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Altyapı Yatırımları Genel Müdürlüğü

Istanbul North Rail Crossing Project (INRAIL)

Biodiversity Management Plan

September 2026

1 Introduction

1.1 Project Description

The Istanbul North Rail Crossing Project (hereafter “INRAIL”, or “the Project”) is a major infrastructure initiative intended to create a new, high-capacity railway connection between the Asian and European sides of Istanbul. The scheme proposes a 127-kilometre electrified dual-track corridor extending from Çayırova to Çatalca, crossing the Bosphorus via the reserved railway section on the Yavuz Sultan Selim Bridge, and is planned to be developed through four civil works lots, together with a corridor-wide signalling and electrification contract. Its development responds to the current limitations of the existing cross-Bosphorus rail system, offering an additional route capable of supporting both freight and passenger traffic at significantly higher volumes.

The Project also includes freight transfer hubs, transformer stations, emergency shafts, ventilation facilities, and construction camps. The new line is also designed to connect directly with Istanbul Airport and Sabiha Gökçen Airport, allowing seamless integration of rail services with the region’s major air transport hubs and enhancing the overall resilience and efficiency of national logistics networks. The Project corridor traverses and/or passes in proximity to a range of natural and modified habitats, including forest, riparian and other biodiversity-sensitive areas, with particular importance attached to ecological connectivity within the North Marmara Forest landscape. These biodiversity sensitivities and the associated mitigation and management requirements are addressed through the Project ESIA and ESMP.

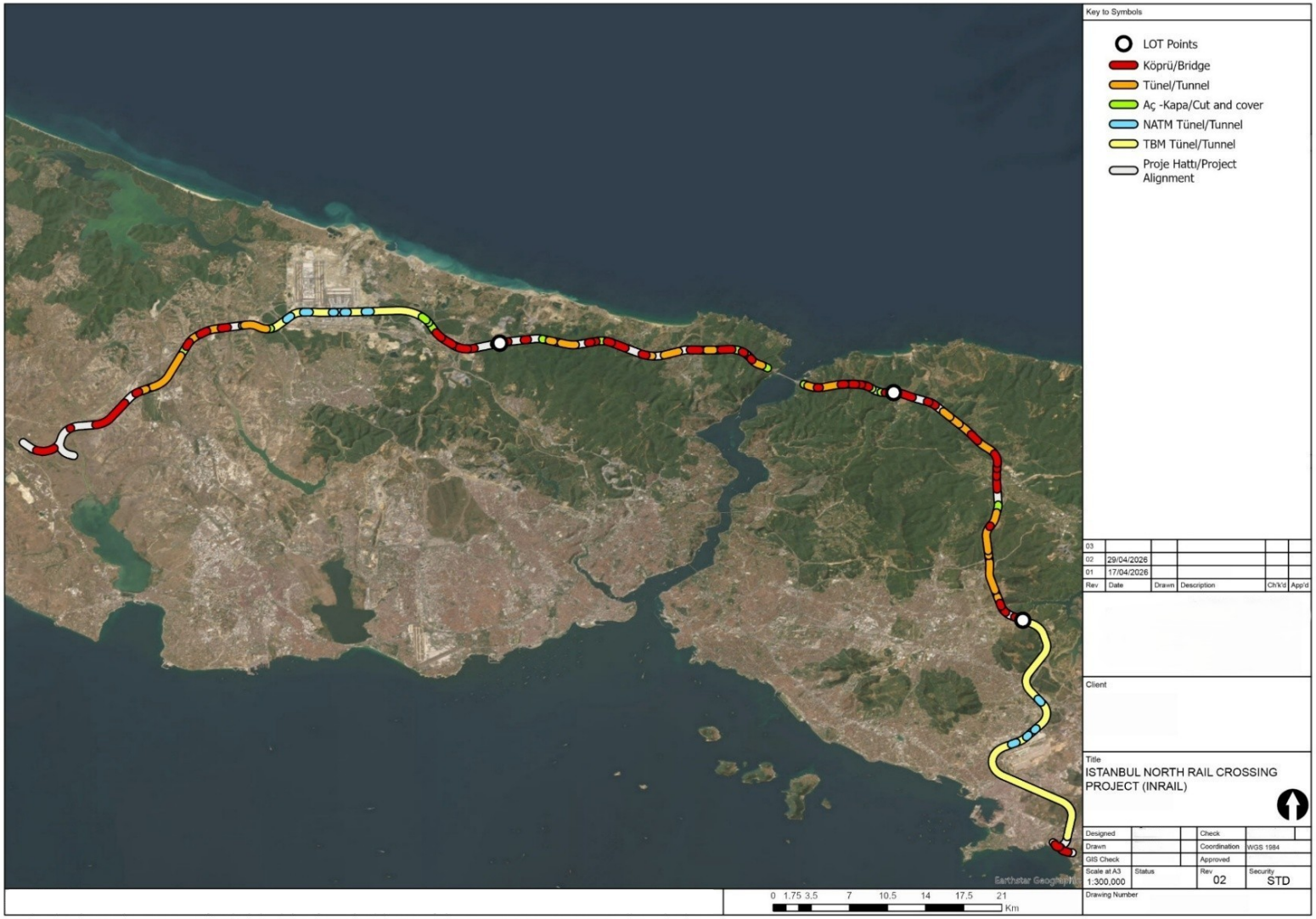


Figure 1 Project route and design specifics (all lots)

1.2 Purpose of the Study

Following preparation of the Project ESIA, additional biodiversity studies were undertaken to supplement and further develop the biodiversity baseline and impact assessment, including additional baseline surveys, Critical Habitat (CH) assessment and further screening and assessment of biodiversity features of conservation importance, and supplementary biodiversity impact assessment. The findings of these studies have been incorporated, as relevant, into the Project's biodiversity management framework and provide supporting technical inputs to this Biodiversity Management Plan (BMP) Biodiversity Action Plan Template included as an Appendix to this BMP.

This document provides the overarching framework for biodiversity mitigation, management, monitoring and reporting for the Project, in accordance with the Project ESIA, ESMP, the World Bank Environmental and Social Framework (ESF), particularly Environmental and Social Standard 6 (ESS6), and applicable Good International Industry Practice (GIIP). These commitments are derived from the outcomes of the Project ESIA and the supplementary biodiversity studies, including the Critical Habitat and PBF assessment. It also aims to address biodiversity management and monitoring requirements identified through these assessments. This plan outlines potential impacts and describes how these should be avoided, mitigated, managed, and monitored. The BMP applies the mitigation hierarchy and establishes the measures necessary to avoid and minimise biodiversity impacts, restore affected biodiversity where appropriate, and address significant residual impacts in accordance with ESS6 and the applicable Project E&S instruments. AYGM retains overall responsibility for Project-level E&S oversight, while implementation of applicable site- and lot-specific biodiversity measures rests primarily with the relevant D+B Contractors under CSC supervision.

This document has been prepared to define the overarching biodiversity management approach for the Project and to guide the Design Build Contractors in the development of Lot-specific Biodiversity Management Plans. These plans are to be updated based on finalised designs and the findings of the Lot-specific ESIA process, reflecting the evolving understanding of Project design and site conditions during construction and operation, and informed by new information as it becomes available, such as pre-construction surveys or stakeholder inputs. The Lot-specific BMPs shall be consistent with this BMP, the Project ESIA and ESMP, the Employer's Requirements, and any applicable biodiversity requirements identified through the detailed design and Lot-specific assessment process. The relevant D+B Contractor shall also prepare and implement a Lot-specific Biodiversity Action Plan (BAP).

1.3 Roles and Responsibilities

The Project is implemented under a lot-based structure, with the railway corridor divided into four construction Lots to be delivered by separate Design and Build (D+B) Contractor(s). Roles and responsibilities are therefore defined both at Project level and per Lot, reflecting the division of works and contractor scope. The allocation of responsibilities for each Lot is summarised in Table 1.

Table 1 Roles and Responsibilities

Roles	Responsibilities
AYGM PIU	• The implementation of the project in accordance with the Employer's Requirements, applicable Project E&S instruments and relevant Project commitments. • Provide overall oversight of the implementation of the BMP, including habitat and species conservation measures. • Oversee the implementation of the BMP by D+B contractors and subcontractors, ensuring that all mitigation and monitoring measures are applied effectively. • Coordinate and oversee stakeholder engagement activities, including biodiversity-related engagement, in accordance with the Stakeholder Engagement Plan (SEP). • Coordinate and implement the E&S handover to TCDD prior to operation, including transfer of operation and maintenance (O&M) procedures, monitoring requirements, biodiversity-related infrastructure obligations (e.g. barriers and wildlife crossings), and any outstanding biodiversity-related monitoring or management requirements.
Project Management Consultant (PMC)	• Provide technical and advisory support to AYGM PIU on all environmental and social matters throughout the Project lifecycle. • Support AYGM PIU in coordinating and technically reviewing Lot-specific BMPs, BAPs and other biodiversity-related documentation prepared by the D+B Contractors. • Ensure effective coordination of BMP activities among the PIU, CSC, PIOC, and D&B Contractor(s). • Support AYGM PIU in the overall coordination and review of biodiversity implementation and performance across the Lots. • Support institutional capacity building and on-the-job training for PIU staff and Contractors.
Construction Supervision Consultant (CSC)	• Supervise and verify that the D+B Contractor(s) implements this BMP, the applicable Lot-specific BMP/BAP requirements, national legislation, the Project E&S instruments and applicable ESS6 requirements. • Supervise and monitor compliance with the activities and implementation carried out by the LOT-specific Biodiversity and Ecology Specialist. • Provide supervision of the Contractor(s) for implementing mitigation measures and issue requests and instructions for resolving environmental non-conformances • Identify non-compliance issues, issue corrective action requests, and follow up until closure. • Maintain site visit records, photographic evidence, monitoring logs, and follow-up action documentation

Roles	Responsibilities
Project Implementation Oversight Consultant (PIOC)	● Provide an independent advisory and assurance role, reporting directly to AYGM and the World Bank. ● Conduct independent E&S audits and reviews in accordance with its scope of services. ● Independently review the adequacy and effectiveness of biodiversity implementation by the D+B Contractor(s). ● Review the quality, assumptions and conclusions of Lot-specific biodiversity assessments, plans and monitoring outputs. ● Track closure of non-compliances but do not issue instructions to contractors. ● Independently verify the biodiversity monitoring results collected by the D&B Contractor(s) and reported to AYGM PIU.

Roles	Responsibilities
Design and Build (D&B) Contractor(s)	• Execute Lot-specific construction. • Implement and oversee biodiversity-related measures in accordance with national environmental legislation, ESS6, the Employer's Requirements and applicable Project E&S instruments. • Prepare Lot-specific ESIA, C-ESMP (including method statements) and relevant sub-plans (including the Lot-specific Biodiversity Management Plan and, where required, Biodiversity Action Plan), based on final design and updated field conditions. • Implement the BMP and all biodiversity-related mitigation, restoration and monitoring measures during pre-construction, construction and the construction-to-operation handover period, as applicable. • Implement all biodiversity protection and habitat conservation measures, including those related to Critical Habitat, Natural Habitat, seasonal restrictions, and species protection. • Undertake required biodiversity baseline and pre-construction surveys where required to inform design and mitigation measures. • Integrate biodiversity-related design refinements and mitigation measures prior to and during construction. • Implement site reinstatement, rehabilitation and handover requirements at the end of construction in line with approved plans. • Ensure coordination among relevant specialists where activities may result in cumulative or corridor-wide impacts. • Undertake supplementary surveys, where required, and assess feasible alternative courses of action if monitoring results, site conditions, or construction activities indicate unanticipated or potential impacts, and implement appropriate measures in coordination with the PIU and relevant specialists. • Notify AYGM PIU and the Engineer of biodiversity-related incidents in accordance with the Project incident notification and reporting requirements, and initiate appropriate response and corrective actions. • Recruit and mobilise qualified E&S personnel and specialist support as required, including the Biodiversity & Ecology Specialist(s) specified in the Employer's Requirements and any additional specialist expertise required by the Lot-specific assessments or site conditions. • Ensure that all site staff and subcontractors receive biodiversity induction training. • Prepare and implement a Lot-specific Invasive Alien Species Management Procedure, as part of or annexed to the Lot-specific BMP, where required by the applicable Project E&S instruments and Lot-specific assessment findings. The procedure shall address prevention, early detection, control, removal, disposal, monitoring and reporting of invasive alien species associated with Project activities.

Roles	Responsibilities
Biodiversity & Ecology Specialist under D+B Contractor **(Lots and Minimum Number of Personnel: Lot 1 :1 person, Lot 2 :1 person, Lot 3 :2 persons, Lot 4 :1 person)**	● Implementation of Lot-specific Biodiversity and Ecology Specialist activities will be supervised by CSC, with overall Project-level oversight provided by AYGM PIU, with PMC providing technical and coordination support and PIOC providing independent review and assurance. ● Where specific biodiversity surveys, assessments or mitigation measures require additional specialist expertise, the D+B Contractor shall engage suitably qualified specialist support as necessary, consistent with the Employer's Requirements, the Lot-specific ESIA and applicable Project E&S instruments. ● Lead on-site coordination of all biodiversity activities during pre-construction and construction. ● Implement BMP measures, including surveys, monitoring and mitigation actions in coordination with other biodiversity specialists such as flora and bird experts. ● Identify biodiversity features (e.g. nests, habitats, fauna) and implement required measures with support from biodiversity specialists. ● Coordinate daily implementation with site teams and biodiversity specialists. ● Implement adaptive management measures in line with this BMP, Lot-specific BMPs, applicable BAPs and ESMP. ● Support site-level verification of design measures during construction. ● Inform site teams and specialists on implementation requirements.
Marine Environmental Specialist under D+B Contractor **(Lots and Minimum Number of Personnel: only Lot 3: 1 person)**	● Coordination of construction activities to be carried out in areas where the Project intersects with the marine environment during the construction phase. ● Implementation of Lot-specific Marine Environmental Specialist activities will be supervised by CSC, with overall Project-level oversight provided by AYGM PIU, with PMC providing technical and coordination support and PIOC providing independent review and assurance. ● Implement the necessary measures to prevent marine pollution, with the support of the Project's specialists, particularly the Biodiversity & Ecology Specialists and Environmental Specialists. ● Implementation of the necessary actions to avoid adverse impacts on aquatic habitats. ● Provide technical support in the preparation of project-related documents, reports and management and action plans. ● Inform site teams and specialists on implementation requirements.

1.4 National Legislation

The Project shall comply with the applicable national legislation relating to biodiversity conservation, protected areas, forests, wetlands, wildlife, fisheries, invasive alien species and natural resource management, together with the relevant requirements of the Project ESIA, ESMP and ESS6.

