installation of sub-surface structures (such as bridge foundations or the desalination shaft), or in excavations (if shallow groundwater is present).

3.2 Summary of Construction Activities by Discharge Location

3.2.1 MCA Construction Activities – TMO and desalination shaft dewatering discharges to Outlet EO1

The MCA lies mostly to the east of Sizewell Marshes SSSI, with part of the SSSI extending to cover the northern boundary of the MCA. The existing ground largely comprises an area of mostly flat grassland, with the southwest corner occupied by existing Sizewell B infrastructure. To the north lies Dunwich Forest, to the west is Sizewell Belts Nature Reserve and Marshes and to the east is the Suffolk Coast Path and North Sea. The MCA is where the main nuclear islands and associated operational infrastructure will be sited for the proposed development. This will include, during construction, the installation of a shaft intake pipe for a desalination

plant (which may be sited in the TCA to the north of the MCA). The shaft will be constructed within the boundary of the MCA however. At a later stage, the MCA will also house the CDO.

The desalination plant is required to provide a temporary supply of water to the site during the construction phase. The intake tunnel for the pumping station requires the construction of an intake shaft which will involve the small quantity of dewatering within the MCA. The intake shaft will be constructed using a wet caisson technique. It is anticipated to be installed at an approximate depth of 21 m below ground level. During the installation of the shaft, the water level within the shaft will be maintained at a level slightly above that of the surrounding groundwater by adding water into the shaft artificially. This will help to ensure the stability of the surrounding material being excavated through and that of the structure during the excavation and to limit groundwater ingress during the excavation. Once the final excavation level is reached, a mass concrete base plug will be tremied into place. The remaining water in the shaft will then be removed via pumps located within the caisson structure to allow for remaining construction works.

In addition to the installation of the desalination shaft intake pipe, other construction activities due to take place within the MCA during the early enabling period include establishment of construction area (main platform), the initial coastal defence feature, laying of construction roads and construction of the SSSI crossing (see below).

During the early enabling works period, the discharge sources from the MCA will therefore comprise:

1. Rainfall-dependent surface water run-off from the area of the MCA itself; and
2. Groundwater, anticipated to be encountered during the installation of the desalination plant shaft. This will only comprise a temporary short-term dewatering exercise to remove water from the shaft itself. The water removed from the shaft will be a mix of groundwater and water introduced to maintain a positive head.

3.2.2 SSSI Crossing Foundations – Outlet DWO1

A permanent causeway will be constructed to provide access to the MCA from Goose Hill to the north-west of the site of the proposed development. This will cross over the Sizewell Marshes SSSI. The source of the discharging associated with this part of the works will be the temporary discharge of groundwater expected to be encountered during the installation of piles (pile cap dewatering) to support the SSSI crossing foundations and shallow groundwater arising from the base and sides of a sheet piled cofferdam that is proposed to be installed.

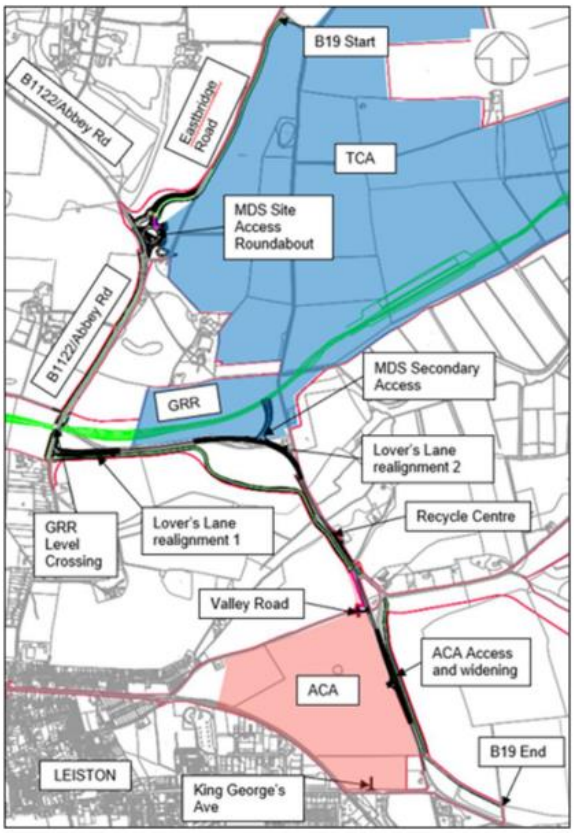
3.2.3 Northern TCA – Outlet O5

Outlet O5 will be located in the very northern section of the TCA. The TCA is located primarily to the north and west of the MCA and the area will be used to support works in the MCA primarily by housing a number of facilities required for the construction period, including for example an accommodation campus, rail terminal and construction contractor compound areas. The TCA is currently an agricultural greenfield site bounded by grassland on each side. To the north of the TCA is the Marsh Harrier Habitat area which was created as part of compensatory habitat under the wider proposed development planning requirements. The catchment area serving Outlet O5 will encompass part of a haul road and will be predominantly made up of proposed borrow pits (to provide granular material for construction purposes and receive excavated material from the main platform) and stockpile areas. The Outlet O5 will serve as an overflow outlet required for intermittent discharges under certain weather conditions (i.e., when infiltration directly into the Marsh Harrier Habitat is not feasible).

3.2.4 AD6 Construction Activities – Outlet O6a

AD6 refers to 'Associated Development 6' which forms part of the proposed development by providing offsite highway improvements, considered separate from the MDS. This part of the project is located to the west of the MCA and Sizewell Marshes SSSI. The AD6 works consist of the upgrading and modification of the existing highway directly adjacent to the power station site, to the north / north-west of Leiston, to accommodate traffic during the construction phase of SZC. They also include the construction of a new diversionary bridleway (referred to as Bridleway 19 or BR19), to enable the removal of the existing bridleway located within the TCA. The modifications are permanent and will be adopted as part of the highway network by SCC. The works will modify local roads to provide access into the MDS ACA and TCA. It will also modify part of the existing road network to accommodate the GRR level crossing of Abbey Road. **Figure 6** below shows the location of the proposed construction works that are part of AD6.

Figure 6 - AD6 Proposed Construction Works



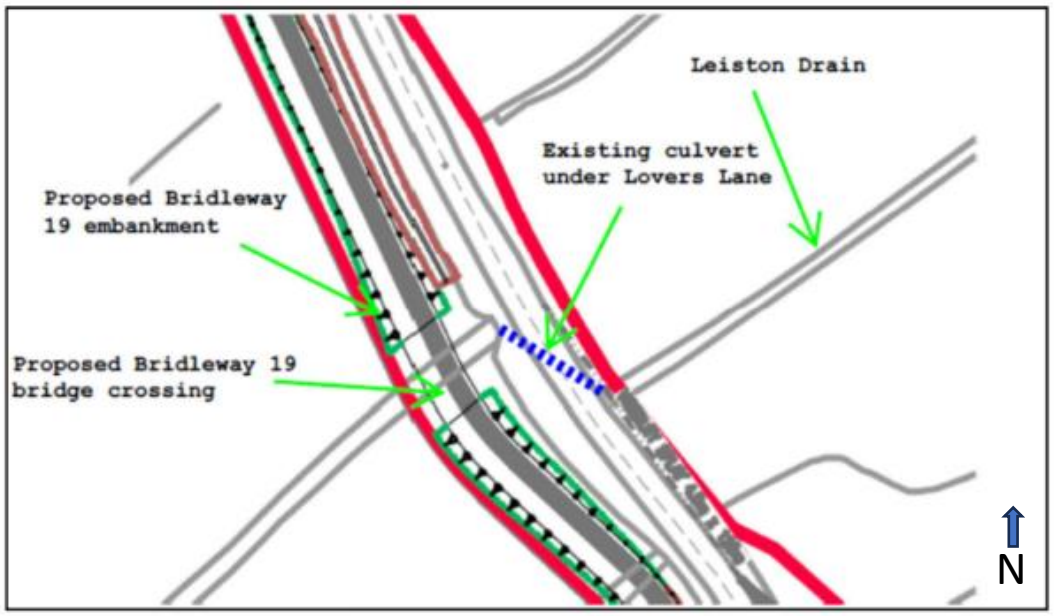
Where uncontaminated surface water run-off or groundwater cannot be infiltrated to ground (with no treatment or intervening use), it will be required to be discharged to watercourse. This is proposed to take place via the permanent surface water drainage systems that will be constructed as part of the modification / upgrade works to the permanent highway and bridleway. These will be constructed in accordance with SuDS methodologies, as described in **Section 4** below. Only the construction activities which will require the discharge of groundwater or surface water run-off to watercourses (to Upstream sections of Leiston Drain and the Leiston Drain main river itself) are included within the scope of this permit application.

In total there will be four different outlets within the scope of the AD6 construction works within this permit application: O6a, O6b, O6c and O8a.

The AD6 construction works that will discharge to Outlet O6a are anticipated to include:

- Lover's Lane Realignment: Lover's Lane is to be re-aligned along approximately 200 m to provide access to the TCA that is required as part of the wider site development. This will require the construction of sections of new pavement, removal of sections of existing pavement and the installation of a surface water drainage network consisting of carrier drains, filter drains, inspection chambers and swales. These works are currently anticipated to begin in November 2024 (subject to final programming and construction sequencing arrangements being determined). An area of permeable granular hardstanding is expected to be constructed adjacent to the works area to provide materials storage and space for welfare units / plant and minibus parking. The new, permanent, surface water drainage system being implemented will discharge into the Leiston Drain. This will therefore be constructed first and used for the discharge of construction related surface water run-off / groundwater (if encountered from shallow excavations). Refer to **Section 4** below for further information on proposed discharging activities.
- Leiston Drain Overbridge Crossing: A bridge for the new BR19 is to be constructed over the Leiston Drain watercourse, parallel to Lover's Lane (see **Figure 7** below). The structure is anticipated to consist of 3 x 20 m spans formed from precast beams placed on piled reinforced concrete piers. It is anticipated the piles will be installed using the continuous flight auger (CFA) method. The piling works have the potential to generate groundwater through augering, which may result in excess water being brought to the surface. It is the intention that this groundwater will be directed across the working piling platform by sandbag bunds into sumps for removal by submersible pumps into a settlement tank system before being discharged into the Leiston Drain via Outlet O6a. As above, it is anticipated that works will begin from 1st November 2024 (subject to final programming and construction sequencing arrangements being determined). Once the piles are installed, excavations will be made to allow for the cropping and casting of the pile caps. Groundwater is anticipated to be generated; if this is likely to be >20m^3/day, a separate abstraction licence will be applied for (outside the scope of this permit application). The pile design is still under development at the time of preparing this permit application while the results of further ground investigation works are obtained.

Figure 7 - Proposed Leiston Drain Overbridge Crossing



Separate to the AD6 phase of works described above but nonetheless relevant to this permit application (and Outlet O6a) is the construction works associated with part of the TCA that will drain to a catchment area referred to as WMZ 6. SuDS drainage networks in this area (which will consist of filter drains, cut off drains and swales) are proposed to discharge to an infiltration basin (WMZ 6 basin) located to the south of the catchment. Due to anticipated infiltration rates (based on infiltration testing carried out to-date), the basin will be required to have an overflow outlet which may be used under certain conditions (e.g., during storm events when rainfall rates are much higher). The need for this has been identified through modelling, as described in **Section 4** below. It is therefore proposed that the overflow will be connected to the O6a outlet that will discharge to the Leiston Drain near Lover's Lane. Outlet O6a will therefore take run-off from the newly constructed BR19 (as part of the permanent highway drainage design) and also temporarily take surface water run-off, when required, from WMZ 6, as part of construction works in the southern TCA. This has been reflected in proposed discharge rates and volumes presented in **Section 4** below.

3.2.5 AD6 – Outlet O6b

The AD6 construction works that will discharge to Outlet O6b are anticipated to include:

- Leiston Drain Overbridge Crossing: As described above, an overbridge is due to be constructed to enable bridleway access over the Leiston Drain watercourse. The groundwater anticipated to be encountered (as described in Section 3.2.4 above) during installation of the overbridge piles is proposed to be pumped to Outlet O6b, well as O6a, to enable discharge of the groundwater from either side of the bridge works. The same approach will be applied to both outlets as described above.
- Valley Road and associated BR19 works: The existing Valley Road junction is to be reconstructed to provide two new vehicular access points to the wider proposed development. This will require installation of new sections of pavement and surface water drainage (as part of the permanent design). A section of BR19 running down from Valley Road will be constructed first to provide a route for the permanent surface water drainage from Valley Road to discharge into the Leiston Drain at Outlet O6b. A small area of granular hardstanding will be constructed adjacent to the works area off

Valley Road to provide space for materials storage, welfare units and plant parking. As with Outlet O6a above, alongside the surface water run-off, any groundwater encountered in shallow excavations is proposed to be discharged into the permanent surface drainage system which will discharge into the Leiston Drain, where the RPS 261 or other exemptions cannot apply. Quantities are anticipated to be minimal.

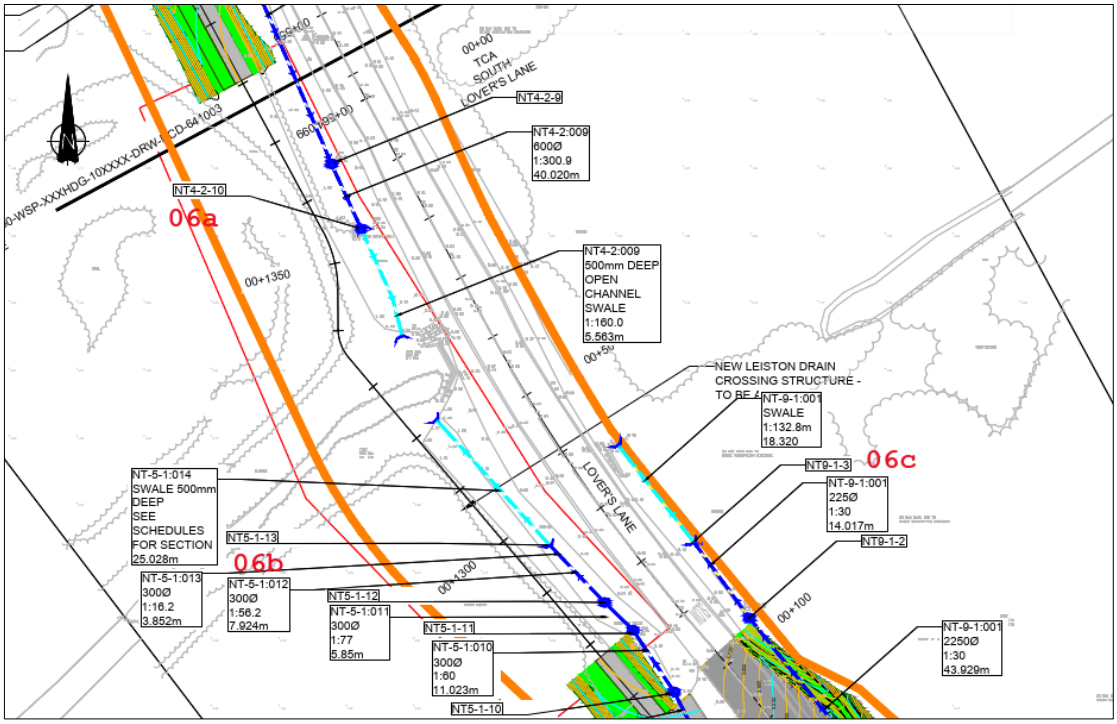
3.2.6 AD6 – Outlet O6c

The AD6 construction works that will discharge to Outlet O6c are anticipated to include:

- Lovers Lane Junction Improvements at Household Waste Recycling Centre (HWRC): The junction which leads into an existing HWRC on Lover's Lane is to be widened to improve access. Construction of this is anticipated to begin in November 2024. This will require the installation of new sections of pavement and surface water drainage system, including the culverting and regrading of the Lovers Lane Ditch (WMB ordinary watercourse) Surface water run-off from the junction reconstruction works is proposed to be discharged to the Leiston Drain watercourse via the surface water drainage system. Given the limited space in this area for the works to take place, any groundwater encountered in shallow excavations is proposed to also be discharged into the permanent works surface drainage system where the RPS 261 or other exemptions cannot apply. The maximum depth of excavations for the drainage works required for the reconstruction of the junction by the existing HWRC is anticipated to be approximately 2.5 m below existing ground level.

Figure 8 below shows the location of Outlets O6a, O6b and O6c described above. The below drawing is a screenshot from a detailed design drawing. No key has been included as the only elements of the drawing relevant to this permit application are the outlets labelled in red text. The remaining aspects of this drawing may still be subject to final design changes.

Figure 8 - AD6 Discharge Outlets O6a, O6b and O6c



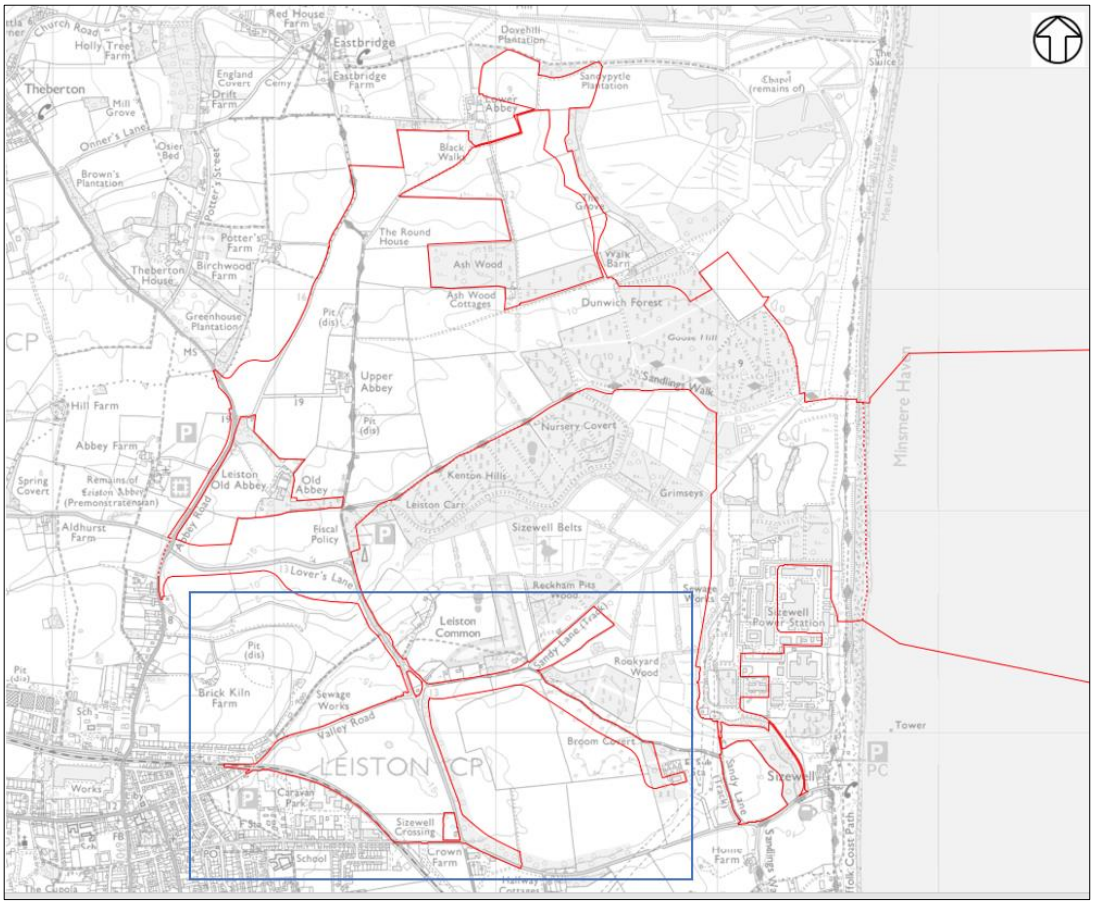
3.2.7 ACA – Outlet O7

The ACA is currently a greenfield site used for agricultural purposes. It is located immediately north-east to the town of Leiston and is bounded by Valley Road, Lover's Lane, King George's Avenue, and an existing railway line. The land is proposed to be used as a multi-purpose site to support the wider proposed development, with the following facilities expected to be present:

- Caravan pitches to house approximately 400 caravans to provide temporary contractor accommodation.
- Heavy goods vehicle (HGV) parking for contractor vehicles.
- Material stockpile areas, including a sand and aggregate stockpile area, a topsoil stockpile, and material transfer laydown area.
- Park and ride and logistics compounds to allow transportation of staff to the main works areas.
- A rail-head central to the site to provide access for deliveries to site via rail.

The ACA is isolated from the TCA and MCA (see **Figure 9** below) and therefore has an independent surface water drainage network to that serving the main construction site. The below figure has been included to show the location of the ACA in relation to the wider proposed development within the DCO Red Line Boundary. The approximate area of the ACA is shown by the blue boundary.

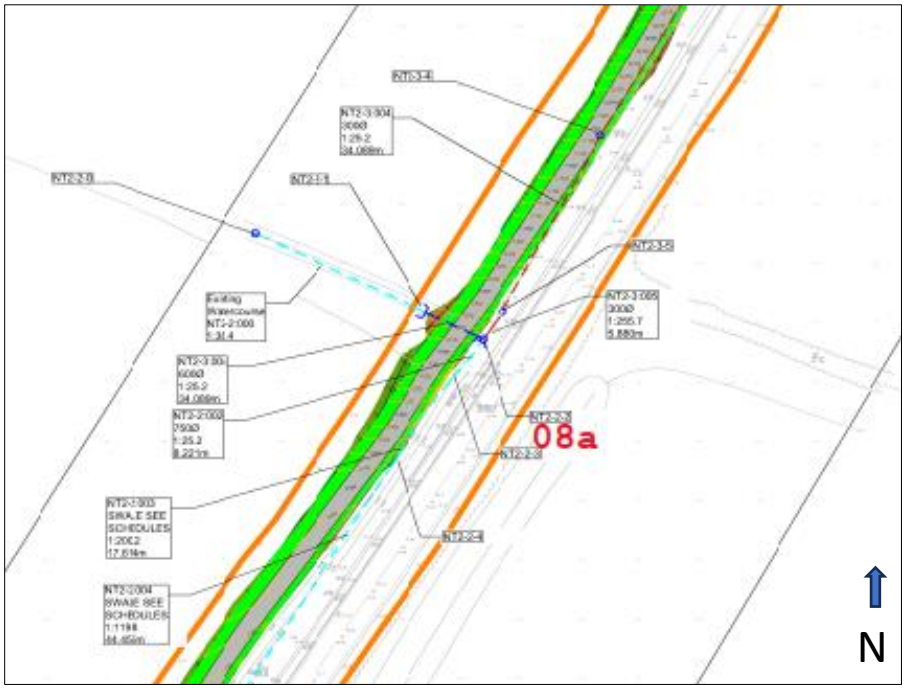
Figure 9 - Ancillary Construction Area Site Location



3.2.8 AD6 – Outlet O8a

Outlet O8a is the location where drainage from the completed highway / BR19 will outfall into the Upstream Leiston Drain (prior to the point at which the watercourse becomes a main river). The location of the outlet is by Aldhurst Farm and, as per Outlets O6a, O6b and O6c above, it is proposed that this is used for management of construction related surface water run-off and groundwater (if encountered from shallow excavations). The location of the Outlet in relation to part of the design for the AD6 route is shown in **Figure 10** below.

Figure 10 - Outlet O8a Discharge Location



The AD6 construction works that will discharge to Outlet O8a are anticipated to include:

- MDS Roundabout and Abbey Road BR19: The works taking part in AD6 at these locations include the development of a new roundabout for the MDS and BR19 highway route, to provide access to the proposed development. The construction sequencing is largely shaped by installation the permanent surface water drainage system that is being implemented for the highway network first and then using this during remaining construction works. Surface water run-off that will be generated on this part of the scheme is proposed to be discharged into an Upstream section of the Leiston Drain (referred to through this document as 'Upstream Leiston Drain'), which is located by Aldhurst Valley Farm and is classed as an ordinary watercourse. From here, the discharge will follow the route of the Leiston, via a re-aligned section of the watercourse, at the southern end of Abbey Road. Separate consents are being applied for the re-alignment and culvert works which are outside the scope of this permit. The outfall and main pipe run from the MDS Roundabout along Abbey Road will be constructed prior to all other works being undertaken as part of AD6 to provide a route for surface water run-off to be discharged. The drainage run will consist of new surface water carrier and filter drain pipework, inspection chambers and swales. Surface water run-off will be collected in an attenuation basin west of Abbey Road prior to entering the drainage system on Abbey Road for discharging to the watercourse. The drainage system will be constructed from the downstream outlet working northward

along Abbey Road towards the MDS Roundabout. A temporary haul road will also be constructed from aluminium matting between Abbey Lane and the MDS Roundabout to facilitate the permanent drainage works and BR19 works.

3.2.9 Green Rail Route Water Management Zone (WMZ) 8 - Outlet O8

A GRR is being constructed as part of the wider proposed development as the project will require the delivery of substantial amounts of construction materials by rail. The area where the GRR is to be developed is currently an agricultural greenfield site bounded by Abbey Road and Abbey Lane to the north-east. The site extends through Buckleswood Road to the south-west to connect to the existing railway line. The site is approximately 15 hectare in area. The rail proposals comprise a temporary rail extension west to east rail route that would connect the existing Saxmundham to Leiston branch line to the SZC MDS, known as the rail extension route, and upgrades to the existing Saxmundham to Leiston branch line.

There is a need to incorporate this area into the permit application as there is the potential for rainfall-dependent surface water run-off to be contaminated with suspended sediment and hydrocarbons from the construction earthworks required to develop the railway embankments and tracks. The run-off within this construction area will be directed, via a network of SuDS swales and ditches, to an attenuation basin referred to as WMZ 8 (or the Abbey Road WMZ). WMZ 8 will then have a discharge outlet (Outlet O8) which goes into the re-aligned section of the Leiston Drain (for which separate consents will be applied for as necessary, as described above). Additional treatment measures may be required as described in **Section 5** of this technical supporting document. Refer to **Appendix B** which shows the location of the GRR area and Outlet O8.

4 PROPOSED WATER DISCHARGE ACTIVITIES

This section describes the proposed discharge and dewatering activities that will be required as part of the construction works outlined in **Section 3** above and that are therefore covered within the scope of this permit application. There are nine discharge and / or dewatering activities being applied for. These will comprise the discharge of rainfall-dependent surface water run-off and / or groundwater, from either shallow excavations or associated with installation of specific construction elements.

4.1 Overview of Drainage Design Principles and Methodology

A Drainage Strategy[2] for the proposed development was submitted and approved as part of the DCO process that was undertaken. This outlined the overarching principles that will be applied toward the management of surface water run-off and groundwater during both the construction and operational phases of the proposed development. Overall, it is intended that, where possible, water will be retained within the site (to limit disruption to the background water levels and flows) and that this will be achieved through infiltration of run-off back to ground (without intervening use). SuDS methods (as discussed further below) will be applied. The outlets therefore being applied for within this permit application are intended to be used only as and when required, for example when infiltration rates are less due to periods of prolonged rainfall and saturated ground conditions.

The key aspects that were considered in the development of this approach and the wider Drainage Strategy included:

- How to control the quantity of surface water run-off from a flood risk perspective (so as not to cause any likely increases in terms of flood risk);
- To avoid adverse impacts in terms of the background water levels within the Sizewell Marshes SSSI and aim to mimic natural hydrological processes;
- To take into consideration proximity of any protected species / habitats (as demonstrated in the accompanying HRA to the permit application); and
- To manage the quality of the run-off to prevent pollution to receiving environments.

