



9. Biodiversity

BRISTOL AIRPORT LIMITED

OUTLINE SAC/SPD ECOLOGICAL MANAGEMENT PLAN FOR NORTH SOMERSET AND MENDIPS BAT SAC SPD SPECIES AND WIDER BIODIVERSITY

1 INTRODUCTION

1.1 BACKGROUND

- 1.1.1 Bristol Airport Limited (BAL) proposes to increase the capacity of Bristol Airport from 10mppa to 12mppa. As part of the proposals additional low cost car parking and highway improvements will be required and is to be sited on land known as Proposed Extension to Silver Zone car park (Phase 2) and A38 Highway Improvement land. The first area is currently used for agricultural purposes, grazed by cattle, the second is a sycamore dominated unmanaged parcel of woodland. Ecological surveys have been undertaken which has revealed a significant presence of lesser horseshoe bat and greater horseshoe bat.
- 1.1.2 Specifically, the proposals will result in the loss of circa 3.7ha of high-quality horseshoe bat foraging habitat associated with the Proposed Extension to the Silver Zone car park (Phase 2), together with the loss of a small area (0.16ha) of woodland edge habitat at the A38 Highway Improvement land.
- 1.1.3 Bristol Airport and the land associated with the Silver Zone car park (Phase 2) and the A38 Highway Improvements is situated near to the North Somerset and Mendip Bats Special Area of Conservation, which is a European site for the purposes of the Habitats Directive (Council Directive 92/43/EEC). Lesser horseshoe bats and greater horseshoe bats are cited as Annex II species which are a primary reason for the selection of the site as a Special Area of Conservation (SAC).
- 1.1.4 The conservation objectives for the SAC state:
- 1.1.5 "With regard to the SAC and the natural habitats and/or species for which the site has been designated, and subject to natural change, ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:
- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
 - The structure and function (including typical species) of qualifying natural habitats;
 - The structure and function of the habitats of qualifying species;
 - The supporting processes on which qualifying natural habitats and the habitats of qualifying species

rely;

- The populations of qualifying species; and,
- The distribution of qualifying species within the site."

- 1.1.6 In short, this seeks to ensure that habitats for horseshoe bat are maintained, and this applies equally to habitat used by horseshoe bat outside of the SAC boundary. Due to its proximity to the SAC and the presence of horseshoe bat, the Silver Zone car park (Phase 2) and A38 Highway Improvement land are considered to provide foraging habitat needed to maintain the favourable conservation status of the SAC.

1.2 REQUIREMENTS OF THE SPD

- 1.2.1 In January 2018, North Somerset Council (NSC) adopted the North Somerset and Mendip Bats Special Area of Conservation Guidance on Development: Supplementary Planning Document (SPD). Compliance with the SPD will be a material consideration in determination of the BAL 12mppa application. Compliance with the SPD enables proposals to demonstrate that adverse impacts on the SAC will be avoided or mitigated. In particular, the SPD states:
- 1.2.2 "...the landscapes around the SAC itself are also important in providing foraging habitat needed to maintain the favourable conservation status of the horseshoe bats. Therefore, the guidance sets out strong requirements for consultation, survey information and appropriate mitigation, to demonstrate that development proposals will not adversely impact on the designated bat populations."
- 1.2.3 The proposed Extension to the Silver Zone car park (Phase 2) is located within Zone B and the A38 Highway Improvement land within Zone C of the 'Bat Consultation Zone' identified in the SPD, with Bristol Airport itself being partly located in Zone B and partly located in Zone C. The SPD requires that development proposals within Zones B and C meet certain survey requirements and, where lesser horseshoe bats and/or greater horseshoe bats are likely to be affected, there is a requirement that mitigation is secured to avoid adverse effects on the integrity of the SAC.
- 1.2.4 Where existing habitats or features of value to bats cannot be retained as part of the development proposals, the SPD requires the provision of replacement habitat. The surveys undertaken in accordance with the SPD are also required to inform the metric for calculating the replacement habitat to be provided. The SPD sets out the precise methodology for calculating an appropriate level of replacement habitat.
- 1.2.5 An Ecological Management Plan for the site must be provided setting out how the site will be managed for SAC bats in perpetuity.

1.3 ABOUT THIS DOCUMENT

- 1.3.1 The remainder of this document sets out the provision of SPD-compliant replacement habitat within either Zone A or Zone B of the Bat Consultation Zone, that will be delivered either in woodland owned by Bristol Airport or at an alternative suitable location approved by North Somerset Council in consultation with Natural England. It also provides a draft Outline SAC/SPD Ecological Management Plan (to discuss further and agree with North Somerset Council and Natural England), which will set out the principles that the final SAC/SPD Ecological Management Plan must include when it is approved post consent.
- 1.3.2 Appendix 11F to Chapter 11: Biodiversity of the Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum Environmental Statement describes the requirements of the SPD and the proposals for the delivery of replacement habitats in compliance with this document.

2 BRISTOL AIRPORT WOODLAND

- 2.1.1 Bristol Airport owns approximately 6.34 hectares of woodland dominated by non-native hybrid larch / conifer plantation, located within the wider Wrington Warren woodland, to the west of the Airport e.g. ST 47324 65489.
- 2.1.2 Wrington Warren was originally open rough pasture and was planted primarily with conifer plantations in the late 1950's and 1960's. There are some areas of remnant scrub woodland that pre-dates the plantings.
- 2.1.3 The conifer crops fall into 3 classes:
- Hybrid Larch, planted circa 1963, heavily Ivy clad but of good form.
 - Hybrid Larch, planted circa 1968, generally clean and of good form.
 - Scots Pine, planted circa 1968, fair form.
- 2.1.4 The three main conifer stands cover 4.86 hectares of the total 6.34 hectares, just over 75% of the area. If the Bristol Airport woodland is selected for the provision of the SPD replacement habitat, this area would form the key component of the habitat works as set out in Section 3 (below).
- 2.1.5 This leaves around 25% of the area as mixed yew/broadleaf woodland primarily on former quarrying areas. Part of this smaller area forms a component of Goblin Coombe Site of Special Scientific Interest (SSSI). This is natural regeneration of the quarry workings and is thought to have developed post WWI, thus making the Yew at least 100 years old some are much older and may be resultant of the demise of quarrying, broadleaves in this area consist primarily of Ash, Sweet Chestnut and Birch. If the Bristol Airport woodland is selected for the provision of the SPD replacement habitat, this area would fall outside of the SPD management prescription as set out in Section 3 (below) but would be managed to enhance the conservation status of the SSSI and in accordance with details to be agreed with Natural England and North Somerset Council.
- 2.1.6 There are scattered broadleaves within the Conifer plantations and also commercial Conifers scattered within the Yew/Broadleaf areas.
- 2.1.7 A series of plans showing the location, context, crop assessment and Phase 1 habitat type are provided (please refer to Appendix A).

3 PREFERRED OPTIONS

- 3.1.1 In summary, the preferred option for the provision of suitable replacement habitats can be described as (reproduced from the SPD):
- Bristol Airport Woodland: “4.38 ha of existing coniferous plantation (WC0) with canopy cover 75-90%(WF111) currently unmanaged located in SAC Band A managed to become mixed woodland (WB0) with canopy cover <20% (WF114) within 10 years”; OR
 - Alternative Woodland: “8.11 ha of existing mixed plantation (WB1) with canopy cover 50-75% (WF113) currently unmanaged located in SAC Band B managed to become mixed woodland (WB0) with canopy cover <20% (WF114) within 10 years”.
- 3.1.2 It is important to note that the SPD habitat management option can be delivered much quicker than the stated SPD criteria of 10 years. The replacement habitat management option would be delivered in advance of any loss of grassland or woodland horseshoe bat foraging habitat associated with the Silver Zone car park (Phase 2) and A38 highway improvements.
- 3.1.3 The final package of SPD Replacement Habitat will be agreed with North Somerset Council and Natural England.

4 OUTLINE SAC/SPD ECOLOGICAL MANAGEMENT PLAN

- 4.1.1 The SPD sets out how the Habitats Regulations will be applied at Section A7. In particular, it notes that any decision must be made on a precautionary basis and, following the Waddenzee case (C-127/02), that there can be no reasonable scientific doubt remaining as to the absence of adverse effects on the integrity of the site. It goes on to state (paragraphs A8 and A9):
- "For the Somerset authorities to be able to conclude with enough certainty that a proposed project or development will not have a significant effect on the SAC, the proposal or project must therefore be supported by adequate evidence and bespoke, reasoned mitigation. Where appropriate a long term monitoring plan will be expected to assess whether the bat populations have responded favourably to the mitigation. It is important that consistent monitoring methods are used pre- and post-development, to facilitate the interpretation of monitoring data.
 - Mitigation, an Ecological Management Plan and, (where required) monitoring during and / or post development, will be secured through either planning conditions or a S106 agreement or both. Data from monitoring will be used by the Somerset Authorities to determine how the bat populations have responded to mitigation and to increase the evidence base."
- 4.1.2 The delivery of the replacement habitat will require a detailed SAC/SPD Ecological Management Plan that will comply with the SPD to facilitate coordinated and targeted measures for both lesser and greater horseshoe bats in accordance with the habitat creation prescriptions detailed in Annex 6 of the SPD (and for other species of flora and fauna).
- 4.1.3 This will involve the following elements/aims as a minimum:
- Provision of a suitably qualified and experienced Ecological Clerk of Works to oversee matters;
 - Use of suitably experienced contractors to undertake the woodland management works;
 - Ecological tool box talk for all individuals involved in delivering the replacement habitats, including maintenance of an attendance register;
 - To achieve a tree cover of no more than 20% across the conifer plantation areas of the proposed replacement habitat through sensitive tree felling and removal, with reuse of deadwood resource as a habitat feature;
 - Thinning of retained broadleaved tree groups and remaining dense growth through gradual felling and replanting where necessary.
 - Appropriate tree surgery to maintain lifespan of retained trees;
 - Management to sustain all species present within the wood and to create diverse habitats for the recolonisation by other species to maximise biodiversity;
 - Management of open spaces as glades, encouraging the regeneration of ground flora (exploring the potential to re-establish/expand areas of calcareous grassland, thereby supporting the conservation objectives associated with Goblin Combe SSSI);
 - Encouragement of early successional habitats and management through rotational coppicing;
 - Creation of mixed habitat opportunities for invertebrates;
 - Removal of any non-native and invasive species of tree/understorey;
 - Bracken control (as necessary);

- Long term aim to achieve a balanced age structure and to maintain a continuous supply of young growth through regular thinning/felling and to protect and enhance mature features, such as large trees and dead wood;
- 4.1.4 The management of the replacement habitat will continue in the long term and, as such, a detailed plan is essential to ensure that the provision for horseshoe bats is maintained in the future.
- 4.1.5 The final SAC/SPD Ecological Management Plan will be developed and agreed with North Somerset Council and Natural England and the replacement habitat will be secured through a planning condition. The SAC/SPD Ecological Management Plan will form part of an overall Landscape and Ecological Management Plan (LEMP) for Bristol Airport.

5 MULTI-SPECIES BIODIVERSITY PRESCRIPTION

5.1.1 Additional measures will be introduced within the first 12 months to provide multispecies biodiversity mitigation and enhancement from these proposals. These are:

- Retention of standing and fallen deadwood (extent to be agreed);
- 6 x hibernacula and 6 x log pile refugia suitable for a range of species but specified for great crested newt;
- Provision of 20 bat boxes on mature retained trees;
- Provision of 20 bird boxes on mature retained trees;
- Provision of a network of 50 dormouse boxes within the Site, co-located with higher quality arboreally connected understorey and a range of food plants;
-
- Design and provision of suitable information boards highlighting the purpose and nature of the management works and key features of interest;

6 MONITORING

- 6.1.1 An integral element to ensure that the proposed replacement habitat delivers for horseshoe bat species (and other fauna and flora) will be the development of a long-term monitoring program, including detailed baseline surveys and regular reporting to North Somerset Council and Natural England. This will ensure that the effectiveness of the replacement habitat and delivery of enhancement measures can be monitored and adapted in the future as necessary.
- 6.1.2 The specification of the baseline survey and future monitoring will be agreed with North Somerset Council and Natural England in advance, but will include surveys for habitats and flora (NVC), breeding birds and bird habitat, potential bat roost features and bat activity, presence of badger and active setts, suitability for great crested newt and common reptiles, and the presence of dormouse and suitable habitat.

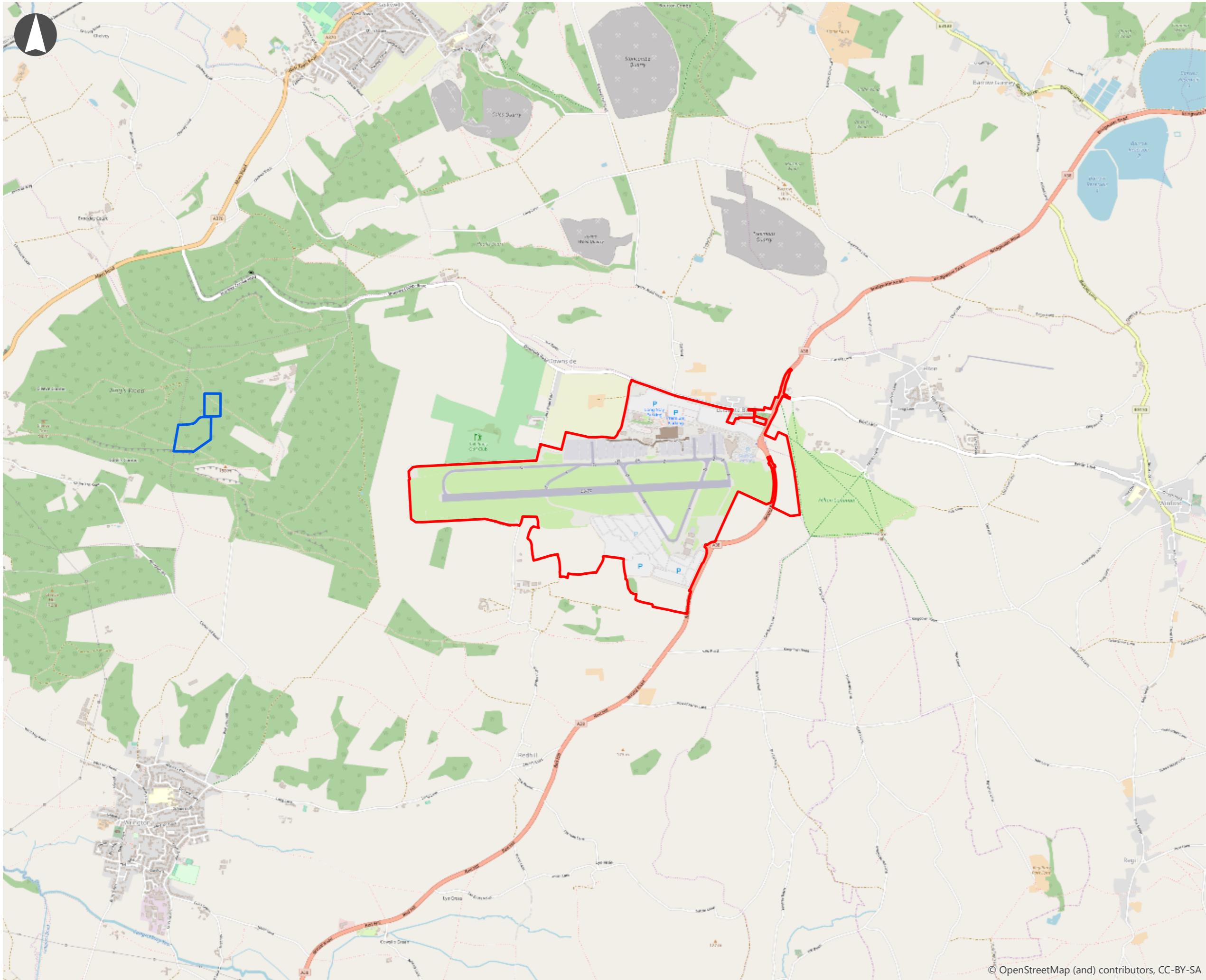
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APPENDIX A - PLANS





CLIENT
Bristol Airport Limited

PROJECT
Development of Bristol Airport to Accommodate
12 Million Passengers Per Annum

TITLE
BAL Woodland Location Plan

SCALE @ A3	CREATED BY	CHECKED BY
1:25,000	MM	MJ
REFERENCE	REVISION	DATE ISSUED
J00341.SLP		21/12/2018

-  Woodland Location
-  Planning Application Boundary



Brockley Hall Stables

Goblin Combe

King's Wood and Urchin Wood

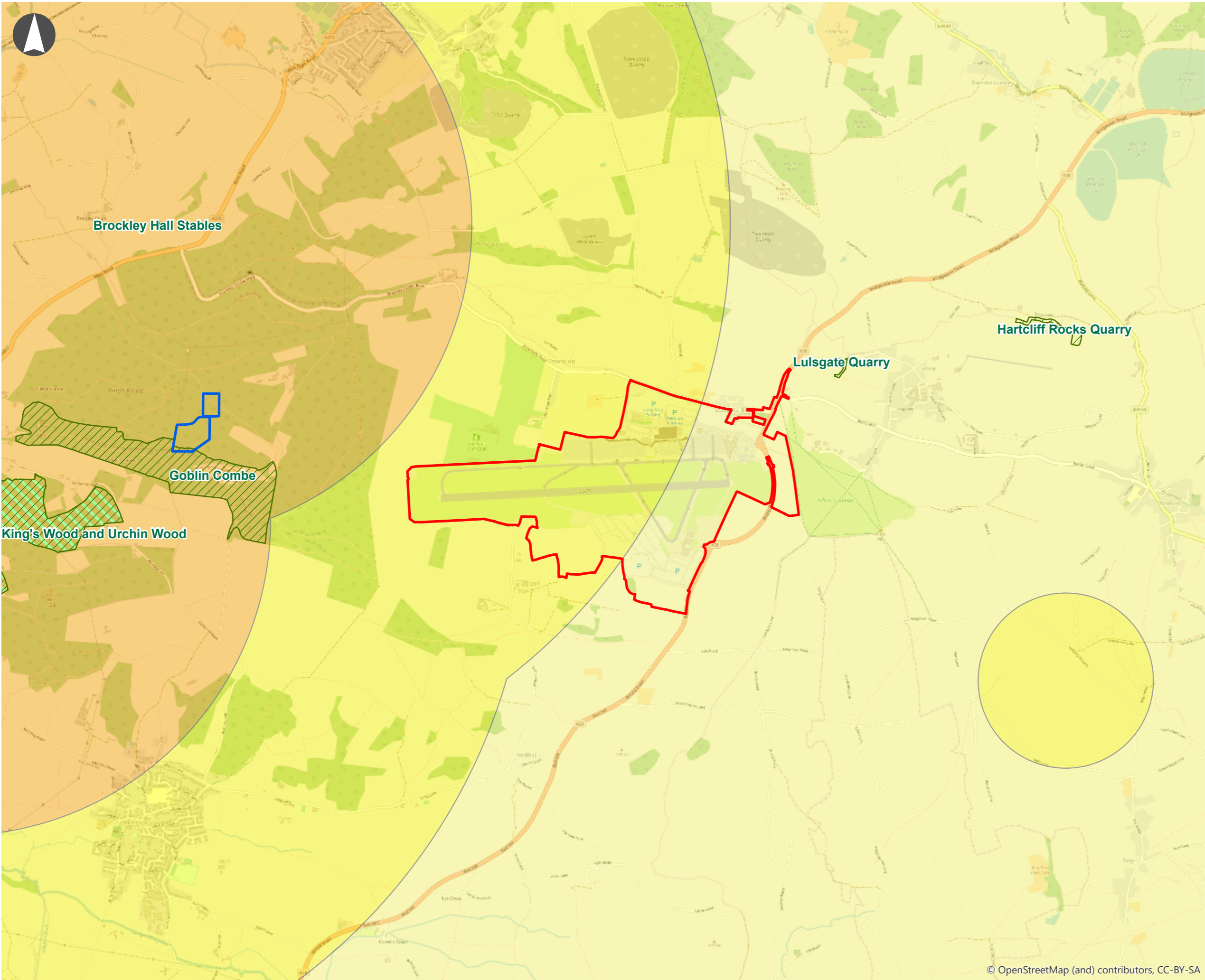


JOHNS
ASSOCIATES

CLIENT		
Bristol Airport Limited		
PROJECT		
Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum		
TITLE		
BAL Woodland Context Plan		

SCALE @ A3	CREATED BY	CHECKED BY
1:10,000	MM	MJ
REFERENCE	REVISION	DATE ISSUED
J00341.SCP		21/12/2018

- Woodland Location
- Planning Application Boundary
- Site of Special Scientific Interest
- Special Area of Conservation



CLIENT
Bristol Airport Limited

PROJECT
Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum

TITLE
BAL Woodland North Somerset and Mendip Bat SAC Zone Plan

SCALE @ A3	CREATED BY	CHECKED BY
1:25,000	MM	MJ
REFERENCE	REVISION	DATE ISSUED
J00341.SLP		21/12/2018

- Woodland Location
- Planning Application Boundary
- Site of Special Scientific Interest
- Special Area of Conservation
- Indicative Mendip Bat SAC Consultation Zones
- Zone A
- Zone B
- Zone C

**Development of Bristol Airport to Accommodate 12 Million Passengers Per
Annum: Response to Comments from North Somerset Council on Biodiversity**

Introduction

This note has been prepared in response to comments provided by the North Somerset Council (NSC) Biodiversity Officer on the planning application and supporting Environmental Statement (ES) for the proposed development of Bristol Airport to accommodate 12 million passengers per annum (mppa) (Application No. 18/P/5118/OUT). Specifically, the note responds to comments received in respect of the biodiversity impacts of the proposed development.