Table 2 National Legislation on Biodiversity

Legislation (Official Gazette Date/Number - Last Revision Date)	National Strategy Documents
• Law on National Parks (11.08.1983/18132 - 09.07.2018) • Land Hunting Law (11.07.2003/25165 - 28.10.2020) • Law on Animal Protection (01.07.2004/25509 - 13.12.2010) • Regulation on the Prevention and Management of the Introduction and Spread of Invasive Alien Species (21.02.2026 / 33175) • Regulation on the Protection of Wetlands (04.04.2014/28962 - 23.06.2022) • Regulation for Implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (27.12.2001/24623 - 20.07.2019) • Regulation on Protection of Wildlife and Wildlife Development Areas (08.11.2004/25637) • Law on Protection of Cultural and Natural Assets (23.07.1983/18113 - 15.06.2022) • Regulation on Collection, Protection and Usage of Plant Genetic Resources (19.07.2012/28358) • Law on Fisheries (04.04.1971/ 13799 - 17.02.2021) • Environment Law (11.08.1983 / 18132 - 15.06.2022) • Forestry Law (08.09.1956 / 9402 - 25.12.2021) • Law on Pasture (28.02.1998 / 23272 - 18.01.2019) • Coastal Law (17.04.1990 / 20495 - 28.10.2020)	• National Plan on on-site Protection of Plant Genetic Diversity (1998) • National Environmental Action Plan (1999) • National Forestry Program (2004) • National Rural Development Strategy (2024-2028) • National Biodiversity Action Plan (2018-2028) • Climate Change Adaptation Strategy and Action Plan (2024-2030)

1.5 International Conventions and Agreements

International agreements, conventions, and protocols regarding the protection of habitats and species, to which Türkiye is a Party and which are relevant to the Project, are listed below:

- The Convention on the Conservation of European Wildlife and Natural Habitats (BERN) (1984)
- The Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR) (1994)
- The UN Convention on Biological Diversity (1997)
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1996)

1.6 Project Standards

The Project will be implemented in accordance with the World Bank Environmental and Social Framework (ESF), the applicable Project E&S instruments, and the Employer's Requirements. For biodiversity, the principal applicable standard is Environmental and Social Standard 6 (ESS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources. This BMP has been prepared to support implementation of the Project's biodiversity-related requirements under ESS6 throughout Project design, construction and the applicable handover and operational phases.

The impact assessment and critical habitat assessment are carried out in accordance with the following Project requirements and supporting references:

- World Bank ESF- ESS1: Assessment and Management of Environmental and Social Risks and Impacts

  - ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

  - World Bank Guidance Note for Borrowers – ESS6

- International Union for Conservation of Nature (IUCN) Red List of Threatened Species
- Good International Industry Practices (GIIPs)

In accordance with ESS6, the Project's biodiversity management approach aims to:

- Protect and conserve biodiversity and habitats;
- Apply the mitigation hierarchy to avoid, minimise, mitigate and, where appropriate, compensate for significant residual biodiversity impacts;
- Maintain ecosystem services and ecological functions relevant to the Project and affected communities;
- Promote the sustainable management of living natural resources consistent with ESS6 and applicable GIIP; and
- Apply the specific requirements of ESS6 for modified, natural and critical habitats, including the additional conditions applicable where Project activities may affect critical habitat.

1.7 Baseline Review and Previous Works

Baseline review of the Project is based on environmental and social studies undertaken for the initial ESIA between 2023 and 2025, with desk-based review, GIS analysis, and biodiversity field surveys. Following preparation of the initial ESIA, a gap analysis and supplementary biodiversity fieldwork were undertaken in March–April 2026 to further develop the biodiversity baseline and impact assessment. These studies included additional biodiversity assessment and Critical Habitat Assessment and have been incorporated, as relevant, into the Project's updated biodiversity baseline and management framework.

The supplementary biodiversity assessment applied indicative receptor-specific study areas of 500 m for flora, 2 km for terrestrial fauna, including non-bat mammals, reptiles and amphibians, and 5 km for birds and bats. These study areas may be subject to revision and will be re-evaluated once Associated Facilities are identified and the Project design is finalised, as their locations are not yet defined and may fall outside the current study areas; site-specific E&S assessments will therefore be required at the Lot-specific ESIA stage.

This BMP consolidates the relevant baseline information and assessment outcomes and sets out the measures needed to avoid, minimise, restore and, where required, address residual biodiversity impacts, together with assigned responsibilities consistent with ESS6, the Project ESIA, ESMP and the Employer's Requirements. Results are summarised in Table 3 and Table 4.

The Project-level biodiversity baseline and the features presented in Tables 3 and 4 are provided as supporting technical information for the Lot-specific assessment and management process. Their inclusion at Project level does not by itself confirm that the relevant feature will be affected by a particular Lot or that a specific mitigation, compensation or Biodiversity Action Plan measure is required. The relevance of each feature shall be reviewed and, where necessary, verified or updated based on the final design, confirmed Project footprint, Lot-specific surveys, site conditions and seasonal variability.

Table 3: Critical Habitat Features and Relevant Biodiversity Areas Identified through the Biodiversity Assessment

Scientific Name	IUCN	Lot Area
KBA		

Scientific Name		IUCN	Lot Area
Bosphorus KBA		-	Lot 3
Southern Çatalca Peninsula KBA		-	Lot 4
Büyükçekmece Lake KBA		-	Lot 4
Terkos Basin KBA		-	Lot 4
Bird	**Common Name**	**Global / National***	
Aquila heliaca	Eastern Imperial Eagle	VU / EN	Lot 4
Buteo buteo	Common Buzzard	LC / -	
Ciconia ciconia	White Stork	LC / -	
Ciconia nigra	Black Stork	LC / -	
Clanga pomarina	Lesser Spotted Eagle	LC / EN	
Pernis apivorus	European Honey-buzzard	LC / NT	

Table 4: Biodiversity Features of Conservation Importance

Scientific Name	Conservation Status / Source	Lot Area**
KBA		
Terkos Basin KBA		Lot 4
Bosphorus KBA		Lot 3 - 4
Küçükçekmece Basin KBA		Lot 4
Pendik Valley KBA		Lot 1
Şile Coast KBA		Lot 2
Habitats		
B3 Rock cliffs, ledges and shores, including the supralittoral	-	Lot 3
C1.2 Permanent mesotrophic lakes, ponds and pools	-	Lot 2, Lot 3
C2.3 Permanent non-tidal, smooth-flowing watercourses	LC	Lot 2, Lot 3
E3.4 Moist or wet eutrophic and mesotrophic grassland	EN	Lot 1, Lot 3
F5.3 Pseudomaquis	-	
G1.1 Riparian and gallery woodland, with dominant Alnus, Betula, Populus or Salix	NT	Lot 4

Scientific Name		Conservation Status / Source	Lot Area**
G1.A Meso- and eutrophic Quercus, Carpinus, Fraxinus, Acer, Tilia, Ulmus and related woodland		NT	Lot 2, Lot 3, Lot 4
G3.F Highly artificial coniferous plantations		-	All Lots
G5.8 Recently felled areas		-	-
Flora	**Common Name**	**Global / TRDB**	
Centaurea hermannii		DD / EN	Lot 4
Cirsium byzantinum (syn. Cirsium polycephalum)		- / CR	Lot 4
Symphytum tuberosum subsp. nodosum		- / VU	Lot 4
Ornithogalum pascheanum		- / EN	Lot 1-2-3
Galanthus plicatus subsp. byzantinus		NE / -	Lot 4
Lathyrus undulatus		EN / VU	Lot 2
Bird	**Common Name**	**Global / National***	
Ardea alba	Great White Egret	LC / EN	
Aythya ferina	Common Pochard	VU / VU	
Aythya nyroca	Ferruginous Duck	NT / EN	
Branta ruficollis	Red-breasted Goose	VU / VU	
Calidris ferruginea	Curlew Sandpiper	VU / -	
Chlidonias hybrida	Whiskered Tern	LC	
Circus macrourus	Pallid Harrier	NT / CR	
Clanga clanga	Greater Spotted Eagle	VU / VU	
Falco vespertinus	Red-footed Falcon	VU / -	
Milvus migrans	Black Kite	LC / EN	
Neophron percnopterus	Egyptian Vulture	EN / VU	
Phoenicopterus roseus	Greater Flamingo	LC / EN	
Platalea leucorodia	Eurasian Spoonbill	LC / EN	
Plegadis falcinellus	Glossy Ibis	LC / EN	
Pluvialis squatarola	Grey Plover	VU / -	
Streptopelia turtur	European Turtle-dove	VU / VU	

Scientific Name		Conservation Status / Source	Lot Area**
Thalasseus sandvicensis	Sandwich Tern	LC / EN	
***Mammal* (non-Bat)**	**Common Name**	**Global / EU / Mediterranean**	
Canis lupus	Grey Wolf	LC / LC / LC	
Lutra lutra	Eurasian Otter	NT / NT / NT	
Vormela peregusna	Marbled Polecat	VU / VU / VU	
Oryctolagus cuniculus	European Rabbit	EN / NT	
Spermophilus citellus	European Ground Squirrel	*EN* / EN / VU	
Bat	**Common Name**	**Global / EU / Mediterranean**	
Rhinolophus ferrumequinum	Greater Horseshoe Bat	NT	Lot 4
Rhinolophus hipposideros	Lesser Horseshoe Bat	NT	Lot 4
Rhinolophus euryale	Mediterranean Horseshoe Bat	NT / VU / VU	Lot 4
Rhinolophus blasii	Blasius's Horseshoe Bat	LC / NT / VU	Lot 4
Rhinolophus mehelyi	Mehely's Horseshoe Bat	VU / VU / EN	Lot 4
Myotis myotis	Greater Mouse-eared Bat	LC	All Lots
Myotis blythii	Lesser Mouse-eared Myotis	LC / NT / VU	Lot 3, Lot 4
Myotis bechsteinii	Bechstein's Bat	NT / NT / VU	Lot 3, Lot 4
Myotis daubentonii	Daubenton's Bat	LC	Lot 3, Lot 4
Myotis capaccinii	Long-fingered Bat	VU / VU / VU	Lot 3, Lot 4
Myotis alcathoe	Alcathoe Whiskered Bat	NT	Lot 3, Lot 4
Myotis emarginatus	Geoffroy's Bat	LC	Lot 3, Lot 4
Nyctalus lasiopterus	Giant Noctule	VU / NT / VU	Lot 3, Lot 4
Barbastella barbastellus	Barbastelle Bat	NT / NT / VU	Lot 2, Lot 3, Lot 4
Miniopterus schreibersii	Schreiber's Bent-winged Bat	VU / NA / VU	Lot 2, Lot 3
Reptile		**Global**	
Testudo graeca	Common Tortoise	VU	

Scientific Name		Conservation Status / Source	Lot Area**
Testudo hermanni	Hermann's Tortoise	VU	
Emys orbicularis	European Pond Turtle	NT	
Invertebrate		**Global**	
Gomphus flavipes	Syrian Clubtail	LC	

*Kirwan et al (2008) The Birds of Turkey The Distribution, Taxonomy and Breeding of Turkish Birds.
**Fauna features' Lot areas not given for their mobility

2 Methodology

The process of BMP preparation includes the stages presented in Figure 2. The methodology draws on the Project ESIA, supplementary biodiversity studies and the applicable requirements of ESS6, with particular consideration of natural and critical habitats and application of the mitigation hierarchy.



Figure 2 Process's stages of BMP

The assessment and management approach for biodiversity, including natural and critical habitats, follows the applicable requirements of ESS6 and the biodiversity-related requirements established in the Project ESIA, ESMP and Employer's Requirements.

Mitigation hierarchy has been considered for mitigation measures as avoidance, minimisation, restoration and offset (Figure 3). Avoidance and minimisation measures prevent or reduce impacts, while restoration addresses affected biodiversity where impacts could not be fully avoided or minimised. Compensation or biodiversity offsets may be considered only where significant residual impacts remain after application of avoidance, minimisation and restoration measures, and subject to the applicable Project requirements and approvals. The mitigation hierarchy is explained in detail in Table 5.

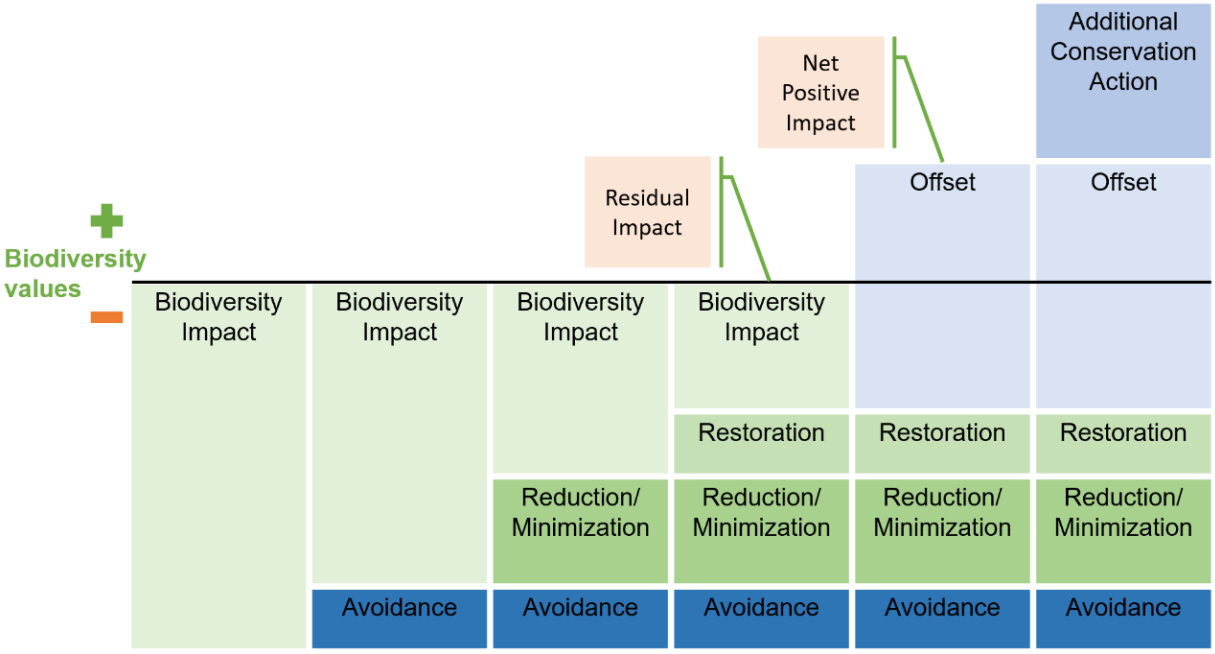


Figure 3 Mitigation Hierarchy.

Impacts can be further reduced through project design to minimise impacts on biodiversity-sensitive areas. Avoidance of sensitive biodiversity features should be considered as a priority during design and construction planning, where feasible. Where this is not possible, on-site impacts can be minimized through project infrastructure placement and project design. Further impact reduction may include on-site restoration. Where significant residual biodiversity impacts remain after application of the mitigation hierarchy, compensation or offset measures may be considered in accordance with ESS6, the Employer's Requirements and the applicable approval process.

Table 5: Mitigation hierarchy

Mitigation way	Explanation
Avoidance	The first and most crucial phase in the hierarchy of mitigation is avoidance. It is based on actions taken to foresee and prevent biodiversity impacts. Biodiversity impacts/risks should be detected early in the project planning stages for avoidance to be effective. Effective avoidance can be achieved through project design (to situate infrastructure and choose designs that avoid impacts), scheduling (to ensure the timing of project activities is favourable for biodiversity), and site selection where applicable.
Minimisation	Minimisation refers to actions taken to reduce the duration, intensity, and/or extent of impacts that cannot be totally avoided. Early planning and the development of design alternatives can help identify potential minimisation methods. Measures may be applied during relevant Project phases, as appropriate.
Restoration	Restoration refers to actions intended to restore certain biodiversity features or ecosystem services damaged by Project impacts that could not be fully avoided or minimised. Restoration measures may include reinstatement or rehabilitation of temporarily disturbed habitats and other appropriate site-specific measures identified through the Lot-specific assessment and management process.
Offset	Offsets are measures that may be considered to address significant residual biodiversity impacts that cannot be avoided, minimised or adequately addressed through restoration. Any biodiversity offset requirements would be determined based on the assessment of residual impacts and would be subject to the applicable Project requirements and approval by the Employer and the World Bank.

3 Biodiversity Management

The overall aims of this BMP together with the associated objectives are provided in Table 6. These aims may be subject to refinement based on detailed design, Lot-specific assessments, updated biodiversity information and the applicable Project E&S requirements.