In summary, the following principles apply to the drainage methodology:

- Design methods and principles from the CIRIA SuDS Manual[3] will be incorporated where possible to avoid or reduce the need for discharges of surface water run-off and groundwater to receiving watercourses. The SuDS Manual is considered best practice with regards to managing surface water run-off.
- The SuDS hierarchy presented below has been applied, where feasible:
  - Store rainwater for later use (e.g., rainwater harvesting);
  - Use infiltration techniques (e.g., porous surfaces);
  - Attenuate rainwater in basins or open water features for gradual release to agreed waterbodies through outfalls;
  - Attenuate rainwater by storing in tanks for gradual release to agreed waterbodies through outfalls; and

- Discharge rainwater direct into watercourse or sea.

- Where surface water is proposed to be infiltrated to ground, infiltration rates have been confirmed through on-site testing. Where surface water cannot be discharged via infiltration, it will be treated and discharged to existing watercourses (as explained in the below paragraph) or to the Sizewell Foreshore.
- The overall surface water drainage design aims to retain the existing undeveloped site drainage conditions by infiltrating surface water to ground where possible. The aim of this is to maintain groundwater recharge as the Sizewell Marshes SSSI is sensitive to changes in groundwater levels.
- Maximum discharge rates have been defined as greenfield run-off rates, calculated by catchment areas (as agreed at the DCO submission stage, see specifically Section 3.0.13 of the Drainage Strategy[2]). Where discharge is made to the Foreshore, the rate will be dependent on the level of treatment required and the capacity of the treatment system.
- SuDS have been prioritised to aid pollution control. The primary pollutant of concern from construction sites is silt / sediment, or suspended solids. The drainage design has been developed such that SuDS are proposed for treatment, maintenance and sustainability benefits, in so far as can be practicable. The methods proposed will provide pollution control and aim to mimic the existing drainage characteristics to prevent impact on designated habitats. Where reliance on SuDS alone is not considered to be effective, for example due to the presence of other parameters in addition to suspended solids, or due to specific on-site characteristics (such as geological or hydrogeological conditions), additional treatment methods will be incorporated and discharge to receiving watercourses or to ground.

The proposed activities requiring permitting are explained in **Section 4.3** further below. Information on proposed treatment methodologies associated with the discharge and dewatering activities are then described in **Section 5**.

4.1.1 Drainage Design Criteria

The Drainage Strategy set out the strategic design criteria that has been incorporated with regards to water management (during both construction and operation). This has been reiterated below to aid with the understanding of the drainage design principles that were followed to inform the proposed discharge activities.

The below criteria were submitted for approval under specific requirements of the DCO (Requirements 5, 23 and 35) (Section 3.2.0 of the Drainage Strategy[2]):

1. Discharge and Volume criteria

    - Drainage facilities to provide no surface water flooding from a 1 in 30-year return period rainfall event, in accordance with accepted guidelines, combining a range of techniques e.g., infiltration systems, permeable paving, and surface drainage structures to remove water from paved or semi-paved surfaces (e.g., storage areas) with no ponding for a 1 in 30-year rainfall event.
    - Store or safely convey the run-off from exceedance storm events greater than the 1 in 30-year return period, without putting public or property at risk.
    - Reduce, if possible, or at least not increase, the pre-development risk of flooding.
    - Determine the impact and store on site the volume of water generated from a 1 in 100-year plus climate change rainfall event to prevent escape into adjacent areas.

2. Water quality criteria
    - Remove / treat any contaminants within surface water run-off before discharge.
3. Amenity and ecology criteria
    - Provide amenity and ecological enhancement, if practicable.
4. Sustainability criteria
    - Protect the environment, minimise the use of finite natural resources and energy and provide value to those involved in its design, construction and operation.

4.1.2 Rainfall Return Periods

The SuDS Manual[3] specifies that when discharging run-off from to surface waters, SuDS should be designed to intercept run-off and any associated pollutants, such as silt, for most rainfall events up to approximately 5 mm in depth. When run-off does occur, treatment within SuDS components is essential for frequent rainfall events, for example up to a 1 in 1-year return period event, where contaminants may be mobilised and washed off impermeable surfaces, and the aggregated contribution to the total pollutant load to the receiving waterbody could be greater. For rainfall events greater than the 1 in 1-year event, where larger volumes of surface water are generated, it is likely that the dilution available in the receiving waters will be increased, and environmental risks of pollution will be reduced, however treatment will still be applied to the run-off. Details on the specific treatment trains and pollution prevention measures being incorporated into the proposed discharge activities are set out in **Section 5** further below.

Table 3 below sets out the rainfall return periods that have informed the design of the proposed drainage systems on site.

Table 3 - Surface Water Drainage Parameters

Return Period (years)	Drainage Criteria	Description
1	No surcharging above outfall soffits	The highest probability event to be specifically considered to ensure that flows to the watercourse are tightly controlled for frequent events. This criterion aims to ensure the morphological conditions in the stream remain the same.
30	No surface flooding	A useful intermediary event for which to assess on-site system performance, because of its relevance for industry standard design. Surface water will be accommodated within SuDS structures. However, it will be ensured that the surface water level within the structure remains 0.3m below the top of the structure.
100	Controlled flooding to sacrificial external areas	Represents the boundary between high and medium risks of fluvial flooding defined in the National Planning Policy Framework. This limit recognises that it is not practicable to fully limit flows for most exceedance events. Overland flow will be managed through existing and proposed surface

		topography to ensure that flood flows are directed away from critical site infrastructure.
>100	Exceedance event	When the capacity of the surface water drainage network is exceeded, surface water run-off will cumulate on the surface and be removed by overland flow to lower areas.

Proposed drainage systems utilising the various SuDS techniques (as described further below) will be designed to accommodate the predicted flows for all rainfall return periods listed in the above table. Industry standard MicroDrainage modelling has been used to assist the design of the SuDS methods that will be incorporated (alongside any below ground pipework). Following the Flood Studies Report (FSR) method, which used Sizewell, Suffolk, as the location, an M5-60 and 'r' ratio of 18.2 mm and 0.4 respectively, has been used to predict the various storms in which the drainage infrastructure will be subject to, including varying storm intensities and return periods. The FSR has been used as this is considered more suited to the short duration, high frequency rainfall events that are important for system design. For system simulation, methods from the Flood Estimation Handbook (FEH) website service[16] have been used as analysis has shown that, for this location, these rainfall models generate greater rainfall volumes than FSR for the longer duration, more extreme rainfall events.

For the proposed discharges to the Leiston Drain in AD6, a desktop FEH catchment assessment was undertaken to estimate flow rates in the watercourse at its point of issue and the tributary watercourse (Upstream Leiston Drain) at Aldhurst Farm / Abbey Road. The assessment was used to inform the permanent highway drainage design which will also be used for the management of run-off and groundwater generated during construction.

4.1.3 Attenuation

Proposals for attenuation structures have been designed to cater for the 100-year critical event, with an additional climate change allowance (as described in **4.1.5** below). The rate of discharge to any watercourse will be limited to the equivalent greenfield run-off rate for the site, as appropriate to the existing undeveloped conditions, via the provision of storage and / or flow restrictors (e.g., hydro-brakes or similar). This was agreed at DCO stage (Section 2.2.16 of Drainage Strategy[2]). Flow control systems will constrain the rate of discharge, and attenuation storage will be employed when the rate of inflow from the storm run-off is greater than the subgrade infiltration rate or greenfield run-off rate.

4.1.4 SuDS and Infiltration

SuDS will be designed in accordance with the CIRIA SuDS Manual[3] (as described above). To ensure systems readiness to deal with a rainfall event, any infiltration or discharge rates from the systems will be sufficient so that any attenuation storage becomes half empty within 24 hours. Where practicable, soakaways will be placed to ensure that the seasonally high groundwater table is at least 1 m below the base of the soakaway. Infiltration systems will also be installed a minimum of 5 m away from any foundations or other underground structures.

Sufficient inspection and maintenance will be undertaken during the life of SuDS features, throughout both construction and operation of the development once complete.

[16] Home Page - FEH Web Service (ceh.ac.uk)

Infiltration is being used where viable across the site. This is in accordance with the SuDS hierarchy highlighted above and is the approach that was submitted, and accepted, at the DCO stage of the proposed development (Section 2 of the Drainage Strategy[2]). To identify where infiltration is and is not considered to be viable, site-wide infiltration tests have been undertaken. For the MDS, these have been carried out as part of previous investigations in 2014 – 2021, through both trial pits and boreholes. For AD6, infiltration rates were tested at various locations along the route of the proposed scheme. Where the tests have shown that infiltration is not suitable, for example based on baseline geological conditions and soil permeability, discharge to watercourse will be required.

4.1.5 Climate Change Allowance

The Drainage Strategy for the proposed development has considered for climate change allowance when calculating anticipated discharge volumes and rates (Section 4.1.2 of the Drainage Strategy[2]). The surface water drainage network designed for the works has been designed to retain excess storm water which results from a 1 in 100-year return period plus climate change rainfall event within the site with a 40 % allowance for the permanent drainage design associated with AD6 works (described further below), and a 20 % climate change allowance for the temporary construction outlets given their temporary (up to 20 years) lifespan. This is in accordance with EA guidance (see **Table 4** below).

Table 4 - EA Guidance for Climate Change Allowance[17]

Applies across all of England	Total potential change anticipated for the '2020s' (2015-2039)	Total potential change anticipated for the '2050s' (2040-2069)	Total potential change anticipated for the '2080s' (2070-2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

Separate flood risk assessments have been completed for the proposed development however these are beyond the scope of this permit application.

4.1.6 Calculation of Discharge Volumes and Flow Rates

Discharge volumes and flow rates have been calculated based on the greenfield run-off rates provided for the catchment areas, where applicable, which was agreed at the DCO stage of the proposed development. Depending on the part of the site being referred to this has either been calculated at 2 l/s/ha or 1 l/s/ha. For groundwater dewatering volumes (e.g., at the TMO Outlet EO1, the SSSI Crossing Foundations Outlet DWO1 and the AD6 Leiston Drain Overbridge at Outlets O6a and O6b), the supporting risk assessments provided further detail on how these volumes and rates have been calculated.

For AD6, the provided volumes and flow rates take into account both construction-related run-off and groundwater alongside average and worst-case volumes of anticipated highway run-off (1 in 5 year and 1 in

[17] Flood risk assessments: climate change allowances - GOV.UK (www.gov.uk)

100 year storm events respectively). This is because the construction-related run-off and groundwater is being proposed to be discharged via the permanent highway drainage system that will be constructed first as part of the scheme.

The sub-paragraphs further below provide the **maximum** discharge flow rates and volumes for each discharge and dewatering activity within this permit application.

4.2 Receiving Receptors

The DCO Drainage Strategy (refer to **Appendix Q)** set out the overall approach toward management of site drainage, with the preferred option being to infiltrate to ground (with no treatment / intervening use) where possible to ensure that the surrounding designated sites and sensitive ecological receptors are not impacted by changing water levels and flows, for example within Sizewell Marshes SSSI. Where infiltration is not viable, for example due to underlying ground conditions or the nature of the discharge itself (i.e., requiring treatment), it will be captured and discharged to existing surface watercourses, or to the Sizewell Foreshore.

Surface water on the site currently infiltrates to ground and enters a series of interconnected local ditches and watercourses, some of which are proposed to receive the treated discharge. The receiving watercourses fall within the Leiston Beck Water Framework Directive (WFD) waterbody catchment. The area comprises two heavily modified, low energy lowland river systems; the Leiston Drain and Minsmere River. Both discharge to the Minsmere Sluice which is located to the north of the stretch of Suffolk Coast where the proposed development is situated. The sluice discharges to the North Sea; this is controlled by penstock and is dependent upon river and sea levels. Water levels are regulated within the catchment area to maintain the ecological balance within the Sizewell Marshes SSSI. Surface water levels are strongly influenced by water levels and flows within groundwater systems and furthermore the groundwater from the underlying aquifer contributes to the water balance of the Marshes.

The following features fall within the above-described site setting and are proposed to be receptors for the discharge activities included within this permit application:

- Leiston Drain, which is the main receiving watercourse (in that most of the discharge outlets in this application are proposed to enter this watercourse). Flow and water quality in the Leiston Drain is heavily influenced by the discharge of treated effluent from Leiston Sewage Treatment Works. The watercourses arises at Aldhurst Farm and then enters the site boundary via a culvert beneath Lovers Lane, where it splits into two channels (see below), one of which becomes a designated main river. From here it runs across the Sizewell Marshes SSSI in an easterly direction before turning northwards running parallel to the MCA and Suffolk coastline up to Minsmere Sluice. The Leiston Drain is a WFD designated waterbody (GB105035046271 – Leiston Beck).
- Downstream of Lovers Lane, the Leiston Drain splits into two separate channels. The northern channel is the main river (described above), while the southern channel joins an WMB adopted watercourse, Sizewell Drain (DRN163G0202). This is the primary watercourse draining the Sizewell Marshes SSSI area and is sometimes referred to as the 'Sizewell Belts' area. The watercourse flows in a northerly direction to re-join the Leiston Drain to the north of the MCA.
- Upstream Leiston Drain (also referred to colloquially as 'Upper Leiston Beck' or 'Aldhurst Valley Stream'), which arises by Aldhurst Farm on Abbey Road, comprises an ordinary watercourse which eventually becomes the Leiston Drain main river channel (described above) prior to it entering the site of the proposed development at Lovers Lane culvert.

- WMB unnamed drain (No.7 (DRN163G0101) which runs to the north of the TCA and then connects into the Leiston Drain.
- Finally, effluent from the MCA made via the TMO will discharge onto the Sizewell Foreshore, above the Mean High Water Spring tides (MWHS) level. Here it will percolate through the sand and shingle on the beach, with some of the discharge potentially reaching the groundwater beneath the beach. Under certain tidal surge conditions, the discharge from the TMO could enter the North Sea directly (which has been considered in the supporting TMO Groundwater Discharge Risk Assessment in **Appendix O**).

With regards to whether the receiving watercourses described above have flow all year round, which is a requirement to address in the EA permit application form Part B6, please see the below comments:

- The flow in the Leiston Drain is not anticipated to dry up during the year as the flow is primarily made up of discharged effluent from the Leiston Sewage Treatment Works, which serves the nearby town of Leiston. It is important to note however that the flows in the Leiston Drain are affected by the control of the Minsmere Sluice further upstream, over which SZC do not have any control. This is operated by the relevant regulator based on tidal aspects and flows from other watercourses.
- Sizewell Drain is not anticipated to dry up completely, however it may cease to flow in drought conditions. The flow rate in Sizewell Drain is difficult to measure due to weed growth, however, generally, ditches within the vicinity of Sizewell Belts have been observed as having water / being wet.
- The WMB Drain is only likely to flow for part of the year, however it may not completely dry up due to the fact it is a low-lying network that is likely to intercept the water table.

Risk assessments have been undertaken where required, in accordance with GOV.UK guidance, to consider the potential impacts of the proposed discharge activities on the receptors outlined above. These are summarised in **Section 6**.

4.2.1 Connection to Foul Sewer

As per the permit application form, Part B6, there is a requirement to consider whether the proposed discharge could be made to public foul sewer. The below table indicates the nearest known sewer distances to the proposed outfall locations.

Table 5 - Nearest (approximate) Sewer Distance

Location of Proposed Discharging Activity	Nearest (known) Sewer (m)
WMZ 7 (Outlet O7)	25 m
WMZ 8 (Outlet O8)	45 m
WMZ 6 (Outlets O6a, O6b, O6)	240 m
Outlet O8a	300 m
WMZ 5 (Outlet O5)	920 m
MCA (Outlet EO1)	2050 m
SSSI Crossing Foundations (Outlet DWO1)	2690 m

The discharge will be comprised of surface water and some quantities of groundwater generated from construction activities on the site of the proposed development only. This type of discharge is not typically accepted by sewerage undertakers as it will lead to an increase in flows requiring treatment that most existing sewerage systems in England are not designed for. Furthermore, most existing sewerage infrastructure does not have any extra capacity to take on additional, temporary, flows of discharge. The nearest sewers to the proposed activities in this permit application are maintained by Anglian Water and are located on King George's Road (by the ACA) and Abbey Road, as shown in the above table, these are closest to WMZ 7 (Outlet O7) and WMZ 8 (Outlet O8). For the other proposed outlets, there is considerable distance between some of the proposed discharging locations and the existing sewerage network. In the operational water discharge activity permit application that was made in 2020, for the proposed development (reference EPR/CB3997AD), it was determined (and accepted by the EA in their decision document for the operational water discharge activity permit for the facility, March 2023 Version 2) that installing several kilometres of pipeline and associated pumping infrastructure would be environmentally unsustainable (for the operational discharging). The same applies to the construction related discharges which are temporary only. Discharging the treated effluent into the receiving watercourses described above will also help to ensure that water levels are maintained in the Sizewell Marshes SSSI, which is considered sensitive to changes in both surface and groundwater levels.

Further to the above, the proposed construction site drainage methodology follow the GOV.UK guidance for Flood Risk and Coastal Change[18], which informs the National Planning Policy Framework hierarchy for sustainable disposal of surface water which is in order of the following priority:

- Into the ground (infiltration)
- To a surface water body
- To a surface water sewer, highway drain, or another drainage system
- To a combined sewer

As most of the effluent is proposed to be discharged to the Leiston Drain watercourse directly, or indeed to watercourses which flow into the Leiston, which receives most of the local sewage treatment works effluent already, the discharge will therefore end up in the same environment for most of the discharge streams within this permit application if the discharges were made to sewer.

During the early construction phase, discharge from on-site welfare facilities (foul water) will be tankered off-site and taken to a suitably licensed waste disposal facility with registered waste carriers.

4.3 Overview of Proposed Discharging Activities

For each surface water run-off and / or groundwater discharge activity being proposed, the following information is provided in this section of the technical supporting document:

- Source and nature of the discharge effluent, including the source area on site and anticipated commencement of discharge; and
- The proposed drainage and management strategy for each discharge stream, including specific outlet locations and receiving receptors.

[18] Flood risk and coastal change - GOV.UK (www.gov.uk)

Table 6 below provides a summary of the proposed discharge activities that are subject to this permit application. Each of the sub-sections further below then provides more detail about each discharge stream (or activity).

Note that there is no specific order or numbering system applied to the outlet references in the below table; these are references that have been used throughout the design programme for the project. Overall, the outlets included within this permit application are considered 'early' outlets required for the enabling works (works to construct the longer-term construction areas), however some may remain in place for the entire duration of the construction period. Outlets O6a, O6b, O6c and O8a within the AD6 phase of the project will form part of the permanent highway drainage design. Further additional discharging outlets may be required in addition to those contained within this application as construction works progress; these will be applied for in a separate permit application or variation. Anticipated discharge commencement dates have been provided based upon currently available design and construction sequencing information. The EA will be notified if there is any change to the proposed discharging start dates.

Note that there are multiple discharge rates and volumes provided for the Outlets which form part of the AD6 scheme (Outlets O6a, O6b, O6c and O8a). This is because the Outlets being used for the discharge will receive both construction run-off (which is to be limited to a rate of 5 l/s) but also run-off from the highway and bridleway once these elements are constructed. Therefore the maximum rates and volumes provided account for both types of discharge (although the highway run-off is not usually subject to environmental permitting requirements). An overflow outlet from WMZ 6 (southern TCA) will also connect into Outlet O6a, therefore at times when the overflow outlet is in use, the discharge volume via Outlet O6a may temporarily increase. The maximum discharge rates and volumes including the highway run-off have been modelled based on either a 1 in 5-year storm event or 1 in 100-year storm event (plus 40 % climate change allowance), as is typical with modelling to support highway drainage design.

When consulting the below table, it is advised that **Appendix B** is referred to which is a design drawing showing the approximate location of each outlet across the site.

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Table 6 - Proposed Discharging Activities

Discharge Stream	Discharge Activity Type	Outlet Reference No. and National Grid Reference Location (approximate)	Receptor	Maximum Discharge Rate (litres / second) and Maximum Discharge Volume (m^3 / day)	Summary of Discharge Source
A	1.3.14 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5m^3/day (requiring specific substances assessment)	EO1 NGR: TM 47654 64054	Sizewell Foreshore (to ground) Greater Sizewell Bay / North Sea (potentially under surge conditions)	200 l/s 17,280 m^3/day	MCA: Discharge of rainfall-dependent surface water run-off and dewatered groundwater and surface water collected in excavations from installation of the desalination plant shaft (intake tunnel). To be discharged via the TMO to the Sizewell Foreshore.
B	1.3.14 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5m^3/day (requiring specific substances assessment)	DWO1 NGR: TM 47361 64528	Leiston Drain	100 l/s 521 m^3/day	SSSI Crossing Foundations: Discharge of groundwater anticipated to be encountered during installation of the pile caps associated with the SSSI Crossing located to the north of the MCA. Groundwater to be dewatered to the Leiston Drain watercourse.

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Discharge Stream	Discharge Activity Type	Outlet Reference No. and National Grid Reference Location (approximate)	Receptor	Maximum Discharge Rate (litres / second) and Maximum Discharge Volume (m^3 / day)	Summary of Discharge Source
C	1.3.13 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5m^3/day (not requiring specific substances assessment)	O5 NGR: TM 46463 65940	Unnamed ditch running north into Water Management Board (WMB) drain no. 7 (DRN163G0101)	35.2 l/s 3,042 m^3/day	Northern TCA: Discharge of rainfall-dependent surface water run-off from Water Management Zone (WMZ) 5 within the TCA. Outlet O5 is an overflow outlet from the Marsh Harrier Habitat, required for when infiltration is not possible (e.g., due to weather conditions).
D	1.3.14 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5m^3/day (requiring specific substances assessment)	O6a NGR: TM 45443 63501	Leiston Drain	5 l/s and 972 m^3/day (construction run-off only) 216 l/s and either 4,992 m^3/day (based on a 1 in 5-year storm event) **or** 9,859 m^3/day (based on a 1 in 100-year storm event) for construction run-off, WMZ 6 overflow discharging, and highway run-off.	AD6 / WMZ 6: Rainfall dependent surface water run-off from part of the AD6 scheme and groundwater anticipated to be encountered from installation of an overbridge over the Leiston Drain. Discharge to be made to the Leiston Drain. The discharge may contain small quantities of groundwater from shallow excavations. The discharge rate and volumes are anticipated to increase at Outlet O6a once the WMZ 6 basin has been constructed and connected to the outlet (which is part of the MDS construction works, separate to AD6) and once the outlet receives highway drainage.

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Discharge Stream	Discharge Activity Type	Outlet Reference No. and National Grid Reference Location (approximate)	Receptor	Maximum Discharge Rate (litres / second) and Maximum Discharge Volume (m^3 / day)	Summary of Discharge Source
E	1.3.14 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5m^3/day (requiring specific substances assessment)	O6b NGR: TM 45442 63495	Leiston Drain	5 l/s and 972 m^3/day (construction run-off only) 198 l/s and either 552 m^3/day (based on a 1 in 5-year event) **or** 1,110 m^3/day (based on a 1 in 100-year event) for construction run-off and highway drainage	AD6: Rainfall dependent surface water run-off from part of the AD6 scheme (Valley Road and Associated BR19 works) and groundwater anticipated to be encountered from installation of an overbridge over the Leiston Drain. Discharge to be made to the Leiston Drain. The discharge may contain small quantities of groundwater from shallow excavations. As above, once the highway and BR19 are completed and connected to the outlet, the discharge rate and volume will increase.
F	1.3.13 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5m^3/day (not requiring specific substances assessment)	O6c NGR: TM 45474 63488	Leiston Drain	5 l/s and 432 m^3/day (construction run-off only) 64 l/s and either 469 m^3/day (based on a 1 in 5-year storm event) **or** 565 m^3/day (based on a 1 in 100-year storm event) combined construction and highway run-off	AD6: Rainfall-dependent surface water run-off from part of the AD6 scheme (Lovers Lane Junction Improvements) and potential small quantities of groundwater (if encountered) from shallow excavations. As above, once the highway and BR19 are completed and connected to the outlet, the discharge rate and volume will increase.
G	1.3.13 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5m^3/day (not requiring specific substances assessment)	O7 NGR: TM 46528 63491	Sizewell Belts (tributary of Sizewell Drain)	62 l/s 5357 m^3/day	ACA: Discharge of rainfall-dependent surface water run-off captured from the ACA and discharged via WMZ 7 to the Sizewell Belts.

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Revision 001

CWDA-18 PERMIT APPLICATION SUPPORTING DOCUMENT

Discharge Stream	Discharge Activity Type	Outlet Reference No. and National Grid Reference Location (approximate)	Receptor	Maximum Discharge Rate (litres / second) and Maximum Discharge Volume (m^3 / day)	Summary of Discharge Source
H	1.3.13 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5m^3/day (not requiring specific substances assessment)	O8a NGR: TM 44625 64013	Upstream Leiston Drain (ordinary watercourse section)	5 l/s and 432 m3/day (construction run-off only) 8.1 l/s and 883 m^3/day (based on a 1 in 5-year storm event) **or** 908 m^3/day (based on a 1 in 100-year storm event) combined construction and highway run-off	AD6: Rainfall dependent surface water run-off from the MDS Roundabout as part of the AD6 scheme being discharged to an Upstream Section of Leiston Drain. May potentially contain small quantities of groundwater (if encountered) from shallow excavations. As pet Outlets O6a, O6b and O6c above, above, once the highway and BR19 are completed and connected to the outlet, the discharge rate and volume will increase.
I	1.3.13 Trade and/or non-sewage effluent discharge to surface water or groundwater with a volume greater than 5m^3/day (not requiring specific substances assessment)	O8 NGR: TM 44466 63737	Leiston Drain	10.6 l/s 916 m^3/day	WMZ 8: Rainfall dependent surface water run-off from WMZ 8 which forms part of the drainage strategy for the GRR part of the proposed development.

4.4 Discharge Stream A – Outlet EO1 (TMO)

4.4.1 Effluent Type, Source and Flow rates

The effluent proposed to be discharged at Outlet EO1 will comprise rainfall-dependent surface water run-off from the MCA and groundwater expected to be derived during the installation of the desalination plant shaft intake. Activities taking place within the MCA will include typical construction activities including earthworks, transfer and storage of materials, plant and equipment, use of vehicles, waste management and potential concreting activities. The surface water run-off proposed to be discharged via the TMO will therefore be treated prior to discharge to ensure potentially elevated levels of suspended solids and pH (from run-off from areas where concreting might take place) are reduced. There may be the presence of certain constituents in the groundwater which are already present in the baseline groundwater quality. These have been identified and described in more detail in the TMO Groundwater Discharge Risk Assessment that has been completed to inform the proposed EO1 discharges; see **Appendix O**. Proposed treatment measures have taken the above factors into account and are described in **Section 5** below.

The discharge flow rate from Outlet EO1 will be limited to a maximum of 200 l/s. This figure has been calculated on the design of the outfall itself (pipe diameter), which has taken into consideration the 24-hour half-drain time requirement for attenuation structures, such as lagoons, which are expected to be constructed in the MCA as required to hold and aid settlement of run-off prior to discharge. The discharge from the TMO will be intermittent, dependent upon rainfall and dewatering activities. The flow rate will be controlled from the treatment plant system(s) that will be incorporated as part of the discharge treatment train.

Based upon the maximum flow rate of 200 l/s, the maximum volume of discharge that could be discharged from the TMO outlet over a 24-hour period is 17,280 m^3/day. It is anticipated that 398 m^3/day would be discharged on average, however. Refer to the TMO Groundwater Risk Assessment (**Appendix O**) for more detail on how these volumes have been calculated.

The discharge of groundwater from the dewatering associated with the installation of the desalination shaft will be short term, only taking place after the base of the excavated shaft has reached the intended level. At this point a mass concrete base plug of approximately 2 m thickness will be placed using a tremie technique to seal the shaft base. Once the concrete plug has gained sufficient strength, a submersible dewatering pump will be placed at the base of the shaft and any water within the shaft pumped out. The total volume of water from the dewatering will be limited to that of the groundwater contained within the shaft and any potable water added during the excavation process to maintain a positive head of water within the shaft itself. This has been estimated to be up to a **maximum** of 500 m^3, which is expected to comprise a one-off discharge of approximately 360 m^3, followed by some smaller, intermittent discharges while the shaft settles into place.