North Somerset Council: Formal Comments from Sarah Dale, Temporary Natural Environment Officer – 24/01/18 and by email 14/02/19	
Theme/Subheading	Extract from document and BAL response
<p>Summary: Designated Sites</p> <p><i>Please refer to detailed response below.</i></p>	<p>It has been ascertained that NOx emissions, nitrogen deposition and acidity will exceed critical loads or targets for several designated sites, but that the levels of this are not considered to be significant. I will need to seek further advice from colleagues in the air quality team and their supporting consultants regarding this issue. The outcome has a potential impact on the Habitats Regulations Assessment (HRA).</p>
<p>Summary:</p> <p>Designated Sites/Protected Species</p> <p><i>Please refer to detailed response below.</i></p>	<p>Additional detail on external lighting proposals needs to be provided for:</p> <ul style="list-style-type: none"> Any additional light spill onto the vegetated corridor alongside Downside Road/northern airport boundary; and Connecting roads through bund between Phase 1 and Phase 2 of Silver Zone extension.
<p>Summary:</p> <p>Priority Habitats</p> <p><i>Please refer to detailed response below.</i></p>	<p>Clarification to be provided regarding the extent of loss and restoration of priority habitats including native hedgerows and grassland.</p>
<p>Summary:</p> <p>Protected Species</p> <p><i>Please refer to detailed response below.</i></p>	<p>Confirmation to be provided that buildings are unsuitable to support nesting birds or avoidance/mitigation measures to be detailed.</p>
North Somerset and Mendips Bat SAC	
Further information 1	<p><i>"For permanent light fittings, it would be expected that light levels onto boundary features will be below 0.5 lux is met to comply with the adopted SPD. The plans provided in Appendix D of the Lighting Impact Assessment demonstrate that light spill can be limited to less than 0.5 lux onto bunds for Phase 1 and Phase 2 of the Silver Zone extension. The proposed use of PIR lighting in this area is also strongly supported. Access between the bunds has not been indicated on plans in Appendix D. Any access between the parking areas and associated lighting requirements need to be clarified."</i></p>
<p>Bristol Airport can confirm that no lighting will be installed within the connecting bunds between Phase 1 and Phase 1 of the Silver Zone extension and no additional lighting is required for access between these two areas. As such, lighting levels within this area will match those already proposed (0.5 lux or less).</p>	

<p>Further information 2</p>	<p><i>“Appendix D of the Lighting Impact Assessment should also include indicative lighting layouts for Downside Road/northern airport boundary. Downside Road is currently unlit. A surprising amount of horseshoe bat activity has been recorded in the copse by the A38. The most likely linear vegetated corridor to this area is either along the northern airport boundary/Downside Road or from fields/ through domestic properties to the north. Although further surveys are not considered necessary, it needs to be demonstrated that adequate dark vegetated corridors for horseshoe bats to the woodland and enhanced area of Downside Meadow will be retained.”</i></p>
	<p>Existing information provided in the Lighting Impact Assessment produced by Hydrock (December 2018) shows lighting levels along Downside Road, associated with the A38 highway improvements (within the vegetated parts of application area). This assessment has been revised in March 2019 by Hydrock to include appropriate lighting mitigation (cowling, fencing, planting) and this confirms that light levels within the vegetated parts of the planning application boundary at this location will not exceed 0.5 lux (a suitable level for light sensitive bat species and other nocturnal fauna). This is confirmed in Hydrock drawing reference 09194-HYD-XX-GF-DR-E-9014 reproduced in Annex A of this document.</p> <p>Commentary on this drawing is as follows. The light spill calculations for the A38 / Downside Road junction have been updated to include the following mitigation methods to reduce light spill into the woodland area: shielding on light columns to reduce backward light spill, a fence and winter bare branch foliage. Light transmittance values have been averaged from guidelines shown in Buiding Research Establishment (BRE) BR 209 Appendix H however, please note that these figures are based on sunlight diffusion through foliage and may differ in reality. The light transmittance of the foliage has been set to 85% to simulate a worst case scenario for winter bare branch conditions.</p> <p>Implementing these measures lights the woodland area to the following maximum values:</p> <ul style="list-style-type: none"> • Maximum horizontal illumination (at ground level) – 0.039 lux; and • Maximum vertical illumination – 0.49 lux. <p>Predicted isolines and further maximum vertical illuminance measurements around the edge of the woodland area are also displayed on the drawing 09194-HYD-XX-GF-DR-E-9014.</p> <p>No additional lighting is proposed for Downside Road beyond the planning application boundary and consequently lighting levels will remain at current ambient levels, subject to further changes brought by any non-airport highways work and/or private residents/businesses along the road.</p> <p>The northside car park is already highly illuminated through its continual use as an airport car park. The development proposals retain the use of this as continually used airport car parking and as such will not result in any increase in lighting levels on the northern vegetated boundary of this car park or the airport owned meadow, or contribute to any elevated change in lighting along Downside Road beyond the airport boundary. The bunds above the northern car park were inaccessible to survey in 2018 by Hydrock, but light levels directly south of the bunds but within the car park were recorded in the region of 3.2 – 22.5 lux (depending on adjacency to lighting columns). The existing column luminaires found in the northern car park were approximately 6m – 8m tall and a range of technologies were found: LED, SON and halogen. The tall treeline that sits between the northern car parks and Downside Road acts as a shield to block light spill from the car parks onto Downside Road.</p> <p>Modern, LED, more directional fittings will be proposed for these areas to reduce the backward light spill onto the bunds as part of future reserved matters applications with the details secured by condition. If backwards light spill is shown to light the bunds more than current values, column height reduction and shielding will be applied to the northern most lighting columns to reduce this as much as possible (but certainly below current levels). The existing treeline is retained, which will further shield the light spill onto Downside Road that is located beyond the trees.</p>

Further information 3	<i>"The Outline SAC/SPD Ecological Management Plan is welcomed. The creation of replacement habitat scheme such as habitat management at Wrington Warren or equivalent can be secured by condition. A more detailed management plan can also be secured by condition to be provided at Reserved Matters stage. Creation of replacement habitat before removal of existing habitat is strongly supported."</i>
<p>A site visit to the BAL owned woodland with Sarah Dale (SD) was completed in February 2019, with verbal confirmation from SD that this woodland meets the SPD criteria in terms of the requirements to provide the necessary replacement habitat.</p> <p>BAL confirms its commitment to providing a suitable robust and enforceable detailed management plan and to the provision of replacement habitat before any removal of existing habitat commences. This approach is set out in the Outline SAC/SPD Ecological Management Plan For North Somerset And Mendips Bat SAC/SPD Species And Wider Biodiversity prepared by Johns Associates (December 2018).</p>	
Other Designated Sites	
Further information 4	<i>"I am satisfied that impacts on wetland birds including disturbance can be scoped out of the ES. I would also not consider that a Habitats Regulations Assessment (Test of Likely Significant Effect) needs to be provided, although this is subject to agreement with Natural England"</i>
<p>Natural England has not raised this as being of further concern in its written response to North Somerset Council dated 25th January 2019 reference 268908.</p> <p>BAL has contacted Natural England (Amanda Grundy) and a site visit and meeting with Amanda Grundy, together with a bat specialist and SSSI specialist has been arranged for 04/04/19 to discuss/agree any final concerns/advice through its Discretionary Advisory Service.</p> <p>BAL has also conducted further research and review of its track keeping data and this information is provided below with respect to statutorily designated sites associated with wetland birds. This information demonstrates that no flights below 1000ft (which are those perceived to have the greatest potential to cause short term disturbance) have been recorded within the sample data (August 2017 – one of the business periods of flying). The following figures illustrate the location of key statutory designated sites associated with birds for reference against flight track data, that includes those designated/notified for bird interest (Figures 1 and 2) and flight tracks/Above Ground Level (AGL ft) for arrivals in August 2017 (Figure 3) and departures in August 2017 (Figure 4). NB SPA is used as a surrogate for the location of related Ramsar Sites)</p>	

Figure 1. SSSI locations for Reference

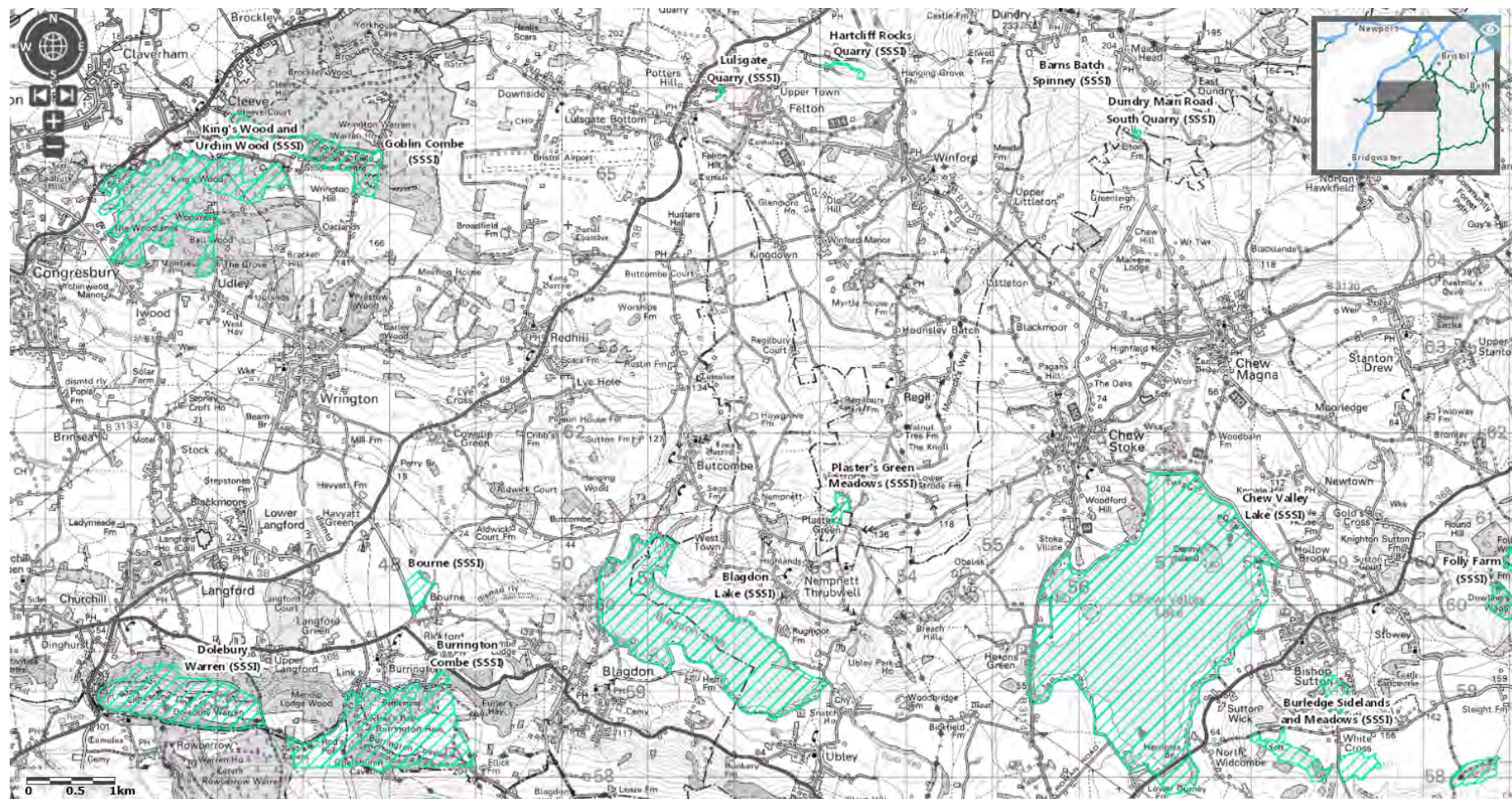


Figure 2. SPA locations for reference

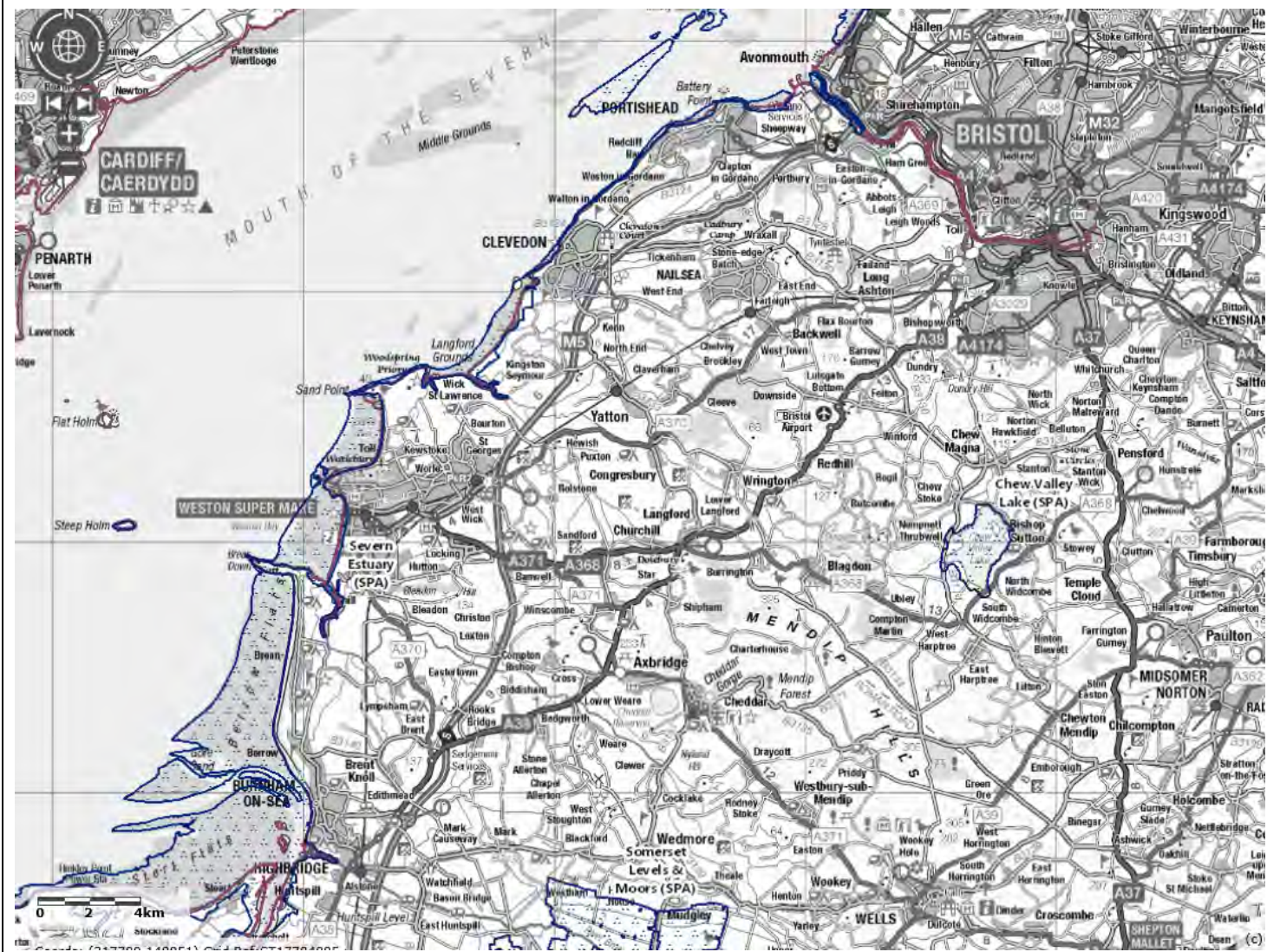
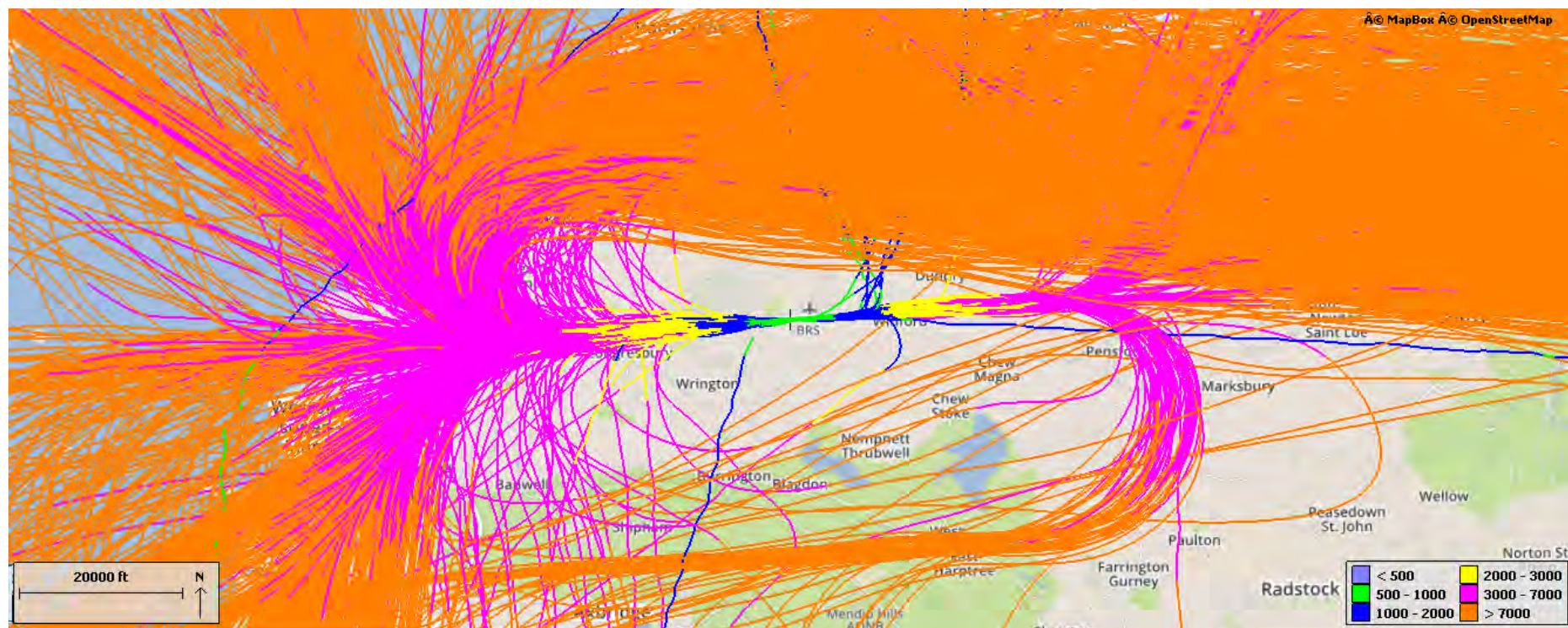
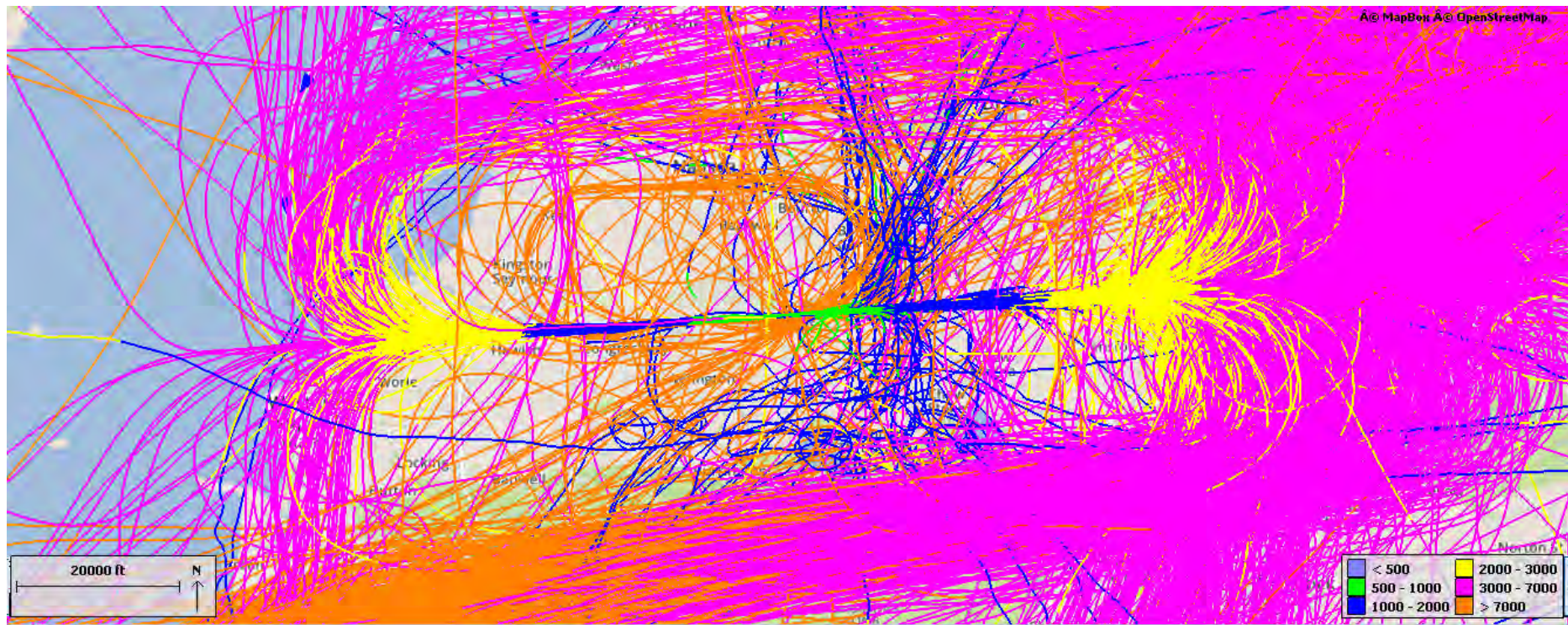