Table 6: Aims of Biodiversity Management Plan

Aim Ref. No	Description of Aims	Associated Objectives
1	To minimise impacts to biodiversity during construction and operation	a) Maintain connectivity between fragmented habitats where relevant and feasible b) Minimise the extent of vegetation clearance in natural habitats c) Protect the aquatic environment during construction works d) Minimise the construction footprint and associated direct biodiversity impacts through appropriate siting and design, where feasible e) Raise awareness among Project personnel and relevant stakeholders on biodiversity and conservation priorities
2	Avoid and minimise adverse impacts on protected and internationally recognised areas of biodiversity importance, including Key Biodiversity Areas, as applicable	a) Minimise disturbance outside approved Project work areas and facilities b) Apply appropriate restoration or other mitigation measures for affected habitats, where required in accordance with the mitigation hierarchy c) Develop appropriate measures to reduce collision risk for bird species, where relevant
3	To manage significant biodiversity impacts in accordance with ESS6 and the mitigation hierarchy	a) Minimise loss of important habitats b) Minimise impacts to important flora and fauna c) Manage risk of introduction or spread of invasive species d) Address significant residual biodiversity impacts, where identified, in accordance with ESS6 and the applicable Project requirements

4 Biodiversity Management Actions

This plan is a living document providing the Project-level framework for Lot-specific ESIAs which will be prepared by the Design and Build Contractors based on the final design and Lot-specific conditions. The findings of those assessments will be used, where relevant, to refine and update the Lot-specific biodiversity management and monitoring actions to be implemented under the relevant Lot-specific BMP to address spatial variation along the corridor.

It sets out the framework for updating biodiversity information where necessary, including through supplementary ecological surveys, and consideration of relevant seasonal or site-specific constraints, where identified through the Lot-specific assessment process.

The following content summarises the principal biodiversity management actions relevant to Project implementation, including measures applicable during pre-construction and construction, together with associated monitoring and reporting requirements.

It provides a common framework for considering biodiversity across the Lots, including Project Facilities and Associated Facilities, as applicable, while allowing Lot-specific measures to be refined based on final design, site conditions and the relevant E&S assessments.

The impacts and related management actions are given in Table 7.

Table 7 Biodiversity Management Actions

Potential Impact / Risk	Biodiversity Management Actions	Responsibility	Monitoring / Verification
Detailed Design and Construction Phase			
Habitat loss, fragmentation and disturbance to ecological connectivity	Apply the mitigation hierarchy during detailed design and construction planning, giving priority to avoidance and minimisation of impacts on natural, critical and other biodiversity-sensitive habitats. Minimise the permanent and temporary Project footprint and unnecessary vegetation clearance. Review identified ecological connectivity areas during detailed design and consider the location and configuration of bridges, culverts, underpasses, tunnel sections and other Project structures in relation to fauna movement, where relevant. Existing landscape connectivity and adjacent infrastructure, including existing crossing opportunities, should be taken into account. Temporary work areas, access arrangements and other construction facilities should be planned to minimise additional habitat fragmentation and disturbance.	D+B Contractor(s), under CSC supervision	Design review; Lot-specific biodiversity assessment; site inspections; habitat-condition observations; relevant connectivity/fauna monitoring
Impacts on flora and vegetation	Minimise vegetation clearance and disturbance outside approved work areas. Consider the location of flora of conservation importance identified through previous surveys when planning final work areas and temporary facilities. Undertake pre-construction ecological checks or surveys where required by the Lot-specific assessment and seasonal detectability of relevant species. Where flora of conservation importance may be affected, first consider avoidance or micro-siting and, where appropriate, determine suitable protection, collection, translocation, propagation or restoration measures based on confirmed site conditions and specialist advice. Suitable topsoil should be retained and reused where appropriate to support reinstatement and revegetation.	D+B Contractor(s), under CSC supervision	Pre-construction survey/check records; vegetation-clearance inspections; flora observations; site records; restoration/revegetation monitoring
Disturbance to terrestrial fauna	Minimise disturbance, injury and mortality of terrestrial fauna during vegetation clearance, earthworks, excavation, traffic movement and other construction activities. Undertake ecological checks in biodiversity-sensitive areas where required. Where relevant, manage open excavations, trenches, drainage features and other construction elements to reduce fauna entrapment and allow safe escape. Construction personnel should be made aware of relevant wildlife protection requirements. Hunting, trapping or intentional harm to wildlife by Project personnel shall not be permitted. Where fauna is encountered during works, appropriate site-specific measures should be taken based on the nature of the encounter and ecological advice, where necessary.	D+B Contractor(s), under CSC supervision	Site inspections; fauna observation records; wildlife incident/mortality records; inspection of excavations and other potential entrapment features; corrective-action records
Disturbance to birds and bats	Consider breeding, migration, roosting, commuting and other sensitive ecological periods where identified through the Lot-specific assessment. Pre-construction or pre-clearance checks should be undertaken where relevant habitats or sensitive features may be affected. Where active nests, roosts or important movement features are identified, appropriate avoidance or mitigation measures should be determined based on site-specific conditions and ecological advice. Detailed design should consider opportunities to minimise collision, disturbance and habitat-severance risks associated with above-ground structures, lighting and other relevant infrastructure.	D+B Contractor(s), under CSC supervision	Ecological survey/check records; nest/roost observations where relevant; bird/bat monitoring; incident records; design review
Noise and vibration effects on fauna	Manage construction noise and vibration in accordance with the Project ESMP, C-ESMP and applicable noise and vibration management measures. In areas where sensitive fauna or habitats are identified, consider whether the timing, duration or intensity of high-disturbance activities could result in material biodiversity impacts. Additional controls, monitoring or activity-management measures may be applied where warranted by the Lot-specific assessment or monitoring findings.	D+B Contractor(s), under CSC supervision	Noise/vibration monitoring where applicable; ecological observations; site inspections; records of mitigation and corrective actions
Artificial lighting impacts	Avoid unnecessary lighting and minimise light spill into adjacent natural habitats and other biodiversity-sensitive areas where practicable. During detailed design and construction planning, consider the location, direction, intensity and duration of lighting in relation to nearby habitats and nocturnal fauna. Lighting controls should remain consistent with operational, security and OHS requirements. Additional site-specific measures may be considered where sensitive bird, bat or other nocturnal fauna activity is identified.	D+B Contractor(s), under CSC supervision	Design review; night-time site inspections where relevant; ecological observations; review of lighting arrangements
Dust and other construction-related disturbance	Implement applicable dust suppression, erosion control, housekeeping and other pollution-prevention measures in accordance with the Project ESMP and C-ESMP. Particular consideration should be given to sensitive vegetation, aquatic habitats and other biodiversity receptors close to active work fronts, haul routes, stockpiles and material handling areas. Where material effects on biodiversity are observed, review the effectiveness of existing controls and implement additional measures as appropriate.	D+B Contractor(s), under CSC supervision	Routine environmental inspections; dust monitoring where applicable; vegetation/habitat observations; corrective-action records
Introduction or spread of invasive alien species	Apply appropriate measures to reduce the risk of introducing or spreading invasive alien species through construction equipment, vehicles, materials, topsoil movement, landscaping and restoration works. Disturbed areas and other locations with increased susceptibility to invasive species should be considered during biodiversity inspections. Where invasive alien species are identified and Project activities could contribute to their spread, appropriate management measures should be considered through the Lot-specific BMP or other relevant management procedures. Restoration planting should take invasive-species risks into account.	D+B Contractor(s), under CSC supervision	Site inspections; invasive-species observations; restoration monitoring; records of control measures where implemented
Impacts on aquatic and riparian habitats	Minimise disturbance to watercourses, wetlands, riparian vegetation and other aquatic habitats. Maintain appropriate pollution-prevention, erosion and sediment-control measures during works near aquatic environments. Detailed design should consider potential changes to drainage, flow and habitat connectivity	D+B Contractor(s), under CSC supervision	Site inspections; water-quality monitoring where applicable; aquatic/riparian habitat observations; biodiversity monitoring where warranted; restoration records

	where relevant. Where construction may directly interact with aquatic habitats, site-specific mitigation and monitoring measures should be determined based on the nature of works and Lot-specific assessment. Temporarily affected aquatic or riparian areas should be reinstated or rehabilitated where appropriate.		
Pollution, waste and hazardous materials affecting biodiversity	Manage fuels, chemicals, hazardous materials, waste, wastewater and accidental releases in accordance with the Project ESMP, C-ESMP and applicable sub-plans. Prevent uncontrolled disposal or storage of waste, spoil or hazardous materials in natural, critical or other biodiversity-sensitive habitats. Apply appropriate containment, spill-prevention and emergency-response arrangements at relevant work areas. Where a pollution incident could affect biodiversity, assess the affected area and implement appropriate corrective measures.	D+B Contractor(s), under CSC supervision	Environmental inspections; waste and hazardous-material records; spill/incident records; relevant water/soil monitoring; corrective-action follow-up
Excavated material and disposal activities	Manage excavated material in accordance with the Contractor's applicable C-ESMP and Excavated Material & Land Management Plan. The D+B Contractor should assess reuse, temporary storage, transport and disposal options against applicable legal and Project requirements. Biodiversity-sensitive habitats, protected areas, watercourses, wetlands and other environmentally sensitive locations should be taken into consideration when identifying and assessing potential management and disposal arrangements. Where new sites or access arrangements are proposed, relevant E&S assessment and approval requirements should be followed.	D+B Contractor(s), under CSC supervision	Review of Contractor plans; records of reuse and disposal; site inspections; verification of relevant approvals/permits
Unanticipated biodiversity impacts or newly identified sensitive features	Where previously unidentified biodiversity features, sensitive habitats, species of conservation importance or materially different site conditions are encountered, review the potential significance of the finding before continuing activities that could materially affect the feature. Where appropriate, adjust work methods, sequencing or local work areas and identify additional avoidance, minimisation, restoration or other mitigation measures through the Lot-specific E&S management process. Relevant biodiversity information should be updated where the new finding materially affects existing management measures.	D+B Contractor(s), in coordination with CSC and AYGM PIU as applicable	Site records; ecological observations; updated assessments where required; corrective/adaptive-action records; monitoring results
Reinstatement and restoration of temporarily disturbed areas	Reinstate and rehabilitate temporarily disturbed areas in accordance with the applicable Project E&S instruments and Lot-specific plans. Restoration should consider the original or surrounding habitat characteristics, soil condition, erosion risk, appropriate vegetation and intended post-construction land use. Native or locally appropriate species should be considered where ecological restoration is relevant. Restoration performance should be reviewed and remedial measures such as replanting, erosion control or invasive-species management considered where necessary.	D+B Contractor(s), under CSC supervision	Site inspections; photographic records; vegetation/habitat-condition monitoring; maintenance and remedial-action records
Operation Phase			
Habitat fragmentation and disturbance to ecological connectivity	Maintain biodiversity-related infrastructure and ecological connectivity measures incorporated into the final Project design, where applicable. Relevant fauna crossings, culverts, underpasses, fencing, escape features and associated habitat interfaces should remain functional and appropriately maintained. Operational observations or targeted monitoring may be used to assess whether relevant connectivity features are functioning as anticipated. Where obstruction, deterioration or recurring fauna-related issues are identified, appropriate maintenance or adaptive measures should be considered.	TCDD and/or other responsible entity following operational handover, as applicable	Routine infrastructure inspections; maintenance records; fauna observations; targeted connectivity monitoring where warranted
Condition of reinstated or restored habitats	Maintain and review reinstated or restored areas where continued management is required following construction. Monitoring should consider vegetation establishment, habitat condition, erosion, invasive species and other factors relevant to the restoration objective. Additional maintenance, replanting or remedial measures may be undertaken where establishment is unsuccessful or where monitoring identifies deterioration requiring intervention.	TCDD and/or other responsible entity following operational handover, as applicable	Habitat-condition observations; restoration monitoring where applicable; maintenance/remedial-action records
Noise and vibration disturbance to fauna	Manage operational noise and vibration effects on biodiversity-sensitive receptors through the applicable operational environmental management arrangements. Where operational monitoring, complaints, observations or biodiversity studies identify material effects that were not adequately anticipated, additional assessment or technically feasible mitigation may be considered.	TCDD and/or other responsible entity following operational handover, as applicable	Environmental monitoring; biodiversity observations; operational records; follow-up assessment where required
Artificial lighting disturbance	Operational and security lighting should, where practicable and consistent with railway safety and security requirements, minimise unnecessary light spill into adjacent natural habitats and other biodiversity-sensitive areas. Where material effects on nocturnal fauna are identified, appropriate operational or technical adjustments should be evaluated.	TCDD and/or other responsible entity following operational handover, as applicable	Site inspections; review of lighting arrangements; biodiversity observations where relevant
Introduction or spread of invasive alien species	Manage invasive alien species risks associated with maintenance works, disturbed areas, landscaping and operational facilities. Monitoring should focus on areas where Project activities may facilitate establishment or spread. Where material occurrences are identified, appropriate control or follow-up measures should be considered based on the species, location and scale of the issue.	TCDD and/or other responsible entity following operational handover, as applicable	Site inspections; invasive-species records; maintenance/control records where applicable
Impacts on aquatic and riparian habitats	Maintain drainage, erosion-control and other relevant Project measures necessary to avoid material degradation of aquatic and riparian habitats during operation. Where construction-related restoration or mitigation has been implemented, its condition may be reviewed where continued monitoring is warranted. Changes in drainage, sedimentation, erosion or habitat condition that could result in material biodiversity effects should be addressed through appropriate maintenance or adaptive measures.	TCDD and/or other responsible entity following operational handover, as applicable	Routine inspections; drainage/erosion-control maintenance records; environmental and habitat monitoring where relevant

Disturbance to birds and bats	Where operational monitoring or observations identify material bird or bat risks associated with railway operation, lighting, catenary infrastructure or other Project features, the significance and recurrence of the issue should be reviewed. Appropriate management, operational or technical mitigation measures should be evaluated based on the identified risk, operational feasibility and ecological advice.	TCDD and/or other responsible entity following operational handover, as applicable	Biodiversity observations; incident records; targeted bird/bat monitoring where warranted; records of adaptive measures
Bird and bat collision or electrocution risk	Collision or electrocution risks should be monitored where identified as relevant through the Lot-specific assessment, final design, construction-phase findings or operational experience. Particular attention may be given to locations where repeated incidents or material effects are observed. Where significant or recurring impacts are identified, technically feasible measures should be assessed and implemented as appropriate, considering railway safety and operational requirements.	TCDD and/or other responsible entity following operational handover, as applicable	Wildlife mortality/incident records; targeted monitoring where required; infrastructure inspections; records of mitigation or maintenance measures
Pollution, waste and hazardous materials affecting biodiversity	Manage operational waste, fuels, hazardous materials, wastewater and accidental releases in accordance with applicable operational environmental procedures and legal requirements. Prevent uncontrolled releases affecting nearby terrestrial, aquatic or riparian habitats. Where an incident has the potential to cause material biodiversity impacts, the affected area should be assessed and appropriate containment, remediation or other corrective measures implemented.	TCDD and/or other responsible entity following operational handover, as applicable	Site inspections; waste/hazardous-material records; incident and spill records; environmental monitoring and corrective-action records
Unanticipated biodiversity impacts during operation	Where previously unidentified or materially greater biodiversity impacts are observed during operation, assess their potential significance and relationship to Project activities. Where warranted, review existing management measures and consider proportionate adaptive actions, targeted monitoring or technical measures. Lessons from recurring incidents or monitoring results should inform subsequent operational management.	TCDD and/or other responsible entity following operational handover, with AYGM coordination where applicable	Monitoring findings; biodiversity incident records; follow-up assessments; adaptive-management and corrective-action records