4.4.2 Proposed Discharge Location and Receiving Receptor

The proposed discharge point from the TMO is NGR TM 47654 64054 (which will be the location of the headwall forming Outlet EO1). The Outlet will discharge to the Sizewell Foreshore via a gravity pipe toward the shoreline, above the mean high-water spring tide mark (MHWS) tide mark and above highest astronomical tide level. Refer to **Appendix C** for a design drawing of the TMO (as it is currently anticipated to be constructed). Where the outlet pipe falls onto the Sizewell Foreshore, in front of the headwall will be a reno mattress and gabion blocks arranged to baffle the flow to dissipate energy of the flow and inhibit erosion processes. The erosion protection will end before the MHWS level. Water is expected to percolate through the reno mattress into the sand matrix, and subsequently the ground / groundwater. The Outlet structure includes facilities for sampling to confirm compliance with proposed water quality parameters (see **Section 7** below).

The Outlet may discharge directly into the North Sea but only under infrequent surge conditions if discharging is taking place at this exact moment in time. The SZC project team have consulted with the Centre for Environment, Fisheries and Aquaculture Science with regards to this scenario and have subsequently considered tide gauge data from 2016-2023 to further consider the probability of this occurring. This is explained further in **Appendix O.**

During design it was considered whether the proposed TMO discharge could be made directly into the North Sea, however the preferred option was for the discharge to be made closer to the proposed development onto the Foreshore, which is considered less disruptive in terms of public access as it prevents the need for a pipeline across the beach. It was also considered whether discharge could be made to the Sizewell Drain watercourse during construction, which runs to the west of the MCA, however this was avoided due to the increased pollution risk the discharge could pose to the SSSI.

4.4.3 Approximate Discharge Duration

It is anticipated that discharging from the TMO will be required to take place from 1st September 2024 (at the earliest). It is expected that this Outlet will be used throughout the early construction phase until the permanent CDO is operational, which will form part of the design of the final operational facility. A separate permit application will be submitted for the CDO. The discharge from the TMO will be intermittent as it is predominantly rainfall dependent and dependent on when the temporary dewatering is required from the installation of the desalination shaft. The overall anticipated discharging duration from Outlet EO1 is currently expected to be approximately 36 months. This will be dependent upon the sequencing of the planned construction works within the MCA. The duration of the dewatering for the desalination shaft is not anticipated to last any longer than 9 months. This will be comprised most likely of a 'one-off' discharge when the shaft is installed and then smaller intermittent discharges if required due to any seepage while the shaft settles into position. The EA will be kept updated of any changes to the planned discharge durations.

The below table summarises the key requirements as per GOV.UK application form Part B6:

Table 7 - Discharge Stream A Summary

Maximum Discharge Volume (m^3/day)	Maximum Discharge Flow Rate (l/s)	Anticipated Discharge Start Date:	Anticipated Discharge Duration
17,280 Average anticipated to be 398.	200	1st September 2024	36 months (overall) Dewatering anticipated to be no longer than 9 months.

4.5 Discharge Stream B – Outlet DWO1 (SSSI Crossing Foundations)

4.5.1 Effluent Type, Source and Flow rates

The effluent from the SSSI Crossing Foundations will comprise groundwater which will be discharged from excavations required for the installation of the pile caps associated with the crossing and from the base / sides of a sheet piled cofferdam that is being proposed as part of the crossing foundations design. The amount of dewatering required is estimated to be a maximum of 521 m^3/day (separate abstraction licences will be applied

for as necessary). Details on how this volume has been calculated are provided in the Surface Water Pollution Risk Assessment that has been completed for the activity (**Appendix M**)**.** This proposed maximum volume is based on the worst credible case modelled for steady groundwater inflow to the coffer dams during dewatering, multiplied by a 1.1 as a factor of safety, and assuming the dams on each side of the crossing (for each abutment) are being dewatered simultaneously, with 24-hour pumping operations (which again is based on worst-case).

The discharge flow rate will be restricted to a maximum of 100 l/s. This figure has been set to allow for a higher rate at the start of each day should this be required to bring down the water level within the abutments (should the pumps be turned off overnight for example). It has not yet been confirmed whether both abutments will be dewatered simultaneously therefore the above volume and flow rate are worst case scenario. The flow rate provided is based on a standard suitable pump size capable of pumping 25 l/s and using four of these.

4.5.2 Proposed Discharge Location and Receiving Receptor

The groundwater is proposed to be discharged, following treatment (see **Section 5**), at Outlet DWO1 to the Leiston Drain watercourse north of the MCA. Outlet DWO1 is anticipated to be situated at approximately NGR TM 47361 64528.

4.5.3 Approximate Discharge Duration

It is anticipated that the dewatering at the SSSI Crossing will take up to a maximum of 12 months, with the discharge taking place on an intermittent basis throughout this period. This is based on a worst-case scenario. The discharging is anticipated to commence from the beginning of December 2024. DWO1 is a temporary outlet to be used during construction only. The EA will be notified upon completion of the discharge activity and any changes which could impact the anticipated discharge duration.

The below table summarises the key requirements as per GOV.UK application form Part B6:

Table 8 - Discharge Stream B Summary

Maximum Discharge Volume (m^3/day)	Maximum Discharge Flow Rate (l/s)	Anticipated Discharge Start Date:	Anticipated Discharge Duration
521	100	1st December 2024	12 months

4.6 Discharge Stream C – Outlet O5 (Northern TCA)

4.6.1 Effluent Type, Source and Flow rates

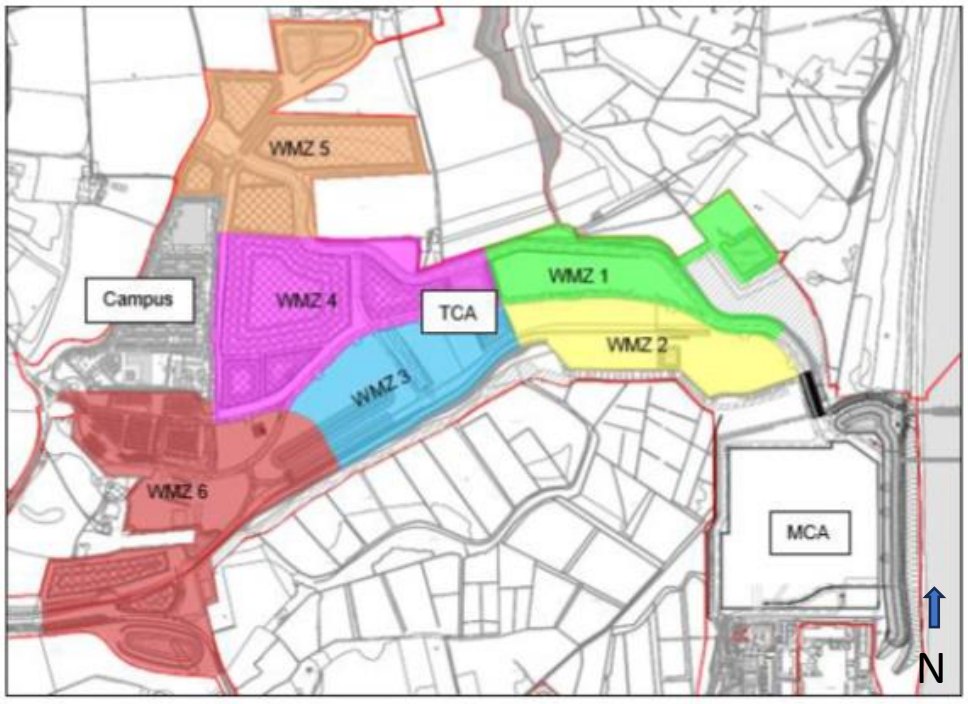
The drainage strategy for the management of surface water within the TCA is based upon the utilisation of six catchment areas. Each of these will be served by WMZ basins, designed for 100-year return period rainfall event including a climate change allowance of 20% for temporary structures (as described in **Section 2** above). The catchment area and WMZ basin that relates specifically to Discharge Stream C and Outlet O5 is catchment area WMZ 5, in the northern part of the TCA (see **Figure 11** below which is a drawing showing the current proposed WMZ catchment areas for the TCA and **Appendix E**).

Activities taking place within this area during the early construction phase will include stockpiling and the construction and use of borrow pits. A haul road will also be constructed to provide access to the rest of the

TCA and MCA. Surface water run-off within this catchment area will be captured by three swale networks which will then direct the flow to the WMZ 5 basin. From here, an outfall pipe from the basin will discharge into the Marsh Harrier Habitat, a purposely constructed wetland, where the run-off will infiltrate. An overflow outlet is required from the Marsh Harrier Habitat in the event that volumes of rainfall-dependent run-off are too high to infiltrate through the Habitat; hence the provision of Outlet O5. Refer to **Appendix F** which shows the proposed location of the overflow Outlet. Prior to the construction of the WMZ 5 basin, temporary ponds may be constructed across the catchment to provide initial surface water storage (refer to **Section 5** below for more information on water management and treatment measures). As with all proposed outlets, the location and positioning of the outlet has taken into consideration any ecological aspects which require avoidance.

The maximum discharge flow rate from Outlet O5 will be restricted to 35 l/s via a headwall. This has been designed so as not to exceed the greenfield run-off rate agreed at the DCO stage. This will be managed by pipe size selection, flow control (such as a hydrobrake) or similar. The maximum volume that therefore could be discharged in a 24-hour period is 3,024 m^3 from Outlet O5.

Figure 11 - TCA Catchment Areas



4.6.2 Proposed Discharge Location and Receiving Receptor

Outlet O5 will discharge, when required, to an existing ditch that lies to the east of the Marsh Harrier Habitat. The ditch flows into an WMB adopted drain, No.7 DRN163G0101, which then converges with the Leiston Drain, prior to the Minsmere Sluice further north up the coastline. The approximate NGR for the discharge point is TM 46463 65940.

4.6.3 Approximate Discharge Duration

Discharging from Outlet O5 is anticipated to be required, at the earliest, from 1st October 2024. The Outlet will only be used during conditions when water levels in the Marsh Harrier Habitat are high, and infiltration cannot take place. The discharge from the overflow Outlet O5 will therefore be intermittent and should only occur when water levels are higher. It is currently anticipated that the discharge Outlet will be required for the duration of the construction period for the proposed development (approximately 10-12 years), up until approximately 2036. Upon completion of the discharging activities, the outlet itself is currently anticipated to be returned to its original state however the Marsh Harrier Habitat will remain in situ. The EA will be notified of any changes that could impact the proposed discharging duration from the Outlet.

The below table summarises the key requirements as per GOV.UK application form Part B6:

Table 9 - Discharge Stream C Summary

Maximum Discharge Volume (m^3/day)	Maximum Discharge Flow Rate (l/s)	Anticipated Discharge Start Date:	Anticipated Discharge Duration
3,024	35	1st October 2024	10-12 years

4.7 Discharge Stream D – AD6 O6a

4.7.1 Effluent Type, Source and Flow rates

Discharge Stream D will comprise treated surface water run-off and groundwater from dewatering associated with AD6 construction works. The construction activities, described in **Section 3** above, which will lead to discharges via Outlet O6a include:

- Lovers Lane Realignment; and
- Leiston Drain Overbridge dewatering.

An infiltration basin, referred to as WMZ 6, will also be required to connect to Outlet O6a during the early construction phase of works. This will serve the southern part of the TCA and will capture and store surface water run-off from this part of the site prior to infiltration to ground. During the design of WMZ 6 it was acknowledged that there is insufficient space for the basin to provide a storage volume which is capable of containing the run-off from the southern TCA in a 1 in 100-year return period rainfall event, plus allowance for climate change, pending infiltration. Therefore, a high-level overflow from the basin is required, which will be connected to Outlet O6a, to allow discharge to the Leiston Drain during a 1 in 100-year or higher storm event. Outlet O6a will therefore discharge the surface water run-off and groundwater from the AD6 works bullet pointed above alongside effluent from WMZ 6, during a 1 in 100-year or greater storm event only and highway drainage run-off once the new highway / bridleway are complete. As described in **Section 4.3** above, the discharge rates and volumes provided take into account the combined discharge streams (not just the construction related run-off), to account for a worst case scenario in terms of volumes and flow rates.

- The construction-only flow rate will be limited to 5 l/s. This is based on the current construction methodology maximum flow rate for discharging, which is 290 litres / minute (equating to 5 l/s). The flow rate will be controlled by a set pump capacity.

- The maximum discharge flow rate for Outlet O6a, based on a 1 in 100-year storm event plus 40 % climate change allowance, and assuming WMZ 6 is discharging simultaneously, is 216 l/s.

The maximum volume of effluent that could be discharged in a day, during construction, will be rainfall dependent and dependent on the extent of groundwater (if any) that is encountered during excavation works. As the permanent highway drainage system outlets are proposed to be used for the discharge of the construction related run-off, the discharge stream may also contain water in the form of run-off from the completed parts of the scheme (highway / bridleway network). This has therefore been accounted for when calculating maximum discharge rates and volumes from Outlet O6a. The maximum daily discharge volume is presented in the below table. Figures are provided for the worst-case scenario (based on all effluent sources discharging at the same time during a 1 in 100-year storm event, plus climate change allowance, as per the flow rates described above), and then for a 1 in 5-year storm event too. It should also be noted that both these figures contain both the potential overflow discharge from WMZ 6 (which would be a maximum of 47 l/s), which will not be discharging continuously, and the 5 l/s construction surface water run-off and groundwater rate. Note that all flow rates and discharge volumes are subject to agreement with the WMB and other regulators as required; any changes to the proposed rates detailed above will be communicated to the EA, however these are not expected to increase. The discharge flow rates and volumes for AD6-related outlets were compiled using FEH Data and the two FEH Hydrographs were inputted in the MicroDrainage model. The rainfall was generated from the areas drawn up within the hydraulic model and applied to the road area and some overland run off where it was considered appropriate based on existing design information at the time of writing. From this flow rates were calculated using the Colebrooke-White equation within the software. The results of this at the outlet were used to calculate the flow rates provided. These were then utilised to provide maximum daily discharge volumes.

Once the construction-related activities have been completed as part of the AD6 scheme and in the southern TCA (which feeds into WMZ 6), Outlet O6a will be retained as part of the permanent new highway / bridleway drainage design. At this point the Outlet will no longer require the water discharge activity permit as the discharge will be for uncontaminated surface water run-off from the road network and bridleway only.

With regards to the dewatering that is likely to be required during the installation of the Leiston Drain Overbridge, the current construction methodology (which is still subject to finalisation) is to remove water from the excavations for the pile caps on both the north and south sides of the Leiston Drain at the same time, using diesel powered pumps, which will have a maximum flow rate limited to that stated in the below table. It is expected that groundwater will be brought to the surface intermittently by the CFA auguring process as piles are installed one by one. This water will be brought to the surface of the piling platform by the rotating action of the auger and its removal as concrete is placed. Locally cut shallow channels will then catch this water as it runs onto the surface and direct it to a sump within the engineered platform, where it will be treated as required prior to discharging. Any changes to the proposed methodology which could impact the dewatering activity will be communicated to the EA. It is proposed that the groundwater is discharged via Outlets O6a and O6b (described further below), following suitable treatment. Based on the maximum flow rate, which will be set by the pumps, the maximum dewatering volume associated with the Overbridge installation could be up to 540 m^3/day (per outlet). An abstraction licence will be applied for separately as required. A Surface Water Pollution Risk Assessment has been completed for this proposed activity to assess the potential impacts of discharging the groundwater to surface water (refer to **Section 6** below and **Appendix N**).

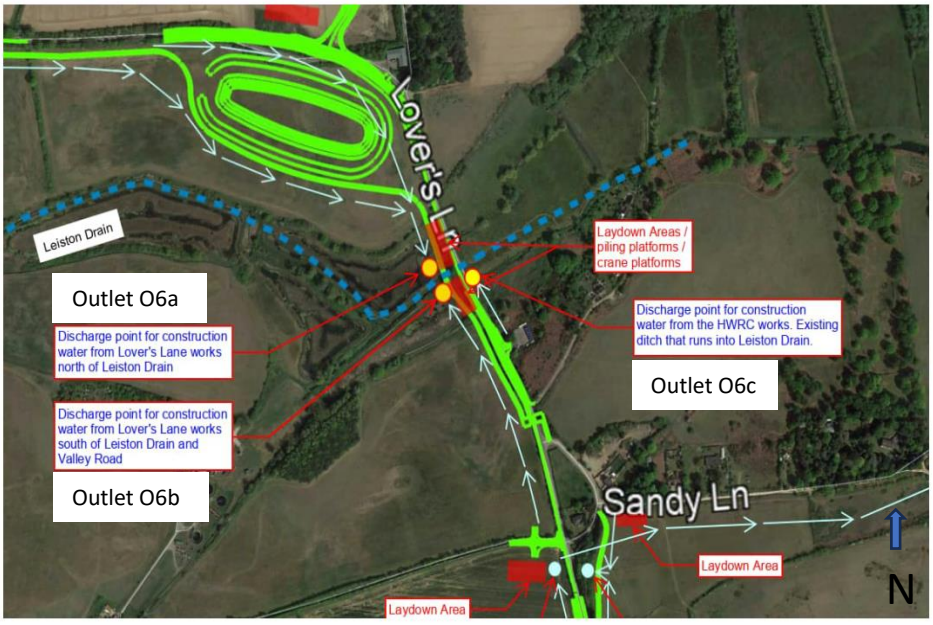
There may also be a need to remove smaller quantities of groundwater from shallow excavations (up to 3.5 m deep) during installation of the permanent highway drainage scheme for AD6. This would usually be managed under the conditions of the Regulatory Position Statement 261 (temporary dewatering from excavations to surface water); however, due to the proximity of the SSSI (Sizewell Marshes), it is anticipated that the RPS might

not be applicable. It is therefore proposed that, if, groundwater is encountered in excavations, it will be pumped to the surface water drainage system, via a sediment sock or similar, which feeds into the above-described outlet. Details of proposed management and treatment of groundwater encountered are set out in **Section 5** below. Details on the existing groundwater levels within the AD6 scheme areas of works have been provided to the EA in December 2023 as part of Pre-Application. This identified that groundwater likely to be encountered in the shallow excavations is expected to be minimal based upon the existing data for the area of works.

4.7.2 Proposed Discharge Location and Receiving Receptor

The discharge will be directed, via a series of SuDS methods (such as filter drains and swales) for surface water run-off, to Outlet O6a which leads into the Leiston Drain watercourse. Groundwater will be managed as described in the above section and discharged to the same location. Outlet O6a is anticipated to be located at NGR TM 45443 63501. **Figure 12** below shows the location of Outlet O6a in relation to the AD6 scheme of works (highlighted by the green route). It also indicates the positioning of Outlets O6b and O6c which are described further below. No key is included as the below figure has been included to provide an indication of the approximate discharge outlet locations only to support this permit application.

Figure 12 - AD6 Outlet O6a



4.7.3 Approximate Discharge Duration

The AD6 construction works which are proposed to discharge via Outlet O6a are anticipated to begin, at the earliest, from 1st November 2024 and are expected to start with the piling works for the construction of the Leiston Drain Overbridge. The anticipated duration of the dewatering of groundwater associated with the installation of the Leiston Drain overbridge is thought to be no more than 8 weeks. The drainage works related to the Lover's Lane Realignment are anticipated to start shortly after this; the exact time frame is dependent on wider construction sequencing. Outlet O6a will then form part of the permanent drainage strategy for the

completed bridleway / highway; however, the connection from WMZ 6 will remain in place for management of overflow run-off from the southern part of the TCA during storm events until construction of the proposed development is fully complete. Notification will be made to the EA in relation to any changes to the discharge rates, volumes and construction activities described. The overall anticipated construction-related discharge duration for the AD6 scheme of works is anticipated to be no more than 15 months. However, WMZ 6 which connects to Outlet O6a may continue to be in use for longer than 15 months. This will be communicated to the EA once the expected discharge end date is known. It is possible that the Outlet may be used for the WMZ 6 overflow during the entire duration of the construction period for the proposed development (currently estimated to be 10-12 years).

The below table summarises the key requirements as per GOV.UK application form Part B6:

Table 10 - Discharge Stream D Summary

Maximum Discharge Volume (m^3/day)	Maximum Discharge Flow Rate (l/s)	Anticipated Discharge Start Date:	Anticipated Discharge Duration
972 m^3/day construction run-off only 4,992 m^3/day – combined construction, highway and WMZ 6 maximum discharge volume (based on 1 in 5-year storm event) 9,859 m^3/day (as above based on 1 in 100-year storm event)	5 l/s – construction run-off only 216 l/s – construction, WMZ 6, and highway run-off (worst case based on 1 in 100 year storm + 40% climate change allowance)	1st November 2024	15 months for AD6 related discharging (including approximately 10 weeks of dewatering) Up to 12 years for discharging from WMZ 6 overflow.

4.8 Discharge Stream E – AD6 Outlet O6b

4.8.1 Effluent Type, Source and Flow rates

Discharge Stream E will comprise treated surface water run-off and groundwater associated with the below AD6 construction works:

- Valley Road and Associated BR19 works; and
- Leiston Drain Overbridge dewatering.

As with Outlet O6a above, the groundwater which is expected to be encountered during the works required for the installation of the Leiston Drain overbridge, will be discharged, following suitable treatment, to the Leiston Drain via Outlet O6b. This is to allow for the points of discharge to be sited on either side of the watercourse. As with Discharge Stream D, there may also be a need to remove small quantities of groundwater, if encountered, from excavations (up to approximately 3.5 m deep) during installation of the permanent

highway drainage scheme. If the Regulatory Position Statement 261 (temporary dewatering from excavations to surface water) cannot apply, it is proposed that any small quantities of groundwater encountered in excavations are pumped to the surface water drainage system which feeds into the above-described outlets. Details of proposed management and treatment of groundwater are set out in **Section 5** below. Once all construction activities have been completed, Outlet O6b will be retained as part of the permanent highway drainage design. This does not fall within the scope of the permitted activities as the discharge will be for uncontaminated surface water run-off from the road network only once fully constructed and operational.

The maximum flow rate for discharging construction-related surface water run-off and groundwater from Outlet O6b will be restricted to 5 l/s. This will be controlled by a set pump capacity. As with Outlet O6a above, the maximum daily discharge volumes have considered the construction discharge rate (5 l/s) alongside the anticipated volume of run-off from the highway drainage itself. Note that all flow rates and discharge volumes are subject to agreement with the WMB and other regulators as required; any changes to the proposed rates and volumes will be communicated to the EA, however these are not expected to increase.

4.8.2 Proposed Discharge Location and Receiving Receptor

The discharge from Outlet O6b will be made to the Leiston Drain watercourse via the permanent highway drainage system. This incorporates a series of SuDS such as filter drains and swales. Groundwater encountered during the installation of the Leiston Drain Overbridge will be managed as described in Section 4.7.1 above. The NGR for Outlet O6b is approximately TM 45442 63495. **Figure 12** above shows the location of Outlet O6b.

4.8.3 Approximate Discharge Duration

The discharge activities for Valley Road and associated BR19 works are anticipated to begin from 1st November 2024. Outlet O6b will form part of the final permanent highway drainage design once the AD6 works are complete. The overall anticipated construction-related discharge duration for the entire AD6 scheme of works is anticipated to be no more than 15 months.

The below table summarises the key requirements as per GOV.UK application form Part B6:

Table 11 - Discharge Stream E Summary

Maximum Discharge Volume (m^3/day)	Maximum Discharge Flow Rate (l/s)	Anticipated Discharge Start Date:	Anticipated Discharge Duration
972 m^3/day - construction run-off only 552 m^3/day - combined construction and highway drainage maximum discharge volume (based on 1 in 5-year storm event) 1,110 m^3/day – combined construction	5 l/s – construction run-off only 198 l/s – construction and highway drainage (worst case based on 1 in 100-year storm + 40% climate change allowance)	1st November 2024	15 months for AD6 related discharging (including approximately 10 weeks of dewatering)

and highway drainage maximum discharge volume (based on 1 in 100-year storm event)			

4.9 Discharge Stream F – AD6 Outlet O6C

4.9.1 Effluent Type, Source and Flow rates

Discharge Stream F will comprise treated surface water run-off and small quantities of groundwater (if encountered in shallow excavations) from potential dewatering associated with the below AD6 construction works:

- Lovers Lane Junction Improvements (at the nearby HWRC).

The maximum proposed discharge flow rate from Outlet O6c for the construction related discharge is anticipated to be restricted to 5 l/s. This will be controlled by a set pump capacity. As per Outlets O6a and O6b above, once the permanent highway drainage scheme is complete, Outlet O6c will discharge run-off from the road network as well (which does not fall within the scope of this permit application). The maximum daily volume of effluent that could be discharged in one day (based on the 1 in 100-year and 1 in 5-year storm events + 40% climate change allowance, plus construction run-off) is presented in **Table 12** below. Note that all flow rates and discharge volumes are subject to agreement with the WMB and other regulators as required; any changes to the proposed rates and volumes will be communicated to the EA, however these are not expected to increase.

As with Discharge Streams D and E above, there may also be a need to remove smaller quantities of groundwater from excavations during installation of the permanent highway drainage scheme. If the Regulatory Position Statement 261 (temporary dewatering from excavations to surface water) cannot apply, it is proposed that small quantities of groundwater encountered in excavations will be pumped to the surface water drainage system which feeds into the above-described outlets. Details of proposed management and treatment of groundwater encountered are set out in **Section 5** below. The maximum depth of excavations for the drainage works required for the reconstruction of the junction by the existing HWRC is anticipated to be approximately 2.5m below existing ground level, therefore no to little groundwater is anticipated to be encountered (based on available data).

4.9.2 Proposed Discharge Location and Receiving Receptor

Discharge from Outlet O6c will flow, following treatment, via a ditch into the Leiston Drain watercourse (following re-alignment / widening works which are beyond the scope of this permit application) at approximately NGR TM 45474 63488. **Figure 12** above shows the location of Outlet O6c.

4.9.3 Approximate Discharge Duration

The construction and associated discharge activities for the Lovers Lane junction improvements are currently anticipated to start from 1st November 2024. Outlet O6c will form part of the final permanent highway drainage design once the AD6 works are complete. The overall anticipated construction-related discharge duration for the entire AD6 scheme of works is anticipated to be no more than 15 months.