Figure 3 Aircraft flight tracks and AGL ft for departures (Bristol Channel is visible to the west and Chew Valley and Blagdon Lakes to the southeast).



Departures: No flights under 1,000ft over these or other statutorily designated sites.

Figure 4 Aircraft flight tracks and AGL ft for arrivals (Bristol Channel is visible to the west and Chew Valley and Blagdon Lakes to the southeast).



Arrivals: No arrivals below 1,000ft at these or other statutorily designated sites.

This additional data further supports the conclusion that impacts on wetland birds including disturbance can be scoped out of the ES and that a HRA (Test of Likely Significant Effect) does not need to be provided.

Further information 5	<i>"It is stated that NOx, nitrogen and acid deposition will exceed limits and critical loads on some designated sites. This is outside my area of expertise and I need to liaise with the air quality specialists to ascertain whether this will cause negative impacts on nearby designated sites including King's Wood and Urchin Wood SSSI, Goblin Combe SSSI and Felton Common LNR."</i>
Please refer to Annex B which sets out full clarification that supports the current conclusions that no significant effects on ecological receptors will occur as a result of the development proposals.	
Further information 6	<i>"Although the highway improvements adjoin a small area of Felton Common LNR and Local Wildlife Site, the red line boundary is not within the designated site. A detailed Construction Environmental Management Plan secured via condition must include measures to ensure that impacts on the LNR/LWS are avoided."</i>
BAL can confirm that no works will occur within the Felton Common LNR and that suitable barriers will be installed to prevent accidental access. This and other measures to prevent any impacts on the LNR/LWS (key elements are detailed elsewhere in the ES) will be detailed within the Construction Environmental Management Plan (CEMP) (to be conditioned).	
Further information 7	<i>"Clarification is required regarding the following: Is the area of grassland marked TN2 sufficiently diverse to be classed as priority habitat/S41 habitat? This will need to be justified based on Section 41/UK Biodiversity Action Plan criteria. If this is priority habitat, how much will be lost, retained and restored? Species-rich grassland should be retained and restored as a priority."</i>
Irrespective of whether this grassland is classified as being Priority/BAP habitat, this more species diverse area, forming part of the proposed Silver Zone Phase 2 car park extension (inclusive of the perimeter habitat bund) will be translocated as intact turves to suitable receptor locations on the bund, being placed in locations of similar aspect, topography, soils. This area covers approximately 0.16ha. As such, it is confirmed that there will be no net loss of Priority/BAP grassland habitat as a result of the development proposals.	
Further information 8	<i>"Is species-rich grassland within the New East Taxiway (EE) proposals (TN6)? Downside Grassland and Airside Grassland Botanical Survey in Appendix 11 indicates that a small area of species-rich grassland may be within the proposals in this area."</i>
The location of the species rich grassland is located east and outside of the footprint of the proposed New East Taxiway Link (EE) proposals and can be seen as a discrete trapezoidal shaped habitat area on the Phase 1 Habitat Survey map (Appendix 11B). Additional airside grassland botanical surveys will be completed in May/June 2019 to confirm no discrete areas of species rich grassland have developed since the last survey. In all cases, should any areas of species rich grassland be identified during these inspections, they will be translocated as intact turves to suitable receptor locations either within the airfield or adjacent grassland areas owned by BAL, being placed in locations of similar aspect, topography, soils and to replace improved or species poor grassland. As such, it is confirmed that there will be no net loss of Priority/BAP grassland habitat as a result of the development proposals.	
Further information 9	<i>"Are localised areas of more species-rich grassland indicated by TN17 sufficiently diverse to be classed as priority habitat? TN17 indicates that areas J, K and O are included but K appears to be the existing multi-storey car park."</i>
These small areas are associated with the northside car park and access roads and are frequently disturbed and modified by a range of on-going management and development activities. These areas are not considered to be sufficiently diverse or permanent enough to be associated with Priority habitat. Notwithstanding this, additional botanical surveys will be completed to in May/June 2019 confirm no discrete areas of species rich habitat have developed since the last survey. In all cases, should any areas of species rich grassland be identified during these inspections, they will be translocated as intact turves to suitable receptor locations either within the airfield, the northside car park bund, or adjacent grassland areas owned by BAL, being placed in locations of similar aspect, topography, soils and to replace improved or species poor grassland. As such, it is confirmed that there will be no net loss of Priority/BAP grassland habitat as a result of the development proposals.	

Further information 10	It is assumed the woodland by the A38 is dominated by sycamore and insufficiently diverse to be classed as priority habitat but this should be confirmed.			
It is Johns Associates’ opinion that this small woodland, and in particular the limited footprint of the development proposals, does not represent good quality Priority Habitat. Please refer to Annex C for further details. In addition, the remaining woodland will be brought into good condition, with an increase in species diversity and improved ecological functionality, with a target for this to evolve into good quality Priority Habitat, through the proposed implementation of a woodland management plan and removal of rubbish and invasive non-native species. Furthermore, additional woodland planting and management is proposed elsewhere on airport land as part of the integrated and embedded ecological, landscape and visual masterplan proposals associated with the planning application (please refer to Appendix 11K of the ES).				
Further information 11	What is the current grassland condition/habitat type to the east of the A38 which forms part of the compensation/enhancement plans? The Biodiversity Action Plan Implementation: Grassland and Woodland Technical Report V1.0 could not be definitive as surveys were completed after cutting. If the area comprises existing good semi-improved grassland/priority habitat, reseeding and tree planting would be discouraged.			
The CEMP and Landscape and Ecological Management Plan associated with discharging Conditions 5 and 6 of planning permission 18/P/5200/RDC established that the majority of the grassland associated with the fields east of the A38 were species poor, with the northern most area also being recorded as improved. As part of the mitigation for this proposal, tree planting to a density of 20% was approved and the proposed tree planting in this location associated with the 12mppa planning application will match this specification. The LEMP for planning permission 18/P/5200/RDC also established that a reduced frequency grass cut adjacent to hedgerows was acceptable to the Bristol Airport Airside Operations team. The proposals for the remaining areas of grassland will follow these principals, increasing species diversity as per the approved grassland specification and reducing the frequency of cutting, and being informed by further botanical surveys planned for 2019. No additional seeding will occur where species rich areas are known (e.g. the calcareous grassland in the A38 cutting) or identified.				
Further information 12	Will any hedgerows with more than one woody native species be impacted? If so, this needs to be considered as Section 41/priority habitat.			
No hedgerows will be impacted by the proposals. All hedgerows will be protected, retained and managed/enhanced.				
Further information 13	A plan showing the location of any areas of priority habitat which will be impacted should be provided. The potential impacts on priority habitats should also be quantified in a table detailing habitat present, habitat retained, habitat lost and habitat created/enhanced as detailed in the scoping response.			
The information and plan included here provides the requested information in relation to the development footprint and areas of Priority Habitat / Potential Priority Habitat (to provide a precautionary approach) created/enhanced at Bristol Airport. Please refer to the plan in Annex D.				
Priority / potential Priority Habitat present within development footprint	Area of Priority / potential Priority Habitat present within development footprint	Area of habitat retained within development footprint ha	Area of habitat lost within development footprint ha	Area of habitat created/enhanced at Bristol Airport ha
Hedgerow – all to be retained	560m	560m	0m	1150m to have further management through additional planting (Measures 1, 7, 8, 12 as per Appendix 11K of the ES) with all hedgerows including in future airport-wide management plan.
Ponds – to be retained	45m ²	45m ²	0m ²	45m ² (Measure 15 as per Appendix 11K)
Lowland Mixed Deciduous Woodland – precautionary approach	0.16ha – perimeter of the Downside Road/A38 Wood	0ha	0ha	1.8ha (Measure 4, 13 and 16 as per Appendix 11K)

Lowland calcareous grassland – all to be retained	0ha	0ha	0ha	3.6ha (Existing locations of SI Calcareous grassland to be safeguarded as per Phase 1 habitat maps in Appendix 11B)
<i>Lowland meadows - – precautionary approach</i>	0.16 within Silver Zone Extension B	0.16	0	1.8ha (Existing location of SI neutral grassland to be translocated to bund as per Phase 1 habitat maps in Appendix 11B and improvement of grassland as per Measure 6 in Appendix 11K)
<i>Wood Pasture / Parkland</i>	0	0	0	5.4ha (Measure 11 as per Appendix 11K)

No off-site habitat enhancements or other ecological mitigation/enhancements listed in the ES have been documented here. A full inventory of all habitats and management prescriptions across the airport will be provided as part of a detailed management plan, to be conditioned.


Further information 14	Based on previous grassland survey information in Appendix 11, airport grasslands which will be directly impacted by taxiway widening were not previously found to be species-rich in nature. The CEMP will need to include measures to ensure that areas of species-rich grassland within the airfield are protected during any construction works e.g. by demarcation/fencing. Is there a reason why airport grasslands are fertilised? Addition of fertiliser could have a negative impact on more species-rich grasslands. It may be difficult to consistently avoid spreading fertiliser onto species-rich areas.
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Appropriate demarcation of these areas during construction works within 50m will be provided to ensure their retention and protection.

Guidance on the need for any applications of fertiliser is given by the CAA in CAP772 Wildlife Hazard Management at Aerodromes and this forms the basis for any decision to use an infrequent and minimal use of fertiliser at Bristol Airport. It states *“Fertiliser should only be applied in sufficient quantities if required to maintain the habitat in a healthy and upright condition. Any decision to apply fertiliser to a site should be based on the soil sample results. Soil sampling should, where practicable, be undertaken at the start of each year by an independent soil testing laboratory. Any deficiencies notified, should be addressed during the spring growing period. Fertiliser should be applied using appropriate equipment and during appropriate weather conditions. The appropriate fertiliser specified by the habitat management specialist should be applied in conjunction with the soil testing information. Fertiliser regimes should be tailored to encourage desirable or discourage undesirable species in the sward, however this should not jeopardise the integrity of the sward.”*

BAL confirms that no fertiliser is applied in areas of known species rich grassland and these areas are already known to the Airside Operations team. Further botanical surveys of the airfield grassland are planned for 2019 and these will further confirm discrete areas where fertiliser should not be applied due to floral diversity. These areas will be mapped and used to instruct future applications of fertiliser, if needed.

Further information 15	Although tree planting within Downside Meadow might overshadow small areas of more diverse grassland, it may also create microhabitats reducing the dominance of grasses and improving diversity of the grassland. An appropriate management plan for areas of mitigation including Downside Meadow will need to be secured via condition and implemented. Compensatory planting will also need to be proposed along the new A38 alignment. This should comprise native species. Restoration and appropriate management of the Downside Road/A38 woodland is encouraged. Although an enhancement measure not formally required by the scheme, appropriate long-term management of Cornerpool Wood is welcomed and could also form part of the raft of enhancement/mitigation measures proposed.
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<p>An appropriate management plan for all areas will be produced, secured by condition and implemented. This will apply to the whole of Bristol Airport.</p> <p>Compensatory planting along the A38 corridor, together with the A38/Downside Road woodland has been defined in the planting plan and schedule prepared by Johns Associates. This woodland will be restored and managed. Please refer to Annex E.</p> <p>Cornerpool Wood will be further restored and managed as defined in the ES, with specific details being set out in an appropriate management plan secured by condition and implemented.</p>	
Protected and notable species	
Further information 16	<i>Lighting – please see Further Information request 1 and 2 (above)</i>
Further information 17	<i>"A plan showing the location of the bat boxes would be useful, in conjunction with lux contour plans or similar for this area."</i>
<p>Please see the plan set out here, showing the general location of installed bat boxes and other artificial bat habitats and lighting information (where available).</p> 	

Further information 18	<i>"It is assumed that buildings which will be impacted were unsuitable to support nesting birds given bird prevention measures at the airport but this should be confirmed. No ground nesting birds were recorded in the areas which will be impacted. It is assumed that standard nesting bird measures which involve removal of dense vegetation during late September- February or immediately following a check by an ecologist will be implemented."</i>
No buildings associated with the development proposals are considered suitable for nesting birds. A precautionary nesting bird inspection to confirm the absence of birds will be carried out prior to any works/demolition etc. Standard precautionary nesting bird measures will be followed (removal of dense vegetation during late September- February or immediately following a check by an ecologist).	
Further information 19 CONFIDENTIAL - BADGERS	<i>"The update badger survey is welcomed. A detailed mitigation strategy will be required in relation to Clan A. It is understood that the bund on which the extensive main sett of the clan is located will be severed to connect Phase 1 and Phase 2 of the Silver Zone extension. At least a 20-30m exclusion zone will need to be enforced or works must proceed under Natural England licence following an appropriate method statement. It is understood that access through the bund between Phases 1 and 2 of the Silver Zone extension can be designed to incorporate a buffer zone of at least 20-30m from badger sett entrances. Badgers frequently expand existing setts or create new setts. Therefore, a detailed mitigation plan can be provided as informed by an update survey submitted with a Reserved Matters application should consent be granted. This can be secured by a condition. Planting of fruiting trees close to badger setts should be considered to provide foraging resources."</i>
CONFIDENTIAL – BADGERS The proposed work to the bund between Phases 1 and 2 of the Silver Zone extension is located more than 50m away from the nearest current entrance associated with the artificial badger sett provided for Clan A. Fruiting trees (e.g. native crab apple) can be included in the planting specification for the landscape bunds associated with the territory of these badger. An updated survey will be submitted and will inform a detailed mitigation plan that will be secured by condition.	
Further information 20	1) Clarity regarding mitigation and enhancement proposals for different phases/applications and in relation to separate commitments under Bristol Airport Biodiversity Action Plan. See also ecology comments for 17/P/5105/FUL discharge of conditions 5 and 6.
Johns Associates is confident that there is no overlap between previous planning applications and associated conditions, and the current Bristol Airport Nature Conservation Management Plan. A fully updated and airport-wide plan (including off-site woodland) will be prepared and implemented by planning condition, informed by further survey and monitoring planned for 2019, that will also be repeated to ensure that ongoing management actively responds to changes in conditions. Further clarity has been achieved e.g. for the enhancement of habitat east of the A38 through the work completed to discharge Conditions 5 and 6 of 17/P/5105/FUL and this will help deliver suitable and incremental benefits in habitat quality and ecological function for each individual planning permission and conditions.	
Further information 21	2) Whether timescales for construction and implementation will allow sufficient time to establish replacement habitat for horseshoe bats. Will any foraging habitat for horseshoe bats (e.g. in Silver Zone Phase 2) be lost imminently?
BAL can confirm that it will deliver the offsite replacement horseshoe bat foraging habitat as specified in the ES in advance of losing any existing foraging habitat associated with Silver Zone Phase 2 and the A38/Downside Road Woodland, together with managing and enhancing the retained area of the A38 Downside Road Woodland and further woodland enhancement/tree planting beyond the A38 and in Cornerpool Wood. Works to deliver this could commence as early as August 2019, subject to planning permission being granted.	
Further information 22	Any additional evidence regarding impacts of noise/lighting from night flights in summer over SAC bat roosts.
BAL has conducted further research/review of its aircraft flight tracking data, using August 2017 as a case study (a busy period and sensitive in terms of bat activity). This is shown overleaf. Figure 5 shows the location of the North Somerset and Mendips Bat SAC close to Bristol Airport. Figure 6 shows flight track data on departures from August 2017 (the busiest period) and Figure 7 shows flight track data for arrivals from August 2017.	