Table 8: Indicative Ecological Connectivity Areas

Indicative Connectivity Area	Lot	Asia / Europe	Approximate Location	Current Design / Landscape Context	Ecological Connectivity Consideration	Indicative Design / Management Consideration
Corridor 1	Lot 1	Asia	Approx. km 34+039	Tunnel/road interface in proximity to NMM infrastructure	The area may provide a movement route for terrestrial fauna across a landscape already influenced by major transport infrastructure.	Potential ecological connectivity should be reviewed during detailed design. Opportunities to maintain continuity with existing NMM crossing features should be considered where technically feasible and environmentally appropriate.
Corridor 2	Lot 2	Asia	Approx. km 39+017	Culvert/road interface near an existing NMM underpass	Existing infrastructure may already provide some degree of permeability for terrestrial fauna. Additional fragmentation from the railway should therefore be considered in relation to this existing crossing context.	Detailed design should consider whether existing connectivity can be maintained or supported through appropriate Project structures or other measures, where required.
Corridor 3	Lot 2	Asia	Approx. km 47+506	Culvert/tunnel interface and nearby NMM bridge configuration	The location may represent an existing or potential ecological connection across linear infrastructure.	The relationship between the railway alignment and the existing NMM crossing arrangement should be reviewed during detailed design. Measures to avoid unnecessary additional barrier effects should be considered where relevant.
Corridor 4	Lot 2	Asia	Approx. km 50+400	Road interface in an area influenced by NMM infrastructure	The area may support terrestrial fauna movement between habitats on either side of the transport corridor.	Potential fauna movement and habitat connectivity should be considered through the Lot-specific assessment. The need for specific connectivity measures should be determined based on updated biodiversity information and final design.
Corridor 5	Lot 3	Asia	Approx. km 53+500	Road interface	Previous biodiversity assessment identified this location as potentially relevant to ecological connectivity.	Detailed design should consider opportunities to avoid unnecessary fragmentation and maintain permeability for relevant fauna, where feasible.
Corridor 6	Lot 3	Europe	Approx. km 1+440	Culvert/road interface associated with NMM infrastructure	Existing culvert and road features may influence fauna movement through this part of the corridor.	Existing connectivity features should be considered when determining the final Project design. Where a material barrier effect is identified, suitable mitigation should be evaluated.
Corridor 7	Lot 3	Europe	Approx. km 2+505	Open-cut section in the vicinity of an existing ecological bridge	This area is particularly relevant because the Project alignment intersects the broader connectivity context associated with an existing ecological bridge.	The relationship with the existing ecological bridge and surrounding habitat network should be reviewed during detailed design. Appropriate measures to avoid unnecessary interruption of ecological continuity should be considered, while the final engineering solution should remain subject to detailed design and feasibility assessment.
Corridor 8	Lot 4	Europe	Approx. km 12+150	Bridge context associated with NMM infrastructure	The area may support fauna movement through existing bridge/open-space conditions.	Potential connectivity with surrounding habitats and existing transport infrastructure should be considered during detailed design, including the suitability of Project structures for maintaining permeability.
Corridor 9	Lot 4	Europe	Approx. km 15+165	Culvert/tunnel interface near NMM crossing features	Existing culvert and landscape conditions may contribute to local ecological connectivity.	The Lot-specific assessment should review potential fauna movement and identify whether existing or proposed Project features can maintain suitable connectivity.
Corridor 10	Lot 4	Europe	Approx. km 19+935	Overpass already included in the current design	The existing design may provide an opportunity to support fauna movement if appropriately integrated with surrounding habitat and existing infrastructure.	The potential ecological function of the overpass should be considered during detailed design. Supporting measures such as appropriate approaches, fencing or habitat treatment may be considered where justified by the Lot-specific assessment.
Corridor 11	Lot 4	Europe	Approx. km 7+650	Open-cut/culvert context near NMM infrastructure	The area may be relevant to movement of terrestrial fauna across parallel transport infrastructure.	Existing NMM connectivity features and local habitat conditions should be considered during detailed design. The need for additional connectivity measures should be determined based on site-specific assessment.

Indicative Connectivity Area	Lot	Asia / Europe	Approximate Location	Current Design / Landscape Context	Ecological Connectivity Consideration	Indicative Design / Management Consideration
Corridor 12	Lot 4	Europe	Approx. km 8+945	Culvert/bridge/tunnel interface	The combination of existing and proposed structures may influence fauna movement through the area.	Detailed design should consider opportunities to maintain permeability and avoid creating unnecessary additional barriers, where relevant.
Corridor 13	Lot 4	Europe	Approx. km 12+845	Agricultural and grassland habitat	Open and semi-open habitats may support movement of terrestrial fauna across the Project corridor.	The need for fauna connectivity measures should be assessed based on updated biodiversity information, habitat use and final design conditions.
Corridor 14	Lot 4	Europe	Approx. km 16+860	Agricultural and grassland habitat	The area may function as part of a broader terrestrial movement network within open habitats.	Potential connectivity should be considered during Lot-specific assessment, with appropriate measures incorporated where a material barrier effect is identified.
Corridor 15	Lot 4	Europe	Approx. km 23+912	Bridge/watercourse context with adjacent riparian or reedbed habitat	The location may provide connectivity associated with both terrestrial and riparian habitats and may be sensitive to changes in watercourse or bridge configuration.	Detailed design should consider ecological connectivity and minimise unnecessary disturbance to adjacent aquatic, riparian and reedbed habitats. The final bridge and associated works should be assessed in relation to both hydraulic and ecological conditions.

The locations presented above represent indicative areas of potential ecological connectivity identified through previous biodiversity studies. They are provided as supporting baseline information and do not prescribe final engineering solutions, structure types or dimensions. The relevance of each location, together with the need and design of any connectivity measure, should be reviewed and refined through the Lot-specific ESIA/BMP and detailed design process, taking into account updated biodiversity information, existing landscape connectivity, adjacent infrastructure and engineering feasibility.

Table 9: Indicative Bat Connectivity Areas

Indicative Bat Connectivity Area	Lot	Asia / Europe	Approximate Location	Current Design / Landscape Context	Connectivity Consideration	Indicative Design / Management Consideration
Bat Corridor 1	Lot 2	Asia	Approx. km 34+030	Tunnel/road interface in proximity to NMM infrastructure	Previous biodiversity studies identified this area as potentially relevant for bat movement across the transport corridor. Existing road infrastructure and changes in elevation may influence continuity of flight and commuting routes.	Potential bat movement should be reviewed during detailed design. Opportunities to maintain or improve connectivity with existing landscape and NMM crossing features should be considered where technically feasible. The need for a dedicated crossing feature or adaptation of existing Project structures should be determined through the Lot-specific assessment.
Bat Corridor 2	Lot 3	Asia	Approx. km 47+506	Culvert/tunnel interface and nearby NMM bridge configuration	The location may provide an existing or potential ecological connection across linear infrastructure. The relationship between the railway design and existing NMM crossing arrangement may influence bat movement.	Detailed design should consider whether existing landscape and infrastructure features can continue to support bat movement. Where a material barrier effect is identified, appropriate design or mitigation measures should be evaluated based on site-specific conditions and bat survey findings.
Bat Corridor 3	Lot 3	Europe	Approx. km 1+440	Culvert/road interface adjacent to NMM infrastructure	The area was identified as potentially relevant to bat connectivity, particularly where existing transport infrastructure already contains crossing features.	Existing connectivity features should be considered during detailed design. Where appropriate, Project structures may be located or configured to avoid unnecessary additional fragmentation and to maintain suitable movement opportunities.
Bat Corridor 4	Lot 3	Europe	Approx. km 2+505	Open-cut section in the vicinity of an existing ecological bridge	This location is of particular interest because of the relationship between the Project alignment and an existing ecological connectivity feature associated with the NMM. The area may support movement of bats and other fauna across the transport corridor.	The ecological bridge context and surrounding habitat connectivity should be reviewed during detailed design. Appropriate measures to avoid unnecessary interruption of the existing ecological connection should be considered, while the final engineering solution should be determined through the detailed design and Lot-specific assessment process.
Bat Corridor 5	Lot 3	Europe	Approx. km 15+165	Road/culvert/tunnel interface in proximity to existing NMM crossing infrastructure	Existing culvert and landscape features may contribute to local bat commuting and broader ecological connectivity.	Potential interaction between the railway design and existing connectivity should be reviewed. Where relevant, the detailed design should seek to avoid creating unnecessary barriers and should consider the suitability of existing or proposed crossing features for maintaining movement.
Bat Corridor 6	Lot 3	Europe	Approx. km 15+990	Road/culvert/open-cut interface near NMM infrastructure	The location may represent a potential connection between habitats separated by the railway and motorway corridors.	The need for connectivity measures should be evaluated using updated Lot-specific biodiversity information. Where bat movement is confirmed or considered material, appropriate design and management measures should be identified without prescribing a specific structure type in this Project-level BMP.

The locations presented above represent indicative areas of potential bat movement and ecological connectivity identified through previous biodiversity studies. These locations are provided as supporting baseline information and do not prescribe final engineering solutions, structure types or dimensions. The relevance of each location, together with the need and design of any connectivity measure, should be reviewed and refined through the Lot-specific ESIA/BMP and detailed design process, taking into account updated biodiversity information, existing landscape connectivity, adjacent infrastructure and engineering feasibility.

Table 10: Indicative Flora Records of Conservation Importance

Species	Relevant Lot(s)	Indicative Seasonal / Survey Consideration	Potential Interaction with Project Activities	Indicative Management Consideration
Centaurea hermannii	Lot 4	The species should be surveyed during an appropriate period when it can be reliably identified; previous studies indicate seed availability during the summer period.	Vegetation clearance, soil stripping, excavation, temporary work areas and other surface disturbance may affect recorded or newly identified individuals.	Where the species is confirmed within or close to the disturbance footprint, priority should be given to avoidance or minimisation through appropriate work-area planning. Where avoidance is not practicable, suitable protection, collection, translocation, propagation or restoration measures may be considered based on specialist advice.
Cirsium polycephalum	Lots 2, 3 and 4	Survey timing should reflect the growing and reproductive period of the species; previous surveys indicate seed collection potential during late summer.	Potential disturbance may arise from vegetation clearance, earthworks, temporary facilities and access arrangements.	Known and suitable habitat should be considered during Lot-specific surveys. Where Project interaction is confirmed, appropriate species-specific measures should be identified based on the scale of impact and site conditions.
Crocus pestalozzae	Lot 2	Late winter–early spring is particularly relevant for reliable detection because of the species' seasonal above-ground growth.	Soil stripping and vegetation clearance undertaken outside the detectable period may result in individuals being overlooked.	Where suitable habitat overlaps the Project footprint, seasonal detectability should be taken into account when planning surveys. Any requirement for protection, collection or translocation should be determined following confirmation of presence and potential impact.
Cyclamen coum	Lots 2 and 4	Survey timing should take account of the species' seasonal growth and flowering cycle; previous biodiversity information indicates relevance of the spring/early summer period for field identification and bulb-related measures.	Vegetation clearance, topsoil stripping and excavation could affect individuals or suitable habitat.	Confirm presence where relevant before disturbance. Avoidance should be considered first; other species-specific measures may be applied where warranted by the Lot-specific assessment.
Ferulago confusa	Lots 3 and 4	The growing and flowering/seed-development season provides the most appropriate period for confirmation; previous	Surface works and vegetation removal may affect recorded populations or suitable habitat.	Lot-specific survey should confirm whether recorded or additional populations interact with the final construction footprint. Appropriate avoidance or

Species	Relevant Lot(s)	Indicative Seasonal / Survey Consideration	Potential Interaction with Project Activities	Indicative Management Consideration
		studies indicate summer seed availability.		other mitigation should then be determined.
Galanthus nivalis	Lots 3 and 4	Late winter–spring is relevant for detection of above-ground plants; seasonal conditions should be considered when confirming recorded populations.	Soil disturbance or vegetation clearance during periods when plants are not readily visible may affect bulbs or associated habitat.	Where suitable habitat is affected, survey timing should allow reliable detection. Collection or translocation should not be assumed automatically and should only be undertaken where justified by site-specific assessment and specialist advice.
Galanthus plicatus subsp. *byzantinus*	Lot 2	Late winter–spring represents the principal period for reliable field identification based on the available Project biodiversity information.	Vegetation clearance, earthworks and temporary land occupation could interact with recorded individuals or suitable habitat.	Confirm the location and extent of affected populations where relevant. Consider avoidance or micro-siting first, followed by other feasible species-specific mitigation where necessary.
Lathyrus undulatus	Lot 2	Spring–early summer is relevant for field identification; the available biodiversity information also identifies seasonal considerations for seed and vegetative material.	Vegetation clearance and soil disturbance may affect plants or their immediate habitat.	Where Project interaction is confirmed, determine appropriate avoidance, protection or other management measures based on the condition and extent of the population.
Leucojum aestivum	Lot 4	Survey timing should reflect seasonal growth and habitat conditions, particularly in wetter or seasonally moist areas.	Works affecting wet habitats, drainage conditions, vegetation or soil may affect the species or associated habitat.	Where suitable habitat may be affected, field verification should consider both species presence and local hydrological conditions. Site-specific measures should be identified accordingly.
Lilium martagon	Lots 2 and 4	The growing season is relevant for reliable detection; previous Project information identifies summer as relevant to reproductive material.	Vegetation clearance, excavation and soil stripping may affect individuals or suitable habitat.	Confirm presence and potential interaction with works through Lot-specific surveys where relevant. Avoidance or other suitable measures should be considered based on confirmed impacts.
Ornithogalum pascheanum	Lots 1, 2 and 3	Spring is particularly relevant for field identification of the species. Seasonal detectability should be taken into account before disturbance of suitable habitat.	Vegetation clearance and soil stripping may affect underground plant material where above-ground parts are no longer visible.	Where suitable habitat overlaps the construction footprint, pre-construction verification should be undertaken where appropriate. The need for collection, translocation or other measures should be

Species	Relevant Lot(s)	Indicative Seasonal / Survey Consideration	Potential Interaction with Project Activities	Indicative Management Consideration
				determined from confirmed field conditions.
Symphytum tuberosum subsp. *nodosum*	Lots 2 and 3	Spring–early summer is generally relevant for reliable identification based on the Project survey information.	Vegetation removal, temporary land occupation and soil disturbance may affect recorded plants or suitable habitat.	Verify relevant records where they overlap planned works and determine proportionate avoidance or mitigation measures based on actual site conditions.

The flora records presented above are based on biodiversity surveys undertaken for the Project and are provided as indicative baseline information. The recorded Lot distribution and seasonal information should be reviewed and, where relevant, verified through the Lot-specific ESIA/BMP and pre-construction survey process. The presence of a species within a Lot does not by itself require collection, translocation or replanting. The need for, and method and timing of, any species-specific measure should be determined based on confirmed interaction with the final Project footprint, site conditions, seasonal suitability and qualified specialist advice.

5 Biodiversity Monitoring and Reporting

This section provides a summary of the biodiversity monitoring framework under this BMP. Biodiversity features to be monitored will be identified and refined, as relevant, through the Lot-specific ESIA, supplementary surveys and pre-construction surveys, and biodiversity monitoring parameters will be determined taking into account the characteristics of the habitat and species composition in the area. Where a Lot-specific BAP is required, its monitoring provisions will be integrated into the relevant Lot-specific biodiversity monitoring arrangements.

A general framework for periodic monitoring activities planned throughout the Project is represented in Table 11. Relevant monitoring may include, as applicable:

- Condition of natural, critical and other biodiversity-sensitive habitats identified through the relevant assessments;
- Status of Critical habitats and species of high conservation concern, where relevant;
- Presence and distribution of invasive alien species, where identified;
- Success of translocation or restoration measures, where such measures are implemented;
- Changes in populations or occurrence of relevant flora and fauna species, where monitoring is identified as necessary through the Lot-specific assessment.