The below table summarises the key requirements as per GOV.UK application form Part B6:

Table 12 - Discharge Stream F Summary

Maximum Discharge Volume (m^3/day)	Maximum Discharge Flow Rate (l/s)	Anticipated Discharge Start Date:	Anticipated Discharge Duration
432 m^3/day - construction run-off only 469 m^3/day – combined construction and highway drainage maximum discharge volume (based on 1 in 5-year storm event) 565 m^3/day (as above based on 1 in 100-year storm event)	5 l/s – construction run-off only 64 l/s – construction and highway run-off (worst case based on 1 in 100-year storm + 40% climate change allowance)	1st November 2024	15 months

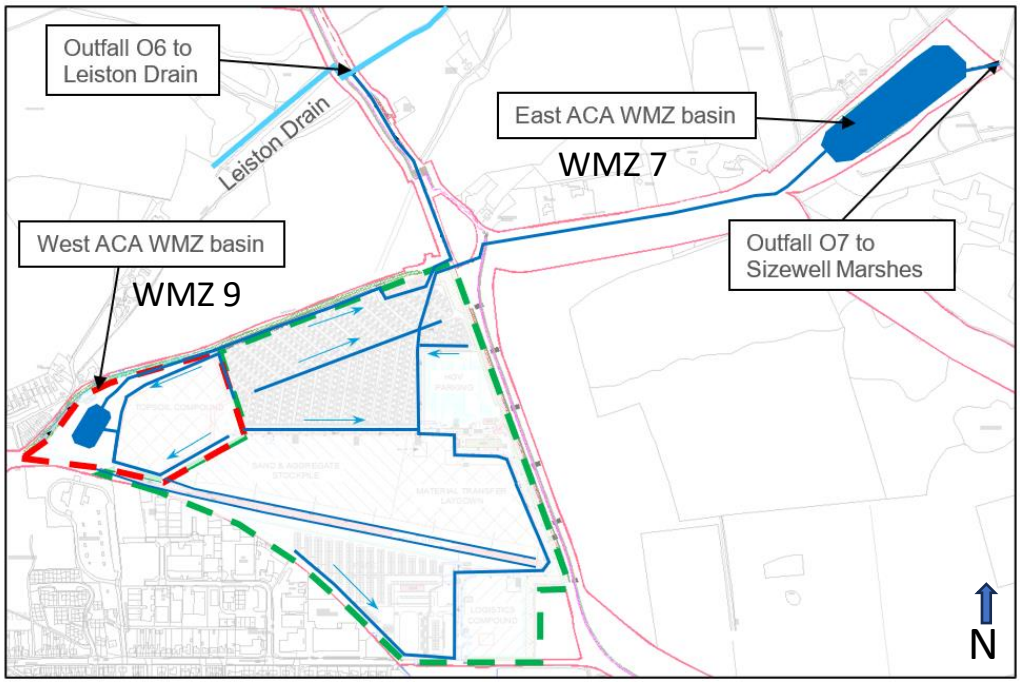
4.10 Discharge Stream G – Outlet O7 (ACA)

4.10.1 Effluent Type, Source and Flow rates

Discharge Stream G will comprise treated surface water run-off from the ACA. As described in Section 3 above, the ACA has an area of approximately 30 ha and will encompass caravan pitches, HGV parking, topsoil compound, sand and aggregate stockpile, material transfer laydown, park and ride and logistics compounds. Surface water run-off from the ACA will be captured in two WMZ basins; WMZ 7 and WMZ 9. WMZ 7 will be located to the east of the ACA while WMZ 9 will be located to the west, as shown in **Figure 13** below. Run-off from the area of land forming the ACA will be captured in swales and diverted to the WMZ basins. WMZ 9 will then be pumped to WMZ 7, which will discharge from the eastern part of the ACA into the Sizewell Marshes via a headwall at Outlet O7 (refer to **Appendix H**).

Flow rates have been calculated using the greenfield runoff rate (2 l/s/ha) agreed at DCO stage. Flows from the WMZ 7 basin at Outlet O7 will therefore be restricted to 62 l/s. The maximum volume of effluent that could be discharged via Outlet O7 in a 24-hour period is 5,357 m^3.

Figure 13 - West and East ACA Water Management Zones and Outlet O7



4.10.2 Proposed Discharge Location and Receiving Receptor

Outlet O7 will discharge treated surface water run-off from the eastern and western parts of the ACA via a headwall to an existing ditch in the Sizewell Marshes SSSI. The discharge is proposed to be made to the Sizewell Marshes to help maintain the water balance across the Marshes to help avoid adverse effects on the ecology in the area and help prevent altering existing run-off characteristics. The ditch itself is a tributary (referred to as Sizewell Belts) which leads to the Sizewell Drain watercourse (receptor). The NGR for the discharge point will be TM 46528 63491.

4.10.3 Approximate Discharge Duration

Discharging from Outlet O7 is anticipated to be required from 1st August 2025. It is expected that the outlet will be required for the duration of the construction period for the proposed development (approximately 10-12 years, up to 2036 potentially). Upon completion of the discharge activities, the outlet will be returned to its original state. The EA will be notified of any changes that could impact the proposed discharging duration from the Outlet.

The below table summarises the key requirements as per GOV.UK application form Part B6:

Table 13 - Discharge Stream G Summary

Maximum Discharge Volume (m^3/day)	Maximum Discharge Flow Rate (l/s)	Anticipated Discharge Start Date:	Anticipated Discharge Duration
5,357	62	1st August 2025	10-12 years

4.11 Discharge Stream H - AD6 O8a

4.11.1 Effluent Type, Source and Flow rates

Discharge Stream H will be made up of treated surface water run-off and groundwater (if encountered in shallow excavations) from part of the works associated with the AD6 scheme (as per Outlets O6a, O6b and O6c above). The construction activities from AD6 which will lead to the discharges being made at Outlet O8a include:

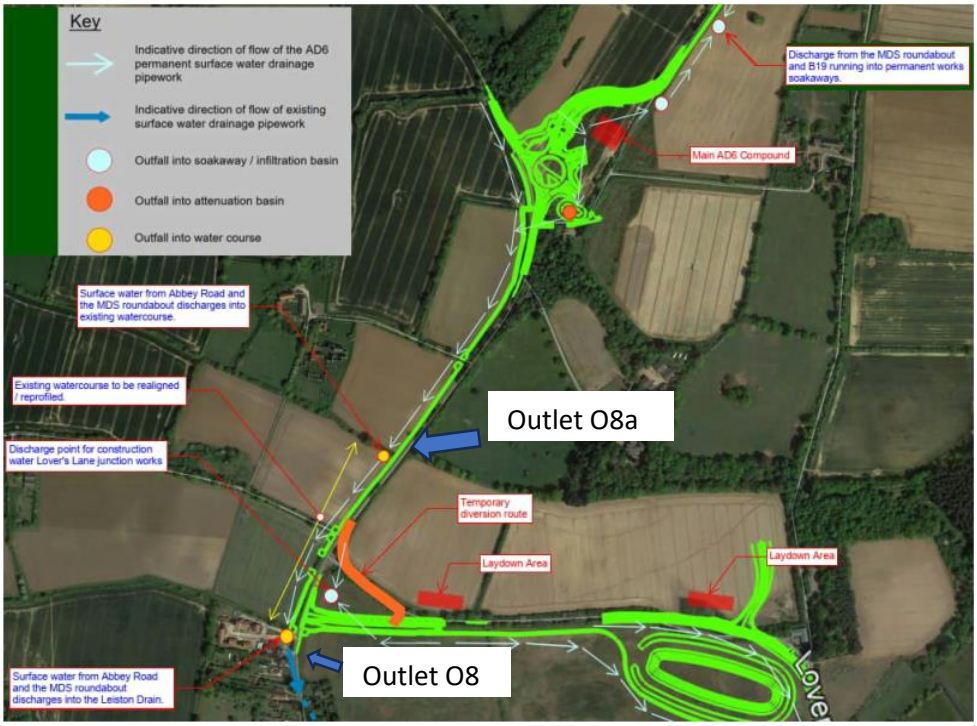
- Surface water run-off from the MDS Roundabout and Abbey Road BR19 (taking place in the northern part of the AD6 scheme of works). The proposed construction methodology is to construct the permanent highway surface water drainage system first and then utilise this for the discharge of construction-related surface water run-off. Rainfall-dependent surface water run-off will therefore be directed via a series of SuDS features to an attenuation basin, which will have an overflow to BR19 at Abbey Road. As with the other WMZ basins subject to this permit application, modelling has been undertaken to inform the predicted hydraulic performance of the basin. The water collected in the basin will be discharged at a controlled rate (via a flow control pump) into a realigned section of an existing watercourse (the receptor) at the southern end of Abbey Road. This is referred to in this application as the Upstream Leiston Drain (ordinary watercourse). The run-off will be treated as described in **Section 5** below. Any surface water run-off not directed into the basin and the permanent drainage system will be infiltrated to ground (where testing has shown that this is viable).
- Discharge Stream H will also comprise some groundwater from excavations (up to 4 m deep) required for the installation of pipework and chambers for the permanent highway drainage system. It is being proposed that any groundwater encountered in these excavations will be removed via submersible pumps (maximum flowrate of 290 litres / minute). Where infiltration within the works boundary is not possible, and the RPS 261 cannot apply, it is proposed that the groundwater is discharged into the permanent drainage system which then discharges into the Leiston Drain (as with Outlets O6a, O6b and O6c above). Any discharged groundwater will first be sent through sediment filters.

Flow rates for the construction related discharge are expected to be limited to 5 l/s, via a throttle structure. A high-level overflow will be provided to ensure that exceedance rainfall does not cause the attenuation basin to overflow in an uncontrolled manner. As with the O6a, O6b and O6c outlets associated with the AD6 scheme of works, run-off from the permanent highway scheme will also discharge via this Outlet (in addition to the construction related effluent). The maximum volume of effluent to be discharged in one day via Outlet O8a, based on the worst-case scenario of 1 in 100-year storm event plus 40% climate change allowance, and the 1 in 5-year storm event, is stated in the below table. Note that all flows rates and discharge volumes are subject to agreement with the WMB and other regulators as required; any changes to the proposed rates and volumes detailed above will be communicated to the EA, however these are not expected to increase.

4.11.2 Proposed Discharge Location and Receiving Receptor

Surface water run-off, and groundwater if encountered in excavations, is expected to be directed via SuDS into the attenuation basin located by the MDS Roundabout. The basin will then discharge via the permanent highway drainage system to Outlet O8a, which in turn will discharge into the Upstream Leiston Drain watercourse, which continues to flow into the Leiston Drain main river. The NGR for the proposed Outlet O8a is TM 44625 64013. **Figure 14** below shows the proposed discharging outlet location for Outlet O8a. Outlet O8 is also shown which is described in the following section.

Figure 14 - Outlets O8a and O8



4.11.3 Approximate Discharge Duration

The discharge from Outlet O8a is anticipated to take place from 1st November 2024. The Outlet will then remain in place as part of the permanent highway drainage design. The overall anticipated construction-related discharge duration for the entire AD6 scheme of works is anticipated to be no more than 15 months.

The below table summarises the key requirements as per GOV.UK application form Part B6:

Table 14 - Discharge Stream H Summary

Maximum Discharge Volume (m^3/day)	Maximum Discharge Flow Rate (l/s)	Anticipated Discharge Start Date:	Anticipated Discharge Duration
432 m^3/day – construction run-off only	5 l/s – construction run-off only	1st November 2024	15 months

883 m^3/day – combined construction and highway drainage (based on 1 in 5-year storm event) 908 m^3/day – combined construction and highway drainage (based on 1 in 100-year storm event)	8.1 l/s - construction and highway run-off (worst case based on 1 in 100 year storm + 40% climate change allowance)		

4.12 Discharge Stream I – WMZ 8 Outlet O8

4.12.1 Effluent Type, Source and Flow Rate

The source of surface water run-off proposed to be discharged at Outlet O8 will be treated rainfall-dependent surface water run-off from the construction area housing the GRR scheme. During the construction of the railway track bed and embankments / landscaping bunds, there is the potential for mobilisation of suspended solids and potential hydrocarbons from the earthworks activities, e.g., due to the use of plant, vehicles and machinery. It is proposed that SuDS techniques will be constructed within the area to collect and direct the run-off from this part of the site and drain it to an attenuation basin, WMZ 8. This will then contain an Outlet which will discharge to a realigned section of the Leiston Drain. Additional treatment measures such as settlement systems will be used where required. The attenuation basin will remain a permanent feature of the GRR once operational.

The discharge rate from Outlet O8 will be restricted to 10.6 l/s. This is proposed to be controlled by vortex control (e.g., a hydrobrake) from an overflow structure (which also applies to the other basins described within this permit application). The maximum volume of effluent that could be discharged in a 24-hour period is 916 m^3.

4.12.2 Proposed Discharge Location and Receiving Receptor

Outlet O8 is proposed to discharge treated surface water run-off from WMZ 8 which will be located to the south of the AD6 scheme of works (to the west of the Sizewell Marshes SSSI). WMZ 8 will be connected to the realigned section of the Leiston Drain with the proposed outlet location at NGR TM 44466 63737. Refer to **Appendix I** and **Figure 14** above for the location of Outlet O8.

4.12.3 Approximate Discharge Duration

The estimated discharge start date for Outlet O8 is 1st December 2024. It is currently anticipated that the discharge from Outlet O8 will be required for the duration of the construction period (approximately 10-12 years, up until 2036 potentially). Upon completion of the discharge activities, the Outlet will be returned to its original state. The EA will be notified of any changes that could impact the proposed discharge duration from the Outlet.

CWDA-18 PERMIT APPLICATION SUPPORTING DOCUMENT

The below table summarises the key requirements as per GOV.UK application form Part B6:

Table 15 - Discharge Stream I Summary

Maximum Discharge Volume (m^3/day)	Maximum Discharge Flow Rate (l/s)	Anticipated Discharge Start Date:	Anticipated Discharge Duration
916	10.6	1st December 2024	10-12 years

5 PROPOSED POLLUTION CONTROL AND TREATMENT METHODS

Current construction industry and discharge activity best practice, lessons learnt from similar project experiences, and relevant regulatory requirements and guidance have all been taking into consideration for management of the proposed discharge and dewatering activities. Importantly, the setting of the site and its proximity to several protected areas has also been considered when developing the above-described discharge activity proposals and the below-described proposed pollution control and treatment methods.

The types of construction activities taking place within each part of the site have also been considered, to ensure that proposed measures are designed to ensure effective pollution prevention, whilst taking into account physical site characteristics and conditions. Risk assessments (explained in **Section** 6 below) have also helped to inform the proposed pollution control and treatment methods to ensure that these are designed to meet certain suggested water quality parameters.

The below guidance has been used specifically to formulate the proposed approaches to pollution control and treatment:

- The EA's approach to groundwater protection February 2018 Version 1.2[19]
- Environmental Permitting Guidance Groundwater Activities December 2010 Version 1.0[20]
- The CIRIA SuDS Manual 2015[3]

This section outlines the general measures that will be applied to protect surface water and groundwater during the construction and discharge activities while specific treatment methodologies for each above-described discharge stream are provided further below, where known at the time of writing.

5.1 Sustainable Drainage Systems (SuDS)

In accordance with best practice for managing surface water run-off, the drainage methods implemented on site will be in accordance with the CIRIA SuDS Manual[3], as described in **Section 4.1** above.

The types of SuDS techniques anticipated to be implemented include (but may not be limited to) the use of:

- Swales – proposed to convey flows from areas where higher sediment loads are expected to be present in the run-off (e.g., from stockpile areas). Swales, where incorporated, have been designed to minimise land-take while providing sufficient capacity to convey storm run-off volumes. Swales will be frequently dredged to remove accumulated sediment and maintain capacity;
- Filter drains – proposed along sub-catchment area boundaries to capture run-off from areas without kerbs. To be connected to downstream discharge networks (WMZ basins);
- Infiltration trenches; and
- WMZs (see further below for how these will be used for treatment).

[19] The Environment Agency's approach to groundwater protection (publishing.service.gov.uk)

[20] https://assets.publishing.service.gov.uk/media/5a7958f6ed915d07d35b4b8d/pb13555-ep-groundwater-activities-101221.pdf

Where suitable, the surfaces of the catchment areas across the site are proposed to be permeable so that surface water can infiltrate to ground in the first instance. Any run-off that does not infiltrate directly will be captured through swales that border each catchment area. The swales provide local source control to ensure the management of water returning to the ground to mimic the existing conditions. The swales will contain an infiltration trench beneath them which will encourage further infiltration, as well as provide additional storage. Any water that does not infiltrate through the infiltration trench into the surrounding ground will be captured by a perforated pipe within the trench, which will convey the flow to a WMZ basin (see below). Note that this technique will only apply to the parts of the site where WMZ basins are to be constructed.

Conventional drainage systems, e.g., buried pipes, are proposed in some areas to convey flows where SuDS are not suitable due to vehicle access requirements, health and safety considerations or space constraints. Linear channel drains are proposed to capture and convey run-off where SuDS are not suitable in some areas due to pedestrian access or other operational requirements.

All SuDS treatment features will require and be subject to regular maintenance, as outlined in **Section 8** below. As highlighted in **Section 4** above, where SuDS alone are not expected to provide sufficient treatment, additional treatment methods will be incorporated as described further below. This approach has been based upon the Simple Index Approach (SIA) as described within the CIRIA SuDS Manual and is considered best practice with regards to identifying required pollution prevention measures.

Specifically, for managing run-off from the proposed AD6 scheme, the environmental impact of discharging highway run-off has been assessed using the Highway's England (now National Highways) Water Risk Assessment Tool (HEWRAT) methodology. The assessment results confirmed that a SuDS management train with a combination of swales, filter drains, attenuation and infiltration basins, for AD6 discharges to ground and at attenuated rates to watercourses are low risk and therefore acceptable (for the permanent highway drainage design which will also be used to managed run-off generated during construction).

5.1.1 Water Management Zones (WMZs) Basins

Attenuation basins (known as WMZs) are proposed to be implemented across parts of the site during construction. These will be used for settlement / sedimentation, infiltration and / or attenuation of run-off. As described in **Section 4** above, the design of the WMZs has considered relevant return periods and climate change allowances. The design of each WMZ basin has been informed by information from ground investigations, including groundwater levels, infiltration rates, and watercourse connectivity. WMZs will have an access ramp for maintenance to clear out any silt build-up as and when required.

Approximate storage volumes (which were initially required to inform the overall Drainage Strategy[2] for the proposed development) were defined through MicroDrainage modelling. Parameters that were input into the modelling included the rainfall run-off method (Flood Estimation Handbook 2013[21]), return period (years) (2, 30 and 100), storm duration (15-1440 minutes), volumetric runoff coefficient (Cv, which varies per catchment) and % climate change allowance (20 % for temporary structures and 40 % for permanent basins). To prevent surface water from leaving the site in extreme rainfall events (e.g., 1 in 100 events), a combination of temporary ponds, cut off bunds / ditches and check dams will be constructed across the site to meet the 100-year storm

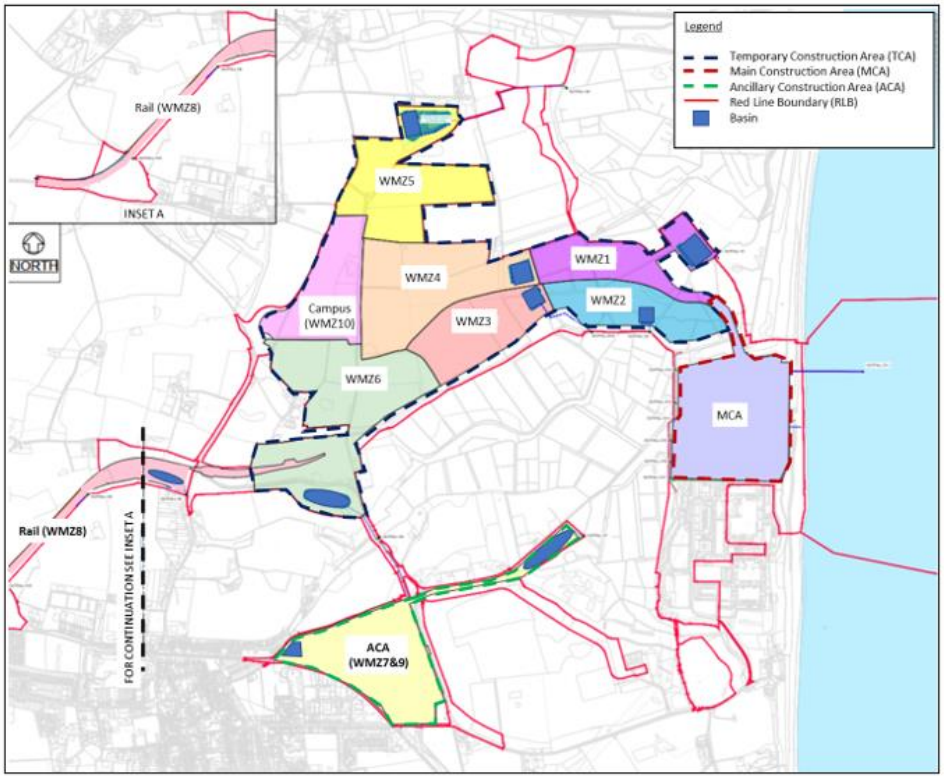
[21] https://www.ceh.ac.uk/sites/default/files/2021-11/Flood-Estimation-Handbook-4-Restatement-And-Application-Of-The-Flood-Studies-Report-Rainfall-Runoff%20Method_Helen-Houghton-Carr%20version%202.pdf

volumes plus climate change allowance, as described in **Section 2** earlier. All run-off will be restricted to greenfield rates where this requirement applies (as agreed at DCO stage).

It is important to note that the construction site will develop throughout the first 12-24 months, at least, and therefore temporary attenuation structures will move position as required to accommodate reprofiling of the site.

Figure 15 below shows the location of the proposed WMZs across the MDS. Only WMZ 5, 6, 7, 8 and 9 are applicable to this permit application.

Figure 15 - Water Management Zone (WMZ) Layout



Where WMZ basins cannot be constructed immediately, temporary ponds may be used within individual catchments to provide much of the attenuation volumes required to manage extreme rainfall events (1 in 100-year plus climate change allowance). The locations for temporary attenuation areas are influenced by the existing ground levels, retained landscaping and sequence of construction events. These will be finalised during final design stages prior to any discharging activities (covered in this permit application) commencing on site.

Within the AD6 scope of construction works, an infiltration basin may be incorporated into part of the design of the surface water drainage strategy to allow the infiltration of surface water run-off in areas where testing has shown that this is viable. Where however infiltration is not suitable, run-off will be directed either directly to watercourse (via the permanent drainage system) from construction areas or to watercourse via an attenuation basin (in the case of discharge going to Outlet O8a).

5.2 Use of Coagulants and / or Flocculants

There may be the need to add coagulants and flocculants to the discharge streams prior to them passing through a clarifier system (to allow for settlement and removal of solids) and being discharged to a receiving watercourse (or to Sizewell Foreshore in the case of the Discharge Stream A). This method of treatment, commonly referred to as 'dosing', helps to reduce finer suspended solids in the discharge as the chemicals help to bind together very fine particles for removal and separate disposal, prior to final discharge. They are typically used alongside other treatment methods (described below). The need for this specific method has yet to be determined however and will be dependent upon site and discharge-stream specific conditions. The need for the use of this treatment method may therefore not be confirmed until construction activities begin on site.

The chemicals expected to be used as dosing agents are not listed as specific substances on the GOV.UK freshwaters specific pollutants and operational environmental quality standards spreadsheet[22], with the exception of ferric chloride which incorporates the use of iron (dissolved). While this is classed as a specific substance, no carry over of the chemical from the treatment plant systems where it will be dosed is anticipated to be present in the final discharge. This is due to the fact that any residue from the dosing chemicals will bound (by the flocculant) and subsequently removed from the effluent stream along with the settled solids, prior to the discharge stream entering the receiving environment. This is further outlined in the supporting risk assessments that accompany this permit application which also contain some example Material Safety Data Sheets for dosing chemicals that might be used. Furthermore, as suspended solids do not have an environmental quality standard (EQS), a surface water pollution risk assessment to assess specifically risks from suspended solids is not possible.

Engagement has taken place with suppliers of suitable treatment systems and data has been provided in the supporting assessments to demonstrate that there should be no carry-over of the dosing chemicals and no other specific substances present in the systems that may be used. This data has been provided to the EA as part of the Pre-Application stage and is contained in the relevant supporting risk assessments to this application.

It is anticipated that coagulation and flocculation dosing may be required to meet the proposed suspended solids limits on site, particularly during the winter months which will likely see extended periods of rain which can impact the amount of time available for solids to settle in attenuation ponds. While using chemicals to help reduce levels of suspended solids in the discharge is not preferable to some alternative treatment options, it is one of the most effective for managing the presence of finer suspended solids in the discharged effluent. This is important to this project due to the ecological sensitivity of the existing site surroundings (for example, the proximity to Sizewell Marshes SSSI). The systems that are anticipated to be used (if required) are considered best practice and will have inlet monitoring to control the chemical dosing rates based on the exact composition of the discharge stream being treated. This will prevent any over-dosing of the chemicals within the system and help to ensure no residual carry-over. The use and management of chemical dosing systems has been considered in further detail within the qualitative environmental risk assessment that has been undertaken to support this permit application **(Appendix L)**. Appropriate training will be provided to operatives on site responsible for management and maintenance of the systems.

[22] Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk)

5.3 General Construction Pollution Prevention Measures

Applicable guidance will be followed to ensure generic pollution prevention measures are implemented throughout the duration of the proposed construction works and discharge activities where appropriate.

Relevant guidance will include for example:

- GOV.UK Guidance on Pollution Prevention for Businesses[23]
- GOV.UK Guidance Protect Groundwater and Prevent Groundwater Pollution[24]
- Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites[25]

Where applicable to the proposed construction works, the following pollution prevention measures will also be implemented on site to mitigate against the presence of any contaminants being present from on-site activities in the discharge streams described in this permit application:

5.3.1 Storage and Use of Materials, Plant, Equipment and Machinery

- Materials stored will be kept to a minimum and located as far away as possible (a minimum of 10 m) from surface waters or other pollution pathways. Ring-fencing of stockpiles with silt fencing or sediment tubes may be required.
- Stockpiling will be kept to a minimum, in terms of duration and heights. Consideration will be given to covering of materials where required. Management of stockpiles will be undertaken in accordance with the Code of Construction Practice for Sustainable Use of Soils on Construction Sites[25] and any project-specific documentation such as Materials Management Plans.
- Plant, equipment and machinery to be stored on hardstanding where possible. Drip trays / plant nappies to be used where appropriate. Suitable spill equipment will be provided.
- Perimeter drainage ditches will be established around stockpiles as necessary to collect run-off. These will be directed to surface drainage systems / outlets for treatment (if required) and discharged. Oil / water separators / interceptors will be incorporated into the drainage design.
- Haul roads will be constructed for areas of frequent plant and vehicle movement. These will be constructed from suitable materials to limit mobilisation of sediments. Any run-off will be directed to either permanent surface water drainage systems (once constructed) or to outlets for treatment (if required) and discharged.

5.3.2 Concrete

- Any concrete and cement mixing and washing areas will be situated at least 10 m away from surface water receptors. Settlement, pH correction, and recirculation systems will be incorporated as required to allow water to be re-used. All washing out of equipment will be undertaken in a contained area, and all wash waters will be collected for off-site disposal. There will be no disposal of concrete washout water via the discharge outlets contained within this permit application.

[23] Pollution prevention for businesses - GOV.UK (www.gov.uk)

[24] Protect groundwater and prevent groundwater pollution - GOV.UK (www.gov.uk)

[25] Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (publishing.service.gov.uk)

- Any proposed treatment measures will take into account the nature and composition of the concretes used on site, including any additives. pH correction may be required for run-off which originates from areas on site where concreting activities have been undertaken.

5.3.3 Fuel, Chemicals and Oil

- Oil storage containers and facilities will be designed and maintained in accordance with the Control of Pollution (Oil Storage) (England and Wales) Regulations 2001, as amended.
- All fuel stored will be held within bunded tanks and all other potentially environmentally hazardous liquids stored on / within bunded storage units. Any ancillary equipment (i.e., nozzles, hoses) will be maintained in good order and stored within bunds where possible.
- Oil and chemical spill kits will be provided in strategic locations and operatives will be trained in their use. Contents will be replaced following any use. A site spill response procedure, or similar, will be implemented as part of the environmental management system requirements. Any used spill equipment will be disposed of as hazardous waste.
- Storage areas will be located as far away from watercourses as possible, and the quantities stored kept to a minimum.
- Any chemicals required to aid discharge treatment processes will be stored in bunded areas / containment and away from watercourses.
- Refuelling facilities will be sited as far away as possible from watercourses / surface water drainage systems. Wherever practicable, these will be located on areas of hardstanding. Site specific fuel management procedures will be adopted as part of management system arrangements.
- Regular site inspections / walkovers will incorporate checks (visual) on all fuel, chemical and oil storage containers and areas. This will include checks for any leaks or damage. Any issues identified will be escalated as per the relevant contractor site management procedures.
- A COSHH register will be maintained on site, complete with risk assessments and material safety data sheets for substances in use.
- Oil interceptors will be installed in certain locations where considered necessary on site, e.g., vehicle parking areas.
- See **Section 7** below for further information on water quality monitoring arrangements.

