

# **An overview of the engineering and biodiversity of the SuDS at Bramford**

# Agenda

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1. Introductions
2. Objective of the presentation
3. EA ONE Offshore Wind Farm
  - Wind farm
  - Onshore substation
4. General engineering approach to SUDS
5. General environmental approach to SUDS
6. Current Wildlife interest at Burstall in relation to SUDS
7. Questions

# Introductions

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**Michael Hotze**

**East Anglia ONE Offshore Wind Farm  
Transmission Asset Package Manager**



**Emma Browning**

**East Anglia One Offshore Windfarm  
Environmental Manager**

# Objective of the presentation

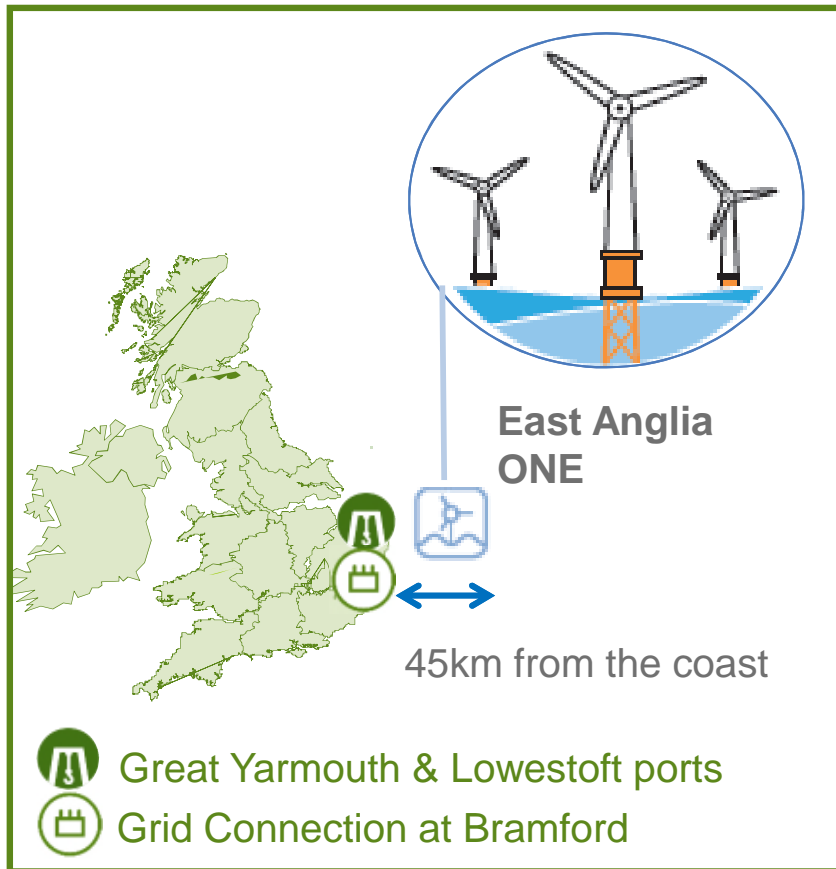
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The objective of this presentation is to reach out and communicate to interested parties about our project. Specifically for today to:

1. Develop an awareness of the EA ONE project generally;
2. Inform about the design and construction of the SUDS pond at the onshore substation; and
3. Inform about the wildlife at the SUDS pond.

# East Anglia ONE – Project Overview

**East Anglia ONE offshore windfarm** will provide 714 MW of new cleaner capacity with an important **investment commitment of £2.5Bn**



## Key Facts



- First Round 3 Project awarded with a CfD
- 102 **7-MW Siemens turbines**
- Powering up to **600,000 homes every year**
- **3,000 jobs** during the construction period followed by **30-year O&M works** in the region

## Timeline



- FID and satisfied CfD requirements 2016
- Engineering work and supplier activities ongoing
- Construction has begun
- First power achieved during 2019