Figure 5. North Somerset and Mendips Bat SAC close to Bristol Airport

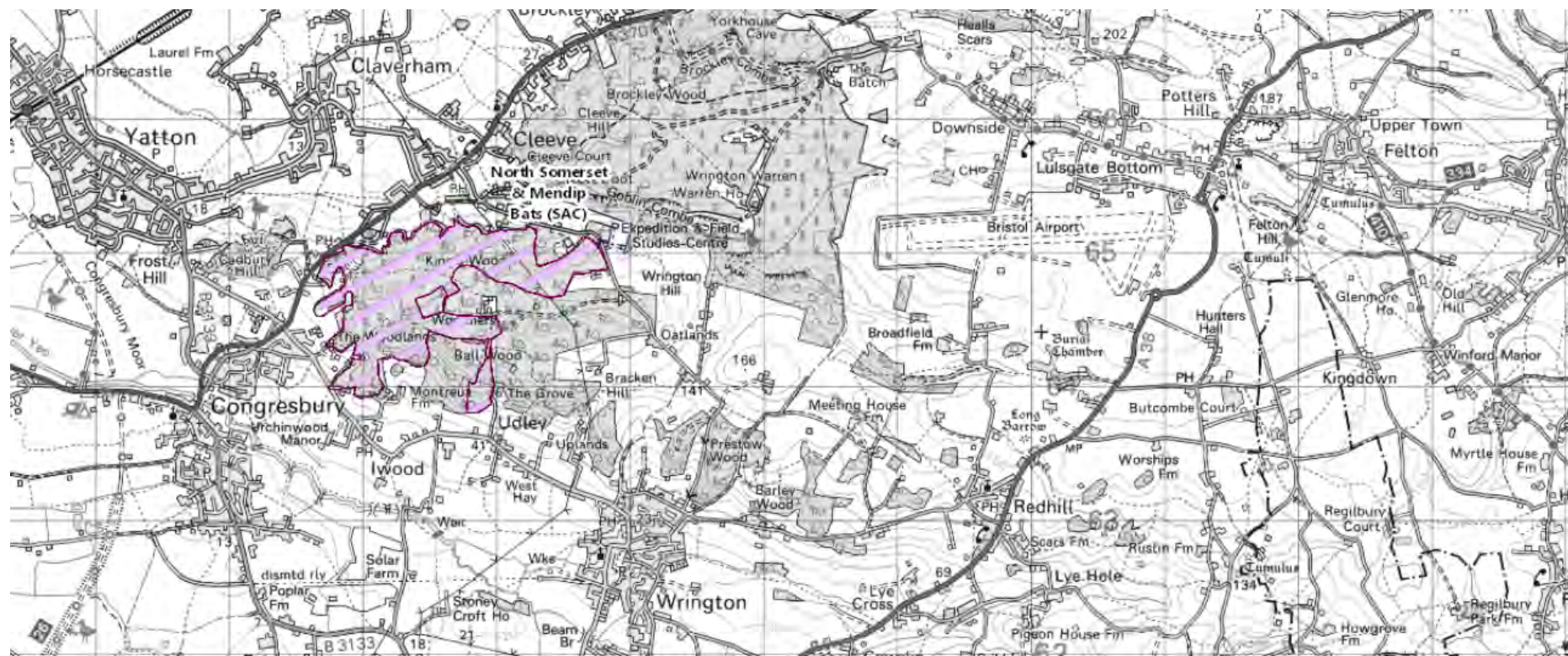
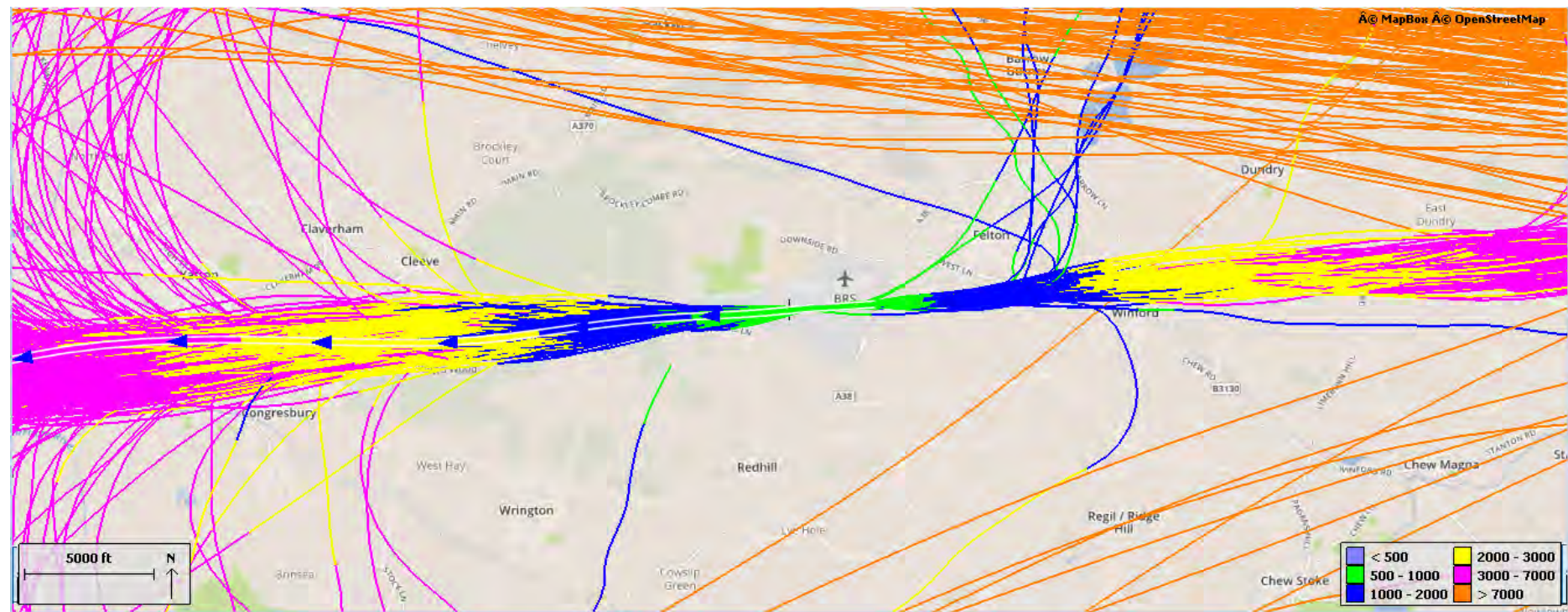


Figure 6. Flight tracks and AGL ft for aircraft departures over the SAC



Departures – It is very unlikely that aircraft would be 1,000ft or below when reaching the ‘North Somerset and Mendips’ SAC on 27 departures as illustrated by the tracks presented above.

Figure 7 Flight tracks and AGL ft for aircraft arrivals over the SAC



Arrivals – The aircraft tracks above indicate that aircraft during August 2017 were typically 1,000ft or above when undertaking their final approach on 09 arrivals across the ‘North Somerset and Mendips’ SAC.

The flight tracks demonstrate the relative heights of aircraft above the SAC on approach and departure are almost always in excess of 1000ft above the SAC (e.g. Kings Wood). Considering horseshoe bats roost within buildings, caves, mines and other noise insulated structures, it is reasonable to conclude that any increase in night flights during the summer will not cause any notable magnitude of change in noise conditions experienced by bats and associated effects on the favourable status of the population.

Approach lighting is unidirectional and not designed to illuminate the area beneath the them and aircraft lighting is directed ahead of the aircraft. Considering this, and particularly the heights the aircraft are overflying the SAC habitats, negligible effects are predicted on the key habitats and bats associated with these areas. No change in approach lighting is proposed by the proposals. No illumination of the roosts or internal conditions is predicted due to the altitude of aircraft above roosts on approach and departure.

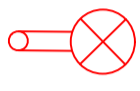
Further information 23	4) Ensuring mitigation proposals are futureproof in relation to both climate change and long-term proposals for the Airport.
<p>The mitigation proposals have been developed in conjunction with reference to the Natural England and RSPB Climate Change Adaptation Manual, as referenced in the ES. Ongoing monitoring and the adoption of a dynamic management plan delivered by condition, with management responding to monitoring outcomes, will ensure that Bristol Airport continues to support diverse, sustained and valuable habitats and biodiversity that are fully aligned to climate change and the needs of the local area.</p> <p>BAL can confirm that the mitigation proposals have been developed alongside the evolution of the 15mppa and 20mppa Bristol Airport Masterplan and located in positions where their long-term presence, ecological function and value will be maintained and sit outside of the anticipated footprint of any future airport development.</p>	
Further information 24	5) Ensuring mitigation proposals are clear and consistent between all documents.
Please see Further Information Request number 20 (above).	
Further information 25	PCAA also raised the issue of a retained dark (0.5 lux) flight corridor along Downside Road as noted in my previous comments.
<p>Please see Further Information request number 2 (above) and Annex A. No change in lighting from the northside parts of Bristol Airport are predicted.</p> <p>BAL would encourage the retention of a dark corridor along Downside Road, working with North Somerset Council and local residents to help understand the need to avoid any additional third party lighting.</p>	


ANNEX A



- NOTES:
1. ALL DIMENSIONS ARE TO BE CHECKED ON SITE BEFORE THE COMMENCEMENT OF WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT & ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
 2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS' AND SERVICE ENGINEERS' DRAWINGS AND SPECIFICATIONS. THIS DRAWING IS COPYRIGHT.

Legend:

 X Indicative column luminaire

 lx Maximum vertical illuminance recorded

P01	11/03/19	Preliminary	HJ	ES
Rev	Date	Description	By	Ckd

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Client :
BRISTOL AIRPORT

Project Title:
**BRISTOL AIRPORT
12MPPA EXTENSION**

Drawing Title:
**ELECTRICAL SERVICES
INDICATIVE LIGHTING
WOODLAND AT A38/DOWNSIDE ROAD
LIGHT SPILL WITH MITIGATION METHODS**

Drawing Status:
PRELIMINARY

Hydrock Job No: **C-09194**

Drawn:	Checked:	Scale @ A1:	Date:	Issue Date:
HJ	ES	1:1000	MAR 2019	11/03/19

Drawing Number:	Revision:
09194-HYD-XX-GF-DR-E-9014	P01

ANNEX B

Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum:

Linking Predicted Changes in Air Quality to Ecological Effects: Clarification

1. Introduction

Bristol Airport Ltd (BAL) has submitted a planning application to North Somerset Council (NSC) for the proposed development of Bristol Airport to accommodate 12 million passengers per annum (mppa) (Application No. 18/P/5118/OUT). During the Air Quality Assessment (presented in Chapter 8 of the Environmental Statement (ES) submitted in support of the planning application) a large number of ecological receptors were identified and changes in respect of local air pollutants which present a risk of actual or potential exceedances of Air Quality Assessment Levels (AQALs) predicted. The magnitude of change was then screened against current Environment Agency guidance¹ to determine whether further assessment should be undertaken as part of the Ecological Assessment (ES Chapter 11).

NSC has a number of queries in respect of the application and accompanying Ecological Assessment, including the following: *'It is stated that NOx, nitrogen and acid deposition will exceed limits and critical loads on some designated sites. This is outside my area of expertise and I need to liaise with the air quality specialists to ascertain whether this will cause negative impacts on nearby designated sites including King's Wood and Urchin Wood SSSI, Goblin Combe SSSI and Felton Common LNR.'*

To assist NSC in assessing whether they concur with the Air Quality Assessment, this note has been produced to clarify the assessment process undertaken in the ES chapters with respect specifically to effects on air quality during airport operation.

Section 2 details the air quality guidance followed during the assessment whilst Section 3 summarises the Air Quality Assessment results for designated conservation sites. Section 4 relates the conclusions reached in the Air Quality Assessment (ES Chapter 8) to the Ecological Assessment (ES Chapter 11).

2. Air Quality Guidance

Appendix 8A of the ES, paragraphs 8.1.21 – 8.1.26 details the AQ Legislation and Guidance followed in the assessment. The key screening criteria and supporting guidance on interpretation are repeated below as follows:

"The EA guidance¹ also gives criteria for screening out source contributions at designated nature conservation sites.

For Special Protection Areas, Special Areas of Conservation, Ramsar sites and Sites of Special Scientific Interest (collectively referred to in this document [ES Chapter 8] as 'major ecological sites'), there is no need for further assessment if the screening calculation finds that:

- Both the following are met:
 - ▶ the short-term PC is less than 10% of the short-term AQAL; and

¹ Environment Agency (2016). Air emissions risk assessment for your environmental permit, [online]. Available at: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>

- ▶ the long-term PC is less than 1% of the long-term AQAL;
- Or:
 - ▶ the long-term PEC is less than 70% of the long-term AQAL.

For local nature sites (ancient woodland, local wildlife sites and national and local nature reserves), emissions are insignificant if:

- The short-term PC is less than 100% of the short-term AQAL; and
- The long-term PC is less than 100% of the long-term AQAL.

Following detailed dispersion modelling, no further action is required if:

- The proposed emissions comply with Best Available Technique (BAT) associated emission levels (AELs) or the equivalent requirements where there is no BAT AEL; and
- The resulting PECs will not exceed AQALs.

IAQM guidance² provides further suggestions on circumstances where there is definitely an insignificant effect on a site in relation to the Habitats Directive. This guidance endorses the EA criteria above, noting that:

“The EA, in consultation with the conservation agencies, is the only organisation with any statutory responsibility that has set out principles and guidance for the assessment of air quality impacts on nature conservation sites. As a consequence, its thinking has been applied to other developments where such assessments are required, involving sources that are not industrial and not regulated by the EA. There is nothing inherently wrong with such an approach, provided that the underlying principles are followed.”

The IAQM guidance goes on to emphasise that these criteria are for screening out effects from further assessment, not an indication that there is an adverse impact:

“As the only available source of guidance that is relevant to this topic, the EA’s approach to assessment has been widely adopted. Unfortunately, this has also led to many instances where the criterion for determining when a new source has an inconsequential effect has been wrongly used as a threshold for the onset of damage to a habitat. It is quite clear from studying the EA’s original guidance and its more recent statements that this is a false interpretation. Instead, in cases where an air quality impact is greater than 1% of a critical level or critical load, this should serve only as a trigger to consider the matter in greater detail with the involvement of a qualified ecologist, to consider the likelihood of an adverse effect on the integrity of the habitat. Furthermore, it should be recognised that the criterion was set as 1% and not 1.0%. It may be considered by some that it is prudent to explore the likelihood of an adverse effect when the impact is, say 1.2% of a critical load, but the reality is that this was never the original intention of the methodology. The calculation of impacts is always subject to some uncertainty, especially where deposition is concerned. It would be more in the spirit of the original proposal to use 1% as a criterion if impacts that were clearly above 1% were treated as being potentially significant, rather than impacts that are about 1% or slightly greater.

“Regardless of these observations on the precision and accuracy of predicted impacts, it is the position of the IAQM that the use of a criterion of 1% of an assessment level in the context of habitats should be used only to screen out impacts that will have an insignificant effect. It should not be used as a threshold above which damage is implied and is therefore used to conclude that a significant effect is likely. It is instead an indication that there may be potential for a significant effect, but this requires evaluation by a qualified ecologist and with full consideration of the habitat’s circumstances.”

² IAQM (2016). Use of a criterion for the determination of an insignificant effect of air quality impacts on sensitive habitats, [online]. Available at: http://www.iaqm.co.uk/text/position_statements/aq_impacts_sensitive_habitats.pdf [Checked 22/03/2018].

3. Summary of Air Quality Results

The screening of source contributions at designated conservation sites was reported in ES Chapter 8, paragraphs 8.10.53-8.10.77 for annual mean nitrogen oxides (NO_x) concentrations to air, maximum daily mean NO_x, nutrient nitrogen deposition and acid deposition.

Annual mean nitrogen oxides (NO_x) concentrations in air

Major ecological sites (SPAs, SACs, SSSIs and Ramsar sites)

The assessment in respect of major sites concludes that, since the predicted environmental contribution (PEC) is less than 70% of the AQAL at all the major receptors, under EA guidance (see Section 2) this impact is **not significant** (ES paragraph 8.10.55), and hence no further assessment is required.

Local nature sites

A similar conclusion is drawn for all local receptors (ES paragraph 8.10.57) with the exception of Felton Common LNR.

In respect Felton Common LNR, ES paragraph 8.10.56 details the Air Quality Assessment and rationale for concluding that the impact will be **not significant**. The key point here is that, although the PEC of annual mean NO_x significantly exceeds the NO_x AQAL on the part of the common closest to the A38, the PC is much less than 100% of the AQAL and therefore, under EA guidance, the impact is not significant and **no further assessment** is necessary. In fact, at the closest part of the common to the road, where total concentrations are highest, the proposed development will slightly reduce concentrations by moving the road traffic further from the site.

Maximum daily mean NO_x concentrations in air

Major ecological sites (SPAs, SACs, SSSIs and Ramsar sites)

The assessment in respect of major sites concludes that, since the PC is less than 10% of the AQAL at all the major receptors, under EA guidance (see Section 2) this impact is **not significant** (ES paragraph 8.10.62), and hence **no further assessment** is required.

Local nature sites

A similar conclusion is drawn for all local receptors (ES paragraph 8.10.64) with the exception of Felton Common LNR.

In respect Felton Common LNR, ES paragraph 8.10.63 details the Air Quality Assessment and rationale for concluding that the impact will be **not significant**. The key point here is that although the PEC of daily mean NO_x is significantly elevated (although it remains below the relevant AQAL), the PC is less than 100% of the AQAL and therefore, under EA guidance, the impact is **not significant** and **no further assessment** is necessary. Additionally, once more, at the closest part of the common to the road, where total concentrations are highest, the proposed development will slightly reduce concentrations by moving the road traffic further from the site.

Nutrient nitrogen deposition

Major ecological sites (SPAs, SACs, SSSIs and Ramsar sites)

ES paragraph 8.10.68 indicates that nutrient nitrogen background deposition rates are modelled to be at exceedance at all receptors already without any additional contribution from the proposed development. However, the additional PC is less than 1% at all the modelled receptors and therefore under EA guidance, it can be considered **not significant** and **no further assessment** is necessary.

Local nature sites

The PC is well below the AQAL for all local receptors (maximum of 7% of the PEC against a screening criterion of 100%) (ES paragraph 8.10.76). Therefore under EA guidance the impacts at these receptors can be considered **not significant**, and **no further assessment** is required.

Acid deposition

Major ecological sites (SPAs, SACs, SSSIs and Ramsar sites)

The assessment in respect of major sites concludes that since the PC all major receptors is less than 1% of the AQAL, under EA guidance (see Section 2) this impact is **not significant** (ES paragraph 8.10.75), and hence **no further assessment** is required.

Local nature sites

The PC is well below the AQAL for all local receptors (maximum of 0.5% of the critical load against a screening criterion of 100%) (ES paragraph 8.10.76). Therefore under EA guidance the impacts at these receptors can be considered **not significant**, and **no further assessment** is required.

4. Ecological Assessment

The ecological effects of changes in air quality are assessed in respect of the North Somerset and Mendips Bat SAC and Constituent SSSIs in ES Chapter 11, paragraph 11.10.22 and Table 11.12, and on other designated sites in Chapter 11, paragraphs 11.11.9 – 11.11.13 and Table 11.13.

In summary, these paragraphs reflect the assessment presented in ES Chapter 8, which concluded that, in respect of each local air pollutant for all major and local designated ecological receptors, under EA guidance, the impacts were **not significant** and that **no further assessment** was required. Therefore it is considered appropriate to have concluded in ES Chapter 11 that air quality effects fall within the 'Very low/neutral' magnitude category, defined in ES Table 11.11 as: *A change to the level of which is so low, it is not discernible on designated sites or habitats or the sizes of species' populations, or changes that balance each other out over the lifespan of a project.*

Issued by



.....
Dr Andrew Brooks

Approved by



pp

.....
Martin Peirce

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ANNEX C

BRISTOL AIRPORT LIMITED

Development of Bristol Airport to Accommodate 12 Million Passengers Per Annum: Further Information on A38/Downside Road Woodland

1 INTRODUCTION

Bristol Airport Ltd (BAL) has submitted a planning application to North Somerset Council (NSC) for the proposed development of Bristol Airport to accommodate 12 million passengers per annum (mppa) (Application No. 18/P/5118/OUT).

Further clarification on the character of the woodland within the proposed development footprint has been requested by NSC, and in particular, to help confirm the habitat status of the woodland lost to development, specifically whether it could be classified as Lowland Mixed Deciduous Woodland Priority habitat.

Johns Associates has conducted further inspections of this woodland, supported by the development details, and produced this technical note to both support its conclusions that this habitat is not Priority Habitat and to confirm wider compensatory/mitigation/enhancement measures proposed for woodland in general.

2 LOWLAND MIXED DECIDUOUS WOODLAND CLASSIFICATION (AFTER UK BIODIVERSITY ACTION PLAN; PRIORITY HABITAT DESCRIPTIONS. BRIG (ED. ANT MADDOCK) 2008.)

The tree canopy comprises varied mixtures of species including oak (typically pedunculate), downy birch, silver birch, ash, wych elm, sycamore, holly and hazel. The ground layer vegetation is variable depending on soil type and includes herb rich, grassy and heathy vegetation.

On the most base-rich soils the tree canopy is typically made up mainly of ash *Fraxinus excelsior*, wych elm *Ulmus glabra* and sycamore *Acer pseudoplatanus*, mixed with other species such as wild cherry *Prunus avium*, goat willow *Salix caprea*, elder *Sambucus nigra* and hawthorn *Crataegus monogyna*. The field layer in these places commonly contains an abundance of herbs such as dog's mercury *Mercurialis perennis*, wood avens *Geum urbanum*, hedge woundwort *Stachys sylvatica*, sanicle *Sanicula europaea*, woodruff *Galium odoratum*, red campion *Silene dioica*, nettle *Urtica dioica* and cleavers *Galium aparine*. In some places the field layer is more grassy, with an abundance of false brome

Brachypodium sylvaticum. Some examples (NVC W8d) have a carpet of ivy *Hedera helix*. Extensive carpets of tuberous comfrey *Symphytum tuberosum* are a feature of some W8 woods in southern and eastern Scotland. Ferns such as broad buckler fern *Dryopteris dilatata*, male fern *D. filix-mas* and scaly male fern *D. affinis* can occur sparsely. Bryophytes can be common but are neither conspicuously abundant nor very diverse in terms of species-richness: the commonest species are the mosses *Kindbergia praelonga*, *Brachythecium rutabulum*, *Eurhynchium striatum* and *Plagiomnium undulatum*, and the liverwort *Lophocolea bidentata*.