5.3.4 Silt Prevention

A range of techniques will be used to control activities that have potential to be a source of sediment laden run-off. As with most construction sites, one of the key parameters of concern is total suspended solids in the proposed discharge streams.

Much of the sediment from surface water run-off will be captured in perimeter swales, cut-off ditches and temporary ponds. The location and extents of temporary ponds are to be confirmed as construction sequencing is detailed. It is subject to ground sampling and material testing to verify infiltration rates. Additionally, the use of settlement systems or similar may be used to reduce total suspended solids. The below bullet points set out the current proposed arrangements that may be incorporated to address sediment laden run-off during the early construction period:

- In some areas, permanent surface water drainage systems will be constructed first (in accordance with SuDS methodology described above). These systems will then be used for discharging of surface water to receiving watercourses, notably the works required for AD6.
- Typical silt prevention measures used in construction (such as erosion matting, silt fencing and gravel) are expected to be used. This may also include measures such as: sediment bags on the end of pumps, silt socks, swales combined with filter strips, silt traps in manholes, gullies and channels.
- In areas where the general fall of the land leads toward watercourses, techniques such as drainage grips containing gravel and silt fencing may be installed (for example at the ends of piling platforms) to prevent sediment being washed into watercourses.
- In areas where there are exposed soils, seeding of the slopes, topsoil and subsoil stockpiles may be undertaken (where required) to prevent run-off from exposed areas during early construction works. This will be undertaken in accordance with the Defra Code of Construction Practice for Sustainable use of Soils[25] and any project-specific management plans, i.e., Materials Management Plan.
- WMZs will be constructed across parts of site, as described in **Section 5.1.1**. Only those which are required as part of the early enabling works have been included within this permit application; WMZ 5, WMZ 7, WMZ 9 and WMZ 8. The following factors were taken into account when designing the WMZ basins: modelled rainfall volumes, run-off catchment area size, sizing of attenuation basins required to achieve settlement of solids, provision for emptying and desilting the basins, provision for monitoring and sampling arrangements (e.g., chambers), provision for additional treatment arrangements, the need for shut-off valves to stop water from discharging from the WMZs in emergency situations or exceedance of permit limits, and / or penstock systems to control water flow within the WMZs.
- Where required, lamella treatment plants (or similar) may be incorporated to help manage levels of suspended solids in the discharge streams. Such systems have been referred to as 'additional' treatment, i.e., to be used in addition to SuDS techniques, in line with the Drainage Strategy[2]. These systems will be maintained in accordance with the manufacturer's instructions and will be subject to regular checks and inspections as part of environmental management system requirements. The size and number of treatment plants is dependent on required the nature of the discharge and outflow rates and volumes. Surface water run-off containing very fine particles, e.g., clay, may not settle efficiently in settlement systems alone and may require the addition of coagulants and flocculants to increase the rate of settlement (as described in **Section 5.2**).
- Increased / heavy rainfall may contribute to the mobilisation of silt therefore weather conditions will be regularly monitored. Re-consideration of discharge arrangements due to changes in weather conditions will be instigated by site management.

5.3.5 Metals and Other Substances Present in Baseline Groundwater

Groundwater may potentially contain elevated levels of naturally occurring metals and other substances. This has been taken into consideration by the risk assessments that support this permit application. The paragraphs further below explain where further consideration and / or treatment may therefore be required for certain discharge streams (in addition to treatment of suspended solids for example).

5.3.6 Nitrates and Phosphates

Surface water monitoring data that is available for the Leiston Drain and Sizewell Marshes SSSI shows elevated levels of nitrates and phosphates. These are predominantly understood to be from discharge from the Leiston

wastewater treatment works further upstream. There may also be nitrates and phosphates present due to diffuse agricultural sources in the wider surrounding area. The construction activities proposed within this permit application are not expected to have an impact on the baseline nitrate and phosphate levels, with the exception of soil stripping which may lead to initial releases of nitrate and phosphate from a short-term perspective. It is therefore recognised that sampling may be required to be undertaken, dependent upon any conditions set by the EA in the permit, however it is expected that any limits set in relation to these parameters will consider the existing surface water quality characteristics (as presented in the Surface Water Baselining Assessment in **Appendix P**).

5.3.7 Summary

Overall, treatment methods will be employed to ensure that concentrations of suspended solids, or other contaminants if present, are removed or reduced to an appropriate level (based on baseline water quality conditions) prior to discharge. Large sediment particles are expected to settle out under reduced flow velocity conditions and attenuation basins will be designed to maximise the natural settlement process. Flocculation and / or coagulation may however be required for finer particles of suspended solids. This would be incorporated through chemical dosing systems. Additional treatment measures for other parameters will be implemented where necessary, e.g. pH correction.

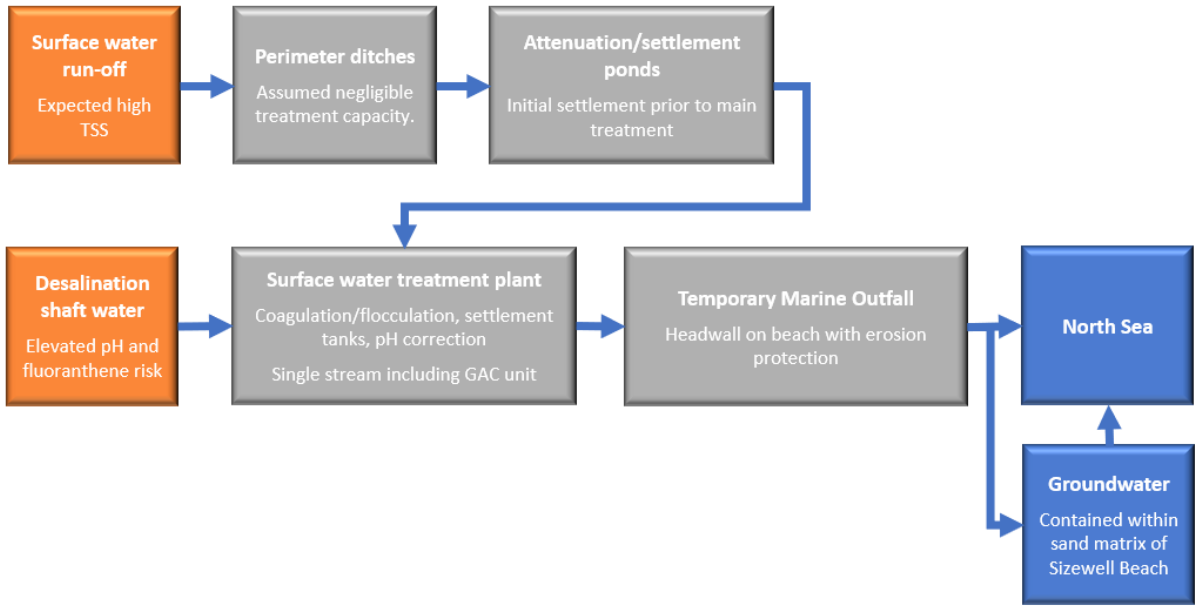
None of the above-proposed treatment methods are anticipated to influence the temperature of the discharge or receiving watercourse (as no thermal components are involved). As stated in application Form Part B6 **(Appendix A)**, the maximum temperature of the discharge is dependent on ambient temperature and is therefore only expected to reach approximately 21 degrees (in summer months for example). For most of the time, the temperature will reflect typical ambient temperatures (approximately between 9-15 degrees).

The below paragraphs summarise the proposed treatment methodologies for each specific activity included within this application. These are subject to finalisation but will ultimately be designed and implemented to ensure that any conditions set out in the permit can be effectively met.

5.4 Treatment of Discharge Stream A – Outlet EO1 (TMO Discharge)

The MCA comprises an area of undeveloped greenfield scrub and grassland. The entirety of the MCA footprint will be developed as part of the SZC construction works. During the early construction phases, various activities will take place in this area, as described in **Sections 2.3 and 3.2.1** above. It is anticipated, based on the works to be undertaken, that potential contaminants in the surface water run-off could include suspended solids (from silt mobilisation) and potentially elevated levels of pH due to concreting activities. **Figure 16** below has therefore been included to demonstrate a potential treatment train option for the surface water run-off and groundwater at the TMO. The final treatment arrangements however will be subject to any requirements / limits that are set out in the permit itself. The methods in the below diagram have been suggested in accordance with the SIA, as set out in the CIRIA SuDS methodology. In essence, this approach allows the user to understand where further additional treatment measures may be required in addition to the use of SuDS techniques, based on a Pollution Hazard Index. It acknowledges that, while SuDS provide certain levels of treatment for particular contaminants common in surface water run-off, these may not be adequate for all types of run-off, therefore additional treatment measures can be identified as necessary.

Figure 16 - Discharge Stream A (Outlet EO1) Proposed Treatment Train Option



5.4.1 Treatment of Surface Water Run-Off

The drainage strategy for the MCA during the early stages of construction works includes a perimeter drainage system to capture any run-off. This will comprise drainage ditches around the perimeter of the area to intercept and capture run-off. Bunds will also be formed where necessary to act as a barrier and direct the water overland to the perimeter ditches. These ditches will convey the water to an / a series of attenuation basins, located in a lower-lying area of the MCA, which will provide an opportunity for initial settlement to take place (i.e., of suspended solids). Retention times within the basin will be calculated during detailed design to help ensure concentrations of suspended solids are reduced. Run-off collected in the basin(s) / ponds will then be pumped, through a flow meter, to a treatment plant(s). This will likely comprise settlement tanks, and potentially coagulation and flocculation dosing (as described in **Section 5.2**) if required to improve settlement performance, and pH correction. It is currently proposed that the treatment plant system for the TMO Outlet will consist of five parallel treatment streams each with a capacity of up to 40 l/s (combined capacity of 200 l/s; equal to the maximum proposed discharge rate via the TMO). The final effluent will be monitored to ensure compliance with set discharge quality requirements (see **Section 7** below).

It is assumed that power for the treatment plant systems will be supplied by a generator. Suitable pollution prevention measures will be in place to manage any fuel required for generators across the site. A hybrid type generator is the preferred option as these have an auxiliary power supply which can be used to power attenuation pond level sensors (where applicable) and monitoring equipment to ensure that these constantly remain online. This applies to all discharge streams where additional treatment systems may be used.

The total suspended solids content of the discharge is proposed to be no greater than 250 mg/l. This limit has been considered appropriate based on the background baseline data that is available (as described further in **Section 7**).

The pH levels of the discharge will be treated if required to ensure they meet acceptable levels (i.e., between 6-9). Where pH levels are below this level, which may be found in peat material, a Sodium Hydroxide (NaOH) substance will be added to increase the water pH level. Carbon dioxide (CO2) may be added to decrease high pH levels.

Figure 16 above provides a potential treatment train option only for Discharge Stream A. This may be subject to change depending on site-specific spatial arrangements / layouts and any limits set in the permit, however the treatment measures incorporated will be in accordance with best practice for managing construction related surface water run-off and groundwater. The type of treatment, number and size of plants is to be confirmed with the surface water treatment contractor (once appointed) and may be subject to ground sampling and material testing.

5.4.2 Treatment of Groundwater from Desalination Shaft Installation

The TMO Groundwater Discharge Risk Assessment undertaken to support this permit application (**Appendix O**) indicated that there is the potential for certain constituents to be present in the baseline groundwater within parts of the MCA. Namely, (mainly sporadic) exceedances were identified against Drinking Water Standards and / or against coastal and estuarine EQS' of the following constituents: chloride, ammonium, ammoniacal nitrogen, sodium, arsenic (dissolved), iron (dissolved), manganese (dissolved), boron, sulphate, copper (dissolved), anthracene, fluoranthene, zinc (dissolved) and hexavalent chromium. It is therefore proposed that, prior to the discharge of any dewatered groundwater in this area, sampling and testing will be undertaken to confirm the absence of such contaminants in the discharge stream. This will likely be undertaken off-site by an United Kingdom Accreditation Scheme (UKAS) accredited laboratory. Additional treatment measures (in conjunction with already-proposed settlement systems for example), or alternative disposal options for the groundwater (e.g., tankering offsite to a suitably licensed waste disposal premises), may therefore be required to be incorporated as part of on-site treatment arrangements if the sampling shows such contaminants to be present. If additional treatment is identified as necessary, based on the groundwater sampling results, this will be communicated to the EA once it known what substances require treatment. At this stage this is currently undetermined as the final treatment measures depend on exactly what constituents are identified as present. No discharge of the groundwater will be made via the TMO without suitable treatment where it is identified the above-referenced parameters are identified to be present, as described in **Appendix O.** Sampling immediately downstream of the treatment plant systems will be undertaken to confirm discharge quality is within any permitted limits.

5.5 Treatment of Discharge Stream B – SSSI Foundations Crossing

As explained in **Section 4**, groundwater is expected to be encountered during the installation of the SSSI Crossing, which will provide access to the MCA. Baseline groundwater data obtained from the site was used to complete a Surface Water Pollution Risk Assessment to support this activity (see **Appendix M**). This identified that there are certain constituents present in the baseline groundwater that failed the assessment screening tests and may therefore require further detailed modelling by the EA during the permit determination period (as per the GOV.UK guidance on surface water pollution risk assessments[10]), to determine whether limits on such parameters need incorporating into the environmental permit. The groundwater encountered will therefore be treated in accordance with parameter limits set in the environmental permit. At present, it is therefore uncertain precisely what treatment systems are required to be incorporated for this discharge stream.

5.6 Treatment of Discharge Stream C – TCA Outlet O5

Surface water run-off from the WMZ 5 catchment area in the northern TCA will be conveyed, attenuated and treated prior to discharge into the Marsh Harrier Habitat wetland area. The catchment for WMZ 5 encompasses part of the main haul road, access roads, material storage area and borrow pits. The primary parameter of concern in this area will be suspended solids, therefore it is proposed to remove as much sediment as possible as close to its source across the TCA. Sediment removal will primarily be provided through a combination of SuDS techniques and conventional drainage components, which form a treatment train across the site. Additional treatment systems, such as settlement plants, will be incorporated where necessary. The WMZ 5 surface water drainage system has been split by sub-catchment areas, as shown in **Table 16** below. This indicates the anticipated drainage methods that will be applied to the discharge from the northern part of the TCA.

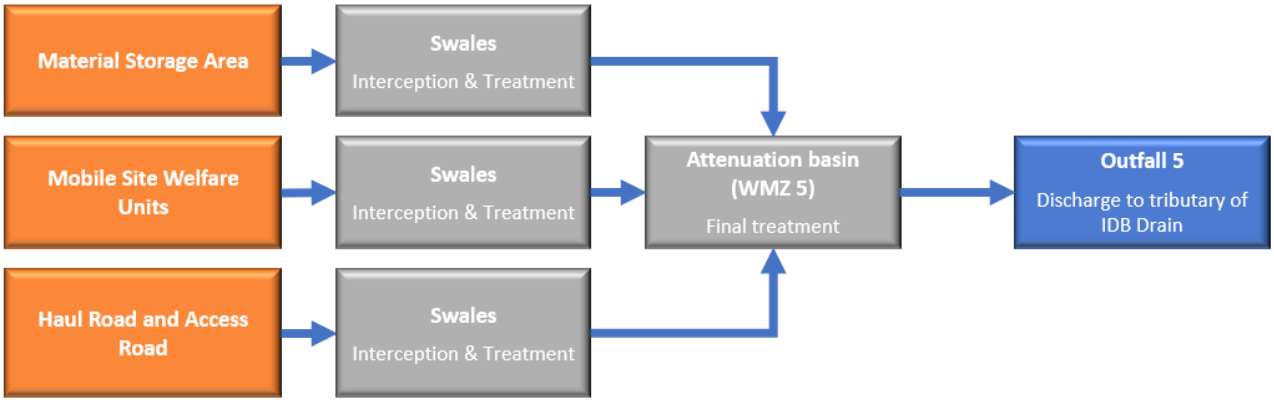
Table 16 - WMZ 5 Sub-Catchment Drainage Methods

Sub-Catchment Area within WMZ 5	Proposed SuDS Methods to be implemented
Borrow pits	Infiltration (where viable) or swales
Material storage area	Swales
Mobile welfare units	None – surface water discharge onto adjacent ground (infiltration). Foul water will be tankered offsite from any welfare units.
Main haul road	Swales
Access roads	Filter drains and swales

Two drainage networks within the catchment are proposed along the boundary and have been designed as perimeter swales to capture any overland flow that may otherwise escape the catchment area. A further swale network has been proposed around the perimeters of each material storage area, stockpile and borrow pit within the catchment area. All three networks will discharge to the WMZ 5 basin located to the north of the TCA.

The WMZ 5 basin will discharge eastward via a gravity pipeline to the Marsh Harrier Habitat. An overflow (Outlet O5) from the Marsh Harrier Habitat will then facilitate the discharge of any excess water (that cannot be infiltrated) to a ditch which runs north into WMB Drain No.7 (DRN163G0101), which subsequently converges with the Leiston Drain watercourse. **Appendix E** shows WMZ 5 at its current stage of design. Note that this is still subject to final design so some aspects may change; these will be notified to the EA if they are expected to impact upon the proposed discharge activities. **Figure 17** below shows the proposed treatment train for Discharge Stream C based on currently available information.

Figure 17 - Discharge Stream C (Outlet O5) Proposed Treatment Train



The above-proposed treatment train has been assessed using the SIA in accordance with the CIRIA SuDS methodology. This has enabled the suitability of each proposed method to be assessed in relation to the expected pollution hazard level (as set out in the SIA methodology Pollution Hazard Index). This has identified that the above-described methods in **Table 16** should be suitable for effective treatment of anticipated contaminants including suspended solids and hydrocarbons. However, given the sensitivity of downstream receptors, additional treatment systems may also be implemented (such as lamella clarifiers and coagulation / flocculation dosing) as necessary to meet required water quality requirements set out in the permit.

WMZ 5 and the associated Outlet O5 is anticipated, at this moment in time, to be returned to its greenfield state upon completion of the proposed construction and discharge activities. The Marsh Harrier Habitat is expected to remain intact.

5.7 Treatment of Discharge Streams D, E and F – Outlets O6a, O6b and O6c

The construction works proposed to take place as part of the AD6 scheme (leading to discharge streams D, E, F and H), will largely be managed through standard construction mitigation measures as described above in **Section 5.3**. For the proposed works associated with the activities described in **Section 3** above, the following pollution prevention and treatment measures are anticipated to be implemented:

- Use of the permanent AD6 highway drainage system, which incorporates the use of SuDS, for management of construction-related run-off. The permanent drainage system will be constructed first which will allow for its use during the remainder of the AD6 construction activities.
- Any fuel / oils will be stored within bunded tanks and all other potentially environmentally hazardous liquids stored on / within bunded storage units. Oil and chemical spills kits will be provided and operatives will be trained in their usage.
- Any discharged groundwater from shallow excavations, required for the construction of the highway drainage system, will be sent through sediment bags and oil dewatering filters (or similar) prior to discharge either via infiltration to ground (where feasible) or through the surface water drainage network and associated discharge outlets.

- Swales may have silt fencing installed within them to help capture sediment. Where allowed by the phasing of the works, sediment and oil filters will also be installed within gully pots to prevent the ingress of contaminants from the highway.
- If required, additional treatment systems (for example, lamella clarifier or dosing systems) may be used to aid treatment, however it is anticipated that the use of sediment bags should be sufficient.

Where dewatering is required for groundwater from the proposed piling works at the Leiston Drain Overbridge (Outlets O6a and O6b), additional treatment methods that are proposed to be incorporated based on current construction methodology are summarised below:

- Sheet pile retaining walls may be installed along the edge of the proposed working platforms (required for installation of the bridge) parallel to Leiston Drain. These would help to create a defined edge that the working platforms can be installed against, preventing any over-dig / interference with the watercourse. Sheet piles may be installed projecting above the proposed working platform level, to act as a barrier to prevent any water reaching the watercourse directly. Small drainage grips containing gravel and silt fencing may also be installed at the ends of the platforms nearest to the Leiston Drain to prevent sediment potentially entering the watercourse.
- Piles are anticipated (at this stage) to be installed using the CFA method; this is however still subject to final design arrangements. Any excess groundwater brought to the surface by the auguring process is expected to be directed across the working platform (for example via sandbag bunds into sumps within the engineered platform) for removal by pump into a lamella settlement tank system, or similar (refer to **Section 4.7**). If required, pH reduction may also be undertaken. Treatment systems will be installed more than 10 m away from the Leiston Drain watercourse wherever possible. Any concrete wash water would be removed for disposal offsite via a licenced waste carrier and taken to a suitably permitted facility (not discharged).
- It is anticipated that volumes of groundwater (>20 m^3/day) may require removal from the excavations (a separate abstraction licence will be applied for). To remove this groundwater, it is anticipated that a diesel-powered pump may be required to be used (intermittently).

The below bullet points outline the further standard mitigation practices that are likely to be applied to the AD6 construction works.

- Infiltration techniques will be used where viable in accordance with the wider site drainage methodology.
- Water from excavations will not be directly discharged to highway drainage or watercourses without undergoing treatment to remove silts and hydrocarbons (if present). For small, isolated excavations, groundwater (if encountered) will be sent through oil filters and sediment socks / filter bags. It is expected that the groundwater would be pumped out with a sump pump with a filter bag on the end of the hose to remove any sediment present.
- Silt screens and cut off ditches may be used, where required. Flows can be directed to sumps where water can then be pumped to a treatment area, for silt removal via additional settlement systems (if identified as necessary).
- Fuel will be stored within bunded tanks and all other potentially polluting liquids stored within bunded storage units. All units will be positioned as far away from the Leiston Drain watercourse (and any other pollution pathways) as possible and the quantity of material stored kept to a minimum. Oil and chemical spill kits will be provided and operatives will be trained in their usage.

- Given the potential need for ready-mixed concrete to be delivered to the site, ideally, the contractor (once appointed) should try and seek an agreement with the concrete supplier to not washout delivery lorries on site (i.e., washouts would be done back at the batching plant) to minimise the risk of any environmental pollution. However, if this is not possible, use of a concrete washout system would be made. The wash water will not be discharged but instead collected for off-site disposal.

5.8 Treatment of Discharge Stream G – ACA (Outlet O7)

Outlet O7 will discharge rainfall-dependent surface water run-off from within the ACA. The ACA is isolated from the TCA and MCA, and therefore has an independent surface drainage network.

Treatment of the run-off is to be provided through the below SuDS techniques:

- Permeable surfacing, for certain parts of the ACA;
- Swales, proposed to convey flows from areas where high sediment loads are anticipated in the run-off, for example in the ACA where there will be a stockpile area and topsoil compound area. Swales will be designed to minimise land-take, whilst providing sufficient capacity to convey design storm run-off and allow the removal of any accumulated sediment;
- Filter drains, used to capture run-off from any areas without kerbs;
- Conventional drainage systems (pipework); and
- WMZ basins (WMZ 7 and WMZ 9, designed to cope with 1 in 100-year storm event plus 20 % climate change allowance for temporary structures). The basins are proposed to store and attenuate run-off prior to discharge. WMZ 9 will collect surface water run-off from the western part of the ACA. This will then be pumped to a pipe network that will drain to WMZ 7 in the eastern part of the ACA. WMZ 7 will collect run-off from the eastern part of the ACA. This WMZ basin will then discharge via Outlet O7 to an existing ditch (tributary) within Sizewell Belts, which flows into Sizewell Drain.

Table 17 below shows the proposed SuDS methods in relation to the ACA sub-catchment areas. The proposed methods have been determined using the SIA method as outlined earlier, in accordance with the CIRIA SuDS methodology.

Table 17 - ACA Sub-Catchment Drainage Methods

Sub-Catchment Area of ACA	Proposed SuDS Methods to be implemented
Northern topsoil compound	Swales
Southern topsoil compound (bund)	Swales
Southern topsoil compound (access road)	Filter drains and infiltration trenches
Railhead	Filter drains and Class 1 full retention interceptor
Material transfer laydown	Filter drains and linear channel drains
Sand and aggregate stockpile	Swales and linear channel drains
HGV parking	Filter drains, linear channel drains, and Class 1 full retention interceptor
Caravan pitches	Permeable surfacing and linear channel drains

Access roads	Gullies and filter drains
Park and ride (car parking and bus compound)	Permeable surfacing

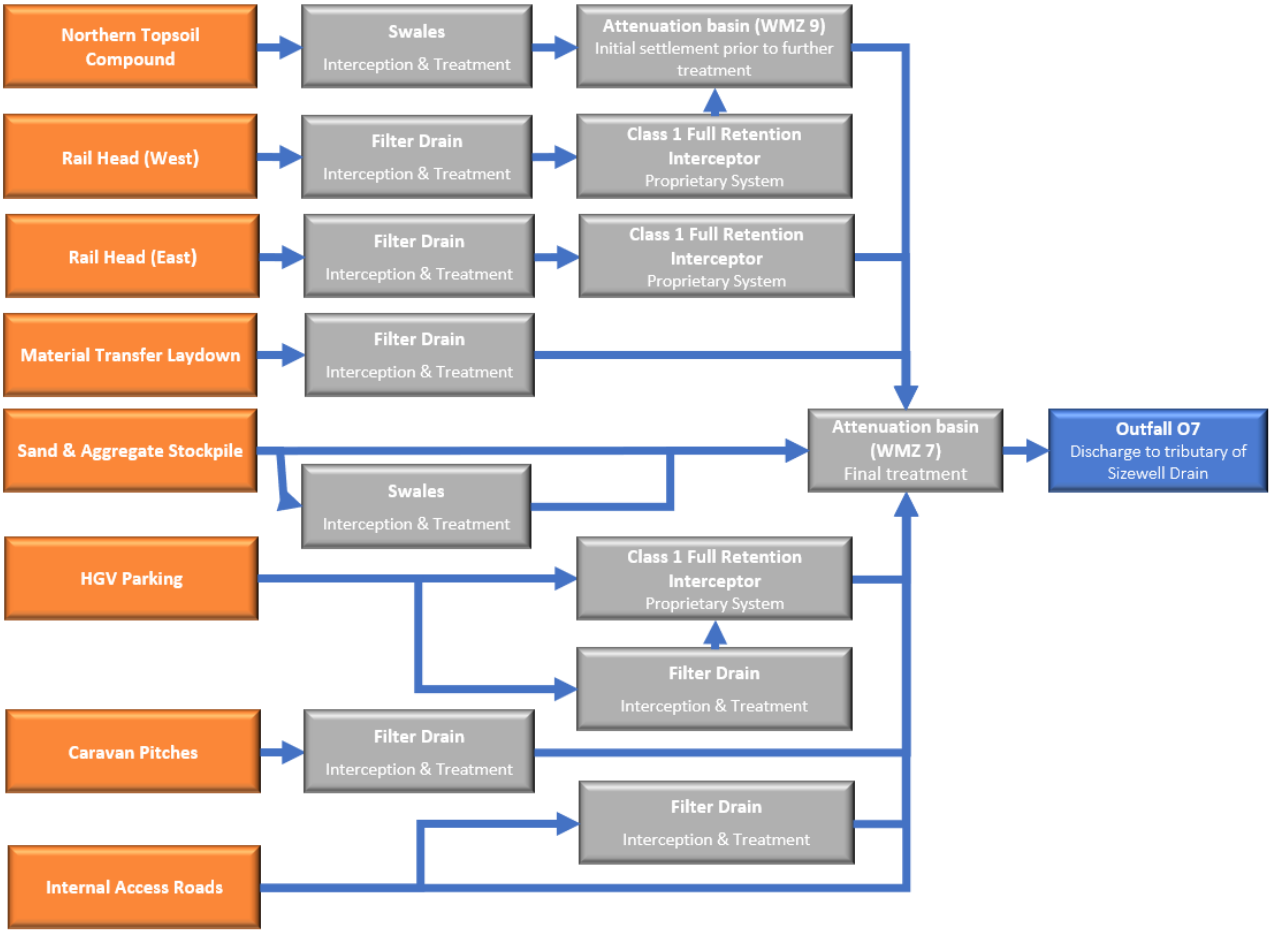
Overall, run-off from the northern topsoil compound and the western half of the railhead will be captured in a gravity network comprising swales and filter drains and conveyed to WMZ 9 where flows will be stored. From WMZ 9, flows will be pumped through a rising main to a break chamber in the north-western corner of the caravan pitch which connects to a downstream gravity network. Surface water run-off from all other areas within the ACA will be captured in a gravity network comprising of a variety of SuDS and conventional drainage systems. Geo-cellular tanks located immediately north of the HGV parking area will be used to provide additional on-site storage required to manage flooding in the 1 in 100-year plus 20 % climate change storm event. Run-off from all areas south of the railhead will be conveyed to infiltration structures including permeable paving and a below ground geo-cellular infiltration tank from which run-off will infiltrate to ground. Flows from the western ACA will be conveyed via a below ground carrier drain to the WMZ 7 basin in the eastern ACA, before being discharged into the tributary of Sizewell Drain (Sizewell Belts) within the SSSI.