# EA ONE Offshore Windfarm

## Offshore Substation

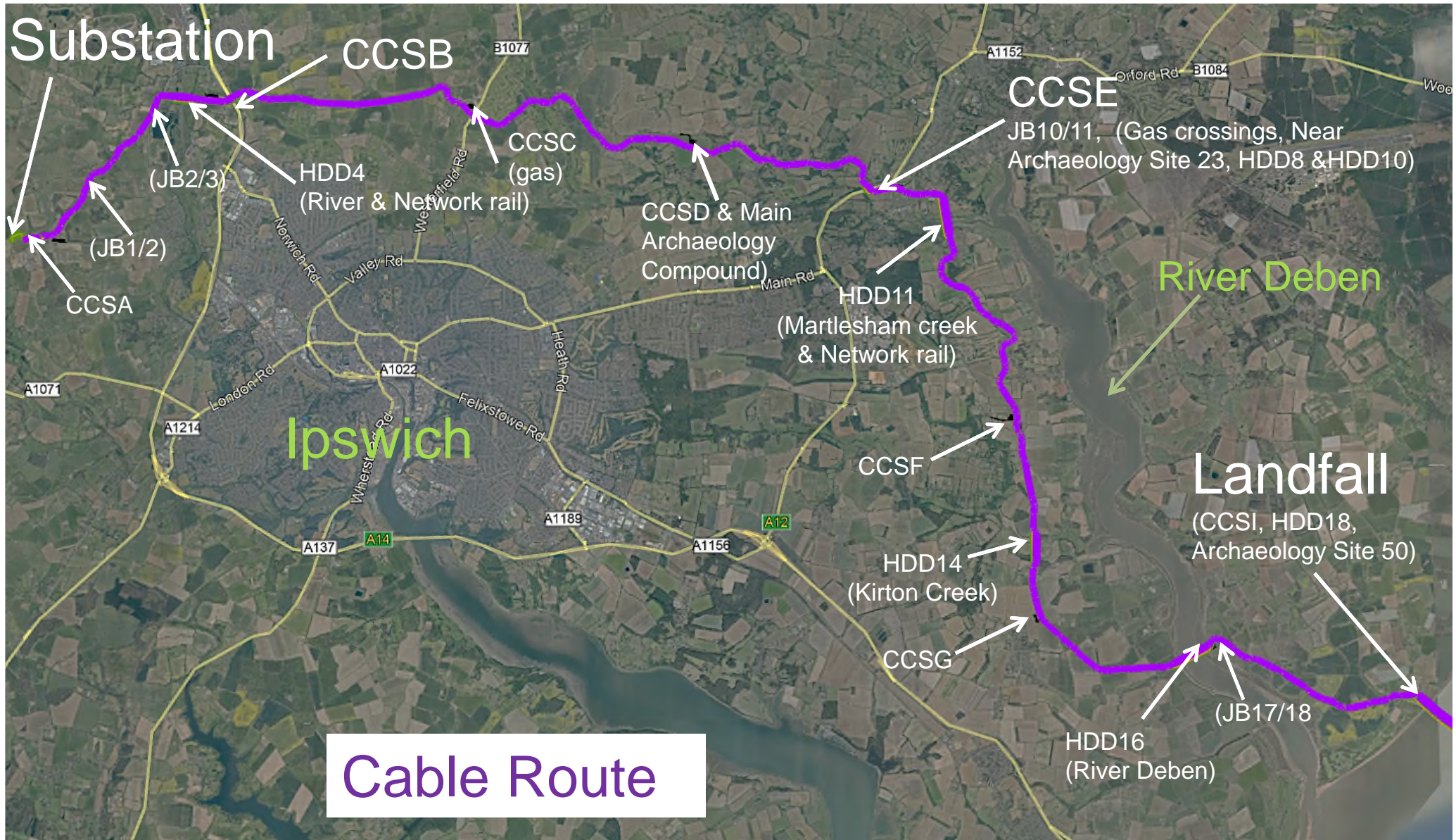


# EA ONE Offshore Windfarm

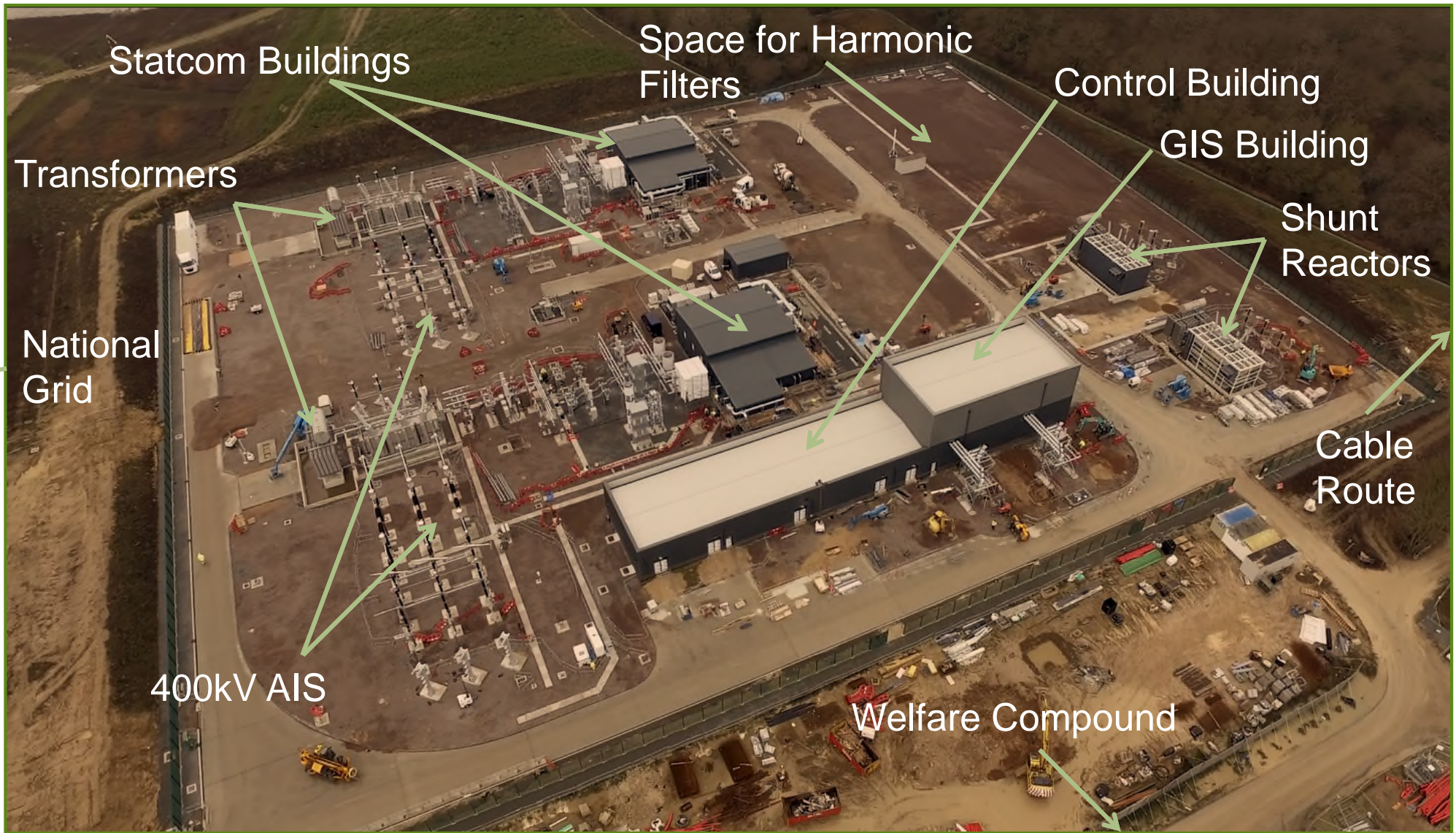
## WTG- Turbine installation continues



# EA ONE Offshore Windfarm



# Engineering of SuDS



## Legislative / planning background

The proposed surface water drainage scheme will be designed to meet the requirements of the National Planning Policy Framework (NPPF) by limiting the post development site run-off to the existing greenfield rate and providing sufficient on site attenuation for rainfall events up to the 1 in 100 year rainfall event, plus allowance for climate change over the lifetime of the development.

A Sustainable Drainage System (SuDS) is utilised that employs the following key principles to ensure the drainage system mimics natural drainage by:

- Storing runoff and releasing it slowly (attenuation);
- Allowing water to soak into the ground (infiltration);
- Slowly transporting (conveying) water on the surface;
- Filtering out pollutants; and
- Allowing sediments to settle out by controlling the flow of the water.