3 HABITAT CLASSIFICATION

The Phase 1 habitat classification of the woodland (after JNCC, 2013) was established by Johns Associates in 2018. This classification/description is reproduced below.

“Broadleaved Semi-Natural Woodland

A small area of secondary woodland is located south of Downside Road (at the site of the proposed A38 highway improvements which is partially within the application site). The canopy is dominated by sycamore *Acer pseudoplatanus*, with an approximate canopy cover of 70%. A small range of coniferous species are present, including yew *Taxus baccata* and box *Buxus semperivirens*, however the canopy cover of such species is not considered to reach 10%, and as such the woodland is not classified as mixed woodland. Within areas of more open canopy, understory species such as locally frequent to occasional hawthorn, elder, holly, blackthorn, yew and box are present. The ground flora is mostly shaded, particularly within the centre of the woodland, with a small cutting located at the centre of the woodland, aligned approximately east to west and up to 5m deep. Within the cutting, hart’s tongue fern *Asplenium scolopendrium* and scaly male fern *Dryopteris affinis* grow at frequent abundance. Dog’s mercury, wild garlic *Allium ursinum* and ivy grow at locally frequent to locally abundant cover. Ground flora situated beneath open areas of the canopy supports abundant establishment of sycamore seedlings. Towards the southern boundary of the woodland, adjacent to domestic gardens, the area of woodland denoted by target note 13 has been subject to dumping of garden waste. As a result, a small number of non-native tree, shrub and herbaceous species have established, including the Schedule 9 invasive non-native variegated yellow archangel *Lamiastrum galeobdolon* subsp. *argentatum*. No recent management of the woodland is evident.”

4 SURVEY RESULTS

Species recorded within the proposed development footprint by Johns Associates in March 2019 are described below in Table 1.

Table 1 Species recorded from the broadleaved semi-natural woodland habitat

Scientific name	English name	DAFOR
<i>Quercus ilex</i>	Holm Oak	R
<i>Acer pseudoplatanus</i>	Sycamore	D
<i>Rubus fruticosus</i> agg.	Bramble	F
<i>Asplenium scolopendrium</i>	Hart’s tongue fern	LF
<i>Prunus spinosa</i>	Blackthorn	R
<i>Primula vulgaris</i>	Primrose	R
<i>Urtica dioica</i>	Common nettle	O
<i>Galium aparine</i>	Cleavers	O
<i>Plantago lanceolata</i>	Ribwort plantain	R
<i>Rumex obtusifolius</i>	Broad-leaved dock	R

Scientific name	English name	DAFOR
<i>Ranunculus ficaria</i>	Lesser celandine	R
<i>Crataegus monogyna</i>	Hawthorn	R
<i>Dipsacus fullonum</i>	Wild teasel	LF
<i>Leucanthemum vulgare</i>	Oxeye daisy	R
<i>Glechoma hederacea</i>	Ground Ivy	LF
<i>Capsella bursa-pastoris</i>	Shepherds purse	LF
<i>Allium ursinum</i>	Ramsoms	LF
<i>Poa trivialis</i>	Rough meadow-grass	O
<i>Narcissus spp.</i>	Daffodil cultivars	R
<i>Hedera helix</i>	Common ivy	F
<i>Arum maculatum</i>	Lords and ladies	F
<i>Buddleja sp</i>	Butterfly bush	R

Photographs, located below, were taken to record the present condition of the woodland. Locations of each plate are numbered in Figure 1.

Figure 1 Location points of plates



Plate 1 Looking north east and showing a 10 metre approx. wide strip of habitat adjacent to the A38



Plate 2 Looking east and showing a 20m approx. area of habitat from the corner of A38/Downside Road



Plate 3 Looking east and showing a 20m approx wide strip of woodland running adjacent to Downside Road



Plate 4 Looking north west and showing a 15m approx wide strip of woodland running adjacent to Downside Road



Plate 5 Looking east and showing 6m approx. wide strip of woodland running adjacent to Downside Road



Plate 6 Looking west and showing a 6m approx. wide strip of woodland running adjacent to Downside Road



5 CONCLUSIONS REGARDING HABITAT PRESENT IN THE A38/DOWNSIDE ROAD WOODLAND

The canopy of the surveyed area of woodland is dominated by sycamore with no coniferous species present. The ground flora is sparse with large areas of bare ground and an abundance of sycamore seedlings. To the east of the woodland, where the canopy is more open, the ground flora is dominated by common tall ruderal herb species. Few lowland mixed deciduous woodland indicator species are present within the area of woodland surveyed, which is dominated by species that are typically associated with recently disturbed soil and less frequently managed areas of habitat.

Consequently, it is considered that this area of woodland, particularly the footprint of the proposed A38/Downside Road highway improvements, is not Priority habitat.

6 INCORPORATED AND EMBEDDED MITIGATION

As part of the development proposals, BAL is proposing the following measures that will adequately mitigate for the loss of the woodland as well as providing enhancement to this woodland and woodland in the local area on land owned by BAL:

- Restoration and management of the remaining woodland including removal of rubbish, INNS, underplanting, tree surgery where needed, long term replacement of sycamore with e.g. oak/yew and other suitable species;
- Long Term Woodland Management Plan;
- Contiguous airport meadow tree planting/management;
- A38 fields woodland management and extension;
- Offsite woodland enhancement.

These measures will be defined in full in a detailed management plan to be conditioned.

Kerry White BSc GradCIEEM

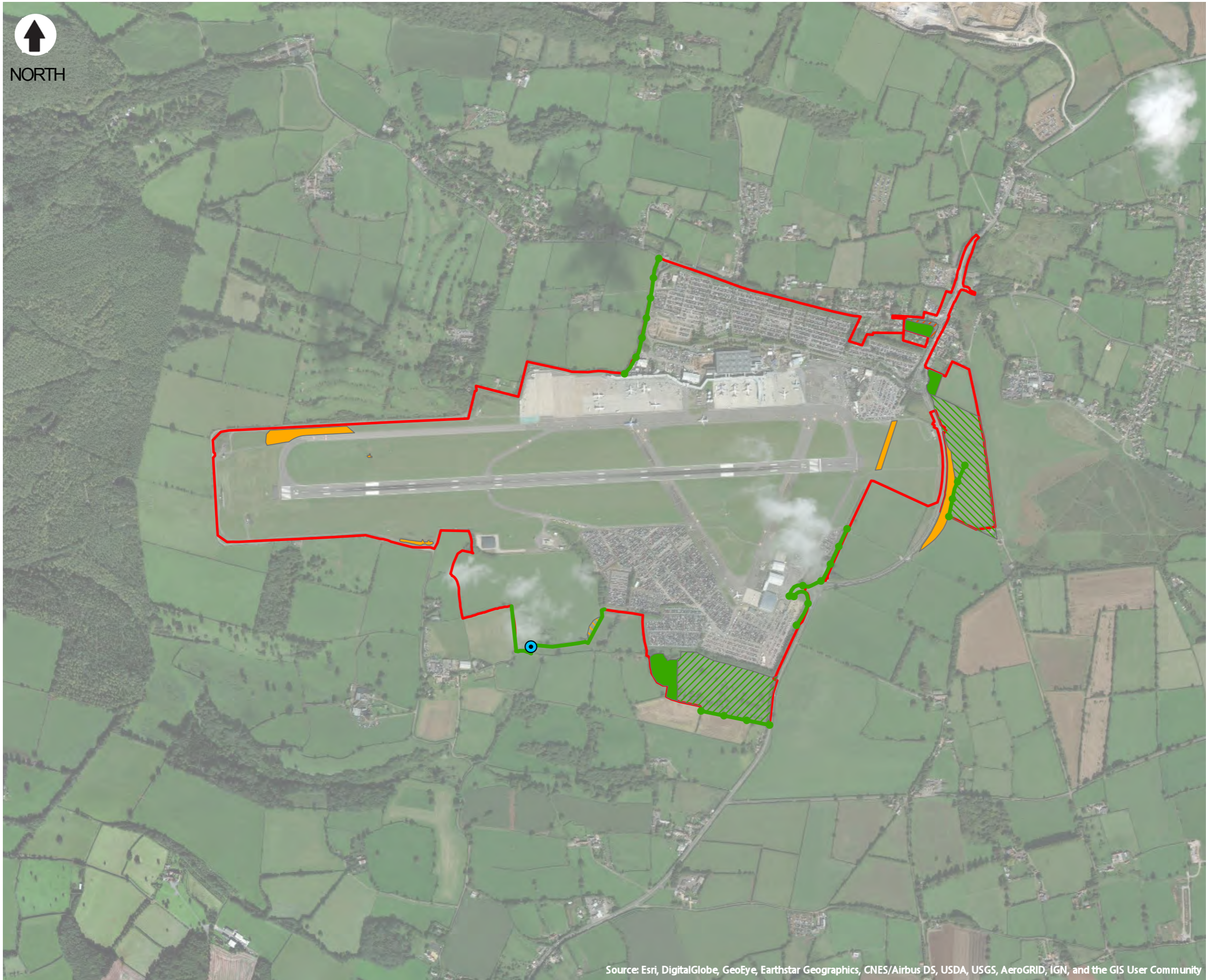
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ANNEX D



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Development of Bristol Airport to Accommodate
12 Million Passengers Per Annum

TITLE
Changes to Priority / Potential Priority Habitat

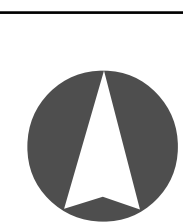
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REFERENCE	REVISION	DATE ISSUED
J00254.FIR1		12/3/2019

- Planning Application Boundary
- Protect, retain, and enhance pond
- Enhance hedgerow
- Protect, retain, and manage hedgerow
- Enhance to woodland pasture
- Enhancement and management of retained woodland to increase diversity, ecological function and condition
- Woodland removed
- Enhance species diversity (based on botanical survey) using BAL approved grass mix and through reduced cutting frequency
- Grassland translocated onto bund proposed for this location
- Protect, retain, and enhance grassland

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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ANNEX E



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Bristol Airport 12mppa post submission support

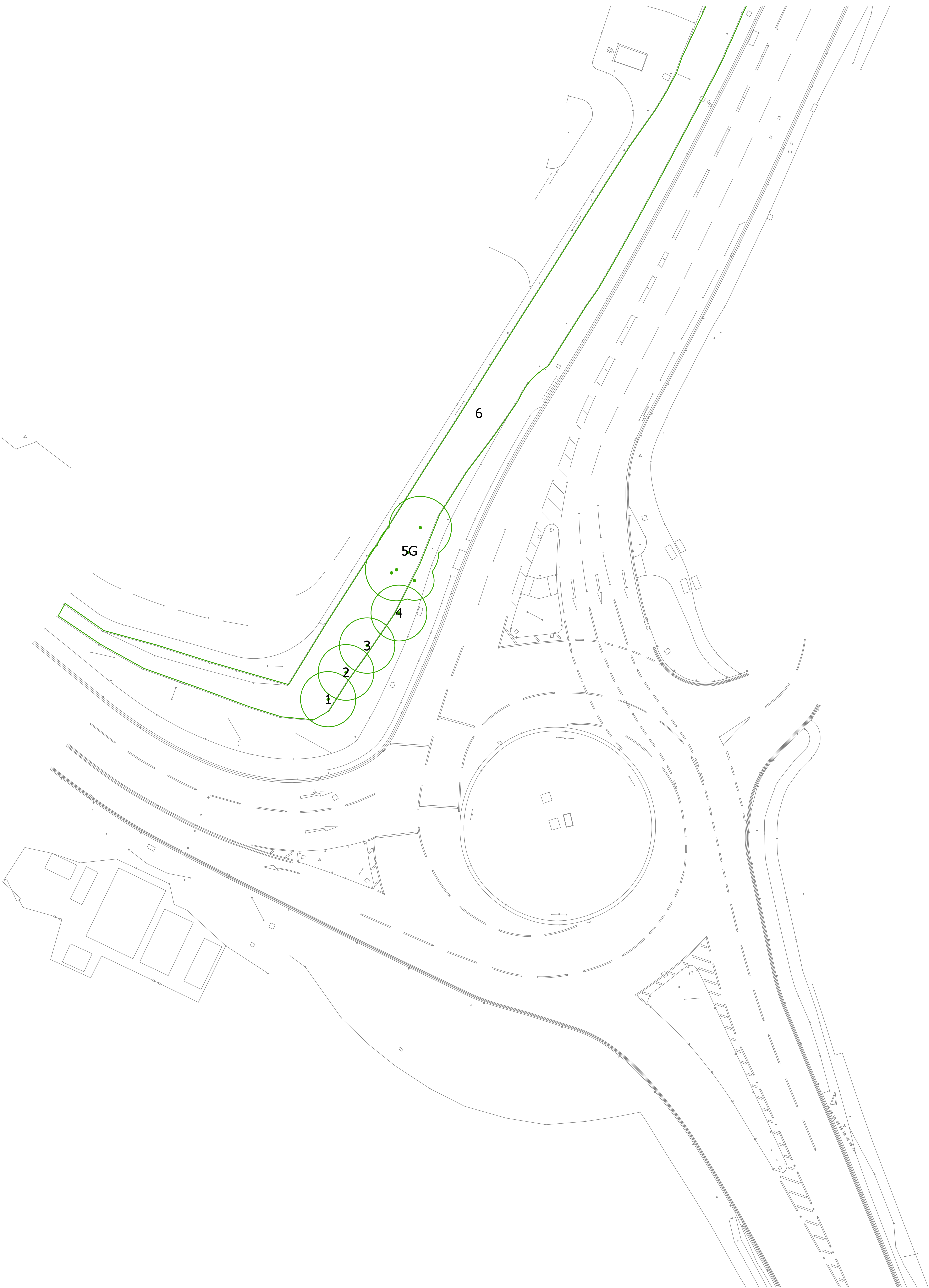
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Existing Tree Survey - Sheet 1 of 3

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Revision A: Changed Tree 18 from Retain to Remove

- Existing Trees
- Existing Hedge/Foliage

Number	Species	Height metres	Stem Diameter millimetres	Life stage YSBMEMWOM	RPA Advice (m)	Overall condition GoodFairPoor(ave)	Category / Sub-category	Tree status Retained/ removed	Notes
(C) describe a group				ESC <100-150-250-400	Only shown where trees are to be retained				
1	Maple	7	200-250	SM>40		Good	C1+2	Remove	
2	Maple	7	200-250	SM>40		Good	C1+2	Remove	
3	Maple	7	200-250	SM>40		Good	C1+2	Remove	
4	Maple	7	200-250	SM>40		Good	C1+2	Remove	
5 G	Ash	7	200-250	SM>40		Good	C1+2	Remove	
6	Mixed hedge	4						Remove	Hedge
7G	Scamora Birch h Beech		250-400			Good		Remove	Trees are situated in neighbours gardens
8G	Yew		150-200			Good		Remove	Trees are situated in neighbours gardens They are in a line
9	Mixed Hedge	3		M>40		Good	C1+2	Remove	Field Maple Hawthorn Hedge Trimmed
10	Holm Oak	8	180	M>40		Good	C1+2	Remove	
11	Sycamore	10	250	M>40		Good	C1+2	Remove	Co-dominant stems
12	Sycamore	12	180	M>40		Good	C1+2	Remove	Co-dominant stems
13	Sycamore	12	150-300	M>40		Good	C1+2	Remove	Multi Stemmed
14G	Sycamore	15	250-300	M>40		Good	C1+2	Remove	Group of 5
15 G	Sycamore	15	150-250	M>40		Good	C1+2	Remove	Group of 4
16	Sycamore	15	350	M>40		Poor	C1+2	Remove	Poor specimen
17G	Sycamore	15	200-350	M>40		Good	C1+2	Remove	Group of 6
18	Sycamore	15	300-450	M>40	5.4	Good	C1+2	Remove	
19G	Sycamore	12-15	150-300	M>40		Good	C1+2	Remove	Group of 20 even aged regeneration
20	Sycamore	18	400-500	M>40		Good	C1+2	Remove	
21G	Sycamore	12	150-300	M>40		Good	C1+2	Remove	Group of 5
22	Conifer Hedge					Good	C1+2	Remove	Hedge
23	Ash		200	SM>40	2.4		B3	Retain	Situated in neighbours garden
24	Grass/Bramble Scrub							Remove	Hedge
25	Ash		200/300	M>40	4.2	Good	C1+2	Possibly retain	Co-dominant stems
26	Ash		400	M>40	4.2	Good	C1+2	Possibly retain	
27	Yew	10	600	M	7.2	Good	A1/Q3	Retain	Other side of road
28	Ash							Retain	Pollarded
29	Ash		400		4.2			Retain	
30	Ash		500		6			Possibly retain	Old pollard, 3 stems
31	Hawthorn		200		2.4			Retain	
32	Hawthorn		200		2.4			Retain	
33	Ash				3.6			Retain	Smld good condition
34	Ash		450		5.4			Possibly retain	
35	Hawthorn		250		3			Possibly retain	
36	Silver Birch		300		3.6			Retain	





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TITLE
Existing Tree Survey - Sheet 2 of 3

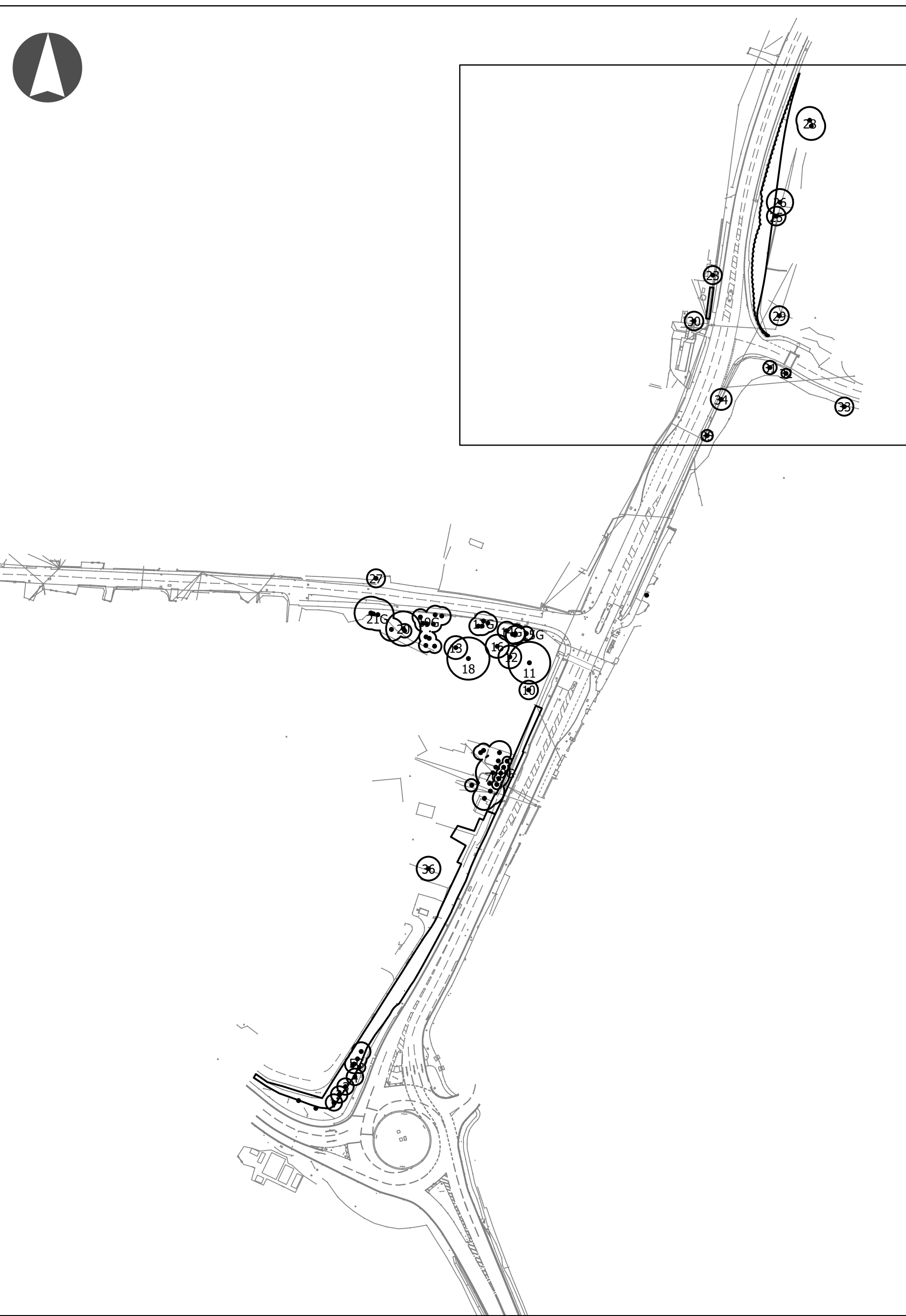
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Revision A: Changed Tree 18 from Retain to Remove