Monitoring results will be used to inform the Lot-specific biodiversity management process and, where necessary, appropriate corrective or adaptive measures. Monitoring records and results will be maintained as part of the relevant Project E&S documentation and reporting arrangements.

Adaptive management will be informed by the results of biodiversity monitoring. Where monitoring identifies unexpected impacts, ineffective mitigation measures or material changes in site conditions, the relevant D+B Contractor will review the applicable measures and implement appropriate corrective or adaptive actions in coordination with the CSC and AYGM PIU, as applicable.

This BMP will serve as a strategic framework for Lot-specific BMPs, which will be developed in line with Lot-specific ESIA findings, final design, site conditions and datasets. Lot-specific BMPs will be treated as living documents and updated as necessary to reflect Project changes and newly available information. Revisions may be required in response to modifications to the route alignment, Project design, construction methodologies, or the acquisition of new biodiversity data that could influence the proposed management and monitoring measures.

For the regular biodiversity reporting;

Biodiversity monitoring and implementation results will be reported through the applicable Project E&S reporting arrangements. In particular:

- The D+B Contractor will maintain appropriate records of biodiversity-related measures, monitoring results, incidents and corrective actions and include relevant information in its monthly E&S monitoring reports in accordance with the Employer's Requirements.
- Project-level reporting to the World Bank will follow the applicable Project and ESCP reporting arrangements.
- Where specific or seasonal biodiversity monitoring is undertaken, the results will be documented and incorporated into the applicable E&S monitoring and reporting process.
- Reports will include relevant data on biodiversity-related incident records and associated corrective actions.

Table 11: Biodiversity Monitoring Requirements

Monitoring Aspect	Monitoring Scope / Parameters	Purpose / Key Considerations	Indicative Timing / Frequency	Responsibility	Records / Outputs
Detailed Design and Construction Phase					
Habitat condition and disturbance	Monitor relevant natural, critical and other biodiversity-sensitive habitats potentially affected by construction. Monitoring may consider habitat loss, fragmentation, edge effects, physical disturbance, dust deposition, pollution, accidental spills and encroachment outside approved work areas.	To verify whether construction activities are causing material changes to habitat condition and whether the mitigation measures defined in the Lot-specific BMP are functioning as intended.	At a frequency proportionate to the sensitivity of the habitat, nature of works and identified risk, as defined in the Lot-specific BMP.	D+B Contractor(s), under CSC supervision	Site inspection records, photographs, habitat condition observations and corrective-action records
Flora of conservation importance	Monitor known or newly identified flora of conservation importance where such species may interact with construction activities. Monitoring may include presence, condition, distribution and potential disturbance.	To confirm whether identified flora remains unaffected or whether additional avoidance, protection, collection, translocation or restoration measures should be considered.	During relevant seasonal periods and construction activities, where required by the Lot-specific assessment.	D+B Contractor(s), under CSC supervision	Survey records, location records where appropriate, photographs and specialist observations
Vegetation clearance and pre-clearance checks	Review vegetation-clearance areas prior to disturbance where sensitive biodiversity features may be present. Checks may cover sensitive flora, active nests, burrows, reptiles, amphibians, small mammals and other relevant fauna.	To identify previously unrecorded or seasonally present biodiversity features and allow appropriate site-specific measures to be applied before clearance.	Shortly before relevant vegetation-clearance or ground-disturbance activities, where required.	D+B Contractor(s), under CSC supervision	Pre-clearance check records, ecological observations and implemented protection measures
Invasive alien species	Monitor disturbed areas, access routes, topsoil stockpiles, reinstated areas and other locations where construction activities may facilitate establishment or spread of invasive alien species.	To identify new occurrences or spread associated with Project activities and determine whether control measures are required.	Based on identified risk, site conditions and seasonal detectability.	D+B Contractor(s), under CSC supervision	Site inspection records, invasive-species observations and management records
Terrestrial fauna	Record wildlife observations, mortality, injuries, entrapment, displacement and interaction with construction activities. Monitoring may include areas affected by excavation, fencing, traffic, blasting, vegetation clearance and other disturbance.	To identify construction-related fauna impacts and determine whether existing measures remain adequate.	During relevant construction activities and as otherwise defined in the Lot-specific BMP. Incident-related monitoring should occur whenever events are observed.	D+B Contractor(s), under CSC supervision	Fauna observation logs, incident records, photographs and corrective-action records
Ecological connectivity	Monitor the condition and, where appropriate, use of ecological connectivity features associated with the Project, including relevant culverts, underpasses, bridges, fauna crossings and surrounding habitat interfaces.	To verify that Project activities do not create avoidable barriers and that connectivity measures incorporated into the design remain functional.	During construction where such features are being established or potentially affected, with frequency based on identified ecological significance.	D+B Contractor(s), under CSC supervision	Site inspection records, fauna observations and targeted monitoring data where applicable
Birds	Monitor breeding, migratory or other sensitive bird activity where the Lot-specific assessment identifies material risk. Monitoring may include active nests, flight activity, disturbance associated with blasting or other high-impact works, and incidental mortality observations.	To support appropriate timing, construction controls and other mitigation where birds of conservation importance or sensitive bird habitats may be affected.	During relevant breeding, migration or other sensitive periods, where required based on the Lot-specific assessment and specialist advice.	D+B Contractor(s), under CSC supervision	Survey records, nest/flight observations where appropriate, incident records and mitigation follow-up
Bats	Monitor potential roosting, commuting and foraging features where bat-related risks are identified. This may include tunnel portals, woodland edges, watercourses, structures and ecological connectivity areas.	To identify potential disturbance, habitat severance or changes affecting important bat features and determine whether additional mitigation is needed.	At suitable seasonal periods and locations where bat monitoring is identified as necessary.	D+B Contractor(s), under CSC supervision	Bat survey records, activity observations and relevant mitigation records
Noise and vibration effects on fauna	Review biodiversity-sensitive receptors where construction noise, vibration or blasting may result in material disturbance.	To identify whether additional controls are warranted in sensitive locations.	Where monitoring or Lot-specific assessment identifies a material biodiversity-related noise or vibration risk.	D+B Contractor(s), under CSC supervision	Noise/vibration monitoring data, ecological observations and corrective-action records
Aquatic and riparian biodiversity	Where works may affect freshwater habitats, monitor relevant watercourses, wetlands and riparian habitats. Monitoring may consider habitat condition, water quality, flow conditions, sedimentation and presence of relevant aquatic fauna.	To detect construction-related deterioration and verify effectiveness of erosion, sediment, pollution-control and habitat-protection measures.	Before, during and/or following relevant works where warranted by the type, duration and sensitivity of the activity.	D+B Contractor(s), under CSC supervision	Water-quality records, habitat observations, aquatic biodiversity records and photographs
Topsoil and soil handling relevant to biodiversity	Monitor stripping, storage, handling and reuse of topsoil where preservation of vegetation, seed bank or habitat restoration potential is relevant.	To support successful reinstatement and avoid avoidable degradation, contamination or invasive-species establishment.	During relevant stripping, storage and reinstatement activities.	D+B Contractor(s), under CSC supervision	Site inspection records, photographs and restoration records
Restoration and reinstatement	Monitor temporarily disturbed areas subject to reinstatement, revegetation or habitat restoration. Monitoring may consider vegetation establishment, erosion, habitat condition, invasive species and the need for remedial works.	To assess whether reinstatement/restoration is progressing adequately and whether additional maintenance or corrective measures are necessary.	During restoration and for an appropriate period thereafter based on habitat type, restoration approach and handover arrangements.	D+B Contractor(s), under CSC supervision	Restoration monitoring records, photographs, maintenance records and corrective actions

Translocation or species-specific measures	Where collection, translocation or other species-specific mitigation has been implemented, monitor the relevant receptor or receiving area as appropriate.	To assess the effectiveness of the measure and determine whether additional management is required.	Frequency and duration to be defined based on the species, measure implemented and Lot-specific conditions.	D+B Contractor(s), under CSC supervision	Species-specific monitoring records and follow-up actions
Biodiversity-related incidents and unexpected impacts	Record fauna mortality, significant habitat damage, unforeseen biodiversity effects, failure of mitigation measures or other material biodiversity incidents.	To support timely corrective action and adaptive management.	As incidents or observations occur, with follow-up monitoring where required.	D+B Contractor(s), under CSC supervision and coordination with AYGM PIU as applicable	Incident records, investigation findings, corrective actions and follow-up records
Operation Phase					
Ecological connectivity and fauna crossings	Review the condition and effectiveness of connectivity measures incorporated into the final Project design, including relevant fauna crossings, culverts, underpasses, fencing and escape features. Monitoring may consider physical condition, obstruction and evidence of fauna use where appropriate.	To determine whether connectivity measures continue to function during operation and whether maintenance or adaptive measures are warranted.	As defined through operational handover arrangements and based on the significance of the relevant connectivity feature and operational experience.	TCDD and/or other responsible entity following operational handover, as applicable	Inspection records, maintenance records and targeted fauna-monitoring data where undertaken
Bird collision and disturbance	Record relevant bird mortality, collision or repeated disturbance events associated with railway and catenary infrastructure, particularly where operational risks were identified during Lot-specific assessment or construction-phase monitoring.	To determine whether operational impacts are materially greater than anticipated and whether additional mitigation should be considered.	At locations and frequencies proportionate to the identified risk and monitoring findings.	TCDD and/or other responsible entity following operational handover, as applicable	Bird incident/mortality records, observations and targeted monitoring reports where required
Bat collision and disturbance	Monitor potential operational effects on bats where relevant, including interaction with infrastructure, lighting, habitat connectivity or known roost/commuting features.	To identify material operational impacts and inform adaptive mitigation where needed.	Where identified as necessary based on Lot-specific assessment, construction findings or operational observations.	TCDD and/or other responsible entity following operational handover, as applicable	Bat observations, incident records and targeted survey results where undertaken
Terrestrial fauna mortality and entrapment	Record relevant wildlife mortality, entrapment and repeated incidents associated with railway infrastructure or fencing.	To identify recurring risk locations and support adaptive management or maintenance measures.	As part of routine operation and maintenance observations and through targeted monitoring where recurrent issues are identified.	TCDD and/or other responsible entity following operational handover, as applicable	Wildlife incident records, maintenance observations and follow-up actions
Aquatic and riparian habitats	Review relevant aquatic/riparian habitats and mitigation or restoration measures where continued operational monitoring is warranted.	To identify deterioration potentially associated with Project operation or failure of drainage/erosion-control measures.	Based on residual risk, habitat sensitivity and operational conditions.	TCDD and/or other responsible entity following operational handover, as applicable	Environmental monitoring records, habitat observations and maintenance records
Restored or reinstated habitats	Review the establishment and condition of restored areas that require continued monitoring following construction.	To determine whether further maintenance, replanting or other remedial actions are warranted.	For a period appropriate to the restoration measure and as defined through handover arrangements.	TCDD and/or other responsible entity following operational handover, as applicable	Habitat condition records and maintenance/remedial-action records
Invasive alien species	Monitor locations where operation or maintenance activities may contribute to establishment or spread of invasive alien species.	To identify material new occurrences and determine whether management or control measures are necessary.	Based on identified risk, seasonal detectability and site conditions.	TCDD and/or other responsible entity following operational handover, as applicable	Site inspection records and invasive-species management records
Unanticipated operational biodiversity impacts	Review previously unidentified or materially greater biodiversity impacts identified during operation.	To support proportionate adaptive management where actual operational impacts differ materially from those anticipated.	As issues are identified.	TCDD and/or other responsible entity following operational handover, with AYGM coordination where applicable	Monitoring findings, incident records and adaptive-management records

6 Indicative Seasonal Biodiversity Considerations

The periods presented below are indicative and are based on biodiversity information available at the time of preparation of this BMP. They are intended to support Lot-specific planning and do not constitute fixed Project-wide construction prohibition periods. Relevant seasonal sensitivities, survey requirements and any activity restrictions shall be reviewed and refined, where necessary, through the Lot-specific ESIA/BMP process based on updated field information, final design, construction methodology and qualified specialist advice.

Where avoidance of a sensitive period is not reasonably practicable, appropriate site-specific mitigation measures should be considered in accordance with the mitigation hierarchy and applicable Project E&S requirements.

Table 12 Indicative Seasonal Biodiversity Considerations

Biodiversity Feature / Species	Relevant Lot(s) / Area	Indicative Sensitive / Survey Period	Potentially Relevant Activities	Indicative Management Approach
Galanthus plicatus subsp. *byzantinus*	Lot 2	Late winter–spring, when the species is more readily detectable; bulb/seed collection timing should reflect seasonal condition of the plant	Vegetation clearance, soil stripping, excavation and temporary facility establishment	Confirm presence and extent through Lot-specific survey where relevant. Where individuals may be affected, determine whether avoidance, protection, collection, translocation or other measures are appropriate based on confirmed site conditions and specialist advice.
Ornithogalum pascheanum	Lots 1, 2 and 3	Spring, when above-ground parts are most likely to allow reliable identification	Vegetation clearance and soil disturbance	Confirm known records and search suitable habitat before disturbance where required. Any collection or translocation timing should be determined based on actual phenological condition.
Crocus pestalozzae	Lot 2	Late winter–early spring	Vegetation clearance, excavation and soil stripping	Survey during a period when the species can be reliably detected, where relevant. If confirmed within the disturbance footprint, determine appropriate avoidance or species-specific management measures.
Galanthus nivalis	Lots 3 and 4	Late winter–spring	Vegetation clearance and soil stripping	Confirm presence in suitable habitats before relevant works where necessary. Collection or translocation should only be undertaken where justified by the Lot-specific assessment and specialist advice.
Lathyrus undulatus	Lot 2	Spring–early summer	Vegetation clearance, soil disturbance and site establishment	Consider seasonal detectability during pre-construction surveys. If potentially affected, assess opportunities for avoidance and determine any further species-specific measures.
Centaurea hermannii	Lot 4	Late spring–summer	Vegetation clearance and soil stripping	Survey during an appropriate seasonal window where the known or suitable habitat overlaps with planned works. Site-specific protection or collection measures may be considered where necessary.
Cirsium polycephalum	Lots 2, 3 and 4	Late spring–summer	Vegetation clearance and soil disturbance	Confirm distribution where relevant to the construction footprint and apply appropriate avoidance or mitigation measures based on survey findings.
Ferulago confusa	Lots 3 and 4	Spring–summer	Vegetation clearance and soil stripping	Consider survey timing sufficient to enable reliable identification. Where affected individuals are confirmed, determine appropriate site-specific management.
Symphytum tuberosum subsp. *nodosum*	Lots 2 and 3	Spring–early summer	Vegetation clearance and soil disturbance	Confirm presence where suitable habitat is affected and consider avoidance or other species-specific measures where necessary.
Lilium martagon	Lots 2 and 4	Spring–summer	Vegetation clearance and soil stripping	Consider the species' seasonal detectability during Lot-specific surveys. Where confirmed, assess appropriate avoidance, collection or translocation measures.
Leucojum aestivum	Lot 4	Spring–summer, depending on local habitat and seasonal conditions	Works affecting wet or seasonally moist habitats, vegetation clearance and soil disturbance	Survey suitable habitat where relevant and determine site-specific measures based on confirmed presence and hydrological conditions.
Cyclamen coum	Lot 4	Late winter–spring	Vegetation clearance and soil stripping	Confirm presence before disturbance where relevant. Any collection or relocation measures should be based on field conditions and specialist advice.
Freshwater habitats and sensitive aquatic species	Relevant watercourses, wetlands and freshwater habitats within affected Lots	Sensitive periods may include spawning, breeding or early-life stages of species identified through Lot-specific surveys	In-stream works, culvert works, bridge foundations, temporary diversions, dewatering, excavation and other works affecting watercourses	Identify relevant seasonal sensitivities through Lot-specific aquatic surveys where required. Where sensitive species or habitats are confirmed, construction timing and mitigation measures should be adapted as appropriate to the type and scale of works.
Breeding birds	Relevant habitats, particularly KBAs and other areas supporting breeding birds	Generally spring–summer, depending on species and local conditions	Vegetation clearance, tree removal, blasting, excavation and other high-disturbance activities	Where breeding habitat is present, undertake appropriate pre-construction or pre-clearance checks. Active nests or other sensitive breeding features should be protected through site-specific measures determined with ecological advice.
Wintering birds	Particularly wetland, open-water and other suitable habitats, including relevant KBAs	Generally winter period	High-disturbance works near important wintering habitat	Consider wintering bird use where the Lot-specific assessment identifies material risk. Where significant concentrations are recorded, appropriate timing, disturbance-control or spatial measures should be evaluated.
Migratory birds	Relevant migration corridors and areas identified through Lot-specific assessment	Spring and autumn migration periods, depending on species and location	Blasting, high-disturbance surface works and activities associated with above-ground infrastructure	Where migration-related risks are identified, consider appropriate seasonal monitoring and design or construction measures based on observed bird movements and site-specific risk.