## Design basis

All surface water runoff from the operational Substation (platform, facilities and roads) will be collected and will receive at least two consecutive stages of treatment in its conveyance across the site, including attenuation within basins, before its controlled release.

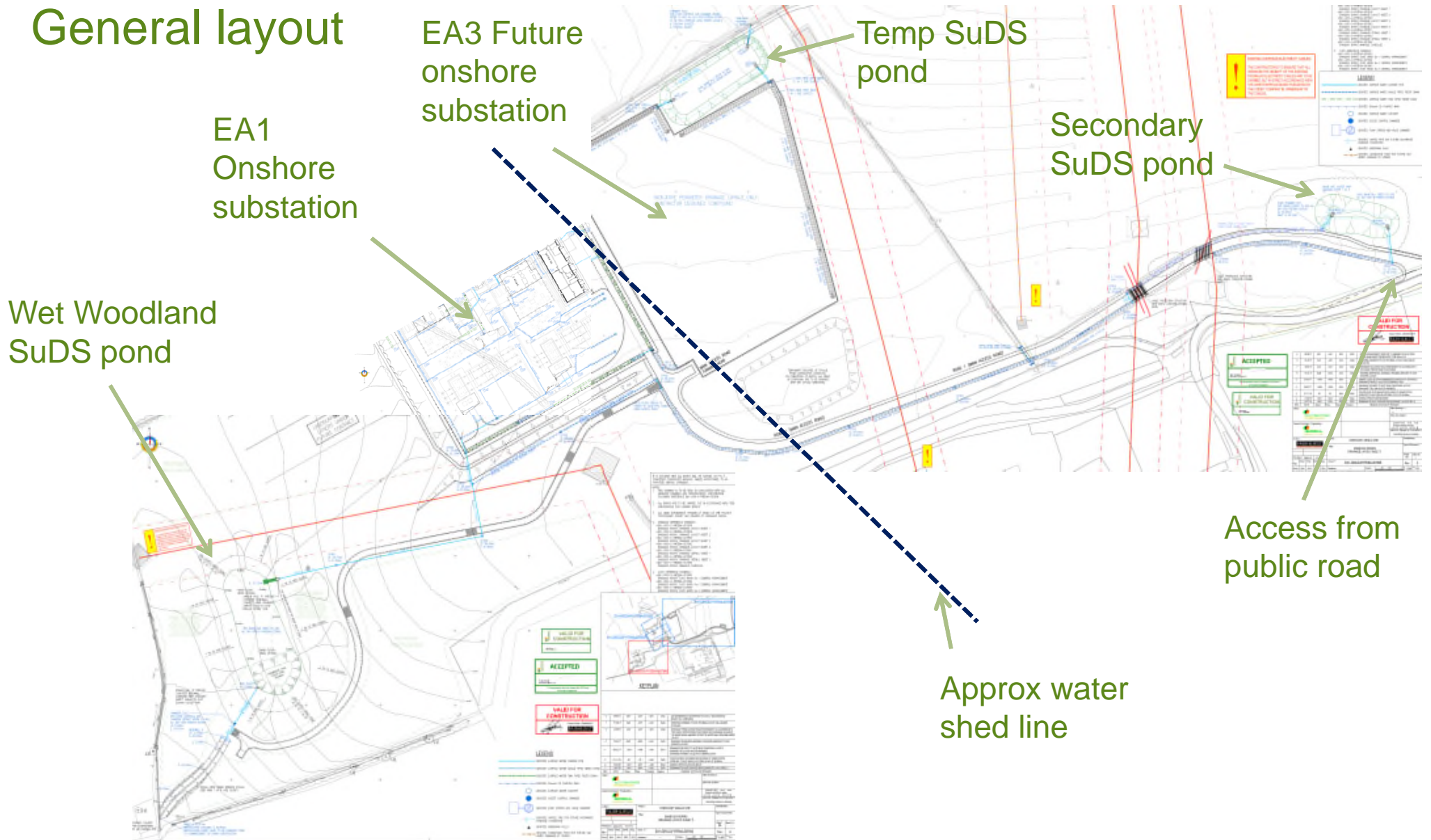
The SuDS basin, with a controlled outlet, provides a second stage of treatment and full attenuation limiting the rate of discharge to the equivalent of the pre-existing greenfield rates.