- Existing Trees
- Existing Hedge/Foliage



Number	Species	Height metres	Stem Diameter millimetres	Life stage YS/M/EM/ADOM	RPA Rating (m)	Overall condition Good/Fair/Poor/V	Category / Sub-category	Tree status Retained/ removed	Notes
(C) describe a group				ESC <100/150/250/400	Only shown where trees are to be retained				
1	Maple	7	200-250	SM>40		Good	C1+2	Remove	
2	Maple	7	200-250	SM>40		Good	C1+2	Remove	
3	Maple	7	200-250	SM>40		Good	C1+2	Remove	
4	Maple	7	200-250	SM>40		Good	C1+2	Remove	
5 G	Ash	7	200-250	SM>40		Good	C1+2	Remove	
6	Mixed hedge	4						Remove	Hedge
7G	Scamora Birch h Beech		250-400			Good		Remove	Trees are situated in neighbours gardens
8G	Yew		150-200			Good		Remove	Trees are situated in neighbours gardens They are in a line
9	Mixed Hedge	3		M>40		Good	C1+2	Remove	Field Maple Hawthorn Hedge Trimmed
10	Holm Oak	8	180	M>40		Good	C1+2	Remove	
11	Sycamore	10	250	M>40		Good	C1+2	Remove	Co-dominant stems
12	Sycamore	12	180	M>40		Good	C1+2	Remove	Co-dominant stems
13	Sycamore	12	150-300	M>40		Good	C1+2	Remove	Multi Stemmed
14G	Sycamore	15	250-300	M>40		Good	C1+2	Remove	Group of 5
15 G	Sycamore	15	150-250	M>40		Good	C1+2	Remove	Group of 4
16	Sycamore	15	350	M>40		Poor	C1+2	Remove	Poor specimen
17G	Sycamore	15	200-350	M>40		Good	C1+2	Remove	Group of 6
18	Sycamore	15	300-450	M>40	5.4	Good	C1+2	Remove	
19G	Sycamore	12-15	150-300	M>40		Good	C1+2	Remove	Group of 20 even aged regeneration
20	Sycamore	18	400-500	M>40		Good	C1+2	Remove	
21G	Sycamore	12	150-300	M>40		Good	C1+2	Remove	Group of 5
22	Conifer Hedge					Good	C1+2	Remove	Hedge
23	Ash		200	SM>40	2.4		B3	Retain	Situated in neighbours garden
24	Grass/Bramble Bank							Remove	Hedge
25	Ash		200/300	M>40	4.2	Good	C1+2	Possibly retain	Co-dominant stems
26	Ash		400	M>40	4.2	Good	C1+2	Possibly retain	
27	Yew	10	600	M	7.2	Good	A1/2/3	Retain	Other side of road
28	Ash		400		4.2			Retain	Pollarded
29	Ash							Retain	
30	Ash		500		6			Possibly retain	Old pollard, 3 stems
31	Hawthorn		200		2.4			Retain	
32	Hawthorn		200		2.4			Retain	
33	Ash				3.6			Retain	Smld good condition
34	Ash		450		5.4			Possibly retain	
35	Hawthorn		250		3			Possibly retain	
36	Silver Birch		300		3.6			Retain	



Number	Species	Height metres	Stem Diameter millimetres	Life stage YSBM/MWOM	RPA Grade (m)	Overall condition Good/Fair/Poor/Nil	Category / Sub-category	Tree status Retain/Remove	Notes
(C) describe a group				ESC <100-150-250-400	Only shown where trees are to be retained				
1	Maple	7	200-250	SM>40		Good	C1+2	Remove	
2	Maple	7	200-250	SM>40		Good	C1+2	Remove	
3	Maple	7	200-250	SM>40		Good	C1+2	Remove	
4	Maple	7	200-250	SM>40		Good	C1+2	Remove	
5 G	Ash	7	200-250	SM>40		Good	C1+2	Remove	
6	Mixed hedge	4						Remove	Hedge
7G	Scamora Birch h Beech		250-400			Good		Remove	Trees are situated in neighbours gardens
8G	Yew		150-200			Good		Remove	Trees are situated in neighbours gardens
9	Mixed Hedge	3		M >40		Good	C1+2	Remove	They are in a line Field Maple Hawthorn Hedge, trimmed
10	Holm Oak	8	180	M >40		Good	C1+2	Remove	
11	Sycamore	10	250	M >40		Good	C1+2	Remove	Co-dominant stems
12	Sycamore	12	180	M >40		Good	C1+2	Remove	Co-dominant stems
13	Sycamore	12	150-300	M >40		Good	C1+2	Remove	Multi Stemmed
14G	Sycamore	15	250-300	M >40		Good	C1+2	Remove	Group of 5
15 G	Sycamore	15	150-250	M >40		Good	C1+2	Remove	Group of 4
16	Sycamore	15	350	M >40		Poor	C1+2	Remove	Poor specimen
17G	Sycamore	15	200-350	M >40		Good	C1+2	Remove	Group of 6
18	Sycamore	15	300-450	M >40	5.4	Good	C1+2	Remove	
19G	Sycamore	12-15	150-300	M >40		Good	C1+2	Remove	Group of 20 even aged regeneration
20	Sycamore	18	400-500	M >40		Good	C1+2	Remove	
21G	Sycamore	12	150-300	M >40		Good	C1+2	Remove	Group of 5
22	Conifer Hedge					Good	C1+2	Remove	Hedge
23	Ash		200	SM>40	2.4		B3	Retain	Situated in neighbours garden
24	Grass/Bramble Bank							Remove	Hedge
25	Ash		200/300	M>40	4.2	Good	C1+2	Possibly retain	Co-dominant stems
26	Ash		400	M>40	4.2	Good	C1+2	Possibly retain	
27	Yew	10	600	M	7.2	Good	A1/2/3	Retain	Other side of road
28	Ash		400		4.2			Retain	Pollarded
29	Ash							Retain	
30	Ash		500		6			Possibly retain	Old pollard, 3 stems
31	Hawthorn		200		2.4			Retain	
32	Hawthorn		200		2.4			Retain	
33	Ash				3.6			Retain	Smld good condition
34	Ash		450		5.4			Possibly retain	
35	Hawthorn		250		3			Possibly retain	
36	Silver Birch		300		3.6			Retain	

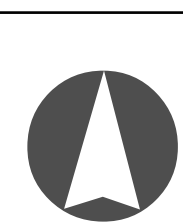


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PROJECT	Bristol Airport 12mppa post submission support
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CHECKED BY	AP
REFERENCE	J00382.ET3
REVISION	A
DATE ISSUED	4/3/2019

Revision A: Changed Tree 18 from Retain to Remove

- Existing Trees
- Existing Hedge/Foliage





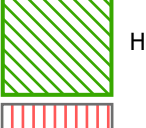
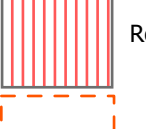
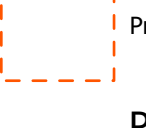

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TITLE
Tree retention removal and protection plan -
Sheet 1 of 3

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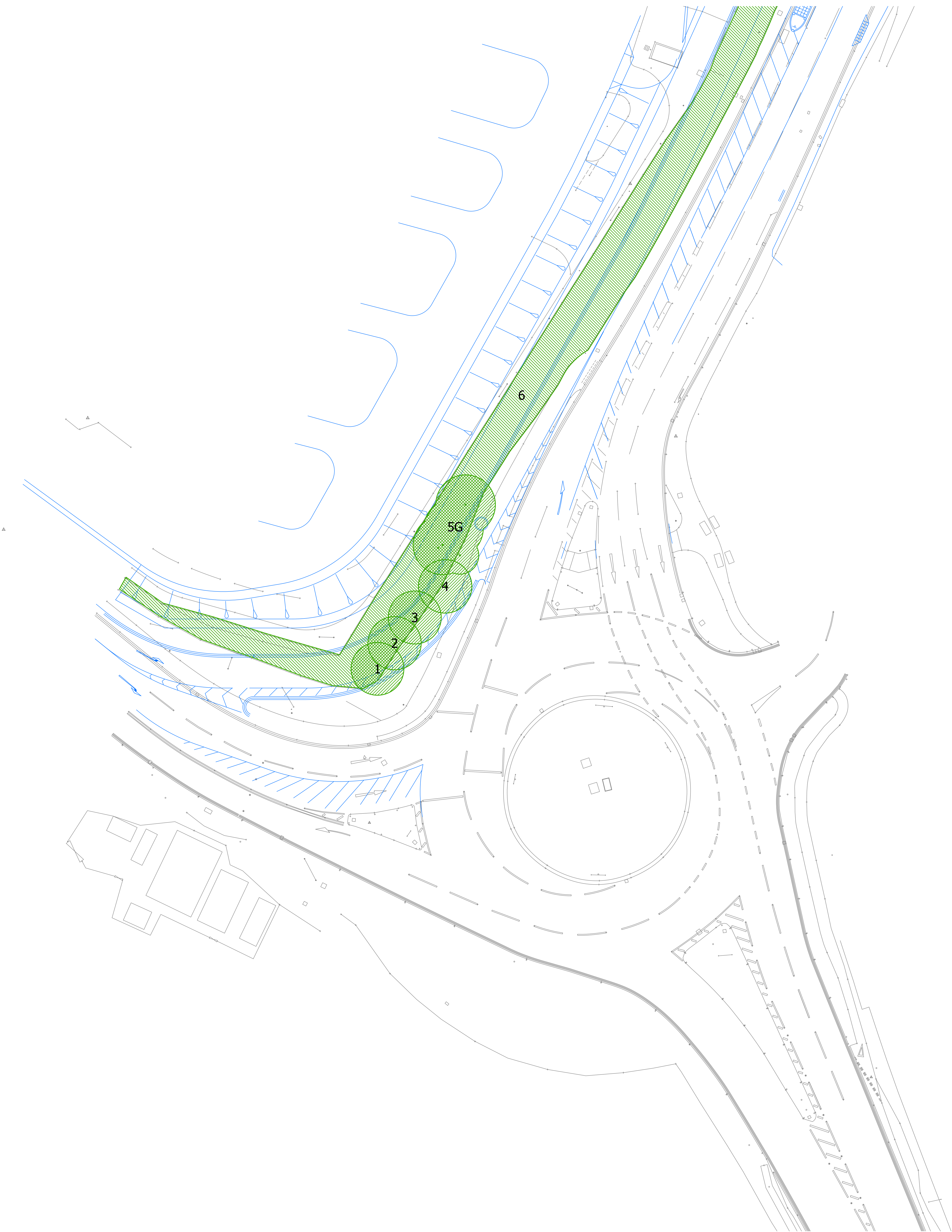
Revision A: Changed Tree 18 from Retain to Remove

-  Trees to be removed
-  Trees to be retained
-  Hedges to be removed
-  Root Protection Area (RPA) (approximate area)
-  Protective fencing (approximate location)
-  Proposed road layout (CTAS drawing C1124-M2-A38-011 2.4)

For trees to be retained, RPA and location of protective fencing to be agreed on site prior to works commencing.

Protective fencing compliant with BS 5837:2012.

Number	Species	Height metres	Stem Diameter millimetres	Life stage YSBMEMWOM	RPA Radius (m)	Overall condition GoodFairPoorV Nil	Category Sub-category	Tree status Retained/ removed	Notes
(C) describe a group				ESC <100-150/250-400	Only shown where trees are to be retained				
1	Maple	7	200-250	SM>40		Good	C1+2	Remove	
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32	Hawthorn		200		2.4			Retain	
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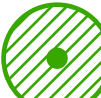


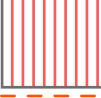
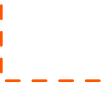

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Bristol Airport 12mppa post submission support

TITLE
Tree retention removal and protection plan -
Sheet 2 of 3

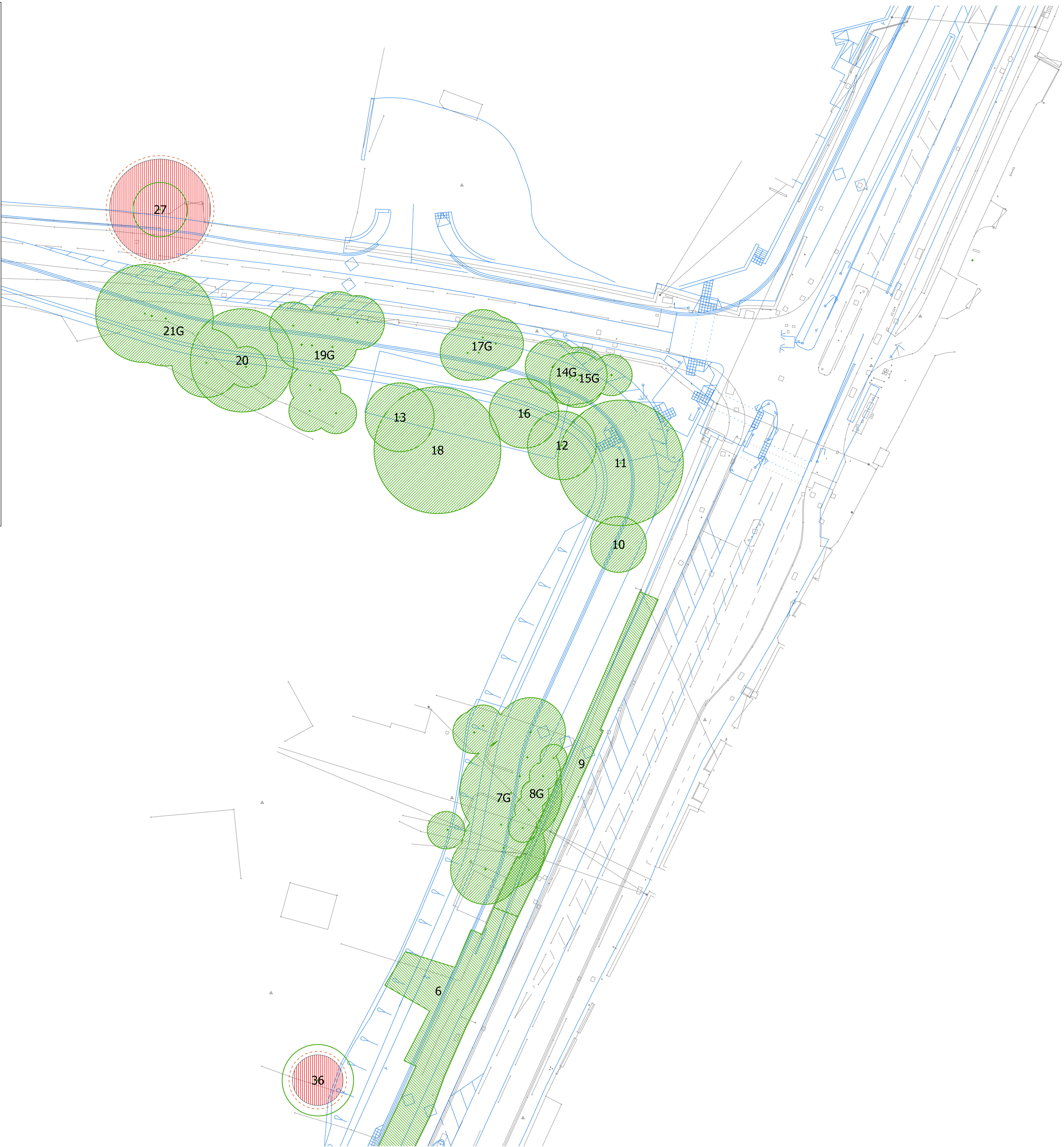
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REFERENCE J00382.TR2	REVISION A	DATE ISSUED 4/3/2019

Revision A: Changed Tree 18 from Retain to Remove

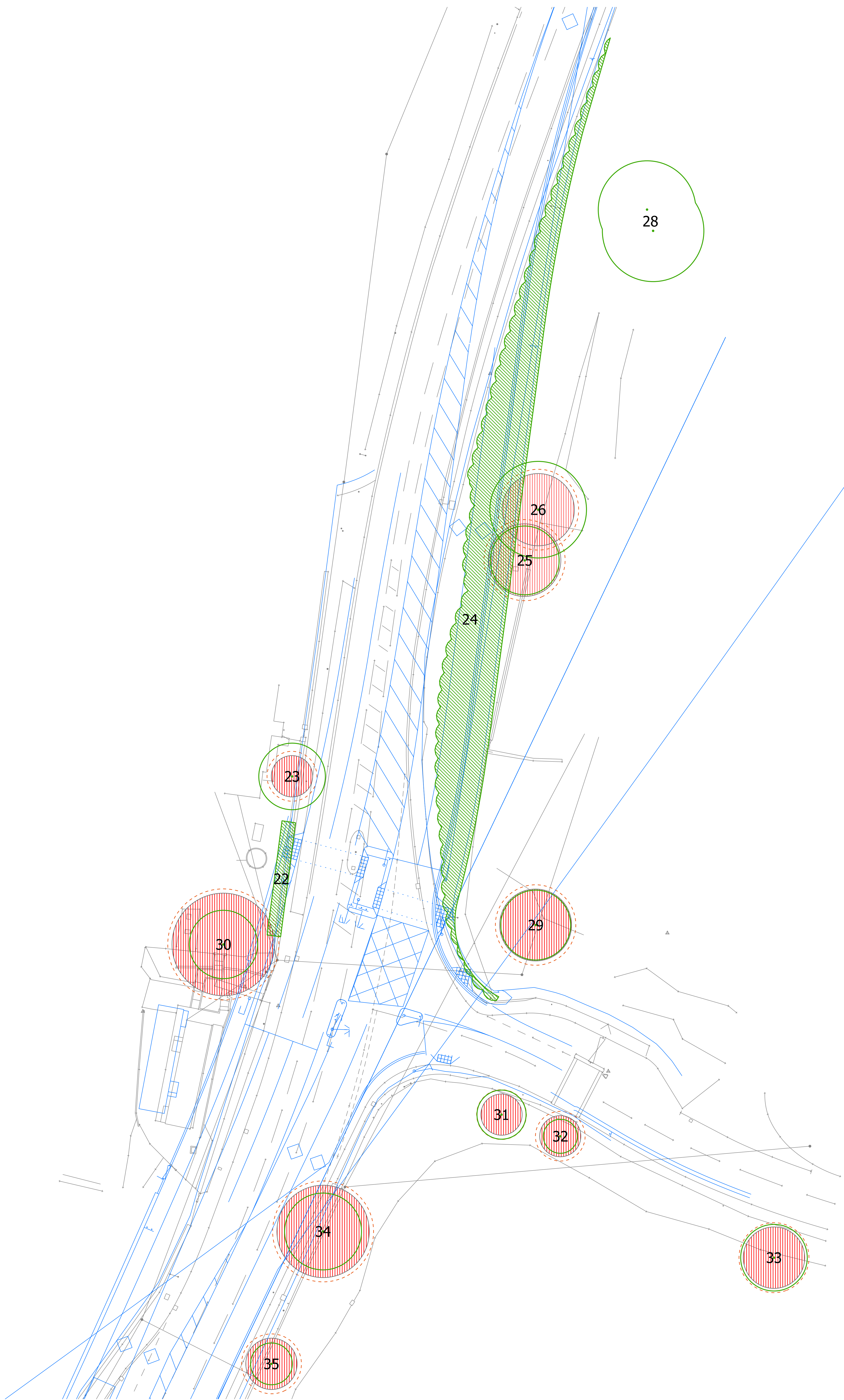
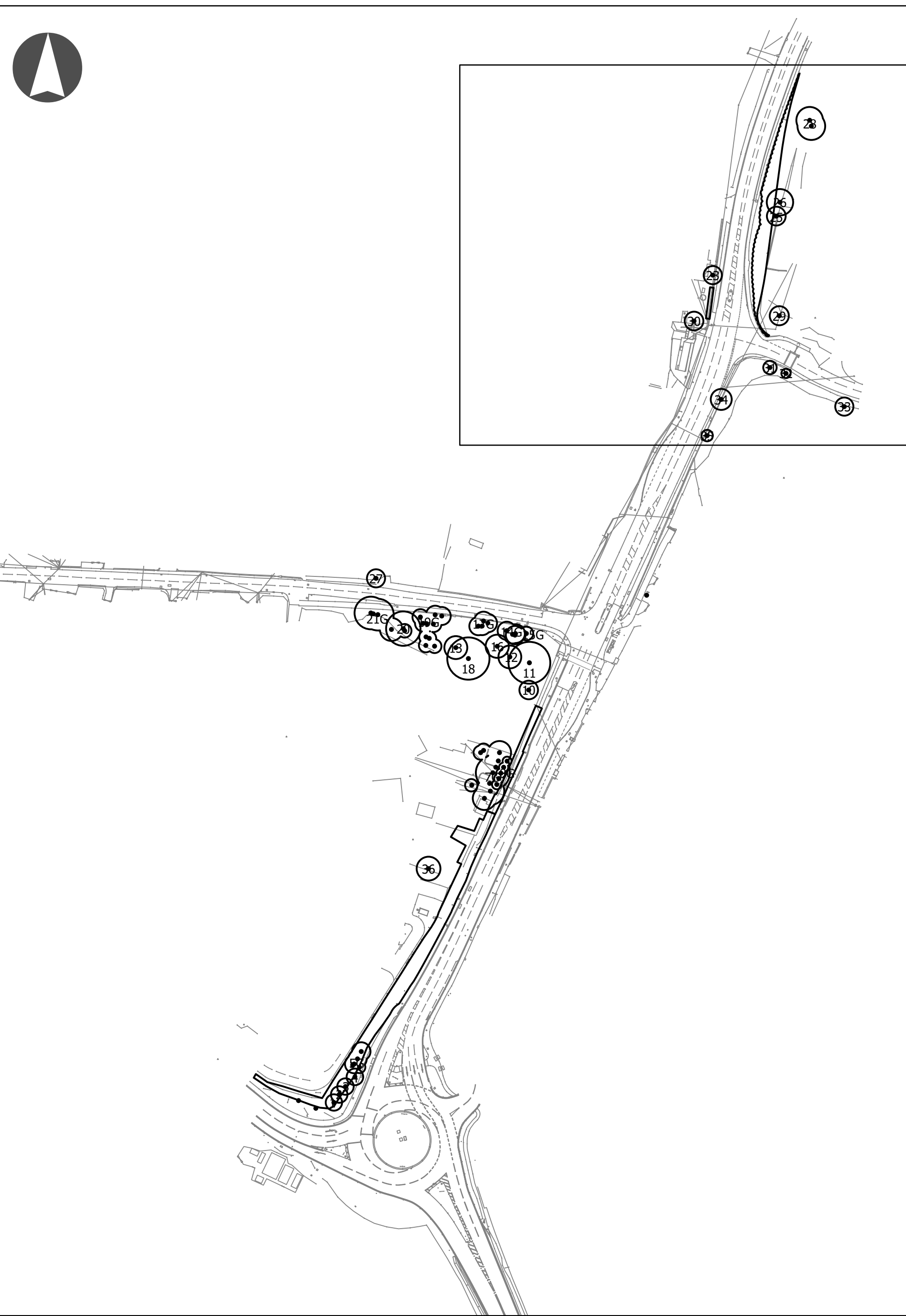
-  Trees to be removed
-  Trees to be retained
-  Hedges to be removed
-  Root Protection Area (RPA) (approximate area)
-  Protective fencing (approximate location)
-  Proposed road layout (CTAS drawing C1124-M2-A38-011 2.4)