Biodiversity Feature / Species	Relevant Lot(s) / Area	Indicative Sensitive / Survey Period	Potentially Relevant Activities	Indicative Management Approach
Bats	Suitable roosting and commuting habitats, woodland edges, watercourses, structures and identified connectivity areas	Seasonal sensitivity may vary according to roosting, breeding and hibernation behaviour	Tree removal, demolition, lighting, tunnel portals and works affecting potential roost or commuting features	Where suitable bat habitat or potential roost features are present, undertake targeted checks where required. Appropriate timing, exclusion, protection or alternative mitigation measures should be based on confirmed site conditions and specialist advice.
Tortoises and other reptiles	Suitable terrestrial habitats within relevant Lots	Higher activity generally occurs during warmer months, while reduced mobility or hibernation may occur during colder periods	Vegetation clearance, soil stripping, excavation and vehicle movement	Where relevant species are likely to occur, undertake pre-clearance checks and apply appropriate measures to reduce injury or mortality. Timing should be adjusted where site-specific ecological conditions warrant.
Terrestrial mammals	Forest, grassland, agricultural and connectivity habitats identified through Lot-specific assessment	Seasonal sensitivity may vary according to breeding, hibernation and movement patterns	Vegetation clearance, excavation, night works, blasting and establishment of barriers	Consider seasonal activity and movement patterns in construction planning where material risks are identified. Measures may include timing adjustments, maintaining connectivity or additional site checks.
Soil stripping and vegetation clearance	All relevant Lots	Timing should consider the seasonal presence of flora and fauna of conservation importance identified at the relevant location	Topsoil stripping, site clearance and earthworks	Prior to disturbance in biodiversity-sensitive areas, confirm whether relevant ecological features require protection or additional mitigation. The appropriate timing should be defined through the Lot-specific BMP rather than through a fixed Project-wide seasonal prohibition.

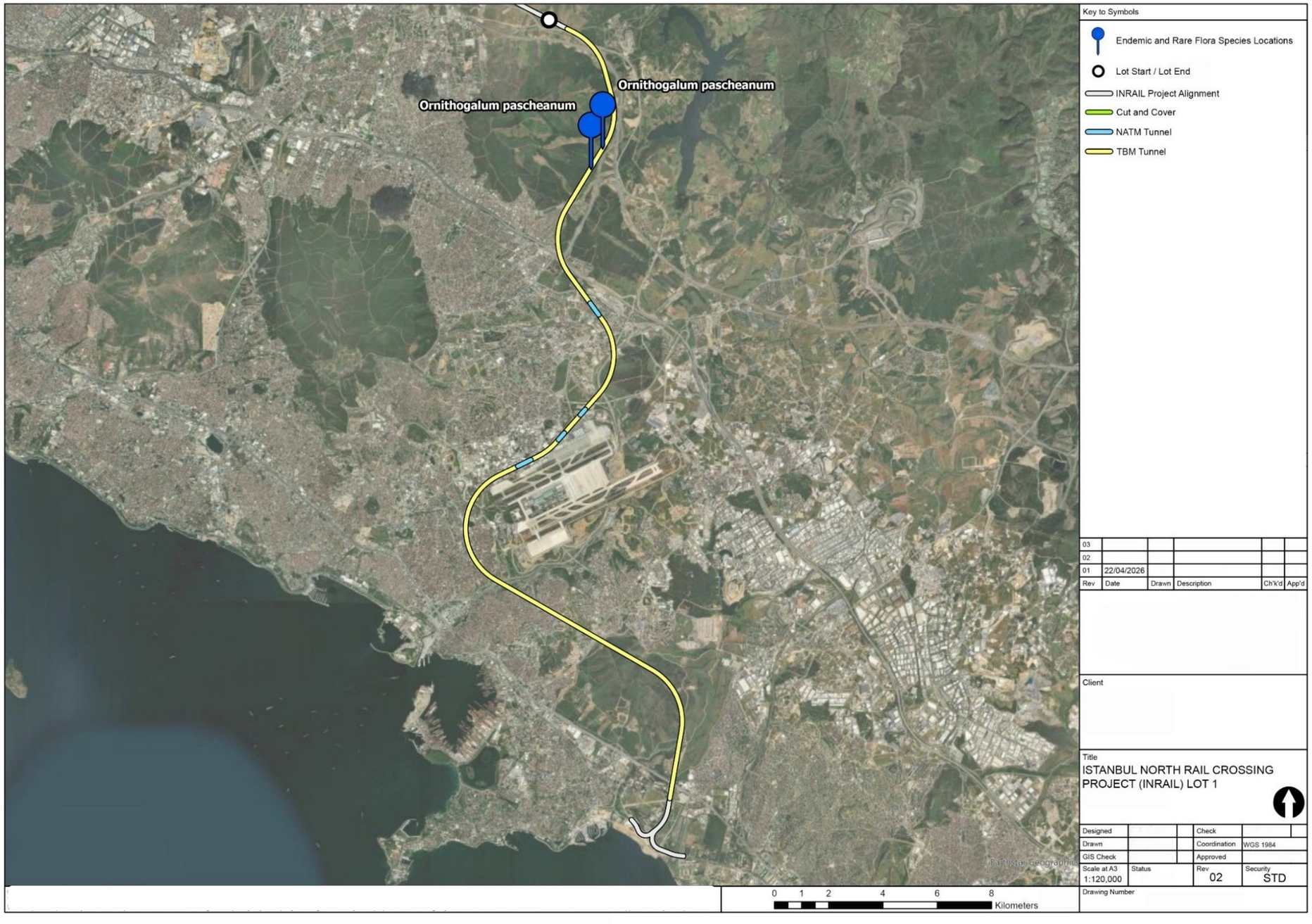
The surveys listed below represent indicative further biodiversity survey needs identified on the basis of available Project information. The need, scope, timing, methodology and spatial coverage of each survey should be confirmed and refined through the Lot-specific ESIA/BMP process, taking into account final design, construction methodology, seasonal conditions and updated biodiversity information. Additional surveys may be undertaken where required by the Employer's Requirements or the applicable Project E&S instruments.

Table 13 Indicative Further Survey Requirements

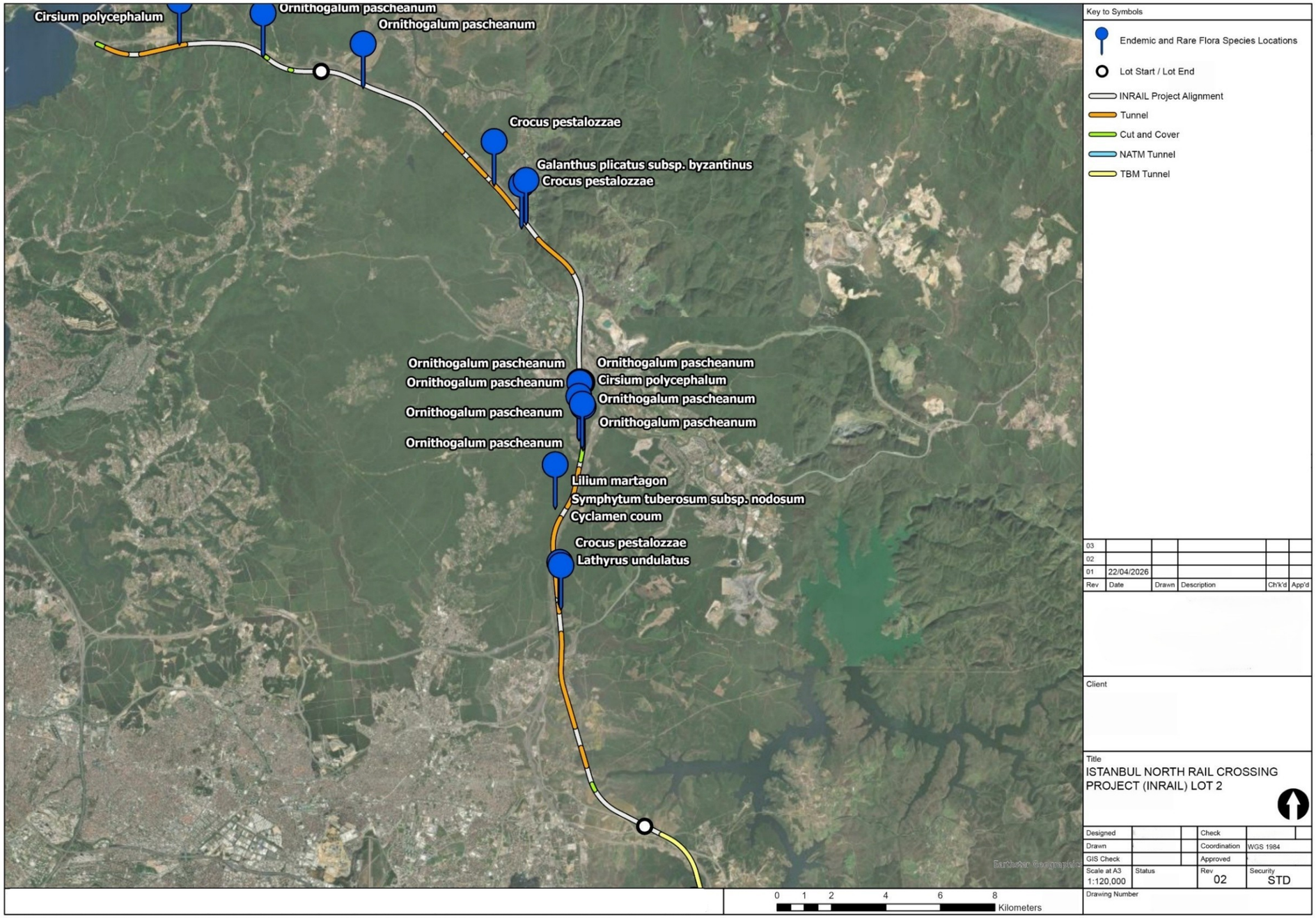
Survey	Indicative Timing	Indicative Method / Purpose	Indicative Location / Coverage
Breeding Bird Survey – *Aquila heliaca*	Relevant breeding season, generally February–July	Survey and, where appropriate, monitoring of breeding activity and potential nest locations to support assessment of Project-related disturbance and development of appropriate mitigation measures.	Büyükçekmece–Çatalca area and other relevant habitats identified through Lot-specific assessment. Sensitive nest-location information should be managed appropriately and need not be publicly disclosed.
Bird Vantage Point / Flight Activity Survey	Relevant seasonal periods, including migration and breeding periods where appropriate	Observation of bird flight activity, movement patterns and use of relevant Project areas to support assessment of collision and disturbance risks associated with above-ground infrastructure. The final survey methodology should be proportionate to the identified risk and site conditions.	Relevant above-ground sections and other areas identified as potentially important for bird movement through the Lot-specific assessment.
Wintering Bird Survey	Relevant winter period, generally December–February	Appropriate bird survey methods, such as point counts or other suitable observational methods, to confirm wintering bird use and identify potential Project-related sensitivities.	Büyükçekmece Lake and other relevant wetland or wintering-bird habitats, where applicable.
Pre-construction Biodiversity Survey	At an appropriate time prior to commencement of relevant works, considering seasonal detectability of target biodiversity features	Confirm and update biodiversity conditions within areas potentially affected by construction, including relevant habitats, flora and fauna identified through the Lot-specific assessment.	Relevant Project work areas, associated facilities and other areas where construction activities may interact with biodiversity-sensitive features.
Flora Survey	Appropriate growing/flowering season for the species or habitat concerned	Confirm presence and distribution of flora of conservation importance and support determination of any required avoidance, protection, collection, translocation or restoration measures.	Suitable habitats and previously identified locations potentially affected by the relevant Lot.
Mammal and Herpetofauna Survey	Appropriate seasonal period based on species activity and detectability	Confirm presence and use of relevant habitats by mammals, reptiles and amphibians and identify any site-specific mitigation needs.	Relevant terrestrial habitats, ecological connectivity areas and work areas identified through Lot-specific assessment.
Pre-clearance Ecological Check / Walkover	Shortly before vegetation clearance or other relevant ground-disturbing activities, where required	Confirm whether sensitive flora, active nests, burrows, fauna or other biodiversity features requiring protection are present within the work area. Where relevant, appropriate avoidance, protection, exclusion or fauna-management measures should be identified before disturbance.	Relevant vegetation-clearance and ground-disturbance areas identified through the Lot-specific BMP.
Aquatic Biodiversity Survey	At an appropriate seasonal and hydrological period where works may affect freshwater habitats	Confirm aquatic habitat condition and relevant fauna/flora and support assessment of potential impacts and site-specific mitigation.	Watercourses, wetlands and aquatic habitats potentially affected by Project works.
Bat Survey	Appropriate seasonal periods based on roosting, commuting and activity patterns	Survey potential roosting, foraging and commuting features where the Lot-specific assessment identifies material bat-related risks.	Suitable habitats, structures, woodland edges, watercourses and connectivity areas potentially affected by the Project.