The Wet Woodland SuDS is a modified detention basin, with shallow sloping sides (between 1 in 10 and 1 in 20) featuring a permanently retained pool of water at the outlet end, giving it a more natural appearance. The area will be landscaped, with planting of suitable tree and plant species, which can tolerate the occasional inundation and to provide a habitat for bird life.

There are actually two SuDS basins, however the outlet from the secondary SuDS basin is pumped back to the access road drainage towards the wet woodland SuDS pond. This was a late design change due to UKPN cables blocking the original discharge route. The Wet Woodland SuDS has therefore become the primary discharge route for surface water run-off from the Substation.

# Engineering of SuDS

## General layout

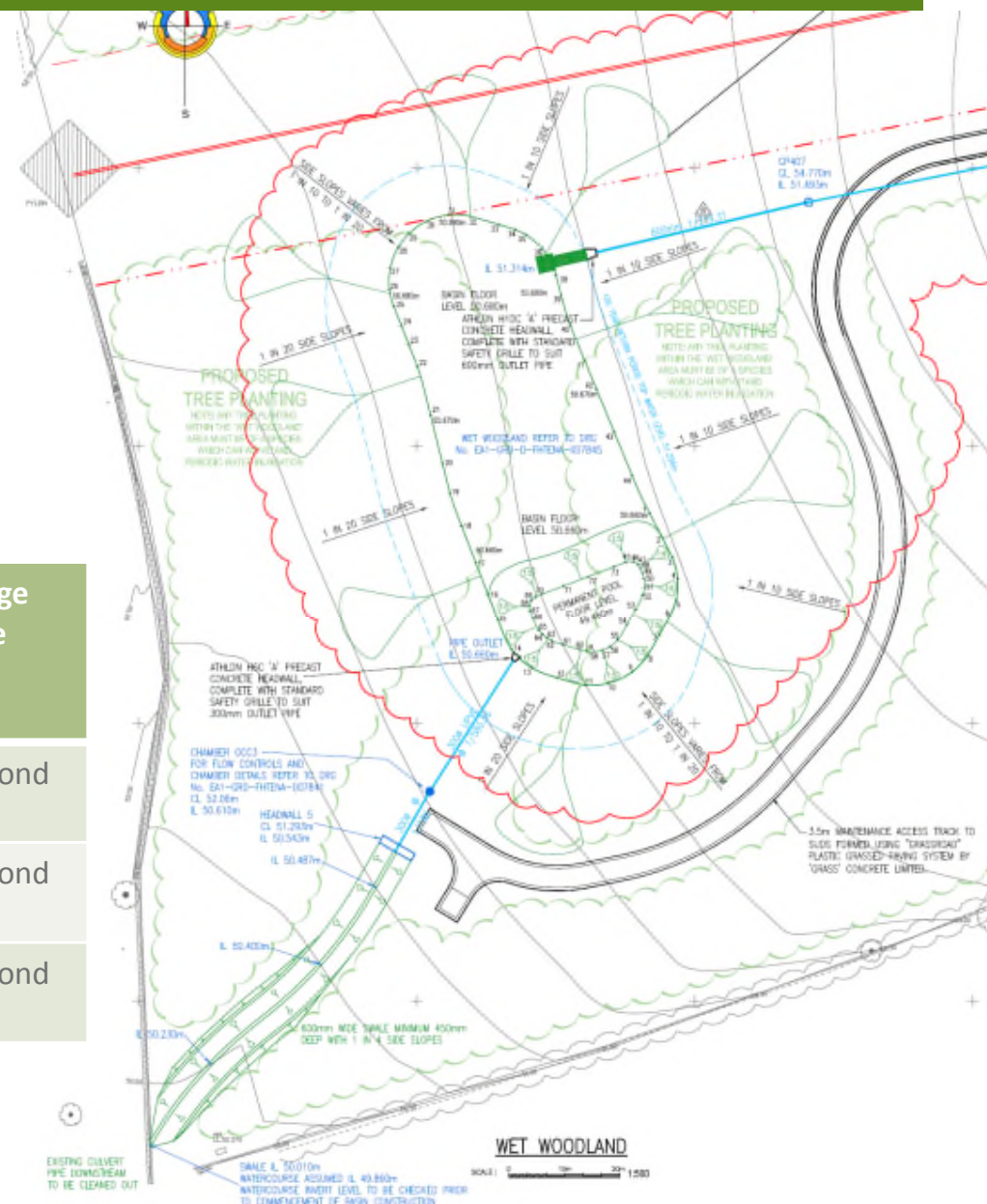


## General layout

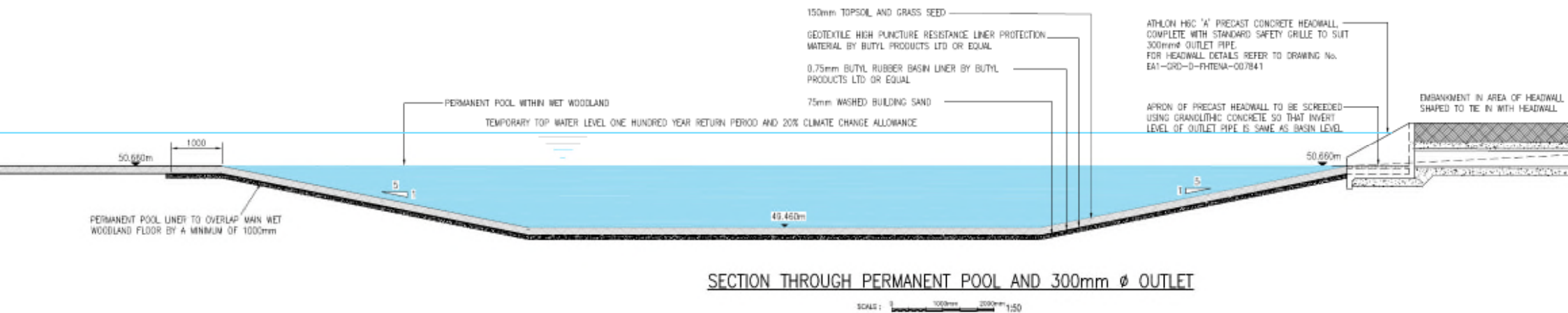
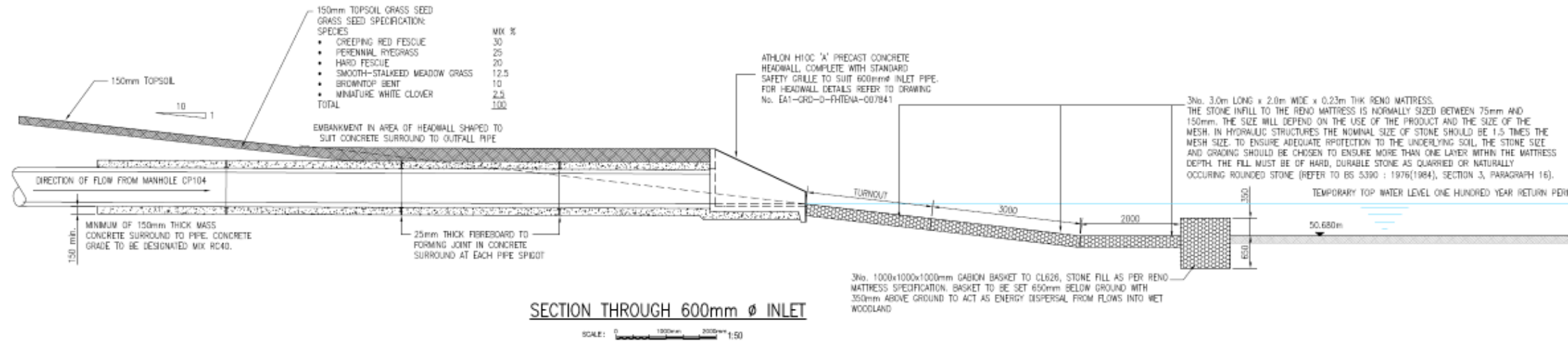
### Size / Depth / surface area relationship

- Permanent pool circa 20m x 15m
- 100 year storm event size circa 100m x 50m
- Minimum surface area 2532m<sup>2</sup> (no run-off)
- Maximum surface area 5506m<sup>2</sup>