Note that the WMZ's are still subject to final design, therefore some characteristics described may be subject to change. Where these could impact on the proposed discharge activities subject to this permit application, notification will be made to the EA. Refer to **Appendix H** which shows Outlet O7 and WMZ's 7 and 9.

In addition to the SuDS highlighted above, run-off from certain areas within the ACA (including aggregate stockpiling and HGV parking) may require additional treatment prior to discharge to the WMZ 7 basin. This is likely, if required, to comprise of a settlement system to treat oil, pH and suspended solids, as described in **Section 5.2** above. The need for additional treatment will be assessed once any permit has been issued and / or through on-site monitoring.

Figure 18 below shows the current proposed treatment train for Discharge stream G:

Figure 18 - Discharge Stream G (Outlet O7) Proposed Treatment Train



Upon completion of the required construction discharge activities, the surface water drainage features will be removed, and the land reinstated to its pre-construction 'greenfield' state.

5.9 Treatment of Discharge Stream H – Outlet O8a

For surface water run-off and potentially small quantities of groundwater from shallow excavations at the MDS Roundabout and Abbey Road BR19 area of works (within the AD6 scheme), the following mitigation measures are anticipated to be implemented to provide treatment of Discharge Stream H:

- An attenuation basin to capture run-off and pumped groundwater from excavations, where necessary. This will aid settlement of suspended solids. The proposed design of the basin has been undertaken in accordance with the outputs of MicroDrainage modelling and incorporates an allowance for climate change, as described in **Section 4** above.
- The discharge from the basin is expected to be directed to the permanent drainage system as part of the AD6 scheme of works, which has been designed in accordance with SuDS methodologies.

- Silt fencing may be installed in existing / re-aligned ditches leading to the Leiston Drain to capture any silt that may be present in the surface water run-off. Any captured sediment in these features will be removed off-site to a suitably licensed waste management facility by registered waste carriers.
- If required, additional treatment systems (e.g., lamella or dosing systems) may be used to aid treatment where necessary.

5.10 Treatment of Discharge Stream I – Outlet O8

Discharge Stream I will comprise treated surface water run-off from the area of land in which the GRR is to be developed. The area will include the railway track bed and embankments / landscaping bunds adjacent to the railway line. At the time of writing, the detailed design for this area is in its early stages. The information within this section of the permit application is therefore still subject to final detailed design. The EA will be notified of any changes that are made following submission of the permit application that could impact the proposed discharge activities.

The proposed drainage system for this part of the site shall be to use SuDS techniques to convey, treat and direct surface water run-off to the attenuation basin (WMZ 8). From here, additional treatment will be incorporated as required and the resultant treated effluent discharged via a headwall into a re-aligned section of the Leiston Drain. The re-alignment works will be consented as appropriate (e.g. by a FRAP).

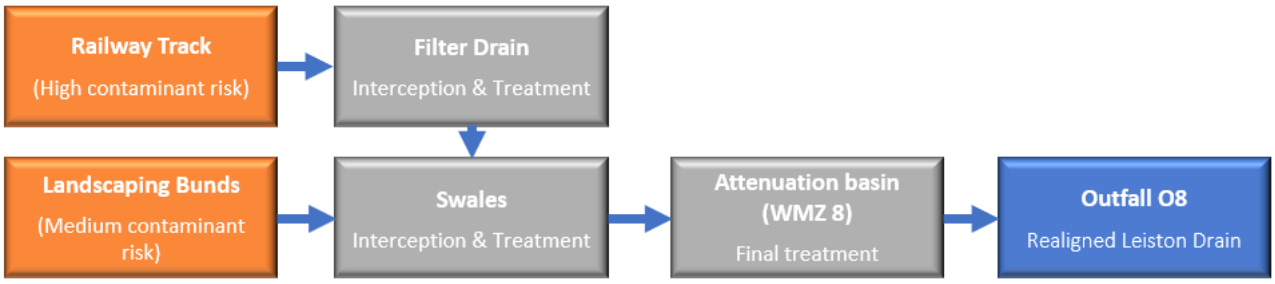
Table 18 below shows the proposed sub-catchment areas which make up the GRR area. As with the SuDS methods incorporated as part of the other discharge streams above, the effectiveness of these in terms of pollution prevention has been determined using the SIA method, in accordance with the CIRIA SuDS methodology.

Table 18 - Green Rail Route Sub-Catchment SuDS Drainage Methods

Sub-Catchment	Proposed SuDS Methods to be implemented
Railway line track bed	Filter drains Swales
Landscaping bunds	Swales

The below diagram shows the proposed treatment train for discharges to be made via Outlet O8:

Figure 19 - Discharge Stream I (Outlet O8) Proposed Treatment Train



Given the sensitivity of the downstream receptors, the quality of the discharged water will be monitored against the required water quality parameters (to be set in the permit). If further treatment is identified as being required, as with the other discharge streams described above, equipment such as lamella clarifiers and dosing of coagulants / flocculants will be incorporated into the treatment methodology for Discharge Stream I.

Refer to **Appendix I** which shows Outlet O8 at its current stage of design. Note that this is still subject to final design so some aspects may change; these will be notified to the EA if they are expected to impact upon the proposed discharge activities. Upon completion of the required construction discharge activities, most surface water drainage features will be removed, and the land reinstated to its pre-construction 'greenfield' state. Once the railway line is operational, it is not anticipated that the discharge permit will be required as run-off from the railway line will filter through the track bed ballast acting as a filter drain before being captured in a gravity network of swales and conveyed to WMZ 8, which will remain a permanent feature. Run-off from the embankment will enter directly to the swales to be conveyed to WMZ 8. The basin will discharge via gravity to the re-aligned Leiston Drain watercourse.

6 ENVIRONMENTAL RISK ASSESSMENTS

The following best practice guidance was consulted to support this section of the permit application:

- GOV.UK guidance Risk assessments for your environmental permit[9]
- GOV.UK guidance Surface water pollution risk assessment for your environmental permit[10]
- GOV.UK guidance Groundwater risk assessment for your environmental permit[11]
- EA Internal Guidance 'Permitting of hazardous chemicals and elements in discharge to surface waters' (H1 Risk Assessment) (EA, December 2019)[26]

The risk assessments required to be undertaken to support the permit application are provided as Appendices to this supporting technical document. Please see the below list of supporting assessments:

- Appendix L – Bespoke (qualitative) Environmental Risk Assessment
- Appendix M – Inflow and Discharge H1 Assessment: SSSI Crossing Dewatering
- Appendix N – Dewatering Discharge Risk Assessment AD6 Leiston Drain Crossing
- Appendix O – TMO Groundwater Discharge Risk Assessment
- Appendix P – Surface Water Baselining Assessment

Each of the above are summarised in the sections further below; however it is intended that this section of the document is read in conjunction with the relevant supporting Appendix.

For the other discharge activities included within this permit application, where discharges are proposed to be made to surface waters, with either no or small quantities of groundwater from shallow excavations, no specific substances assessment was considered to be required as there are not anticipated to be any hazardous substances, priority substances or other pollutants present in the final effluent discharge streams. Whilst iron, listed as a specific substance on the GOV.UK Freshwaters specific pollutants and operational environmental quality standards[10], can be present in ferric chloride (used for dosing in treatment plant systems for suspended solids removal), it is not anticipated to be present in the final effluent as the systems are designed to prevent any over-dosing and therefore residual carry-over of the chemical in the final discharge stream. Furthermore, where we have stated that groundwater may be encountered in shallow excavations, this is dependent upon the groundwater depths. From background data, as discussed and shared with the EA during Pre-Application, it is not considered that significant quantities (if any) groundwater will be encountered based on the proposed excavation depths. Usually, this type of activity would be covered under the Regulatory Position Statement 261, however this may not apply to all discharge activities in this application due to the proximity of the SSSI. The discharge activities have been considered in the qualitative risk assessment provided as **Appendix L** however.

Furthermore, as described in the treatment section above and monitoring section below, surface water baselining has been undertaken to understand the background water quality across the site. This has confirmed that there are some elevated levels of certain contaminants in groundwater in certain parts of the site, however none of these are specific substances that are being added to the discharge from the construction activities being undertaken. Consideration of how the proposed water discharge activities may impact on the Water

[26] https://admlc.files.wordpress.com/2023/10/h1-software-tool-user-guide-v8-final.pdf

Framework Directive (WFD) classifications of the Leiston Beck water body were also considered where relevant in the risk assessments.

In addition to the water discharge related assessments listed above, a HRA and CRoW assessment were also undertaken to support this permit application. These are summarised below and provided in full in in **Appendix K**.

6.1 Surface Water Baselining Assessment Outcomes

In terms of existing background water quality, or baseline conditions, these are heavily influenced by the inflow of saline water at Minsmere Sluice and from the baseline flow in Leiston Drain, which is characterised largely by the flow received from the Leiston Sewage Treatment Works. The watercourses have been characterised, within the Surface Water and Groundwater chapters provided as part of the DCO submission stage (referenced in **Section 2** above), as generally very low energy flows and near vertical banks. Generally, they are heavily vegetated, and the substrate is largely obscured. The substrate typically consists of fine sediments (silts) when it flows over the peat and coarser gravel when flows run over the Crag bedrock. The surface water features within the area of the proposed development site are prone to sediment deposition and transportation (when flows have sufficient energy). Surface water and groundwater levels are closely interconnected and recharge on one another during dry and wet periods. These factors have been taken into consideration during the proposal of, what are considered to be, appropriate water quality parameters for the discharge activities and also the above-described treatment methods.

6.1.1 Purpose and Scope of Assessment

An assessment of the surface water baseline conditions at the site has been undertaken to support the proposed pollution control and treatment methods (as outlined above in **Section 5**) and the water quality management and monitoring requirements associated with the proposed discharge streams identified within this permit application.

The Surface Water Baselining Assessment has enabled limiting values for the discharge of surface water run-off to be proposed. The full assessment has been provided to the EA as part of the permit Pre-Application stage and is appended to this document in **Appendix P**. The below bullet points have been included to provide an overview of the scope of the assessment and the key outcomes and conclusions with regards to the proposed water quality parameters and limits associated with the discharge streams detailed within this application. Final limits will be set by the permit.

- A long-term surface water, groundwater and gas monitoring arrangement has been in place at the site of the proposed development since 2013 to help set a baseline in terms of surface water, groundwater and gas conditions. The data collated by this monitoring and sampling programme has been used to inform the Surface Water Baselining Assessment completed as part of this permit application.
- The surface water dataset is for 7 monitoring points across the Sizewell Belts (Sizewell Drain) and Leiston Drain between November 2014 and June 2022. Refer to **Figure 20** below which shows the location of the monitoring locations. These are representative of the receiving watercourses for the proposed discharging locations contained within this permit application for the majority of discharge streams.

- The assessment also includes the 2019 Cycle 2 WFD classifications for Leiston Beck (aka Leiston Drain) Water Body (sourced from the EA 2021 Catchment Data Explorer – Leiston Beck Water Body[27]) and derivation of WFD specific screening criteria for selected determinands. Surface water samples were screened against freshwater Environmental Quality Standards (EQS). The assessment summarised any exceedances of relevant EQS and WFD criteria for the receiving waterbodies. Note that the surface water monitoring points included in the assessment are upstream of any tidal effects and therefore it was not necessary to screen data against coastal and estuarine EQS.
- The scope of works included presentation of mean and Q95 flow calculations using surface water flow data from the baseline monitoring programme.
- Data was collected on the following:
  - Water quality indicators, including pH, electrical conductivity, biochemical oxygen demand (BOD), chemical oxygen demand (COD), suspended solids (SS) at 105°c, alkalinity (total);
  - Nutrients, including chloride, ammonium, nitrite, nitrate, phosphate, phosphorus (total), sulphate, total oxidised nitrogen, sodium, dissolved organic carbon, total organic carbon;
  - Dissolved metals including chromium (hexavalent), chromium (trivalent), arsenic, boron, cadmium, chromium, copper, manganese, nickel, lead, zinc, iron, phosphorus, calcium, potassium, magnesium, and mercury (low level); and
  - Total metals including arsenic, boron, cadmium, chromium, copper, iron, manganese, nickel, lead, zinc.

[27] https://environment.data.gov.uk/catchment-planning/WaterBody/GB105035046271

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Revision 001

CWDA-18 PERMIT APPLICATION SUPPORTING DOCUMENT

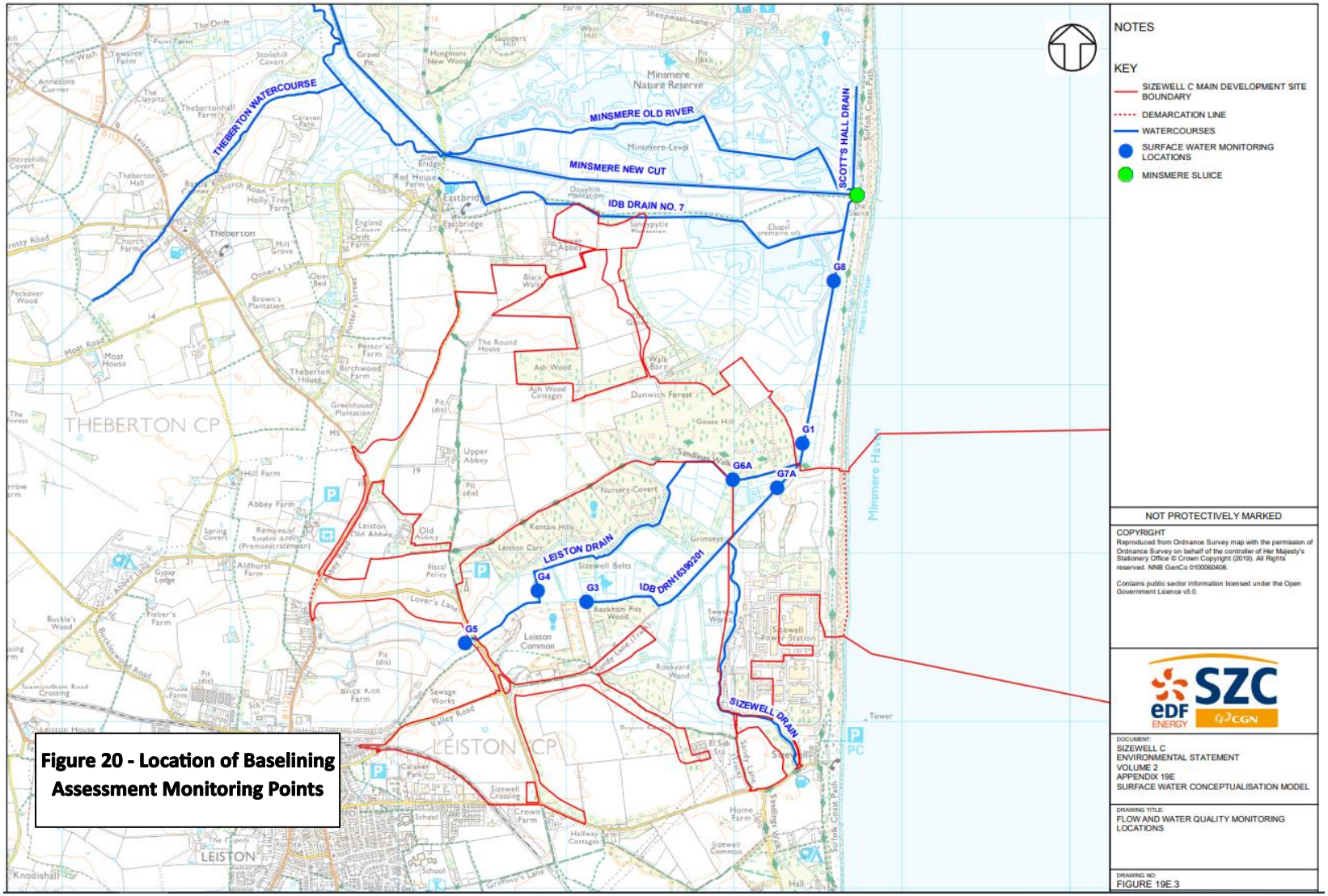


Figure 20 - Location of Baselining Assessment Monitoring Points

6.1.2 Summary of Key Outcomes from Surface Water Baselining Assessment

The below bullet points summarise the key outcomes and findings from the Surface Water Baselining Assessment:

- Results for pH within the baseline dataset ranged between 7.2 and 9.2. Only one of pH measurement was out of the range of the freshwater operational environmental quality standard (EQS).
- Baseline data for suspended solids (SS) indicated a wide range of values (<5 mg/l to 2,300 mg/l). Most results were less than 60 mg/l. Higher values were much less frequent. The higher SS that were identified are likely to be associated with episodes of higher rainfall and are not considered to be representative of general conditions within the surface water network.
- Most dissolved polycyclic aromatic hydrocarbons (PAHs), phenolics, BTEX (benzene, toluene, xylene and ethylbenzene), polychlorinated biphenyl (PCBs) and other volatile or semi volatile organic concentrations recorded were below the laboratory limit of detection.
- Limiting values have been proposed based on the outcomes of the assessment for pH, suspended solids and visible oil and grease (see **Section 7.2** below). Limits have been proposed for these parameters only as these are typically contaminants which may be associated with construction works. There may be other aspects affecting the baseline conditions, for instance discharge from the Leiston Sewage Treatment Works upstream, however these are not associated with the proposed discharging activities and will therefore not be monitored as part of on-site management measures.

6.1.3 Groundwater Quality Monitoring

Groundwater quality monitoring data has been obtained from areas across the MDS from 2020-2023. This has been used to support the TMO Groundwater Discharge Risk Assessment **(Appendix O)** accompanying this permit application, and the Surface Water Pollution Risk Assessments (**Appendix M and N)**.

6.2 Environmental Permit – Bespoke Environmental Risk Assessment

In accordance with risk assessments for your environmental permit guidance, a bespoke risk assessment has been developed to support this permit application. This has considered the proposed construction and associated discharging activities for the parts of the development within the scope of the permit application (as described in **Section 3** above). It has also considered potential treatment options for the discharge streams, including the use of chemical dosing to help reduce levels of suspended solids.

In particular, the bespoke ERA has considered:

- Risks from the discharging activities (note that wider site-specific risks to the environment from construction activities, beyond discharging, will be addressed by the contractor's management systems)
- Nearby receptors (including people, animals, property and anything else that could be affected by identified hazards)
- Possible pathways from the hazards to the receptors (in accordance with source-pathway-receptor methodology)

In addition, risks relevant to the specific permitted activities (discharging to surface water and groundwater) were assessed to check whether they can be considered acceptable and / or screened out. These assessments are explained in the below sections.

The bespoke ERA is attached to this supporting document as **Appendix L**.

The methodology and criteria used to develop the bespoke ERA is summarised below.

6.2.1 Bespoke Environmental Risk Assessment Approach

The GOV.UK guidance, Risk assessments for your environmental permit, was used to produce the risk assessment for the proposed discharging activities. This was produced in conjunction with the quantitative screening assessments described further below to demonstrate consideration of the source-pathway-receptors model for the proposed discharging activities.

The scope of the assessment was limited to activities associated with the proposed discharging activities only and not the wider construction activities that will be undertaken in each area. Risks associated with these will be addressed in construction related environmental management documentation, e.g., a construction environmental management plan (CEMP).

The approach undertaken for the risk assessment comprised the following stages:

1. Identify which outlet included within the scope of this permit application the hazard identified relates to. This was mostly 'all' outlets.
2. Summarise the hazard that could occur, defined as the activity or event with potential to cause environmental risks.
3. Identify the receptors. As the scope of the ERA is the proposed water discharging activities, the receptors are mainly the receiving watercourses and / or groundwater however other receptors have been included where relevant.
4. Identify the pathways or routes by which the hazard might come into contact with the receptor.
5. Summarise the potential harm that could be caused should contact occur.
6. Undertake impact assessment through consideration of the probability of exposure (likelihood of the risk occurring, hazard coming into contact with the receptor), the level of harm (consequence) that could occur and the subsequent magnitude of the risk (harm that could be caused). The below sub-paragraphs explain the ratings used in the impact assessment, which is subjective and has been completed by professionals undertaking this permit application.
7. Description of mitigation (or control) measures that will be implemented.
8. Residual impact (after mitigation measures have been implemented).

The above approach is consistent with the GOV.UK guidance.

The criteria used for the impact assessment as part of the ERA is defined in **Table 19** below:

Table 19 - Bespoke Environmental Risk Assessment Impact Assessment Criteria

Impact Assessment Rating	Criteria

Probability of Exposure	*Defined as the likelihood of the receptors being exposed to the hazard with no control measures implemented.*
High	Exposure is probable: direct exposure likely with no distance or barriers between hazard source and receptor.
Medium	Exposure is a possibility - barriers to exposure less controllable.
Low	Exposure is unlikely: several barriers exist between hazards source and receptors to mitigate against exposure.
Very Low	Exposure is very unlikely: effective, multiple barriers in place to mitigate against exposure.
Consequence	*Potential level of harm that could be caused to the receptors.*
High	Consequences are likely to be long-lasting and / or affect a large area / number of receptors. Receptors are considered to be of importance (e.g., statutory designated areas). Difficult to reverse effects.
Medium	Consequences are likely to be medium duration and require some level of intervention to reverse.
Low	Consequences are temporary / short term and affect a small area / low number of receptors only. Likely to require little to no intervention for full recovery.
Very Low	Very minor level of harm caused lasting an extremely limited duration.
Magnitude of Risk	*Determined by combining the probability of exposure with the level of the potential consequences – refer the below Magnitude Rating Grid Box. The below provide a summary of what the magnitude means from a practical perspective.*
High	Identified risks will require stringent monitoring and / or additional assessment.
Medium	Identified risks require some level of regular monitoring. Active management and maintenance required.
Low	Identified risks require periodic review but results from this may not need recording. Low level of active management and maintenance required.
Very Low	Identified risks require infrequent review (i.e., less than monthly).

The below grid box summarises how the overall magnitude has been determined for each identified risk within the qualitative ERA. This methodology has been developed using a subjective professional opinion; it is therefore open to some element of interpretation. However the overall purpose of the ERA is to identify the key risks from the proposed discharging and dewatering activities, in accordance with Source-Pathway-Receptor methodology, and outline what control measures will therefore be implemented to reduce the overall level of risk.

Table 20 - Qualitative ERA Magnitude Rating

Probability of Exposure (below) /	**High**	**Medium**	**Low**	**Very Low**

Consequence (right)				
High	High	High	Medium	Medium
Medium	High	Medium	Medium	Low
Low	Medium	Low	Low	Low
Very Low	Low	Very Low	Very Low	Very Low

6.3 Surface Water Pollution Risk Assessments

6.3.1 SSSI Crossing – Discharge Stream B Risk Assessment

An Inflow and Discharge H1 Assessment, or Surface Water Pollution Risk Assessment, was completed for Discharge Stream B, the SSSI Crossing dewatering activity (Outlet DWO1). The Assessment required as the proposed discharge activity involves the dewatering of groundwater from installation of a cofferdam, which will facilitate the construction of pile caps for the SSSI crossing bridge, to surface water. It is proposed that the dewatered groundwater is discharged to the Leiston Drain, north of the MCA. Baseline groundwater quality in this area has some elevated levels of constituents, therefore, the assessment and specific substances screening has been undertaken. The Assessment was shared for the EA's review and comment during the pre-application stage.

Appendix M to this supporting document contains the full assessment that was undertaken, including the below supporting appendices:

- Appendix A – Supporting Information
- Appendix B – Borehole Logs
- Appendix C – Freshwater EQS Screening
- Appendix D – Laboratory Sheets
- Appendix E – Upstream Surface Water Quality Data
- Appendix F – H1 Surface Water Screening Tests

The Assessment explains the dewatering requirements that will be needed based upon current construction sequencing information. In short, the dewatering will enable a safe working environment to be maintained during pile cap construction at the SSSI crossing. The Assessment determines approximately how much water will require pumping out of the excavation, and then undertakes the relevant screening and significant load testing, in accordance with GOV.UK guidance for Surface Water Pollution Risk Assessments[10], to determine the potential impact of discharging the groundwater to surface water (the Leiston Drain).

Data that was input into the assessment is included in **Appendix M**. In summary, out of the 208 analysed substances, 157 do not have an EQS value. A further 22 substances were screened out at pre-screening stage where they were not detected and the Limit of Detection (LOD) was sufficiently low. It was noted that nitrite and phosphorus are not included in the H1 guidance as substances with EQS values that require screening, however these were included in the assessment using a non-statutory criteria for nitride and a WFD derived criteria for phosphorus (which was developed in the Surface Water Baselining Assessment – **Appendix P**).

Nine substances were screened out at tests 1 and 2, therefore a total of 20 substances (which failed tests 1 and 2) were taken forward to tests 3 and 4. Of those substances, four passed and are not liable to cause pollution. Seven of the remaining substances which failed one of test 3 or 4 have not been detected above the LOD in any of the groundwater samples. They were included in the screening tests because the LOD is greater than the EQS. This group includes free cyanide, hexavalent chromium and five organic compounds. These substances are not considered likely to be present in baseline groundwater (or the discharge) and are therefore not considered further.

Nine remaining substances were determined as potentially liable to cause pollution in the receiving watercourse as they are both measured in the discharge and fail one of tests 3 or 4. These include: cadmium (dissolved), chloride, manganese (dissolved), nickel (dissolved), dissolved chromium (trivalent), ammoniacal nitrogen, nitrite, phosphorus (dissolved) and ammonium. These either failed on the AA or MAC tests 3 or 4.

Ammonium, ammoniacal nitrogen, nitrite and phosphorus failed the screening tests due to a high mean concentration identified in upstream water samples, with the background concentration exceeding the EQS. However for these substances, the release concentrations is lower than the background concentration, showing that the discharge is not expected to impact water quality for these substances. The concentrations of cadmium, nickel, chloride, manganese and trivalent chromium however are considered liable to cause pollution in the receiving watercourse. These substances are elevated compared to background upstream surface water quality; therefore, further detailed modelling may be required, in particular for the following substances: cadmium, nickel, chloride, manganese and trivalent chromium, which are all present in the baseline groundwater quality. As per GOV.UK guidance, it is expected that the further detailed modelling, if deemed as being required, will be undertaken by the EA during the permit determination period for the purposes of determining permit conditions and limits in terms of water quality. Suitable treatment measures for the groundwater to be dewatered during the crossing installation will then be determined on the basis of any permit conditions and limits that are set.