7 Appendix-1

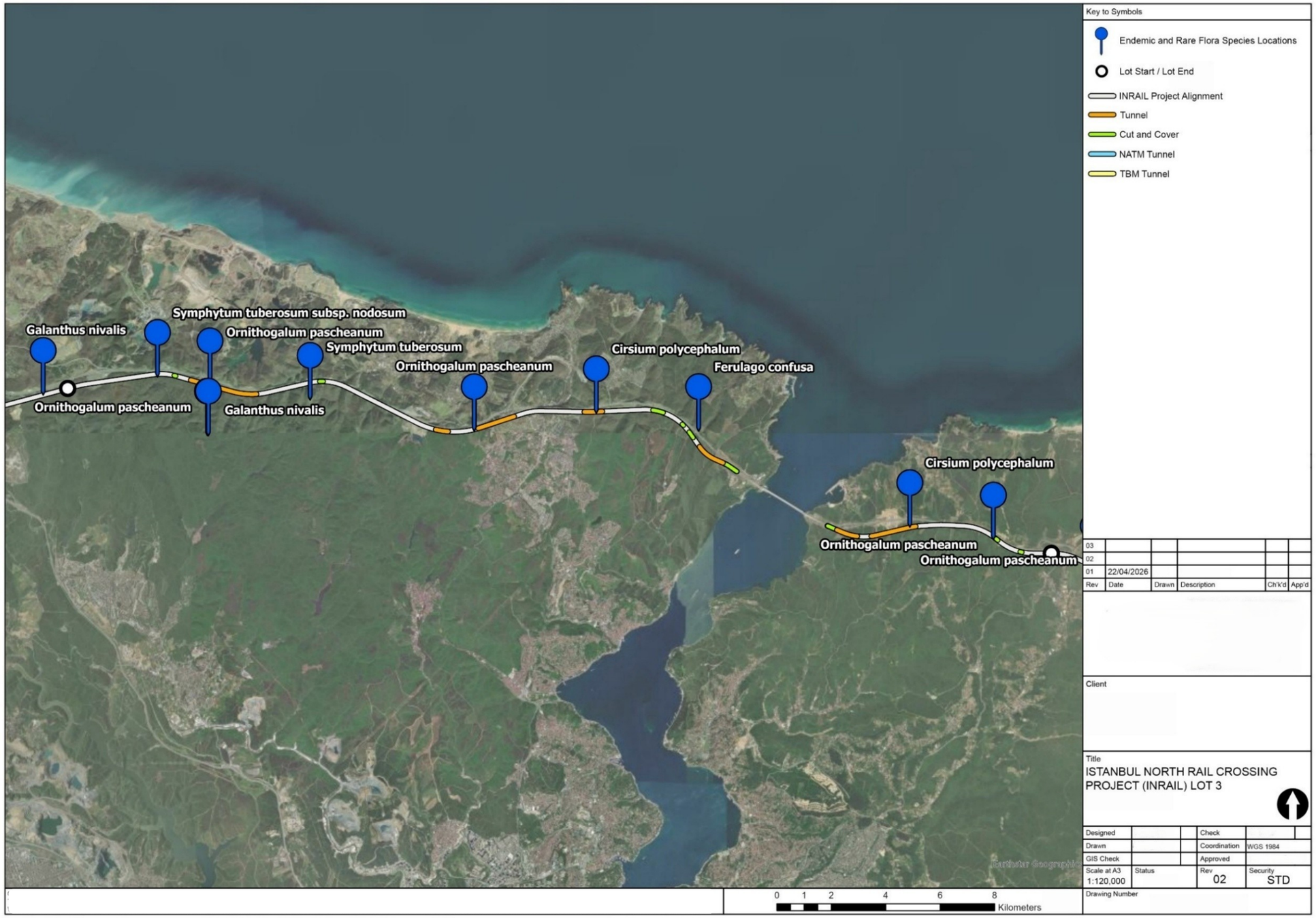
Endemic and Rare Flora Species Locations



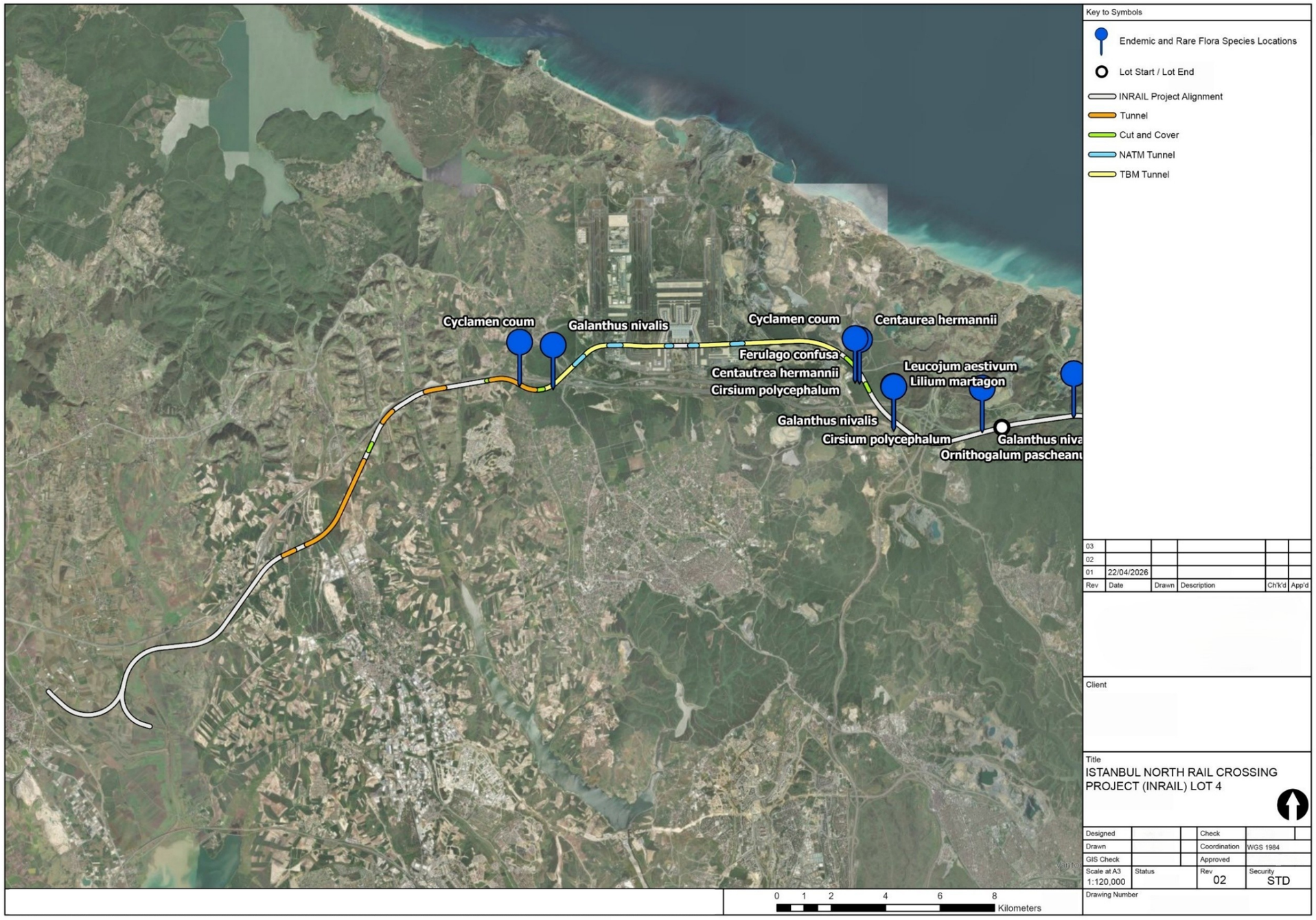
FigureApp 1 Indicative - The Project Endemic and Rare Flora Species Locations (Lot 1)



FigureApp 2 Indicative - The Project Endemic and Rare Flora Species Locations (Lot 2)



FigureApp 3 Indicative - The Project Endemic and Rare Flora Species Locations (Lot 3)



FigureApp 4 Indicative - The Project Endemic and Rare Flora Species Locations (Lot 4)

8 Appendix-2

Biodiversity Action Plan Template

Instructions for Use

This document provides a template and indicative minimum content framework for the preparation of Lot-specific Biodiversity Action Plans (BAPs) under the Istanbul North Rail Crossing Project (INRAIL).

The structure, section headings, sub-headings, tables and annexes provided herein are indicative and may be expanded, refined, reorganised or supplemented as necessary to reflect the biodiversity risks, impacts, conservation objectives and implementation requirements of the relevant Lot.

The D+B Contractor shall ensure that the Lot-specific BAP is sufficiently detailed and proportionate to the significance and complexity of the biodiversity issues identified through the finalized ESIA, Lot-specific biodiversity assessments, final design and supplementary/pre-construction surveys, as applicable.

Where additional sections, technical studies, species-specific action plans, habitat restoration plans, monitoring protocols or other supporting instruments are identified as necessary through the Lot-specific assessment, these shall be included or cross-referenced as appropriate. Where residual biodiversity impacts require consideration of compensation or offset measures, any associated plans or instruments shall be developed only where required under the applicable Project requirements and subject to the relevant review and approval process.

The template shall not be interpreted as limiting the scope of the Contractor's biodiversity obligations under the Employer's Requirements, finalized ESIA/ESMP, C-ESMP, Project BMP, Lot-specific BMP or other applicable Project requirements.

Where a section or sub-section is not applicable to the relevant Lot, this shall be clearly stated and justified in the Lot-specific BAP.

The Lot-specific BAP shall be prepared as a complete, stand-alone implementation document and shall not consist solely of responses to the headings or tables provided in this template. The level of detail should be proportionate to the biodiversity features, impacts and management measures relevant to the Lot.

1. Introduction

1.1 Purpose and Scope

This Appendix establishes an indicative minimum content framework for the preparation of a Lot-specific Biodiversity Action Plan (BAP) for the Istanbul North Rail Crossing Project (INRAIL).

The relevant Design and Build (D+B) Contractor shall prepare a Lot-specific BAP where required by the finalized ESIA and ESMP, applicable Project requirements, or the findings of the Lot-specific biodiversity assessment, including Critical Habitat assessment and assessment of significant residual biodiversity impacts.

The BAP shall be based on the final detailed design, confirmed Project footprint, construction methodology and sequencing, Project Facilities and Associated Facilities, as applicable, and the results of supplementary and pre-construction biodiversity surveys. The Employer's Requirements require biodiversity baseline information and impact assessments to be updated or supplemented where necessary to reflect the final design, site-specific conditions and seasonal variability.

The BAP shall define the actions required to address significant residual biodiversity impacts remaining after application of the mitigation hierarchy and shall establish the additional biodiversity actions, monitoring and adaptive management measures required for the relevant Lot. Where specific No Net Loss (NNL), Net Gain (NG), compensation or offset requirements are determined to apply through the applicable Project requirements and approval process, these shall be addressed in the Lot-specific BAP as appropriate.

The BAP shall, as applicable:

- identify Critical Habitat features, KBAs, sensitive habitats, species of conservation importance and ecological-connectivity features relevant to the Lot;
- confirm and characterise and, where appropriate, quantify significant residual biodiversity impacts;
- define measurable conservation objectives and appropriate performance indicators;
- identify habitat- and species-specific conservation actions, where required;
- identify and evaluate compensation and biodiversity offset measures only where significant residual impacts require such measures in accordance with the applicable Project requirements;
- consider relevant Project-level biodiversity actions and determine their applicability to the Lot based on final design, site conditions and confirmed impacts;
- establish monitoring, appropriate performance criteria and adaptive management requirements; and
- define implementation, reporting, roles, responsibilities, resource requirements and, where relevant, handover or longer-term management arrangements.

The BAP shall complement, rather than duplicate, the finalized ESMP, C-ESMP and Lot-specific Biodiversity Management Plan (BMP). Avoidance, minimisation and on-site restoration measures shall primarily be addressed through those instruments, while the BAP shall focus on significant residual impacts and additional biodiversity actions requiring more specific management, monitoring or conservation measures.

Where Project-level biodiversity assessments identify potentially suitable conservation, restoration or offset actions, the Contractor shall consider their relevance and applicability to the respective Lot. Measures demonstrated to be technically feasible, ecologically appropriate and necessary based on the confirmed Lot-specific impacts and applicable Project requirements shall be incorporated into the Lot-specific BAP through the applicable review and approval process.

1.2 Documents Supporting the BAP

The BAP shall be prepared using the latest applicable Project information, including:

- Employer's Requirements;
- finalized Lot-specific ESIA and ESMP;
- C-ESMP;
- Project Biodiversity Management Plan (BMP);
- Lot-specific BMP;
- updated Critical Habitat assessment and other relevant Lot-specific biodiversity assessments;
- supplementary biodiversity assessments and surveys;
- pre-construction flora, fauna, avifauna, bat and habitat surveys, where applicable;
- relevant Project design drawings and construction methodologies;
- Project Facility and Associated Facility assessments, where applicable;
- cumulative-impact assessments, where relevant;
- applicable biodiversity monitoring and stakeholder-engagement records; and
- other relevant Project management plans and technical studies that may affect biodiversity management, such as noise and vibration, water management, waste management, pollution prevention, traffic management and reinstatement/restoration plans, where applicable.

Existing Project-level biodiversity assessments and identified conservation, restoration, compensation or other biodiversity-management options shall be treated as an important technical basis for the Lot-specific BAP, but shall be verified and refined using final design and Lot-specific information. Where Project-level information identifies potential conservation or offset opportunities, these shall not be treated as automatically applicable to the Lot and shall be subject to Lot-specific assessment and the applicable review and approval process.

1.3 Stakeholder Engagement

The preparation and implementation of the BAP shall include engagement with relevant stakeholders where relevant to inform the feasibility, location, implementation and sustainability of proposed biodiversity actions.

Stakeholders may include competent national and local authorities, forestry and nature-conservation authorities, landowners and land users, academic institutions, biodiversity experts, NGOs and other organisations with relevant local or technical knowledge.

Stakeholder engagement shall be particularly undertaken where the BAP involves:

- habitat restoration or enhancement outside the direct Project footprint;
- biodiversity offset or compensation areas, where applicable;
- measures within or affecting KBAs or other recognised biodiversity areas;
- long-term land-management commitments; or
- conservation partnerships or species-specific programmes.

Relevant Project-level stakeholder engagement and biodiversity consultation records should be reviewed as part of the Lot-specific BAP preparation. Where additional biodiversity actions, conservation areas, restoration measures or compensation/offset options are being considered, further engagement should be undertaken as necessary to confirm ecological, legal, land-use and implementation feasibility.

1.4 Applicable Requirements

The BAP shall identify the legal, contractual and Project E&S requirements relevant to the biodiversity features and actions addressed by the Plan.

These shall include, as applicable:

- national legislation, permits and approvals;
- Employer's Requirements and Conditions of Contract;
- World Bank Environmental and Social Framework, including ESS6;
- Environmental and Social Commitment Plan;
- finalized ESIA and ESMP;
- Project Biodiversity Management Plan and Lot-specific BMP;
- applicable World Bank Group EHS Guidelines; and
- Good International Industry Practice.

Where compensation or biodiversity offset measures are identified as necessary to address significant residual biodiversity impacts, they shall be developed only after application of avoidance, minimisation and restoration measures and shall be subject to the applicable Project review and approval process, including approval by the Employer and the World Bank where required.

1.5 Roles and Responsibilities

The BAP shall define responsibilities for its preparation, review, implementation, monitoring, reporting and handover and, where applicable, operational management, consistent with the Employer's Requirements, ESMP and Project BMP.

Roles shall be defined, as applicable, for:

- AYGM PIU;
- PMC;

- CSC/Engineer;
- PIOC;
- D+B Contractor;
- other Lot Contractors where cross-Lot coordination is required; and
- TCDD/future operator for responsibilities extending into operation.

The D+B Contractor shall remain responsible for preparation and implementation of its approved Lot-specific BAP and for providing the necessary specialist input, surveys, monitoring and records. The involvement of AYGM, PMC, CSC/Engineer or PIOC shall not relieve the Contractor of its obligations under the Contract.

Where biodiversity features, ecological corridors or proposed conservation measures extend across more than one Lot, the relevant Contractors shall coordinate their actions to ensure consistency and avoid duplication of measures, monitoring activities or reported outcomes. AYGM PIU, supported by the PMC and CSC/Engineer as applicable, may facilitate coordination where corridor-wide consistency is required.

The PIOC shall retain an independent advisory and assurance role and shall not exercise direct authority to instruct the D+B Contractor.