For trees to be retained, RPA and location of protective fencing to be agreed on site prior to works commencing.

Protective fencing compliant with BS 5837:2012.



Number	Species	Height metres	Stem Diameter millimetres	Life stage YSBMEMWOM	RPA Radius (m) Only shown where trees are to be retained	Overall condition GoodFairPoor(ave)	Category Sub-category	Tree status Retained/removed	Notes
(C) denotes a group									
1	Maple	7	200-250	SM>40		Good	C1+2	Remove	
2	Maple	7	200-250	SM>40		Good	C1+2	Remove	
3	Maple	7	200-250	SM>40		Good	C1+2	Remove	
4	Maple	7	200-250	SM>40		Good	C1+2	Remove	
5 G	Ash	7	200-250	SM>40		Good	C1+2	Remove	
6	Mixed hedge	4						Remove	Hedge
7G	Scamora Birch h Beech		250-400			Good		Remove	Trees are situated in neighbours gardens
8G	Yew		150-200			Good		Remove	Trees are situated in neighbours gardens They are in a line
9	Mixed Hedge	3		M>40		Good	C1+2	Remove	Field Maple Hawthorn Hazel Trimmed
10	Holm Oak	8	180	M>40		Good	C1+2	Remove	
11	Sycamore	10	250	M>40		Good	C1+2	Remove	Co-dominant stems
12	Sycamore	12	180	M>40		Good	C1+2	Remove	Co-dominant stems
13	Sycamore	12	150-300	M>40		Good	C1+2	Remove	Multi Stemmed
14G	Sycamore	15	250-300	M>40		Good	C1+2	Remove	Group of 5
15 G	Sycamore	15	150-250	M>40		Good	C1+2	Remove	Group of 4
16	Sycamore	15	350	M>40		Poor	C1+2	Remove	Poor specimen
17G	Sycamore	15	200-350	M>40		Good	C1+2	Remove	Group of 6
18	Sycamore	15	300-450	M>40	5.4	Good	C1+2	Remove	
19G	Sycamore	12-15	150-300	M>40		Good	C1+2	Remove	Group of 20 even aged regeneration
20	Sycamore	18	400-500	M>40		Good	C1+2	Remove	
21G	Sycamore	12	150-300	M>40		Good	C1+2	Remove	Group of 5
22	Conifer Hedge					Good	C1+2	Remove	Hedge
23	Ash		200	SM>40	2.4		B3	Retain	Situated in neighbours garden
24	Grass/Bramble Bank							Remove	Hedge
25	Ash		200/300	M>40	4.2	Good	C1+2	Possibly retain	Co-dominant stems
26	Ash		400	M>40	4.2	Good	C1+2	Possibly retain	
27	Yew	10	600	M	7.2	Good	A1/Q3	Retain	Other side of road
28	Ash		400		4.2			Retain	Pollarded
29	Ash		500		6			Retain	
30	Ash		200		2.4			Possibly retain	Old pollard, 3 stems
31	Hawthorn		200		2.4			Retain	
32	Hawthorn		200		2.4			Retain	
33	Ash		450		3.6			Retain	Smld good condition
34	Ash		250		5.4			Possibly retain	
35	Hawthorn		300		3			Possibly retain	
36	Silver Birch				3.6			Retain	



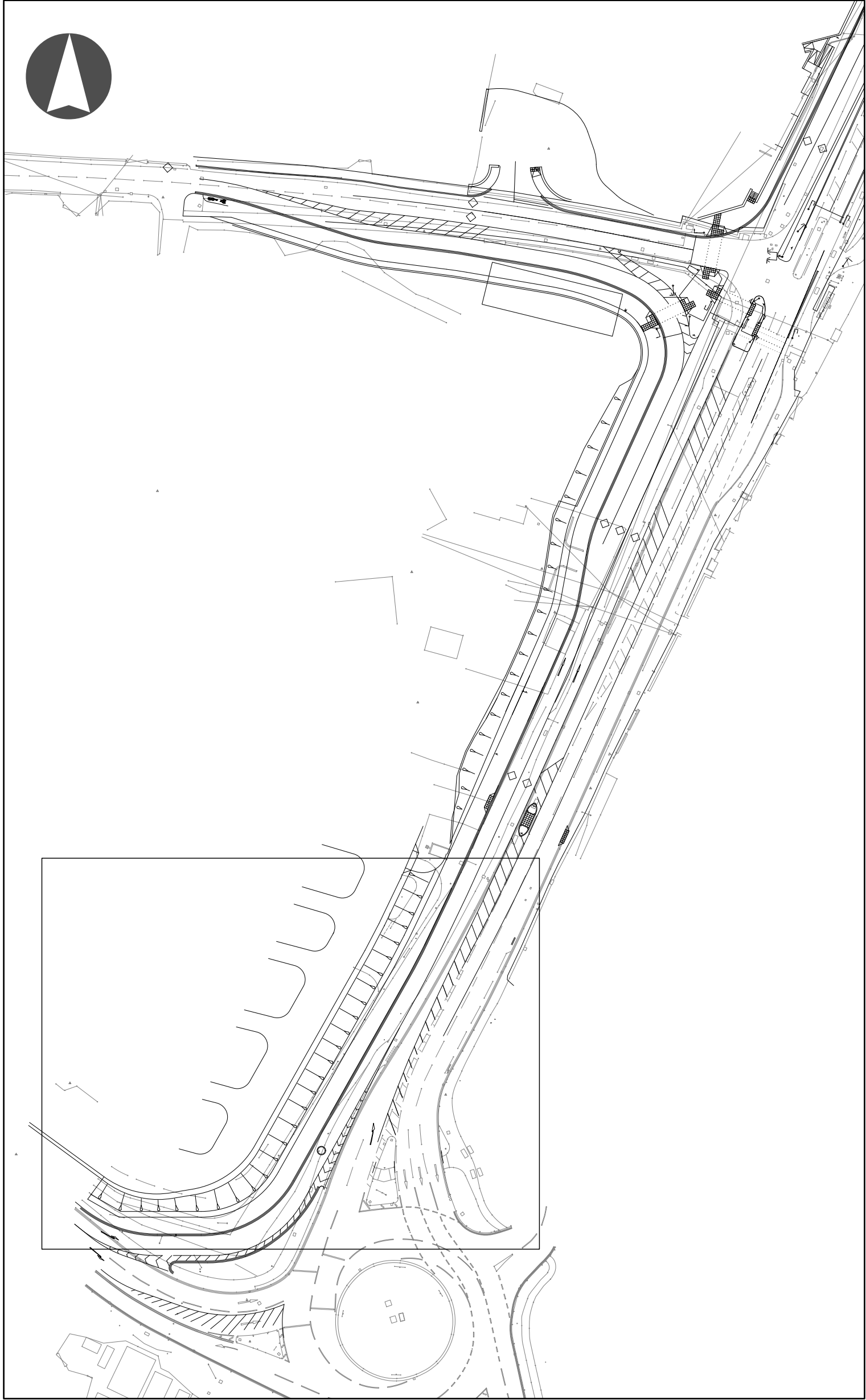
Number	Species	Height metres	Stem Diameter millimetres	Life stage YSBWEMWOM	RPA Radius (m) CSC <10x10/23x40	Overall condition GoodFairPoor(Not val)	Category Sub-category	Tree status Retained/ removed	Notes
(C) describe a group									
1	Maple	7	200-250	SM>40		Good	C1+2	Remove	
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3	Maple	7	200-250	SM>40		Good	C1+2	Remove	
4	Maple	7	200-250	SM>40		Good	C1+2	Remove	
5 G	Ash	7	200-250	SM>40		Good	C1+2	Remove	
6	Mixed hedge	4						Remove	Hedge
7G	Scamora Birch h Beech		250-400			Good		Remove	Trees are situated in neighbours gardens
8G	Yew		150-200			Good		Remove	Trees are situated in neighbours gardens
9	Mixed Hedge	3		M >40		Good	C1+2	Remove	They are in a line Field Maple Hawthorn Hedge, trimmed
10	Holm Oak	8	180	M >40		Good	C1+2	Remove	
11	Sycamore	10	250	M >40		Good	C1+2	Remove	Co-dominant stems
12	Sycamore	12	180	M >40		Good	C1+2	Remove	Co-dominant stems
13	Sycamore	12	150-300	M >40		Good	C1+2	Remove	Multi Stemmed
14G	Sycamore	15	250-300	M >40		Good	C1+2	Remove	Group of 5
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19G	Sycamore	12-15	150-300	M >40		Good	C1+2	Remove	Group of 20 even aged regeneration
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21G	Sycamore	12	150-300	M >40		Good	C1+2	Remove	Group of 5
22	Conifer Hedge					Good	C1+2	Remove	Hedge
23	Ash		200	SM>40	2.4		B3	Retain	Situated in neighbours garden
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25	Ash		200/300	M>40	4.2	Good	C1+2	Possibly retain	Co-dominant stems
26	Ash		400	M>40	4.2	Good	C1+2	Possibly retain	
27	Yew	10	600	M	7.2	Good	A1/2/3	Retain	Other side of road
28	Ash		400		4.2			Retain	Pollarded
29	Ash							Retain	
30	Ash		500		6			Possibly retain	Old pollard, 3 stems
31	Hawthorn		200		2.4			Retain	
32	Hawthorn		200		2.4			Retain	
33	Ash				3.6			Retain	Smld good condition
34	Ash		450		5.4			Possibly retain	
35	Hawthorn		250		3			Possibly retain	
36	Silver Birch		300		3.6			Retain	

Revision A: Changed Tree 18 from Retain to Remove

- Trees to be removed
- Trees to be retained
- Hedges to be removed
- Root Protection Area (RPA) (approximate area)
- Protective fencing (approximate location)
- Proposed road layout (CTAS drawing C1124-M2-A38-011 2.4)

For trees to be retained, RPA and location of protective fencing to be agreed on site prior to works commencing.

Protective fencing compliant with BS 5837:2012.



CLIENT

Wood Environment and Infrastructure Solutions UK Limited

PROJECT

Bristol Airport 12mppa post submission support

TITLE

Soft Landscape Plan - Planting Sheet 1 of 3 Revision A

SCALE @ A0

1:100

CREATED BY

JS

CHECKED BY

AP

REFERENCE

J00382.SLP1

REVISION

A

DATE ISSUED

20/3/2019

Woodland - Exact location of woodland trees and understory mix to be agreed on site prior to works commencing.

Trees

Native Hedge

Ornamental Hedge

Native Shrub Mix

Ground Cover Mix

x x x x
x x x x
x x x x

Bulb Planting

Meadowmania AM14 for roadside verges or similar approved

Emorsgate Mix EW1F wildflowers for woodland or similar approved

Revision A - 13/03/19
Base-map updated to most recent drawing (C1124-M2-A38-011 2.5) from CTAS, planting changed to reflect repositioning of fence line.
Soft Landscape Specification

General

It is the responsibility of the design/developer to design foundations and structures to accommodate all proposed and existing trees and shrub planting, with reference made to HNSD Standards Chapter 2.2 'Bulking near Trees, Revised 2018' where appropriate.

The developer/contractor should satisfy themselves that trees are a safe distance from drainage runs and services and that no planting falls within service strips.

All landscape contractors shall make themselves aware of all service locations prior to commencing on site works including planting operations.

All planting works to be carried out in accordance with BS4428 1989 'Code of Practice for General Landscaping Operations (including hard surfacing)'. Where any deviance from this specification occurs within a scheme, the contractor shall request the relevant detail from the designer prior to proceeding.

Existing Vegetation

All trees and hedges which are shown for retention should be inspected for safety by a suitably qualified member of the Arboricultural Association and subject to BS5837 2012. Trees in relation to design, demolition and construction - recommendations. They should be protected during all stages of construction with temporary fencing in accordance with BS5837 2012, and must comply with all applicable planning conditions. Any tree surgery required shall also be in accordance with BS3968 2010 'Tree work. Recommendations'.

The landscape contractor shall make the Landscape Architect aware of any rigorous weeds classified under the Wildlife Act 1969 and invasive weeds (as noted in section 1420 of the Wildlife and Countryside Act 1981, Schedule 8 Part II) that may be present on site at the earliest opportunity.

Topsoil

The landscape contractor shall satisfy himself as to the suitability and availability of topsoil on site, and if necessary topsoil shall be imported from an approved site. Soil having to be carried out as required by the Control of Pollution Act 1989 shall be in accordance with BS3045 2009 'Topsoil Specification for topsoil and requirements for use'. The depth of topsoil spread shall not normally exceed 100mm (maximum depth 100mm) with suitable rooted subsoil providing the remainder of the minimum rooting depth.

Grass areas 150-400mm depth
Shrub areas 400-600mm depth
Trees 600mm depth

Tree pits to be backfilled with topsoil - see tree planting specification.

Soil Amendments

To be applied to all newly planted areas unless directed otherwise by the CA.

Organic slow-release fertiliser or similar approved to be applied at a rate of approximately 10g/m² of topsoil spread into the top 100mm of soil, and 1.5kg per m² of backfill for pit planting. All application rates to be applied as per manufacturer's instructions. General Site Release Fertiliser (see Scotts Emery CRF 11.22 9-04Mg or similar approved) to be applied as per manufacturer's instructions.

Plant Stock

All plant material to be as specified in the Plant Schedule, and available for inspection by the Landscape Architect and/or CA.

At least material shall be in accordance with BS3996 1 (1992) 'Nursery Stock Specification for Trees and Shrubs', BS3996 10 (1990) 'Nursery Stock Specification for Ground cover plants', BS3996 1988A:1 (2013) 'Recommendations for Turf for General Purposes - Handling and Establishing Landscape Plants', Horticultural Trades Association, 2002 and The National Plant Specification - Handling and establishment Nov. 1995.

Any plant stock to be planted outside the planting season (November to March) must be kept in storage (not to be containerised). All containerised stock to have healthy, well-developed root system within the specified pot size. Where ground cover is to be planted, the stock must be in accordance with BS 4428 1989 'Code of Practice for General Landscaping Operations (including hard surfacing)'. All plant material shall be protected to the next approved pot size, re-spaced to allow for 15-20% growth per season, and maintained in healthy vigorous growth throughout weather conditions.

Planting Specification - proposed tree, shrub and hedge planting.

General

Planting of trees and shrubs to take place between end of October - March unless otherwise agreed.

All planting areas to be weed free prior to planting. Allow the application of approved translocated systemic herbicide in line with Health and Safety Regulations (HSE), Control of Pesticide Regulations 1986 amended 1997, EU Biocides regulation (EC/924/2006) and Control of Substances Hazardous to Health (COSHH) 2002. Application to be as per manufacturer's instructions.

All planting beds to be thoroughly topped over or otherwise to a depth of 400mm, prior to planting. Ensure that the subgrade and topsoil are both free draining. All planting beds to be 50mm below adjacent hard or grass surfaces. Where more grass is proposed, soil levels to be 10mm below, of flush with adjacent surfaces.

Tree Details

Tree pits to be prepared to the following standards:

Tree pits for container grown trees to be as below, unless otherwise directed:

6-10cm girth 800mm diameter x 1000mm depth
10-15cm girth 1000mm diameter x 1000mm depth
15-20cm girth 1200mm diameter x 1000mm depth

Rooted trees - pit diameter to be 500mm greater than the root ball dimensions, wide enough to accommodate roots when fully spread. Depth of tree pit to be 100mm greater than the depth of the rootball/container and backfilled with 100mm layer of approved clean drainage gravel. Base and sides of all pits to be roughened to allow root penetration. Works to be in accordance with BS 4428 1989 'Transplanting Root-balled Trees'.

Where trees are planted within grassland they shall have a 400mm diameter circle around the base of the trunk to be maintained free from grass and spread with 75mm mulch.

All trees to be watered to where planted with a minimum of 20 litres. Shallow 12 gallons, and then on a weekly basis for the duration of 15 months unless otherwise agreed, except where the weather conditions are very wet.

Tree stakes: All trees (except for semi-ruderal trees) to be single staked - stakes well driven into the ground, minimum 300mm into bottom of tree pit. Stakes to be pressure treated, round (75mm diameter), pointed both ends. Trees to be secured with plastic/chair providing tree free, valued to the stakes. For trees 14-15cm girth or larger 2 no. 100mm diameter stakes required. All stakes to be coated at one end, extending above ground by 1/3 of the height of the ground to the first branch.

Shrub/hedge planting

Shrubs to be planted in pits 150mm wider and deeper than their root spread. Pits to be backfilled with a mixture of topsoil/substrate as above.

Stakes to be a minimum of 300mm from and adjacent hard surface.

Following planting and watering operations, beds to be mulched with 75mm of approved mulch unless otherwise directed.

Grass

Grass to be planted in a minimum of 300mm from and adjacent hard surface.