6.3.2 AD6 Leiston Drain Overbridge – Discharge Streams D and E (Outlets O6a and O6b)

A Surface Water Pollution Risk Assessment has also been completed for the proposed Leiston Drain Overbridge, which forms part of the AD6 scope of construction works and relates to the proposed discharge points, Outlets O6a and O6b. As described in **Section 3** above, a bridge is required to be installed to enable crossing over the Leiston Drain. Groundwater is anticipated to be encountered during installation of the bridge foundations, which is anticipated to involve CFA piling. This will be required to be treated and discharged, along with the surface water run-off from this part of the scheme, via Outlets O6a and O6b. As the proposed discharging activity involves the discharge of groundwater to surface water, a surface water pollution risk assessment has been completed.

The Assessment has been shared with the EA as part of the Pre-Application discussion stage to ensure that its scope and conclusions meet relevant GOV.UK guidance and any applicable legal requirements. **Appendix N** contains the full assessment and below supporting documents as Appendices:

- Appendix A – Borehole Logs
- Appendix B – G5 Flow and Stage Data
- Appendix C – Laboratory Sheets
- Appendix D – Groundwater Data Summary for Input to H1 Screening
- Appendix E – Upstream Surface Water Quality Daya

- Appendix F – M-BAT Assessment and PNEC's
- Appendix G – H1 Surface Water Screening Tests

Water quality data from boreholes and groundwater monitoring points near the proposed position of the Leiston Drain Overbridge were used to inform the assessment. These were monitored on four occasions during 2020-2022 as part of a site-wide groundwater monitoring programme.

The assessment results conclude that, out of 215 analysed substances, 156 did not have an EQS value. A further 27 substances were not detected in the discharge and had an LOD that was sufficiently low (<10% EQS). Of the remaining 32 substances, 18 were screened out at Test 1 or 2, leaving 14 substances which were taken forward for Tests 3 and 4. Of those 14, cadmium, nickel and hexachlorobutadiene passed both tests. A further nine substances comprising organics, low level cyanide and chromium (hexavalent) failed one of Test 3 or 4 but have not been detected above LOD in any of the groundwater samples included in the assessment. They were included in the screening tests because the LOD was not sufficiently lower than the EQS. These substances are not considered likely to be present in the baseline groundwater with no nearby sources of contamination identified and are therefore not considered further.

In summary, the substances which failed screening tests 3 and 4 were phosphorus (dissolved), nitrite and dissolved cadmium (trivalent). These failed the annual average test 4. This is due to a high mean concentration identified in the upstream water samples, with the average background concentration exceeding the EQS. For these substances, the average release concentration is lower than the background concentration however, which shows that the proposed discharge is not expected to impact surface water quality for these substances.

The second part of the screening assessment comprised the significant load test which applies to any priority hazardous substances in the discharge. The test was progressed for cadmium (dissolved), anthracene, hexachlorobenzene, hexachlorobutadiene, dissolved mercury low level, benzo[a]pyrene and the sum of benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h, i)perylene, indeno(1,2,3cd)pyene. The test completed indicated that none of the priority substances in the discharge would exceed the respective significant load thresholds.

In summary, the screening tests indicated that measured concentrations of tested substances within the discharge are not anticipated to cause pollution through the proposed discharge of groundwater to the Leiston Drain from Outlets O6a and O6b.

6.4 TMO Discharges to Groundwater Environmental Risk Assessment

A risk assessment for discharges to groundwater has been undertaken to consider potential impacts from the discharging of treated surface water run-off and groundwater from the MCA to the Sizewell Foreshore, via the TMO at Outlet EO1 (Discharge Stream A). The Assessment undertaken has been completed in accordance with the below GOV.UK guidance:

- Groundwater risk assessment for your environmental permit (published 1st February 2016)[11].

The full Assessment is provided in **Appendix O** to this supporting document with the below supporting Appendices:

- Appendix A – Drawings
- Appendix B – Relevant Borehole Logs
- Appendix C – Dosing Chemical Safety Data Sheets (note these have been included as examples only to indicate the type of dosing chemicals that could be used as part of treatment measures)

- Appendix D – Groundwater Screening Data
- Appendix – Groundwater Discharge Coastal and Estuarine Waters H1 Screening Assessment

In summary, the Assessment sets out the scope and environmental setting of the TMO (Outlet EO1). This includes a high-level description of the location and topography, geology, hydrogeology, and any designations. The characteristics of the discharge are then described, including the anticipated discharge volume and quality and how these have been calculated / obtained. The Site Conceptual Model is then presented before the Assessment details the qualitative risk screening that was undertaken and determines the approach with regards to consideration of coastal surface waters assessment (for the infrequent occasions whereby the effluent from Outlet EO1 could be discharged directly into the North Sea – see below). Finally, an assessment of accidents and the overall conclusions are presented.

The Assessment has been provided to the EA for review and comment during Pre-Application. It was discussed whether the TMO discharge to the Foreshore should be classed as a discharge to ground or discharge to coastal surface waters. The decision was made that the discharge should be classed as a discharge to ground / groundwater due to the siting of the TMO invert (outfall pipe) and infiltration apron, which does not extend as far seaward as the MHWS. For this same reason, the TMO discharge is not anticipated to require a marine licence. Marine discharge modelling (such as Cormix) is also therefore not suitable to this discharge stream as this is usually only used below the mean low water spring tide mark (MLWS) and it would assume no infiltration to ground take places (which again is not the case here). **Appendix C** (Outlet EO1 design drawing) shows the MWHS and MLWS in relation to the TMO outlet.

The EA's environmental permitting guidance for Groundwater Activities (December 2010)[28] was also considered when determining the approach for the assessment. This highlights that a groundwater activity is a discharge that might lead to a direct or indirect input of a pollutant to groundwater. As explained in the assessment, the discharge from the TMO is expected to percolate into the shingle and sand beneath the invert on the Foreshore, rather than be discharged directly to sea. However, there may be infrequent occasions, for example during surges, when the TMO outfall pipe itself does reach the coastal surface water body directly (if discharging at this exact moment in time), therefore consideration has still been given in the risk assessment to the North Sea as a marine receptor.

As with the other assessments described above, the discharge from the TMO has been considered in the HRA and CRoW assessment undertaken to support the permit application and wider proposed development.

6.4.1 Key Conclusions from the TMO Groundwater Discharge Risk Assessment Screening Process:

Most of the discharge via the TMO will comprise surface water run-off from the MCA. This will be treated prior to discharge to remove risks of contamination. The primary parameter of concern in the surface water run-off will be suspended solids. It is proposed that these will be reduced to a maximum of 250 mg/l (refer to **Section 7** below) via treatment measures, which may include dosing of coagulants and flocculants (if required). The risk assessment concludes overall that the risk in the vicinity of the outfall is very low from a suspended solids perspective. No hazardous substances are expected to be present in the surface water run-off discharged from the outfall.

In addition to the treated surface water run-off, there will be some discharging of groundwater which will be dewatered (via submersible pumps) from the installation of the desalination plant shaft (intake pipe) that is to

[28] https://assets.publishing.service.gov.uk/media/5a7958f6ed915d07d35b4b8d/pb13555-ep-groundwater-activities-101221.pdf

be constructed within the MCA. The amount of groundwater expected to be discharged is not thought to be any more than 500 m^3. This is likely to take place as a one-off discharge, of approximately between 300-400 m^3, with some minimal quantities then being pumped intermittently as and when required while the shaft settles into place. The duration of the entire dewatering for the desalination shaft is not anticipated to last any longer than 9 months. The groundwater is expected to comprise less than 0.5% of the annual discharge volume.

Table 5-5 within the assessment presents a summary of exceedances of EQS and Drinking Water Standards that have been identified from the baseline groundwater quality.

In short, the constituents that exceed Drinking Water Standards include chloride, ammonium, ammoniacal nitrogen, sodium, arsenic (dissolved), iron (dissolved), manganese (dissolved), boron and sulphate. Those that exceed coastal and estuarine EQS' include copper (dissolved), iron (dissolved), anthracene, fluoranthene, zinc (dissolved) and chromium (hexavalent). The assessment explains that some of these contaminants (especially chloride, ammonium and sodium) are likely to be influenced by saline intrusion (due to the proximity of the coast) and may also be affected by underlying geology, adjacent marshes and farming activities (such as fertiliser spreading). Some of the constituents were only identified in sporadic exceedances within the data. This is described further in the assessment (Section 5.2.3).

Therefore, the discharged groundwater is expected to contain elevated metals and nutrients based on measured groundwater quality in the area. The concentration of contaminants is expected to be at, or less than, background concentrations in the aquifer. As described in **Appendix O**, Section 6.2, some of the-described constituents that **could** be present in the groundwater prior to discharge are classed as hazardous substances and non-hazardous pollutants. Sampling and testing for those which are not typical of the baseline groundwater quality, e.g., PAHs, may therefore be required prior to discharge of the groundwater via the TMO. The results of the sampling and testing would determine whether any additional treatment measures (in addition to suspended solids settlement systems for example) would be required, or alternative disposal options (such as tankering of the groundwater offsite for disposal at a suitable licensed waste management facility). With regards to whether any additional treatment measures are required prior to the discharge being made, it is expected that this will be confirmed as part of the EA's decision with regards to the permit and associated monitoring and sampling requirements.

Overall, the proposed discharge activity is considered to be low risk to the receiving environment (Sizewell Foreshore and potentially the North Sea) as the effluent will be treated to remove risks of contamination and, particularly for the proposed groundwater discharge, this is short-term in duration and temporary. Furthermore, dewatered groundwater is expected to constitute only a very minor contribution to the overall volume of water discharged via the TMO at Outlet EO1 and is likely to be significantly diluted with inputs from surface water run-off, further reducing risks with regards to contaminants.

6.4.2 TMO Groundwater Discharge Coastal Surface Water H1 Assessment

In addition to the screening assessment completed in accordance with the relevant groundwater risk assessment guidance, consideration has also been given to the proposed discharge from a coastal surface water assessment perspective following feedback from the EA during Pre-Application discussions. Section 8 of **Appendix O** summarises the approach that was undertaken to address the feedback.

In summary, this concluded that:

- Hazardous substances hexavalent chromium and PAHs have been detected sporadically in groundwater within the MCA however these are not expected to be present in the dewatered groundwater to be discharged (due to the fact that they were sporadic exceedances and it is a small quantity of groundwater to be discharged).

- Confirmatory sampling and testing of the groundwater to be discharged will be carried out prior to pumping to the TMO to determine the presence of hexavalent chromium and PAHs. If identified, an alterative mode of disposal (e.g., tankering offsite with a licensed waste contractor), or additional treatment measures suited to the identified contaminants prior to discharge, will be required.
- Iron will be present in concentrations that exceed H1 screening test 1. No other substances fail the screening tests (assuming PAH and hexavalent chromium are confirmed not to be present).
- Direct discharge of the groundwater to the North Sea is considered unlikely to occur as, as described in this technical supporting document elsewhere, the discharge would only reach the sea directly under surge conditions, and when discharging of the groundwater is taking place (which will be intermittent). The probability of this occurring is considered further in the Coastal Surface Water H1 Assessment section of **Appendix O.** Furthermore, the discharged groundwater will be diluted to an extent with treated surface water run-off discharge.
- The assessment concludes therefore that the potential for any impact in the marine environment from discharge of groundwater via the TMO is considered to be extremely low and can be mitigated, therefore further quantitative modelling is not considered to be required / suitable.

6.5 Habitats Regulation Assessment (HRA) and Countryside and Rights of Way (CRoW) Assessment

As described in the introduction to this Section, a HRA and CRoW assessment have also been undertaken to support the proposed discharging activities, in addition to the environmental risk assessments for water discharging. The HRA and CRoW assessments are required as the permitted activities will be located within close proximity to statutory designated / protected areas, as described in **Section 2** earlier. Both of these assessments are provided in full in **Appendix K.** This section has been included to provide an overview of the scope and approach undertaken to inform each assessment. The final outcomes are detailed in **Appendix K.**

6.5.1 HRA Overview and Key Outcomes

- Screening was undertaken for Likely Significant Effects (LSE) as part of the assessment. This identified the relevant European sites with respect to the permit application.
- An initial high-level assessment of the effect pathways considered relevant to the proposed discharging activities to establish relevant and non-relevant features for further assessment is presented in the HRA. The HRA also sets out the potential for LSE to arise, alone or in-combination with others plans and projects.
- Where it was determined that LSE may arise as a result of the permit activities, these were taken forward to the screening stage of the HRA. This part of the assessment draws on information presented in the Secretary of State HRA that was produced during the DCO stage of the project, where valid in relation to the proposed works, and additional subsequent information that has been produced since, for example the above-described environmental risk assessments.
- The approach toward undertaking the HRA was discussed and agreed upon during regulatory pre-application discussions as part of the wider project with the relevant personnel from SZC and regulatory bodies including the EA. It is recognised that the risks included within the HRA cover all those considered to be relevant to the proposed discharging activities, including proposed treatment

measures. These have been presented with the intention to provide regulator, Natural England, with the sufficient amount of information to consider the effects of the proposed activities during the permit consultation and determination period.

- The European Designated Sites, Qualifying Features and Conservation Objectives included in the HRA screening are presented in the supporting assessment (see **Appendix K).** The designated sites include:
  - Minsmere to Walberswick Heaths and Marshes SAC (UK0012809)
  - Minsmere to Walberswick SPA (UK9009101)
  - Minsmere to Walberswick Ramsar (UK11044)
  - Southern North Sea SAC (UK0030395)
  - Outer Thames Estuary SPA (UK9020309)
- The following potential impacts were considered as part of the screening assessment for LSE included:
  - Direct habitat loss and direct / indirect habitat fragmentation
  - Water quality (effects on freshwater or marine environment)
  - Alteration of hydrological / hydrogeological regime
- It was concluded that it is not possible to rule out LSE as a result of the proposed discharging activities within this environmental permit application. Therefore, it was deemed necessary to undertake further assessment to determine whether adverse effects on the integrity of European and Ramsar sites can be ruled out alone and in combination, considering mitigation measures.
- The relevant sites, qualifying features and effects pathways are:
  - Water quality changes.
- Appropriate Assessment therefore considered these qualifying features for adverse effects, residual effects and in-combination effects. The HRA concluded that, following the implementation of the proposed mitigation measures, no adverse effects have been identified alone as a result of water quality changes. It is considered that with the mitigation proposed there would be no residual effects that could act in-combination and, as such, no further assessment was identified as being required.

6.5.2 CRoW Assessment Key Outcomes

The CRoW assessment has been appended to the above-described HRA and is provided in full in **Appendix K** to this technical supporting document. The assessment considered potential impacts on SSSI's in relation to the proposed water discharging activities included within the scope of this permit application.

- A screening process was undertaken as part of the assessment to determine whether the activities within the permit under consideration will have any potential significant effects on designated SSSI's as a result of its implementation.
- The search areas covered in the screening assessment are defined based on the type of permit being applied for and the activities which form part of the planned works. The screening then allows the assessment stage to focus on the relevant SSSIs only, their qualifying features and potential impacts upon them.

- The assessment outlines the key steps of the screening process that was undertaken. The findings of the screening identified the below SSSI sites:
  - Sizewell Marshes SSSI
  - Minsmere to Walberswick Heaths and Marshes SSSI
  - Leiston-Aldeburgh SSSI (scope out of further assessment due to no hydrological connection).
- The assessment summarises the baseline conditions of the sites identified from the screening (Sizewell Marshes SSSI and Minsmere to Walberswick Heaths and Marshes SSSI).
- The assessment then looks at potential impacts including:
  - Water quality / alteration of hydrology from discharge
  - Disturbance to species due to noise, vibration, and visual impacts of generators and pumps.
- Overall, the assessment concludes that there are potential pathways of effect, however, based on existing conditions on site, the use of embedded mitigation measures, and the small scale of the discharging works, there will not be any significant effect on the SSSI's.

7 WATER QUALITY MANAGEMENT AND MONITORING

7.1 Monitoring strategy

Discharge water quality monitoring and sampling requirements for the proposed discharge activities set out in this permit application will be dependent upon any specific conditions and requirements set out in the permit. This section of the technical supporting document has however been included to summarise the proposed discharge effluent quality parameters informed by the above-described Surface Water Baselining Assessment, alongside a high-level overview of the *expected* monitoring and sampling arrangements that may be implemented once the discharge activities commence. Note that some information presented in this section may therefore change depending on final permit conditions and / or other site-specific characteristics and requirements.

The water discharge monitoring arrangements will be implemented in accordance with the principles outlined in the EA guidance listed below:

- Developing a management system (2016)[29]
- Monitoring discharges to water: environmental permits (published 11 June 2020[30])

In addition to the discharge monitoring infrastructure, the SZC Integrated Management System (IMS) will provide a framework to ensure that the monitoring data is obtained, recorded, and reported as required by the environmental permit and other internal SZC procedures (refer to **Section 8** below).

7.2 Proposed Water Quality (Discharge Effluent) Parameters

7.2.1 Discharge Stream A - Proposed Final Effluent Quality

For Discharge Stream A, which will be comprised of surface water run-off from the MCA and groundwater from dewatering associated with installation of the desalination shaft intake, the proposed discharge quality parameters have been derived from the TMO Groundwater Discharge Risk Assessment provided in **Appendix O** to this supporting document.

The total suspended solids content of water discharged into the sea is proposed to be no greater than 250 mg/l. This limit has been derived from consideration of baseline data that is available and the treatment methods available to reduce the suspended solids from this part of the site. There should be no visible oil or grease present in the final discharge and the pH of the discharge stream will be between 6-9.

If chemical dosing is incorporated as part of proposed treatment methods for suspended solids (as set out in **Section 5 above**), there is not anticipated to be any carry over or residual chemicals in the final discharge stream (based on how the treatment systems being considered work). Data from one treatment system supplier has been provided to the EA as part of the Pre-Application stage to demonstrate this. Treatment systems may be

[29] Environment Agency (2016) Develop a management system: environmental permits - GOV.UK (www.gov.uk) [Last updated 03/04/2023] (Available online)

[30] Environment Agency (2020) Monitoring discharges to water: environmental permits [Last updated 24/11/2022] (Available online)

supplied with telemetry monitoring which will indicate if the discharge is out of specification in terms of pH and / or suspended solids levels.

It is acknowledged that, based on the baseline groundwater quality results presented in **Appendix O,** there may be additional parameters to consider when determining final effluent quality and treatment needs. If these are incorporated into the permit, suitable treatment or alternative disposal options for the dewatered groundwater will be implemented on site.

7.2.2 Discharge Streams B, C, D, E, F, G, H and I – Proposed Final Effluent Quality

The below table outlines the proposed parameters for all other discharge streams included within the scope of this permit application (excluding the above Discharge Stream A at Outlet EO1):

Table 21 - Proposed Water Quality Parameters

Criteria	Treatment Level Required at Monitoring Point	Sample Type
Visible oils and grease	No significant trace present	Visual inspection
Suspended solids (105c)	60 mg/l	Spot sample (maximum allowable concentration)
pH	pH between 6-9	Spot sample

These limits are considered to be applicable to all other discharge streams across the site based on the similar nature of the construction activities taking place and therefore the potential contaminants that could arise, and the supporting background monitoring data that has been used to inform the risk assessments undertaken as part of the permit application.

It is acknowledged that, based on baseline groundwater conditions (where dewatering is taking place), Pre-Application discussions with the EA, and on examples from other similar permitted projects, that there may be a requirement to sample for additional parameters. If this is required as part of permit conditions, it will be communicated to all relevant project personnel on-site and incorporated into any treatment needs and associated monitoring and sampling arrangements.

7.2.3 Discharge Volume and Flow Control and Monitoring

It is expected that limits may be set on the maximum discharge volume (m^3/day) from each outlet. It has been assumed that these will be based upon the maximum discharge volumes provided in **Section 4** of this supporting document (for which the design of WMZs and treatment methods proposed have been based upon). As described in **Section 4**, the volumes presented are the maximum daily discharge volumes that could be experienced. Most of these are rainfall-dependent and therefore could be much less in some cases. Where dewatering is taken place, this has also been incorporated into the maximum discharge volumes. It should be noted that the dewatering activities will be mostly short-term durations and intermittent.

Discharge flow rates will be controlled using suitable flow control methods and / or devices. The rate of flow may be controlled for example through measures such as sizing of pipes and outfalls (where the size of the infrastructure will limit the volume and rate of effluent to be discharged), or alternatively through the use of

instruments such as set pump capacities, hydro brakes, penstock valves and / or throttle structures. All outlets will have some form of flow control implemented.

It is proposed that continuous flow meters are not installed (unless these form part of proposed treatment systems) and that instead instantaneous spot samples are taken to ensure any limits on flow set out in the environmental permit are being complied with, as the majority of discharge streams comprise treated surface water only (which are rainfall-dependent, intermittent and temporary). This is believed to be in accordance with the (now withdrawn) EA guidance EPR 7.01 How to comply with your environmental permit: Additional guidance for water discharge and groundwater[31]. Although withdrawn, this guidance was referred to by the EA in Pre-Application discussions to identify if any discharge streams would require continuous flow monitoring. Based on this guidance (which is yet to be fully replaced by current GOV.UK guidance), Section 2.4.3.2 (which sets out thresholds for flows requiring flow monitoring) states in relation to rainwater runoff and rainfall driven discharges from trade effluent:

'Where flow rates depend primarily on rainfall intensity there is limited regulatory value in continuous flow measurement. We may require temporary flow measurement for regulation and treatment design. This must be justified for each case'.

On this premise, and in conjunction with the fact that there are not anticipated to be any significant concentrations of dangerous or priority substances added to the discharge from construction activities, it is not anticipated that continuous flow monitoring will be required for discharge streams comprising of rainfall dependent surface water run-off. However, it is acknowledged that the EA will assess each water discharging activity on a case-by-case basis. If continuous flow meters are required to be installed, these may be required to meet MCERTS requirements for flow meter specification (as set out in the EA Minimum Requirements for the Self-Monitoring of Effluent Flow'[32] guidance.

For the discharge streams where higher quantities of groundwater are also anticipated to be discharged (in addition to surface water run-off) due to dewatering activities (for example Discharge streams A, B, D and E), it is acknowledged that there could be a requirement to implement continuous flow monitoring during the active dewatering phases, if considered necessary by the EA. This assumption has been based on Pre-Application advice provided by the EA which comprised a review of similar permitted activities at other sites. It is not however anticipated that there would be any requirements for continuous flow monitoring where minor quantities of groundwater from shallow excavations only might be encountered (e.g., at Discharge streams F and H).

Any specific requirements relating to continuous flow monitoring and MCERTS are expected to be detailed in the environmental permit (if granted). Arrangements will then be made on site to ensure that monitoring and sampling requirements can be complied with. Where additional treatment systems are in use, for example to aid treatment of suspended solids, these may contain live flow monitoring equipment (such as telemetry equipment and high-level alarms) which would enable the flow to be recorded and logged as required. Note however that such systems may not be required to be implemented at all outlets included within this permit application. In addition, weather conditions will be monitored on site daily, particularly rainfall intensity, which will have a direct effect on the flow rates and treatment requirements.

[31] PART 1 – proposed split for publishing as separate parts of same document

[32] Minimum requirements for self-monitoring of flow: MCERTS performance standard - GOV.UK (www.gov.uk)

7.3 Proposed Monitoring and Sampling Locations

It is anticipated that periodic instantaneous spot samples will be required where discharge activities are taking place, based on typical environmental permit requirements for this type of construction-related discharge. Visual inspections of the surface water network (where accessible) will also take place, in particular to identify any issues associated with hydrocarbons (oil / fuel) which may leave visible sheens for example. Specific monitoring and sampling arrangements will ultimately be dependent upon the substances which are required to be monitored, and any other conditions set in the environmental permit. As described above, it is anticipated that this will include (but may not be limited too) suspended solids, pH and oil / grease (visible).

Monitoring and sampling points will be established, where possible, to be located after final treatment systems and prior to the discharge entering the receiving environment (watercourse or Foreshore) to enable a representative sample to be obtained. Access to the sampling points will be provided in accordance with relevant safety considerations. This will be maintained as necessary. Accessibility issues will need to be taken into consideration. The expected monitoring and sampling point locations, at the time of writing, are set out in **Table 22** below. These may be subject to change slightly however as final detailed designs are still in development at the time of writing this application. Therefore, based on advice received during the Pre-Application stage from the EA, a Pre-Operational Condition may be included in the environmental permit which would likely require that the exact monitoring and sampling locations are confirmed 1-3 months prior to discharge activities commencing on site. This could require SZC to submit for approval a monitoring plan detailing the monitoring regime and accreditation methods to be used for monitoring and sampling of discharging and dewatering activities on site prior to discharging activities commencing.

Table 22 – Estimated Monitoring / Spot Sampling Point Locations

Discharge Stream	Outlet Reference	Sampling Location NGR	Receptor
A	EO1	TM 47653 64054	Sizewell Foreshore / North Sea
B	DWO1	TM 47342 64534	Leiston Drain
C	O5	TM 46191 65813	Unnamed ditch (tributary of WMB drain No.7 DRN163G0101)
D	O6a	TM 45443 63501	Leiston Drain
E	O6b	TM 45442 63495	Leiston Drain
F	O6c	TM 45474 63488	Leiston Drain
G	O7	TM 46511 63492	Tributary of Sizewell Drain (Sizewell Belts)
H	O8a	TM 44614 64000	Upstream Leiston Drain
I	O8	TM 44426 63761	Leiston Drain

Any changes to proposed sampling locations will be communicated to the EA and requirements captured in relevant construction-related environmental management documentation and procedures to ensure site personnel are aware.

7.3.1 Water Quality Monitoring Frequency

The frequency of any monitoring required in relation to the proposed discharge activities is anticipated to be set out in the permit. SZC initially propose to undertake monitoring of the parameters set out above (pH, visible oil and grease and total suspended solids) on a weekly basis, as a minimum (for instantaneous spot samples). If site activities and / or weather conditions are such that the discharging activities could be affected (for example, during periods of prolonged or intense rainfall), the monitoring frequency can be revisited (as and when identified as being required by Site Operations). During such periods, intensive in-situ monitoring may be required so that reactions to alter the management of the discharge activities are swift and effective.

Where additional treatment systems, such as solids settlement and pH correction systems, are used, these may incorporate telemetry equipment which would allow live monitoring of the discharge. This improves control of the water treatment processes and allow operatives to ensure discharge streams are in compliance with any set discharging criteria. Telemetry monitoring at the outlet of such systems may be implemented for parameters such as total suspended solids and pH for example.

If samples are required to be taken off-site for external laboratory analysis and testing; it is expected that the frequency and any additional requirements in relation to this will be set out by the EA as the regulator within the environmental permit. Consideration of this has been included however in the paragraphs further below.

Any additional monitoring and sampling requirements, including reporting arrangements, for example if there is a need to test for substances without emissions limits based on background water and groundwater conditions or due to the proposed use of dosing equipment, will be agreed with the EA (to inform the basis of permit conditions).

7.4 Discharge Sampling Arrangements

The design of the drainage systems and associated proposed discharge activities will include for the provision of suitable sampling locations, in accordance with the relevant GOV.UK guidance. These will be located, where possible, downstream of all drainage inputs and prior to final discharge into the receiving environment to ensure that the samples are representative of the construction-related effluent only. Consideration will be given to the locations of all sampling points to ensure that they are safely accessible.

Within AD6, construction drainage will discharge into the Leiston Drain at Outlets O6a, O6b, O6c and the Upstream Leiston Drain ordinary watercourse at Outlet O8a. As has been described in **Section 4** above, it is proposed that the discharges will be made into the watercourse from the new permanent drainage system (laid filter drain pipework / shingle bed), which will be constructed first. Because the excavation of the new permanent works drainage system will be carried out over a large area, this makes it difficult to guarantee that the pumped discharges (for management of the surface water and groundwater) will be upstream of all connections from the public highways. Therefore, run-off from the highway may be present in the discharge streams from the outlets, though mitigation measures in the form of swales with silt fencing and sediment and oil filters (where allowed by the phasing of works) are expected to be installed within gully pots to prevent the ingress of contaminants from the highway. This could mean there is a chance that the discharges may not be entirely representative of solely construction water generated on site (e.g., either because it will have been diluted by rainwater, or contains background levels of pollution from the highway where these have not been contained). However, as the permanent SuDS drainage system is designed to reduce pollution loading and flows

from the highway, levels of any background contaminants from the highway are expected to be de minimis. This has been confirmed through assessment using the Highways England Water Risk Assessment Tool (HEWRAT).