	Original greenfield run off rate	Peak discharge rate into the basins from	Peak volume in basin	Peak discharge rate from the basin
1 year return	8.3 litres/second	287 litres/second	>700m <sup>3</sup>	6.0 litres/second
30 year return	23 litres/second	555 litres/second	>1400m <sup>3</sup>	7.9 litres/second
100 year return	34.1 l/s	622 litres/second	>1800m <sup>3</sup>	9.3 litres/second



## General layout



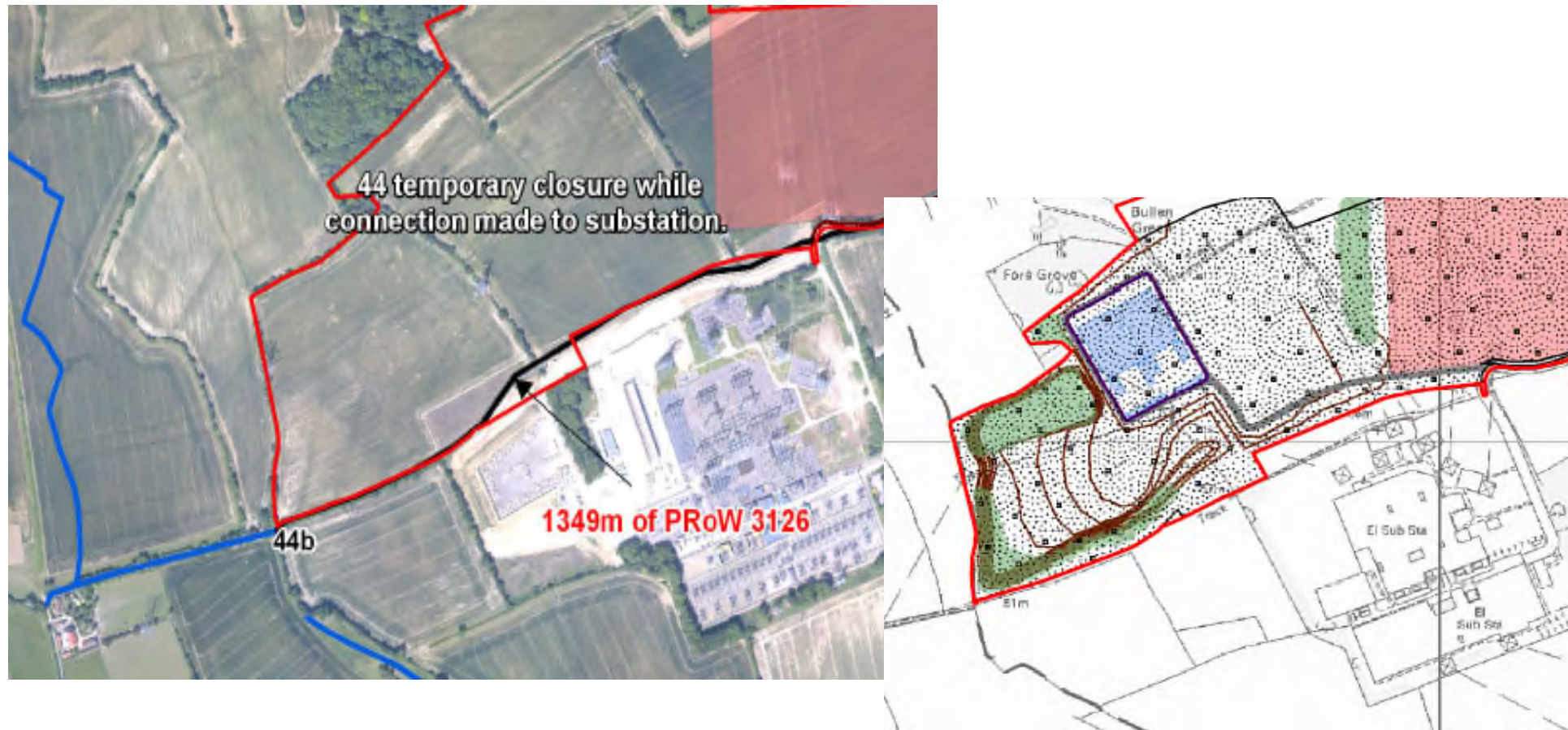
# Engineering of SuDS

## Headwalls and outfalls



## Environmental – Pre-construction Land Use

Environmental Statement identified the area of the substation and SUDS area to be that predominantly agricultural fields