Establishment cut to all grass areas.

When grass is 50mm high remove any debris, litter and stones and cut grass to between 25-30mm, remove all wirings.

Maintenance

Regular visits shall be made for twelve months following practical completion, to maintain all planted areas in a weed and free from conditions. Minimum number of visits to be:

Tree and Shrub areas min 8 visits per year
Groundcover/shrub areas min 10 visits per year
Grass areas min 12 visits per year (early spring and late summer)

Planting Under Existing Trees

All Arboricultural works to follow good horticultural practice and comply with BS3996 2010 'Tree work. Recommendations'.

Plant under deciduous trees to take place during autumn, whenever possible. This will allow new root during planting chance to establish before tree leaf break in spring.

Where proposed planting is to take place within the Root Protection Zone of existing trees, care must be taken to avoid/minimise disturbance to tree roots.

No machinery to be used in the vicinity of the Root Protection Zone. Any excavations to be by hand digging only.

No spoil building materials are to be stored within the Root Protection Zone.

Where turf or weeds are present beneath the existing trees, remove by hand digging. Care must be taken not to dig too deeply. Remove excess soil etc from woodchuff and return this to planting area.

Where there is substantial weed/turf to be removed apply systemic, non-selective herbicide only to grass/leaves or other appropriate site. Do not allow any weeds to grow. Care to be taken that the woodchuff/spray does not come into contact with the soil area of existing trees/shrubs etc. Root and tree bark unaffected by herbicide application. When all weeds have died, removed by careful hand digging.

Where planting is to be carried out over more than a day, water well and temporarily mulch or line with polyethylene sheet. Any soil areas that are newly cultivated. This will reduce evaporation and keep any exposed roots from drying out.

To excavate planting pits, hand dig pit large enough to accommodate the roots of the proposed under-storey planting. Where possible locate planting pits to avoid any large root (50cm+1) encountered. When hand digging retain as many existing roots as possible.

No roots of 2.0cm in diameter or greater to be cut unless the council tree officer/supervising officer has agreed beforehand. When necessary, small tree roots may be cut through to allow planting pits to be located as limited pruning of smaller roots will not adversely affect the tree. Where roots are to be pruned, use sharp secateurs to cut diagonally to the trunk. Leave an angled wound to be as possible. Add a sprinkling of granular slow release fertiliser as Scotts Emery CRF NPK 11.22 9-04Mg (lighter, compact PAS 100 or similar approved, prior to planting. Application as per manufacturer's instructions).

When planting beneath existing trees, initial work should be carried out in sections near to the tree, working away to the perimeter of the planting pit. Lightly water sections when completed.

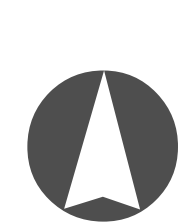
Apply organic mulch to cultivated ground (10-15 cm in depth) taking care to keep mulch away from tree trunks. Review mulch each spring where tree roots are shallow and dense. Water thoroughly when planting is complete, and continue suitable watering regime to ensure the continued thriving of all plants.

Base-mapping taken from Drawing C1124-M2-A38-011 2.5 from C-TAS.

Areas of planting as shown on JA drawings J00382.SLP1-3 Revision A	
Grass verge	135 m ²
Woodland wildflower mix	155 m ²
Ground cover mix	440 m ²
Bulb planting mix	485 m ²
Ornamental hedge mix	275 m ²
Native shrub mix	125 m ²
Native shrub mix	385 m ²
Woodland understory mix	To be agreed on site prior to works commencing/ordering
Woodland tree planting	To be agreed on site prior to works commencing/ordering

WOODLAND UNDERSTOREY/NATIVE SHRUB MIX				
% Mix	Species	Age/Form	Height (cms)	Roots
15	Corylus avellana	1+1; Transplant - seed raised;	40-60	BR
30	Crataegus monogyna	1+1; Transplant - seed raised; branched; 2 breaks	40-60	BR
10	Ilex aquifolium	2L pot. Leader with laterals.	40-60	CG
5	Lonicera periclymenum	Caned; several shoots; 3 breaks	60-80	3L
15	Prunus spinosa	1+1; Transplant - seed raised; branched; 2 breaks	40-60	BR
5	Rosa arvensis	1+0; Seeding; Provenance UK Area 403	40-60	BR
5	Rosa canina	1+1; Transplant - seed raised; Provenance UK Area 304	40-60	BR
15	Sambucus nigra	1+0; Seeding; branched; 2 breaks	40-60	BR

Plant at 1.5m centres. All species group planted at 5-30% per group.



CLIENT
Wood Environment and Infrastructure Solutions
UK Limited

PROJECT
Bristol Airport 12mppa post submission support

TITLE
Soft Landscaping Plan - Planting
Sheet 2 of 3 Revision A

SCALE @ A0	CREATED BY	CHECKED BY
1:100	JS	AP
REFERENCE	REVISION	DATE ISSUED
J00382.SLP2	A	20/3/2019

- Woodland - Exact location of woodland trees and understory mix to be agreed on site prior to works commencing.
- Trees
- Native Hedge
- Ornamental Hedge
- Native Shrub Mix
- Ground Cover Mix
- Bulb Planting
- Meadowmania AM14 for roadside verges or similar approved
- Emorsgate Mix EW1F wildflowers for woodland or similar approved

Revision A - 13/03/19
Base-map updated to most recent drawing (C1124-M2-A38-011 2.5) from CTAS, planting changed to reflect repositioning of fence line.

Soft Landscape Specification

General
It is the responsibility of the design/developer to design foundations and structures to accommodate all proposed and existing trees and shrub planting, with reference made to NBS Standards Chapter 4.2 Building near Trees, Revised 2018 where appropriate.
The developer/contractor should satisfy themselves that trees are a safe distance from drainage runs and services and that no planting falls within service strips.
All landscape contractor shall make themselves aware of all service locations prior to commencing on site works including planting operations.
All planting works to be carried out in accordance with BS5428 1989 Code of Practice for General Landscaping Operations (excluding wet surfaces).
Where any deviance from this specification occurs within a scheme, the contractor shall request the client's written approval from the designer prior to proceeding.

Existing Vegetation.
All trees and hedges which are shown for retention should be inspected for safety by a suitably qualified member of the Arboricultural Association and subject to BS5837 2012 - Trees in relation to design, demolition and construction - recommendations. They should be protected during all stages of construction with temporary fencing in accordance with BS5837 2012, and must comply with all applicable planning conditions. Any tree surgery required shall also be in accordance with BS3998 2010 Tree work Recommendations.
The landscape contractor shall make the Landscape Architect aware of any vigorous weeds (classified under the Wildlife and Countryside Act 1981) that may be present on site at the earliest opportunity.

Trees
The landscape contractor shall satisfy himself as to the suitability and availability of topsoil on site, and if necessary topsoil shall be imported from an approved site. Soil testing to be carried out as required by the Contract Administrator (CA). All topsoil to be in accordance with BS3882 2015 - Specification for topsoil and requirements for use. The depth of topsoil spread shall not normally exceed 300mm (maximum depth 400mm) with suitable leached subsoil providing the remainder of the minimum rooting depth.
Minimum rooting depth shall normally be:
Trees - 600mm depth.
Shrub areas - 450-600mm depth.

Soil Ameliorants
To be applied to newly planted areas unless directed otherwise by the CA.
Agripure Seaview Soilbuilder or similar approved to be incorporated at approximately 10mm to shrub roots, worked into the top 100mm of soil, and 1kg per m² of bare/soil for all plantings. All application rates to be applied as per manufacturers recommendations/instructions. Granular Slow Release Fertiliser (as Scotts Emag CFP 11 22 20) or similar approved to be applied per manufacturers instructions.

Plant Stock
All plant material to be specified in the Plant Schedule, and available for inspection by the Landscape Architect and/or CA.
All plant material shall be in accordance with BS5906 (1990) Nursery Stock Specification for Trees and Shrubs, BS3306-10 (1990) Nursery Stock Specification for Ground cover plants, BS3306-11 (2013) Nursery Stock Specification for Turf and General Purpose, Handling and Stacking Landscaping Plants, Horticultural Trades Association, 2002 and The National Plant Specification - Handling and Establishment Nov. 1990.
Any plant stock to be planted outside the planting season (November to March) unless otherwise agreed to be containerised. All containerised stock to have healthy, well-developed root system within the specified pot size. Where growing on in the nursery is necessary all plant material is to be re-potted to the next approved pot size, re-potted to allow for 15-20% growth per season, and maintained to healthy vigorous growth irrespective of weather conditions.

Planting Specification - proposed tree, shrub and hedge planting.
Timing of trees and shrubs to take place between end of October - March unless otherwise agreed.
All planting areas to be weed free prior to planting. Allow for application of approved broadcast systemic herbicide in line with Health and Safety Regulations (HSE), Control of Pesticide Regulations (HSE) and/or local authority (LHA) and Control of Substances Hazardous to Health (COSHH) 2002. Application to be as per manufacturer's instructions.
Ensure that the substrate and topsoil are both free draining. All planting beds to be 100mm below adjacent hard or grass surfaces. Where mown grass is proposed, soil levels to be 100mm below, of level with adjacent surfaces.
Tree Planting:
Trees to be container grown trees to be as below, unless otherwise directed.
6-10m girth - 100mm diameter x 750mm depth
10-15m girth - 100mm diameter x 800mm depth
Semi-mature - 100mm diameter x 1000mm depth
Rooted trees - pot diameter to be 100mm greater than the root ball dimensions, wide enough to accommodate roots when fully spread. Depth of tree pot to be 100mm greater than the depth of the root ball/container and backfilled with 100mm layer of approved clean drainage gravel. Base and sides of all pots to be lined with polythene. Works to be in accordance with BS 6843:1989 Transplanting Root-balled Trees.
Where trees are planted within grassland they shall have a 400mm diameter circle around the base of the trunk to be maintained free from grass and spread with 75mm mulch.
All trees to be watered in when planted with a minimum of approx. 60 litres of water, and then on a weekly basis for the duration of 12 months maintenance period, except when the weather conditions are very wet.

Tree Stakes: All trees (except for semi-mature trees) to be single staked - stakes well driven into the ground, minimum 300mm into bottom of tree pot. Stakes to be creosote treated, staked 75mm to the stake. For trees 14-16m girth or larger, 2 no. 100mm diameter stakes required. All stakes to be embedded down to give a 150mm height of the ground to the top of the stake.
Shrub/hedge Planting
Shrubs to be planted in 140mm wide and deeper than their root spread. Plants to be backfilled with a mixture of topsoil/erectate as above.
Plants to be a minimum of 300mm from and adjacent hard surface.
All stock to be well watered when planted with approx. 20L of water per m².
Following planting and watering operations, beds to be mulched with 75mm of approved mulch unless otherwise instructed.
Grass
Grass to be planted a minimum of 300mm from the base of a wall/structure, and trained back to adjacent walls, along 2m, same species, 100mm long 8mm deep in the ground either side of the planting requirements as per Shrub/hedge planting.

Grass Planting
All hedgerow trees and whips to be planted in prepared pits 600x400x400mm for hedgerow trees, and 400x200x400mm for whips. Pits to be backfilled with topsoil/erectate as above. All plants to be well firmed. Hedgerow trees to be single staked. All stock to be well watered when planted with a minimum of 4L of water and 10L hedgerow tree prior to applying 75mm depth hard mulch. All trees to be well firmed with proprietary rabbit guards.
Grass Dress
Topsoil for grassed areas to be prepared to a 100mm, all stones over 50mm removed and firmed to achieve a level surface. Grass seedling to comply with BS 4428:1989. Where all grass areas to be covered in a healthy green, seeding to take place during period 1st March - 31st May, or 1st September - 31st October unless otherwise directed.
Soil
Preparation for surfaced areas as for areas of seeded grassland. Turf to conform to BS 5428:1989. Establishment soil to all grass areas.
When grass is 50mm high remove any debris, litter and stones and cut grass to between 25-30mm, remove all debris.
Maintenance
Regular visits shall be made for twelve months following practical completion, to maintain all planted areas in a weed and litter free condition. Minimum number of visits to be:
Tree and Shrub areas min 15 visits per year
Grass/shrub areas min 10 visits per year
Conservation/lowdown meadow min 2 visits per year (early spring and after seed drop).
Maintenance visits to include watering, planting, pest/disease control, litter removal, checking of tree stakes and less re-mulching as required.
All planting beds to be maintained to a minimum depth of medium grade polythene (0.3mm particle size) to a depth of 75mm. All mulch to be pest, disease and weed free and shall not have been treated with any herbicide. Mulch to be spread carefully so as not to cover shoots and foliage and to finish 15mm below adjacent surfaces.
Areas grassed to be cut to achieve a neat and tidy appearance, with a mowing height of 25mm. All airings to be removed from site. Mowing to be suspended if drought or very wet conditions occur.

PLANTING UNDER EXISTING TREES
All Arboricultural works to follow good horticultural practice and comply with BS3998 2010 Tree work Recommendations.
Plant under existing trees to take place during autumn, whenever possible. This will allow new plants to become established before the leaf break in spring.
Where proposed planting is to take place within the Root Protection Zone of existing trees, care must be taken to avoid/minimise disturbance to tree roots.
No machinery to be used in the vicinity of the Root Protection Zone. Any excavations to be by hand digging only.
No open digging materials are to be stored within the Root Protection Zone.
Where turf or waste are present beneath the existing trees, remove by hand digging. Care must be taken not to dig too deeply. Remove excess soil etc from woodland and return this to planting areas.
Where there is substantial wasteful to be removed (e.g. systems, non-selective herbicide only - Glyphosate or similar approved). To be applied as per manufacturers instructions. Care to be taken that the wood/infrastructure does not come into contact with the leaf area of existing trees/shrubs etc. Roots and tree trunks to be protected by such translocated herbicides. When herbicide has been removed by careful hand digging.
When planting is to be carried out over more than 1 day, water well and temporarily shade the tree with polyethylene sheet, any soil areas that are newly cultivated. This will reduce evaporation and keep any exposed roots from drying out.
To excavate planting pits, hand dig pit large enough to accommodate the roots of the proposed under-storey planting. Where possible locate planting pits to avoid any large root (50mm-1m) encountered. When hand digging retain as many existing roots as possible.
No roots of 20mm in diameter or greater to be cut unless the ground tree office/landscape officer has agreed beforehand. Where necessary, small tree roots may be cut through to allow planting pits to be located as desired prior to the start of the planting operation. All cuts to be made at a 45 degree angle. A watering of granular slow release fertilizer as Scotts Emag CFP NPK 11 22 20 80kg/ha, or similar, to be applied prior to planting. Application as per manufacturers instructions.
When clearing beneath existing trees, initial work should be carried out in sections near to the trees, working away in the perimeter of the planting pit. Lightly water sections when completed.
Apply organic mulch to cultivated ground (10-15mm in depth) taking care to keep mulch away from tree trunks. Remove mulch each spring where tree roots are shallow and dense. Water thoroughly when planting is complete, and continue suitable watering regime to ensure the continued thriving of all plants.

Base-mapping taken from Drawing C1124-M2-A38-011 2.5 from C-TAS.

PROPOSED PLANTING

Trees

PROPOSED FORMAL TREES WITHIN HEDGROW PLANTING AT AIRPORT ENTRANCE

Code	Species	Form	Girth (cms)	Height (cms)	Min. No.	Branch	Roots
AP	Acer platanoides 'Fariakes Green'	Extra Heavy Standard (ex 3x; clear stem 200cm;	16-18	450-625	5		RB

Acer platanoides 'Fariakes Green' - Final size approx. 10-15m height
Trees to be planted centrally within proposed hedgerow, at 10m spacing.

Hedging

PROPOSED ORNAMENTAL HEDGROW PLANTING AT AIRPORT ENTRANCE

% mix	Species	Height (cms)	Roots	Specification
100	Prunus laurceraceras rotundifolia	80-100	RB	Bushy, 7 breaks

To be planted in a single row, at 2 per linear metre
To be maintained as a formal clipped hedge - Height approx. 1.5m, width 1.2m.

PROPOSED NATIVE HEDGE MIX ALONG A38

% mix	Species	Age/ form	Height (cms)	Roots	Specification
5	Acer campestre	1+1	40-60	BR	-
10	Carpinus betulus	1+1	60-80	BR	Transplant - seed raised
5	Cornus sanguinea	1+1	40-60	BR	Branched, min. 2 breaks
5	Corylus avellana	1+1	40-60	BR	Branched, min. 2 breaks
40	Crataegus monogyna	1+1	40-60	BR	-
2.5	Euonymus europaeus	1+1	40-60	BR	Branched, min. 3 breaks
10	Ilex aquifolium	2 ltr	40-60	C	Lead + lats
5	Ligustrum vulgare	1+1	40-60	BR	Branched, min. 3 breaks
5	Prunus spinosa	1+1	40-60	BR	Branched, min. 2 breaks
2.5	Rosa canina	1+0	40-60	BR	Branched
5	Taxus baccata	-	40-60	3L	Leaders; furnished to base
5	Viburnum opulus	1+1	40-60	BR	Branched, min. 2 breaks

Plant in a double staggered row with 450mm between rows and 450mm between plants. Plant species randomly throughout the Crataegus matrix. To be maintained at approx. 1.5m height, 1.2m width.

Groundcover planting

% mix	Species	Min pot size	Height (cms)	Specification
33.3	Hedera helix	2 ltr	40-60	Min. 2 breaks from pot level
33.3	Rubus 'Betty Ashburner'	2 ltr	40-60	Min. 2 breaks from pot level
33.3	Vinca minor	2 ltr	20-30	5/6 shoots from pot level

Planted at a density of 4 plants per m² in random species groups of 5, 7 or 9, avoiding obvious straight lines

Bulbs

BULB PLANTING

Code	Species	Min. circumference	Planting	Planting time
CS	Crocus sativus	7-8 cms	Spacing 5 cms	Autumn
GN	Galanthus nivalis	4/5 cms	Spacing 5 cms	Spring/Autumn
NP	Narcissus pseudonarcissus 'Tobularis'	4-5 cms	Spacing 10-15cms	Autumn
NT	Narcissus 'Tete a Tete'	8-10 cms	Spacing 10 cms	Autumn

To be planted in naturalistic swathes, unless otherwise specified. Unless otherwise indicated bulbs to be planted at approximately 3 times the height of the bulb.

Woodland Planting

Code	Species	Form	Height (cms)	Root
AC	Acer campestre	1+1 Transplant. Seed raised	60-80	BR
AP	Acer platanoides	1+1 Transplant - seed raised	60-80	BR
IA	Ilex aquifolium	SL Leader with laterals	60-80	CG
MS	Malus sylvestris	1+1 Transplant. Seed raised	60-80	BR
PA	Prunus avium	1+1 Transplant. Seed raised	60-80	BR
QR	Quercus robur	1+1 Transplant. Seed raised	60-80	BR
TB	Taxus baccata	SL Leader furnished to base.	60-80	CG

To be planted as indicated on planting drawings.

WOODLAND UNDERSTOREY/NATIVE SHRUB MIX

% Mix	Species	Age/form	Height (cms)	Roots
15	Corylus avellana	1+1 Transplant - seed raised; branched; 2 breaks	40-60	BR
30	Crataegus monogyna	1+1 Transplant - seed raised; branched; 2 breaks	40-60	BR
10	Ilex aquifolium	2L pot. Leader with laterals.	40-60	CG
5	Lonicera periclymenum	Caned; several shoots; 3 breaks	60-80	3L
15	Prunus spinosa	1+1 Transplant - seed raised; branched; 2 breaks	40-60	BR
5	Rosa arvensis	1+0 Seeding; Provenance UK Area 403	40-60	BR
5	Rosa canina	1+1 Transplant - seed raised; branched; 2 breaks	40-60	BR
15	Sambucus nigra	1+0 Seeding; branched; 2 breaks	40-60	BR

Plant at 1.5m centres. All species group planted at 5-30No. per group.

Areas of planting as shown on JA drawings J00382.SLP1-3 Revision A	
Grass verge	135 m ²
Woodland wildflower mix	155 m ²
Ground cover mix	440 m ²
Bulb planting mix	485 m ²
Ornamental hedge mix	275 m ²
Native hedge mix	125 m ²
Native shrub mix	385 m ²
Woodland understory mix	To be agreed on site prior to works commencing/ordering
Woodland tree planting	To be agreed on site prior to works commencing/ordering

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