Sampling methods to be used on site are expected to be in accordance with the British Standard for Water Quality Sampling (BS EN ISO5667:2006); however, this will ultimately be dependent on conditions set in the permit. It is anticipated that samples will be collected in either glass, plastic or stainless-steel containers. Sampling vessels will be thoroughly cleaned between sample collection and care will be taken not to disturb any bed sediments in the area of collection. Each sample will be appropriately labelled, sealed and stored in a refrigerated cool box immediately for transportation to the testing facility. For each collected sample a sampling report may be completed, if required.

Monitoring and sampling of discharge outlets is anticipated to be undertaken by either SZC Ltd Site Operations or appointed contractors. Where contractors are required to undertake monitoring and sampling activities, the Site Operations team will ensure that they hold the relevant experience and competencies to undertake the monitoring and sampling in accordance with the environmental permit conditions. Final arrangements will be detailed in a monitoring plan, if required. Aspects of self-monitoring will be covered as required in the SZC EMS documentation and / or contractor construction related environmental management arrangements.

7.4.1 Testing and Quality Assurance

Testing will be conducted such that all parameters under the permit conditions are measured. The monitoring and measurement methods to be used will be agreed with the EA, where required. In-situ water quality testing may be required, for example using handheld electronic meters and field test kits. These may form a routine part of weekly monitoring assessments if considered necessary (for example in relation to elevated suspended solids concentrations).

Analytical testing suites for water quality will be dependent on conditions included within the environmental permit. The basic suite of parameters that may need to be analysed within a laboratory for collected water samples might include pH, suspended solids, aluminium (total) (if dosing). Tests may be required for other parameters dependent upon site conditions or regulatory requirements. The need for, and arrangements to undertake if required, analytical testing will therefore be determined following permit issue. This will be the responsibility of the site compliance team to co-ordinate.

As described above, sampling and testing is anticipated to be carried out in line with British Standard for Water Quality Sampling (BS EN ISO 5667:2006). It will also be conducted under a safe system of work and in accordance with any laboratory quality assurance procedures. Testing will be undertaken at a UKAS accredited facility and will meet any MCERTS requirements. All sampling and monitoring equipment is likely to be subject to a programme of preventive maintenance. Records of all maintenance and calibration will be kept secure and made available to regulators as and when required.

7.5 Reporting of Monitoring and Sampling Results

Results from the water quality monitoring and sampling will be made available as required to environmental regulators, e.g., the EA, upon request or in line with reporting requirements set out in the environmental permit for the proposed discharge activities. These will be managed by the site compliance team. Any non-conformances will be addressed as per internal Environmental Management System (EMS) arrangements. Corrective actions and the implementation of a solution to ensure that the discharge remains in-specification will be agreed with in conjunction with the advice of the EA, where required.

CWDA-18 PERMIT APPLICATION SUPPORTING DOCUMENT

Please refer to **Section 8** below which summarises additional monitoring and environmental management system arrangements that will apply to the proposed water discharge activities.

8 ENVIRONMENTAL MANAGEMENT SYSTEM ARRANGEMENTS

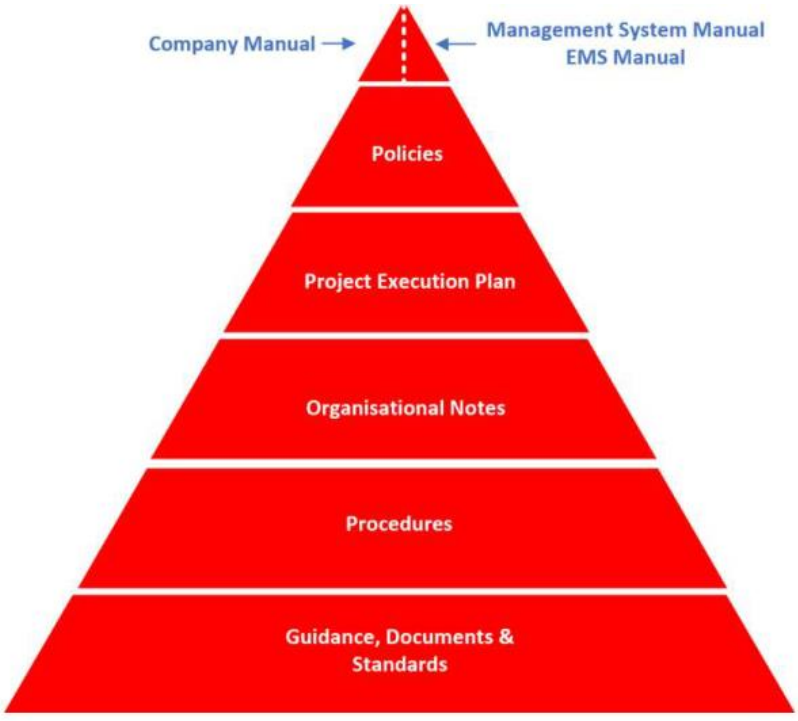
8.1 Environmental Management System

SZC has an Environmental Management System (EMS) that is certified to the management system standard, BS EN ISO 14001:2015. The EMS provides a structured system of procedures, arrangements, and associated tools to manage the effect of SZC's activities on the environment. Relevant aspects of the EMS will be applied to the discharging activities proposed in this application as appropriate, in conjunction with any contractor implemented management system measures.

The aspects of SZC's EMS that are anticipated to be of relevance to the above-described discharging activities are summarised within this section. There is an EMS Manual in place which summarises, in detail, the processes and procedures (and associated documentation / other requirements), that constitute the full EMS, and how these ensure the organisation meets the relevant clauses set out in the 14001 EMS standard.

The EMS forms part of SZC's wider Integrated Management System (IMS) which also comprises the Quality Management and Health & Safety Management systems. These are certified to ISO 9001 and 45001, respectively. The SZC IMS Structure is presented below; the EMS is integrated at each one of these levels.

Figure 21 - SZC IMS Structure



The IMS form a key pillar to SZC's environmental compliance model, alongside Leadership & Governance and Competency and Training.

8.1.1 EMS Scope

The EMS implemented at SZC provides a structured system of procedures, arrangements and associated processes and tools to ensure suitable and, importantly, effective approaches are undertaken with regards to managing environmental aspects relevant to the organisation. The system will be applied to the proposed construction water discharging activities, as deemed relevant by those responsible for undertaking and managing the above-described activities. Where new processes or procedures are identified as being required, for example in relation to specific environmental permit conditions that may be imposed, these will be developed by either the SZC site team or the appointed contractors and communicated to all relevant personnel.

As defined in the EMS Manual, the EMS comprises all SZC-related activities in relation to design, construction and future operations and decommissioning of the SZC nuclear power station. This includes work activities, products and services involving both SZC company employees and contractors.

Where contractors are on-site, they will be required to adhere to their own environmental management systems alongside any site-specific SZC arrangements. For example, work instructions may be developed and communicated in relation to specific environmental permit requirements.

8.2 Construction Environmental Management Approach

There will be a requirement to ensure that the proposed discharging activities set out within this permit application are undertaken in accordance with suitable management measures in place. While the contractors who will be responsible for undertaking the proposed discharging activities have yet to be appointed, Sizewell C Ltd will act as the Legal Operator and will therefore have sufficient control of the activities. In accordance with the relevant GOV.UK guidance (Legal operator and competence requirements: environmental permits[33]), SZC Ltd will:

- Have day-to-day control of the activity, including the manner and rate of discharging activities.
- Make sure that permit conditions are complied with.
- Decide who holds important staff positions and have incompetent staff removed, if required.
- Make investment and financial decisions that affect how the discharging activities are carried out.
- Make sure activities are controlled in an emergency.

There will be a need to ensure that all construction related activities that could have an effect on the environment, are covered in corresponding processes and / or procedures, as considered necessary. These will be documented and shared with the relevant personnel on site.

It is anticipated, at this stage, that the following documentation may be produced:

Construction Environmental Management Plan (CEMP): Once contractors have been appointed, those responsible for undertaking the construction works outlined in **Section 3** and any associated discharging

[33] Legal operator and competence requirements: environmental permits - GOV.UK (www.gov.uk)

activities, outlined in **Section 4** of this supporting document, will be required to develop a CEMP. This will be developed in accordance with any site-specific SZC requirements and will be required to take into consideration any permit conditions relating to the proposed discharging activities. It is to be communicated to any relevant personnel. The CEMP will be submitted by the contractor, prior to work commencing, for review and approval by SZC. The CEMP shall be reviewed periodically and updated as necessary during the execution of the works.

Environmental Management and Monitoring Plans (EMMP): EMMPs may be produced and managed as necessary to provide the framework and signposting for the control of environmental management and monitoring. It is anticipated that, if required, EMMPs are used to identify and communicate the environmental requirements placed on SZC or contractors operating on their behalf. They may be used as tools to control, record and audit environmental management activities throughout the work activities. The specific EMMPs to be developed will be determined upon contractor appointment and permit issue.

Compliance Matrix: A permit-specific compliance matrix will be developed so that the arrangements that support compliance can be easily identified.

Subject Specific Management Plans (SSMP's) (e.g., Materials Management Plans, Site Waste Management Plans, Site Operation Procedures): SSMPs will be produced in response to any specific permitting, planning and legislative requirements, as applicable to the proposed construction activities. The SSMP's detail the specific manner in which work should be undertaken to ensure requirements set out in the EMMP shall be met.

Specifically in relation to the proposed discharging activities, it is envisaged that a Water Quality Sampling and Monitoring programme (or management plan) may be required to be developed upon permit issue. This has not yet been produced as the requirements will ultimately be dependent on any conditions, limits and monitoring arrangements set out in the permit itself, for example water quality parameters and associated emission limit values, monitoring methods and reporting requirements. It is expected however that the programme will include, as a minimum:

- Routine inspection requirements to monitoring and sampling infrastructure
- Periodic monitoring and sampling requirements, including instructions on how sampling and testing should be conducted
- Reporting requirements (both internal and external)
- Roles and responsibilities in relation to the water monitoring arrangements
- Reference to any other relevant EMS documentation e.g., the contractors / sub-contractors CEMP, risk assessment and method statements (RAMS) and environmental emergency response procedures, as considered necessary

Other Contractor Management Plans, Procedures and Method Statements: Other documents may be prepared as necessary to deliver environmental control, for example, contractor and sub-contractor RAMS and Safe Systems of Works.

Environmental Policy: The Contractor(s) will comply with the SZC Environmental Policy Statements and shall ensure that the policy and its requirements are made known to all relevant personnel.

Environmental Legislation, Regulation and Other Requirements: Contractor(s) will carry out work in compliance with the requirements of UK environmental legal requirements. Contractor(s) will also comply with any other mandatory site-specific requirements, such as those specified by the relevant local planning, highways and environmental health authorities, or the relevant statutory agency as applicable to the execution of the works.

Wider EMS Procedures: There are a number of EMS procedures that may be implemented on the project. These are set out within the SZC EMS Manual. Those that may be relevant to the proposed discharging activities set out within the scope of this permit application include the:

- Apply for and Maintain Nuclear and Environment Consent, Permit or Licence procedure. This procedure outlines how obligations in the relevant permission (e.g., environmental water discharge activity permit) are identified, and compliance with those obligations is then maintained through integration with the EMS via the development of compliance matrices and other tools as appropriate;
- Develop and Manage Environmental Requirements procedure. This details how the Environmental Requirements (see below) are implemented and maintained;
- Perform Environmental Monitoring procedure, which details how monitoring of environmental parameters on the SZC site are undertaken; and
- Manage Regulatory Commitments procedure, which is designed to capture wider regulatory commitments outside of a specific permit, consent or licence.

These will be reviewed and updated as necessary following issue of the environmental permit. Requirements will be communicated to site operatives, including contractors and sub-contractors, as deemed necessary. There is also an Environmental Permit, Consent and Licence Register which will be updated following the issue of a permit. This includes references to relevant compliance documentation.

Section 3.3 of the SZC EMS Manual explains that there is an Environment & Sustainability Appendix (that forms part of the planning aspect of the EMS), sets out that contractors must also develop their own Environmental Risk Assessments that identify the environmental aspects and impacts and mitigations of their work. Any contractors with responsibility for overseeing / implementing requirements in relation to the proposed discharging activities will therefore be required to take into account any permit (or other) requirements as part of developing their ERA's. The bespoke ERA produced as part of this permit application may be used to cross-check and / or help to inform key contractor considerations on-site. These will feed into the SZC Register as appropriate.

8.3 Organisation

8.3.1 Management Structure

The details of SZCs over-arching leadership and governance structure are presented in the project's Company Manual. The importance of environmental leadership has been embedded at all levels of the SZC Project and its EMS, with ultimate accountability sitting with the Board of Directors.

The SZC Ltd Board has responsibility for Safety and Environmental Management and is ultimately accountable for all safety, environmental and security related decisions. The Board are responsible for ensuring excellence in safety, environment and security is at the forefront of what the organisation do. This will be achieved through:

- Establishing and implementing effective safety, security, health, and environmental management policies based on national and international best practice and guidance, as well as legislative compliance and compliance with all its consents, licences and permits (including the DCO) as well as other legal obligations (for example measures secured through the land agreements);
- Establishing and maintaining a risk assessment and work authorisation process to manage industrial hazards;

- Overseeing that sufficient "competent persons" and other resources are provided to execute all nuclear licensed, permitted, and consented activity;
- Overseeing the SZC Ltd.'s Safety, Environmental and Security performance, including receiving and reviewing reports and implementing recommendations from the Safety, Health, Environment, Social and Sustainability Committee and the Security Committee;
- Ensuring a culture of constructive challenge to seek opportunities to improve including ensuring a systematic robust challenge from Independent Nuclear Assurance as well as independent review of designs, safety, and environmental documentation;
- Overseeing the implementation of adequate arrangements to control any change to SZC Ltd.'s organisational structure or resources which may affect safety or environmental management;
- Ensuring Safety and Environmental Management takes priority over commercial performance objectives;
- Ensuring the effectiveness of SZC Ltd.'s safety, security, radiation protection, environmental, decommissioning and emergency arrangements; and
- Overseeing an effective safety, health, and environmental management culture, specifically implementing a strong nuclear safety and environmental management culture within the project enabling a proactive identification and mitigation of safety hazards and ensuring that environmental impacts are as low as reasonably achievable.

The ESG department includes Sustainability Assurance, Funded Decommissioning and Nuclear Liabilities Capabilities, ESG Strategy and external Policy and Regulation for related topics on behalf of Sizewell C. The management of environmental compliance and securing and maintaining the environmental permits, licenses and consents is within the Safety, Security and Assurance Directorate. However, to acknowledge that the decisions made by the wider project can have an impact on environmental management and compliance, the project has established an "environmental baseline" which identifies all the posts within the SZC organisation that can make such decisions and assigns them several competency requirements, via the use of Role Training Profiles.

There is an Environmental Surveillance Guidance Note which also sets out how the SZC Environment Team engages in, and conducts assurance of, its Supply Chain, Design Change Process and site activities. This, and any relevant corresponding procedures, will be applied to the proposed discharging activities as considered necessary.

8.3.2 Environmental Roles and Responsibilities

Roles and responsibilities specifically in relation to environmental management are set out in the EMS Manual; these are summarised below:

- SZC Ltd. Board of Directors – hold ultimate responsibility for all environmental management decision-making.
- Executive Leadership Team – responsible for operational management of the business (delegated authority by the Board). The Board is additionally in the process of establishing a Safety, Health, Environment, Social and Sustainability Committee; a formal board committee to provide independent advice, oversight and challenge to the project on behalf of the Board of Directors. The Safety, Security and Assurance Director also sits within the executive team. They are responsible for establishing and

enabling a culture of quality, safety and environmental management through implementation of policies and practices that set out standards.

- SZC Environmental Consenting and Compliance. This department includes Sustainability Assurance, Funded Decommissioning and Nuclear Liabilities Capabilities, alongside the ESG Strategy. It also leads on external Policy and Regulation for related topics on behalf of Sizewell C. Part of the Safety, Security and Assurance Directorate. This Function is responsible for the overall governance of this permit application and they have been responsible for overall sign-off. The Function provides authoritative expertise, advice and assurance on all environmental and decommissioning aspects of the project, along with emergency preparedness, radiation safety, sustainability and nuclear liabilities. The Function has overall responsibility for environmental compliance, including the development and implementation of arrangements that form part of the SZC EMS. The EMS Manual sets out key roles within this Function in relation to the EMS.
- SZC Quality Assurance Team – Sits within the Security and Functional Assurance Function in the Safety, Security and Assurance Directorate. The team has responsibility for the project IMS, quality assurance oversight and surveillance activities and the internal audit programme. The team assures the policies, standards and written arrangements that make up the IMS to meet changing requirements throughout the project life-cycle. This team is also responsible for interfacing with external certification bodies and compliance with ISO management system standards, 9001 and 14001.
- SZC Other Head of Disciplines, Team Leaders and Managers – to lead their teams to take a personal responsibility to work within the SZC EMS.
- SZC All Staff - All staff, including embedded contractors, have a personal responsibility to work within the SZC EMS and to work with the Environment, Decommissioning and Radiation Safety Function to ensure continual improvement.
- SZC Contractors – The external supply chain is to work with the SZC integrated EMS and to comply with the environmental requirements as stipulated by SZC.

In addition to the EMS Manual defined roles and responsibilities, there is a Project Execution Plan which describes the full scope of the SZC project and provides a further high-level overview of key project roles and responsibilities.

8.4 Training and Competency

The EMS Manual for the project sets out the over-arching environmental management-related competency requirements. The following processes are in place:

- An Assess Individual Competency Procedure – sets out the process for assessing SZC posts which hold a Role Training Profile, assigned either via the Environmental or Nuclear Baselines. The procedure includes identification of development or supervisory actions required to close competency gaps.
- A Create Roles, Competencies and Development Actions Procedure – sets out the approach for analysing and defining competency requirements within all identified role training profiles within SZC. A competency area framework is used as part of the process to select the competencies required for each role.
- There is an E&S Appendix which includes the requirement for contractors to provide environmental related training for its personnel, to maintain a competency matrix and to provide training records.

Specifically in relation to the construction activities to be undertaken, the appointed contractor(s) shall be responsible for identifying the training needs of contract personnel to ensure they receive appropriate environmental training. The primary objective of this training shall be to ensure that environmental protection is delivered by offsite and on-site operatives. Training and awareness may involve:

- Toolbox Talks: to be delivered as considered appropriate to relevant personal on a regular basis. These are expected to inform site personal of relevant environmental requirements relating to the discharging permit as well as general on-site environmental considerations and topics such as Pollution Prevention and Waste Management.
- Pollution Prevention / Spill Training: Emergency spill response training will be delivered. Training will involve appropriate use of spill kits and equipment and the steps to follow during an emergency response. It will also set out key roles and responsibilities.
- Site Induction Programmes: Inductions will take the following approach in relation to environmental briefings; Initial Safety Induction will be delivered to all site personnel to give an overview of environmental issues. Second tier induction will be Operative based and will relate to contract work activities. Third tier induction will be Supervisor based and will provide information and guidance on compliance with consents, licensing, monitoring and environmental management for the site.
- Environmental Awareness Training: all site personnel will have or are due to participate in a One Day Site Environmental Awareness Training Course. This will ensure a basic awareness level of environmental issues.
- CIRIA – Control of water pollution on construction sites[34]: This guidance document will be given to supervisors and management. C352 Guidance for Best Practice will be utilised for any specific training on water pollution.

The training shall be delivered by a knowledgeable and competent instructor, who shall be responsible for developing the training material and maintaining a record of the training given to the various levels of personnel.

8.5 Maintenance and Monitoring in relation to Water Discharging Activities

8.5.1 Maintenance of Site Drainage Infrastructure and Treatment Systems

The site drainage (SuDS) features that are to be implemented across the site will require periodic maintenance. **Table 23** below provides an indicative overview of the type of maintenance that may be required. This will be the responsibility of the site contractors to ensure that SuDS features are maintained appropriately to provide effective levels of treatment as intended in the design.

Table 23 - SuDS Indicative Maintenance Measures

Maintenance Type	Indicative Frequency	Typical Tasks
Routine / regular maintenance	Monthly (for normal care of SuDS)	Litter picking Grass cutting

[34] c532 (ciria.org)

		Inspection of inlets, outlets and control structures
Occasional maintenance	Annually (dependent on the design)	Silt control and removal around components Vegetation management around components Suction sweeping of permeable paving Silt removal from catch pits, soakaways and cellular storage
Remedial maintenance	As required (tasks due to repair problems for example)	Inlet / outlet repair Erosion repairs Reinstatement of edgings Reinstatement following pollution Removal of silt build up

Routine inspection will be required to ensure optimal performance of the proposed drainage and pollution prevention and treatment mitigation measures that have been described in detail in **Section 5** above. This is particularly important during periods of prolonged or intense rainfall to ensure that WMZs and other associated drainage features / infrastructure operate as intended and continue to provide sufficient control and treatment of discharging activities.

It will be the responsibility of the SZC Environment Team and construction contractors (once appointed) to determine a suitable routine inspection regime which will incorporate consideration of the below drainage system and discharging activity aspects:

- Maintenance of temporary drainage ditches: regular inspections of drainage ditches will take place for any accumulation of silt or other debris, or other aspects, that could impact the integrity of the ditches. Any accumulation of material will be safely removed and disposed of appropriately in accordance with waste management arrangements on site and legal requirements. If any sediment capture techniques are used, such as sediment mats within ditches, these will also be subject to regular inspection and replacement / removal as considered necessary. Any areas of erosion within the drainage system will be identified through inspection and remedial measures undertaken as required.
- Pipes and culverts: regular inspections will also take place of pipework and culverts implemented as part of the drainage system on site. Similarly to the maintenance of drainage ditches, checks will be made to assess for any build up of sediment or other debris that could hinder the effectiveness of the infrastructure.
- Any dewatering sump areas, used for collection of surface water, will be inspected on a daily basis to ensure the sump is efficiently collecting water from working areas and any pumps are transferring the water as intended to designated WMZs / treatment facilities prior to discharge off-site. Any issues with sumps or pumps will be reported to the relevant personnel on site and discharging will cease if

required. Any associated generators will also be subject to regular inspection and maintenance as required.

- Oil interceptors, where installed, will be inspected on a routine basis to ensure that they are functioning properly and to confirm whether any emptying of residue is required. The inlets and outlets of interceptors will be inspected to ensure that there is no debris causing blockages that could impact drainage flows.
- As described above, attenuation and infiltration facilities (including WMZ basins), will be inspected to ensure that discharge requirements can be met and to ensure they are operating as intended, in terms of both attenuation and treatment (final settlement of solids) where required. For such structures, key areas of inspection will be examination of the inflow and discharge points, physical integrity of the lagoon structures themselves (if constructed as a bunded design), water levels and storage capacities. The WMZ basins have all been subject to design based on modelling which has informed suitable sizing in terms of capacities, including a climate change allowance (as described in **Section 4** above). In particular, operation of the WMZ basins will be closely monitored during periods of prolonged and / or heavy rainfall. Routine inspections will take place to determine the depth of any silt deposits that may require periodic removal.
- Again, as described, above SuDS features will also be subject to routine inspection and maintenance as required. The performance of SuDS can diminish gradually over time as porosity is reduced with siltation, therefore regular inspection of such features is vital to ensure their longevity and effectiveness of treatment of discharge streams across the site. Particular attention will be made to inspection during periods of prolonged rainfall where the soakaway capacity may be exceeded by surface drainage inputs.

All treatment systems will be maintained and operated in accordance with the manufacturer's instructions. These will be provided to relevant site operatives and any additional training / information supplied from the manufacturer as considered necessary. Operation and maintenance of treatment system has been considered in the environmental risk assessment produced to support this permit application. Any faulty or defected systems will be replaced as soon as practically possible. Discharging will temporarily cease at any outlets whereby the treatment equipment is defective. It will not resume until the system(s) have been inspected, repaired, or replaced as necessary. The EA will be notified of any issues relating to treatment systems that could impact required monitoring and reporting arrangements.

8.5.2 Monitoring

Monitoring will be undertaken in accordance with any set environmental permit conditions. These are anticipated to dictate the type, method and frequency of monitoring required along with parameter limits, as explained in **Section 7** above.

Sampling equipment will be regularly visually inspected and checked for any signs of wear and tear / damage which might render it unsuitable for the proposed monitoring requirements. Any faulty or defected equipment will be replaced as required. Any issues with sampling equipment that could impact monitoring and reporting requirements set out as part of the permit will be made known to the EA.

The SZC Ltd. EMS Manual sets out the key procedures that are in place in relation to wider aspects of environmental monitoring, measurement and analysis. These will be applied to the discharging activities where considered necessary. It is likely that a separate monitoring / sampling plan will be developed once the permit has been issued to ensure that specific requirements are addressed. This will be made available to the EA (if developed) upon request.

The site will be subject to regular environmental auditing by the SZC Environment Team. Activities relating to water discharging and dewatering will be incorporated into the scope of these audits where considered necessary.

8.6 Environmental Emergency Response

Section 3.5.2 of the EMS Manual sets out how environmental emergency preparedness and response is to be embedded into the project.

There is an Environmental Emergency Preparedness and Response standard which specifies best practice to be used by SZC to ensure readiness for dealing with any accident or emergency arising on the site. Alongside the standard sits the Establish, Maintain and Develop Emergency Preparedness and Response procedures which provide a strategic approach for deploying the organisation's Emergency Preparedness and Response policy. There is also a Construction Emergency Preparedness and Response procedure which supports an integrated emergency management approach and establishes responsibilities of contractors in compliance with the SZC emergency preparedness requirements.

The contractors CEMP will also be required to contain an environmental incident response procedure or plan. A draft of the CEMP will be subject to SZC approval prior to any construction works commencing on site. This will be required to have taken into consideration the proposed discharging activities set out within this permit application. As part of the SZC EMS, there is a Manage Contractor Site Non-Conformance Procedure which may be applicable should management of the proposed water discharging activities be contracted out.

Any environmental incidents which occur will be investigated in accordance with the SZC management system procedure, Investigate Incidents. This ensures that root causes are identified and both preventative and corrective actions. Investigation reports will be maintained on site. A Manage Non-Conformance procedure is also in place which will be applied if necessary (should any environmental non-conformances arise).

8.7 Permit Application Development and Review

This environmental permit technical supporting document has been subject to a Permit Project Plan as part of the internal development process for the application itself. This forms part of the Sizewell C Ltd EMS and is a requirement for all permits, consents and licences to follow.

The Permit Project Plan identifies the below aspects:

- The type of permit, consent or licence and Regulator
- Category of the application (in terms of whether the permit is considered as Major or Minor) (criteria forms part of internal management systems)
- Scope of the permit application
- Supporting information required
- Cost of application
- Regulatory engagement requirements
- Stakeholder engagement requirements
- Timeline / sequence of permit specific activities
- Interdependencies and risks (i.e., in relation to the wider project)

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- Application process deliverables and timeline of application process
- Organisation roles and responsibilities
- Internal and external technical resource requirements

This technical supporting document in particular has been subject to two internal review processes to ensure that the relevant personnel (from an organisational perspective) have input or reviewed the document as required, depending on their specific role and responsibilities within the wider project framework.

9 CONCLUDING REMARKS

This document has been produced to support the environmental permit application that is being made by Sizewell C Ltd. for proposed water discharging activities that are anticipated to be required as part of the early construction phases associated with the SZC proposed development. It has been prepared with input and review from all relevant technical disciplines.

This document will be submitted to the EA, alongside the required GOV.UK permit application forms, and should be used during the regulatory determination process only.