## Environmental – Pre-Construction - Ecology

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The Environmental Statement and pre-construction surveys identified the following species, these were managed via a qualified ecologist and the relevant licences were in place prior to works taking place

- Badgers – setts within woodland to the north (Fore Grove Wood) – under Disturbance licence
- Great Crested Newts – single pond with low population within woodland to the north (Fore Grove Wood) – Exclusion fencing installed under EPS mitigation licence
- Bats – trees throughout woodland and hedgerows with roosting potential. Activity surveys confirmed foraging activity by common & soprano pipistrelle, myotis species, barbastelle

## Environmental – During Construction

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The project is still under construction, the SUDS pond area below:



# Environmental – During Construction

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## Environmental – Ecology during construction

### Species noted throughout construction:

<b>Birds:</b>	<b>Invertebrates:</b>	<b>Mammals:</b>	<b>Amphibians:</b>	<b>Notable plants:</b>
Little grebe (2) Mallard (10) Reed bunting Linnet (30) Dunnock Goldfinch (15) Meadow pipit (20) Skylark Kestrel Raven Wood pigeon	Small copper butterfly Painted lady butterfly Common blue damselfly Thick legged flower beetle Buffish mining bee Broad bodied chaser Common darter (7 incl. breeding pair) Honey bee Bumblebee species	Badger (2 setts covered by disturbance licence) Brown hare Deer species (various) Rabbit Fox Common pipistrelle Soprano pipistrelle Noctule Serotine	Common toad Common frog Great crested newt (confirmed to north)	Common broomrape Hedge woundwort

## Environmental – Ecology during construction



*Little Grebe*



*Common Darter*

*Small Copper*



# Environmental – Ecology During Construction



## Environmental – Landscape Management Plan



The Onshore Substation Landscape Management Plan defines the variety and arrangement of species to be planted:

- 30,305 Woodland Trees
- 1580 metres of hedge
- 12 hectares of grassland
- 1 permanent SUDs and 1 drainage basin
- 4 Woodland mixes: Core, Edge, Screening and Wet Woodland (mixing both broadleaved & coniferous species)
- Wet Woodland includes species such as Alder, Birch, willow and Ash
- 5 grassland mixes including aquatic species such as fool's watercress, brooklime, pond sedge, purple loostrife
- Additional ecological enhancements to be installed in and around the landscaped areas include **8** log piles and hibernacula, **1** Barn Owl box, **15** bird nest boxes and **12** bat roost boxes

# Environmental – Bio-Diversity Net Gain

Ecological Enhancement &  
Bio-Diversity Net Gain  
Integrated into the permanent design

## Before



## After



## Environmental – Post Construction – Ecological Gains Anticipated

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1. Increase in invertebrate assemblage (both aquatic and terrestrial) within grassland and wetlands, as well as new woodland (particularly as the woodland ages and leaf debris/mulch accumulates naturally)
2. Bat populations further supported by increased optimal foraging habitats and subsequent increase in invertebrate life – particular habitats including woodland edges, wetland and open species rich grasslands
3. Increase in foraging habitat for badgers and other larger mammals such as foxes, hare and deer (although hopefully not too much deer grazing!) as well as smaller mammals such as mice and voles which provide prey for larger mammals and birds
4. Increase in floral diversity due to introduction of aquatic and marginal plants which are somewhat uncommon within the landscape at this location as largely arable with hedge boundaries

## Environmental – Post Construction – Ecological Gains Anticipated

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5. Increase in bird number and species due to various habitats available – already seeing waterfowl such as grebes and ducks present, ground nesting birds expected such as skylarks, woodland species such as finches, thrushes, open grassland and increase in small mammals will attract owls and other birds of prey
6. Potential for GCN to utilise SUDs provided small volume of water is retained. Other amphibian life expected to be maintained including common toad, common newts – palmate/smooth, common frogs.
7. Potential for reptiles due to range of habitats and features available including south facing banks, woodland edges, taller grass and open spaces
8. Direct Gain in Suffolk BAP Habitats including wet woodland, mixed deciduous woodland and hedgerows, and ongoing potential gain for Suffolk BAP Species including bats, hedgehogs, brown hare, reptiles and amphibians and multiple bird species.

# Questions

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