Suggested Roles and Responsibilities Table

Party	Indicative BAP Responsibilities
AYGM PIU	Provide overall oversight of BAP preparation and implementation; ensure consistency with applicable Project E&S instruments and Employer's Requirements; coordinate Project-level review and applicable World Bank No-Objection processes; support resolution of cross-Lot biodiversity issues; and coordinate relevant handover arrangements to the future operator.
PMC	Provide technical and coordination support to AYGM PIU; support review of Lot-specific BAPs and related biodiversity studies; assist with corridor-wide consistency and cross-Lot coordination; and support consolidation of biodiversity information where required.
CSC / Engineer	Review Lot-specific BAPs and associated implementation documents; supervise and verify Contractor implementation; identify non-compliances and require corrective actions in accordance with the Contract; review monitoring results and supporting records.
PIOC	Provide independent advisory, review and assurance support to AYGM PIU; independently assess implementation effectiveness and material biodiversity risks within its scope; and report findings and recommendations to AYGM PIU without exercising direct Contractor-instruction authority.
D+B Contractor	Prepare and implement the Lot-specific BAP where required; undertake relevant surveys and assessments; provide qualified biodiversity expertise; implement approved biodiversity actions; maintain monitoring and implementation records; report through applicable Project E&S reporting arrangements; and coordinate with other Lot Contractors where necessary.
Other Lot Contractors	Coordinate where biodiversity features, ecological connectivity measures or mitigation actions extend across Lot boundaries or could be affected by activities in more than one Lot.
TCDD / Future Operator	Assume relevant biodiversity-related operation, maintenance and monitoring responsibilities following handover, where applicable and as defined through the approved handover arrangements.

2. Biodiversity Baseline and Mitigation Hierarchy

2.1 Biodiversity Baseline

The Lot-specific BAP shall present a concise summary of the biodiversity features relevant to the respective Lot, based on the finalized ESIA, updated Critical Habitat Assessment, supplementary biodiversity assessment, Lot-specific surveys and pre-construction surveys.

The baseline shall identify, as applicable:

- habitat types and habitat condition;
- Critical Habitat features and trigger species;
- other biodiversity features of conservation importance;
- Key Biodiversity Areas and other recognised biodiversity areas;
- flora, birds, bats, terrestrial fauna and aquatic biodiversity features;
- ecological corridors and connectivity features; and
- seasonal or spatial sensitivities relevant to construction and operation.

The Project-level biodiversity baseline shall be used as the starting point; however, the Contractor shall update or refine the information where necessary to reflect the final design, confirmed Project footprint, site-specific conditions, seasonal variability, Project Facilities and Associated Facilities. The Employer's Requirements explicitly require biodiversity baseline information to be updated or supplemented where these factors may affect the assessment.

The BAP shall identify any remaining data gaps or uncertainties and define the additional surveys or verification activities required before relevant biodiversity-sensitive works commence.

Where Project-level assessments have already identified potentially affected CH features, KBAs, habitats or species, the Lot-specific BAP shall verify their relevance to the final Lot design and incorporate them into the Lot-specific baseline, where applicable. Relevant Project-level information should be presented as supporting baseline information and should not be treated as fixed Lot-specific conditions where subsequent design or survey information demonstrates otherwise.

The Lot-specific baseline should clearly distinguish between Project-level information and information verified or updated for the relevant Lot.

2.2 Mitigation Hierarchy Roadmap

The BAP shall demonstrate how the mitigation hierarchy has been applied to the biodiversity features affected by the Lot.

The hierarchy shall be applied in the following sequence:

1. Avoidance – modification of design, siting, construction methodology or timing to avoid impacts on sensitive biodiversity features;
2. Minimisation – reduction of the extent, duration or intensity of impacts that cannot be fully avoided;
3. Restoration / Rehabilitation – restoration or rehabilitation of affected habitats and ecological functions, where feasible; and
4. Compensation / Offset – additional measures for significant residual impacts remaining after the preceding steps, subject to the applicable review and approval process.

This sequence is consistent with the Employer's Requirements, which place compensation or offset at the final stage of the mitigation hierarchy.

The BAP shall provide a Mitigation Hierarchy Roadmap linking each relevant biodiversity feature to the measures applied or proposed at each stage of the hierarchy.

Indicative Mitigation Hierarchy Roadmap

Biodiversity Feature / Receptor	Avoidance	Minimisation	Restoration / Rehabilitation	Reference to ESMP / C-ESMP / Lot-specific BMP	Confirmed Residual Impact	Additional BAP Action / Compensation / Offset Required?
[Feature / receptor]	[Measure or reference]	[Measure or reference]	[Measure or reference]	[Section / plan reference]	[Describe residual impact]	[No / Yes – describe / To be confirmed]

Where Project-level biodiversity studies identify potentially suitable restoration, conservation or offset actions, the Contractor shall consider these within the mitigation hierarchy and assess their applicability to the relevant Lot. Their inclusion in the Lot-specific BAP shall depend on the confirmed residual impact, ecological suitability, technical feasibility and applicable approval process. The identification of a potential Project-level action shall not in itself establish a requirement for its implementation under the relevant Lot.

3. Compensation Strategy

The Lot-specific BAP shall define the approach for addressing significant residual biodiversity impacts that remain after the applicable avoidance, minimisation and restoration or rehabilitation measures have been applied.

Compensation or biodiversity offset measures shall be considered only where significant residual biodiversity impacts remain and where such measures are required under the applicable Project requirements. Any compensation or offset measure shall be developed through the applicable Project review and approval process and shall represent the final stage of the mitigation hierarchy.

For each significant residual impact requiring additional biodiversity action, the BAP shall identify, as applicable:

- the affected biodiversity feature;
- the nature, extent and significance of the residual impact;
- the applicable biodiversity objective, including NNL or NG where such an objective has been established as applicable;
- the type and scale of additional conservation, compensation or offset measure required;
- potential actions and candidate locations;
- ecological suitability and relevance to the affected biodiversity feature;
- expected biodiversity outcome;
- technical and ecological feasibility;
- land availability, access and tenure considerations;
- permitting and competent-authority requirements;
- stakeholder considerations;
- implementation risks and uncertainties; and
- monitoring, maintenance and longer-term management requirements, where applicable.

Potential compensation approaches may include, where appropriate:

- restoration of degraded habitats;
- enhancement of existing habitats;
- assisted natural regeneration;
- habitat creation or ecological succession;
- riparian or wetland restoration;
- measures supporting ecological connectivity; and
- species-specific conservation measures where habitat-based measures alone are insufficient.

Project-level biodiversity studies may be used as a technical source for identifying potential compensation or conservation options. Such options shall be reviewed against the final Lot-specific design, confirmed footprint,

updated biodiversity information and residual impact assessment before being incorporated into the Lot-specific BAP.

Only measures demonstrated to be ecologically appropriate, technically feasible and necessary to address confirmed residual biodiversity impacts shall be carried forward as Lot-specific implementation commitments.

Where biodiversity accounting is undertaken, the BAP shall avoid double counting of biodiversity outcomes. The same conservation outcome should not be credited against more than one residual impact unless the relationship is technically justified and transparently documented.

Where a compensation or biodiversity offset measure requires a level of detailed implementation, monitoring or longer-term management beyond that provided in the BAP, an additional implementation instrument may be prepared where required under the applicable Project requirements and approval process.

4. Residual Impacts and Biodiversity Accounting

4.1 Residual Impact Assessment

The Lot-specific BAP shall identify the significant residual biodiversity impacts remaining after implementation of the applicable avoidance, minimisation and restoration or rehabilitation measures.

The assessment shall be based on the final detailed design, confirmed Project footprint, construction methodology and sequencing, Project Facilities and Associated Facilities as applicable, and updated Lot-specific biodiversity information.

The assessment shall, as applicable:

- quantify permanent and temporary habitat loss where sufficient information is available;
- identify affected Critical Habitat features and other biodiversity features of conservation importance;
- assess habitat fragmentation, degradation and loss or modification of ecological connectivity;
- consider disturbance, mortality, collision, electrocution, barrier effects and other relevant fauna risks;
- consider hydrological, aquatic and riparian impacts;
- distinguish between construction- and operation-phase residual impacts, where relevant; and
- identify significant residual impacts requiring additional conservation, compensation or offset measures.

The existing Project-level residual impact assessment shall be used as a technical starting point. However, Project-level impact estimates shall be reviewed and, where necessary, refined using the final Lot-specific design, confirmed Project footprint, construction methodology and updated biodiversity information.

Project-level calculations or assumptions shall not automatically be treated as final Lot-specific impact values where more accurate information is available.

Where the residual impact cannot reasonably be quantified, an appropriate qualitative or semi-quantitative assessment may be used, provided that the basis and assumptions are clearly documented.

4.2 Biodiversity Accounting

Where quantitative biodiversity accounting or specific NNL or NG objectives are established as applicable to the relevant biodiversity feature, the BAP shall describe the methodology used to relate confirmed biodiversity losses to the anticipated outcomes of restoration, compensation or offset measures.

The methodology shall consider, as relevant:

- habitat area and type;

- habitat condition or ecological quality;
- conservation importance;
- presence and relevance of Critical Habitat features and other biodiversity features of conservation importance;
- severity, duration and reversibility of the impact;
- expected ecological outcome or gain;
- time required for restoration, establishment or habitat maturation;
- uncertainty and delivery risk; and
- appropriate precautionary factors or multipliers, where technically justified.

The accounting approach should consider both biodiversity quantity and quality or condition where these are relevant to the affected feature.

The BAP shall clearly document:

- the accounting methodology;
- baseline and reference information;
- data sources;
- assumptions;
- calculation approach;
- uncertainties; and
- limitations.

Project-level assumptions or condition values may be used as an initial technical reference but should be refined where more accurate Lot-specific information is available.

Quantitative biodiversity accounting shall not be required where it is not appropriate to the biodiversity feature, impact or proposed action. In such cases, the BAP may use an appropriate qualitative or semi-quantitative approach.

4.3 Summary of Residual Impacts and Compensation Targets

The BAP shall provide a consolidated summary linking each significant residual biodiversity impact to the applicable biodiversity objective and required response.

An indicative format is:

Biodiversity Feature / Receptor	**Biodiversity Status / Significance**	**Residual Impact**	**Impact / Accounting Metric**	**Baseline / Reference Condition**	**Applicable Biodiversity Objective**	**Additional Action / Target, where applicable**	**Proposed Response**
[Feature]	[CH / KBA / habitat / species of conservation importance / other]	[Residual impact]	[Area / condition / population / qualitative basis]	[Baseline]	[Avoid further impact / restore / compensate / NNL / NG where applicable]	[Target or action]	[Proposed response]

Where separate biodiversity objectives apply to different features, these should be addressed individually rather than combined into a single aggregated target unless an integrated approach is technically justified.

Project-level residual impact estimates, candidate actions or potential compensation targets should be reviewed and refined against final Lot-specific information before they are adopted as Lot-specific commitments.

Confirmed measures shall be carried forward into the Biodiversity Action Programme and, where necessary, into any supporting implementation instrument required for detailed delivery.

5. Review of Biodiversity Actions

5.1 Action Framework for Habitats and Notable Species

The Lot-specific BAP shall define the biodiversity actions required to address confirmed significant residual impacts and other biodiversity management needs identified through the Lot-specific assessment.

Where NNL or NG objectives have been established as applicable to a particular biodiversity feature, the action framework should also identify how the relevant actions contribute to those objectives.

Actions shall be developed on the basis of:

- the residual impact assessment;
- applicable biodiversity accounting, where relevant;
- final design and construction methodology;
- Lot-specific biodiversity information;
- feasibility considerations;
- relevant Project-level biodiversity studies; and
- stakeholder and authority input, where necessary.

The action framework may include, as relevant:

- habitat restoration and enhancement;
- assisted natural regeneration and reforestation;
- wetland, grassland and riparian restoration;
- ecological-connectivity improvements;
- flora collection, propagation, translocation or re-establishment where justified;
- species-specific conservation measures;
- measures for birds, bats and terrestrial fauna;
- wildlife-crossing or movement-facilitation measures;
- targeted habitat or species research and monitoring; and
- conservation partnerships with competent authorities, academic institutions, research organisations or NGOs.

Project-level biodiversity actions identified through earlier studies shall be reviewed as potential technical options. Only measures confirmed as relevant, feasible and necessary for the respective Lot shall be incorporated as Lot-specific implementation commitments.

The BAP shall distinguish, as applicable, between:

- measures addressing significant residual impacts;
- compensation or biodiversity offset measures, where required;
- additional conservation or enhancement measures;
- Project-level or corridor-wide measures requiring coordination; and
- Lot-specific measures directly implemented by the relevant D+B Contractor.

Each confirmed action shall be included in the Biodiversity Action Matrix.

Biodiversity Feature / Receptor	Residual Impact / Management Need	Objective	Action	Action Level / Applicability	Location	Responsible Party	Timing / Ecological Window	Indicator	Performance / Completion Criterion	Estimated Cost / Cost Basis
[Feature]	[Impact / need]	[Objective]	[Action]	[Lot-specific / shared / Project-level coordination]	[Location]	[Party]	[Timing]	[Indicator]	[Criterion]	[Estimate / contract / TBD]

Where one action contributes to more than one habitat, species or Lot, the relationship shall be clearly explained. Where biodiversity accounting applies, the treatment of shared outcomes shall avoid inappropriate double counting.

5.2 Next Steps

The Lot-specific BAP shall identify the steps necessary to move from assessment and preliminary action identification to implementation.

These shall include, as applicable:

1. confirmation of Lot-specific significant residual impacts and applicable biodiversity objectives;
2. completion of outstanding surveys or verification activities;
3. completion of any required feasibility assessment;
4. review of Project-level proposed biodiversity actions against final Lot-specific conditions;
5. identification and assessment of suitable restoration, compensation or offset areas, where applicable;
6. engagement with competent authorities, landowners, land users and other relevant stakeholders, where necessary;
7. final selection and detailed design of confirmed biodiversity actions;
8. preparation of any supporting implementation instruments required for technically complex actions;
9. implementation of approved biodiversity actions;
10. monitoring and reporting against the applicable objectives and indicators; and
11. adaptive management where monitoring demonstrates underperformance, unexpected impacts or changed ecological conditions.

The implementation sequence shall be refined to reflect the final construction programme, ecological sensitivities and applicable approval requirements.

6. Offset Design, Implementation, Monitoring, Evaluation and Adaptive Management

6.1 Compensation and Biodiversity Offset Design, Where Required

Where compensation or biodiversity offsets are identified as necessary following application of the mitigation hierarchy, the Lot-specific BAP shall define the relevant design approach based on the confirmed residual impacts and applicable Project biodiversity objectives.

The design shall, as applicable:

- identify the biodiversity feature and significant residual impact to be addressed;
- define the intended ecological outcome;

- identify and assess candidate actions and locations;
- assess ecological suitability and relevance to the affected biodiversity feature;
- consider habitat condition, ecological connectivity and landscape context;
- consider additional conservation benefit where relevant;
- assess implementation feasibility, delivery risk, time lag and uncertainty;
- define the proposed restoration, enhancement, creation, protection or other conservation approach;
- identify relevant permitting, land and stakeholder requirements; and
- identify implementation, monitoring and longer-term management responsibilities, where applicable.

Potential approaches may include:

- habitat restoration;
- assisted natural regeneration;
- habitat enhancement;
- habitat creation;
- riparian or wetland restoration;
- ecological connectivity improvements; and
- species-specific conservation measures.

Potential Project-level offset or compensation options shall be treated as candidate options only. Their applicability shall be reviewed against the final Lot-specific residual impact assessment and relevant feasibility considerations.

Where a measure is confirmed as ecologically appropriate, technically feasible and necessary, it shall be incorporated into the Lot-specific BAP through the applicable Project review and approval process.

Where detailed implementation requirements justify preparation of a separate supporting instrument, such an instrument may be prepared and cross-referenced by the BAP.

6.1.1 Cost and Funding Arrangements

The BAP shall provide an estimated cost or cost basis for each confirmed biodiversity action and, where applicable, each compensation or offset component.

Cost estimates may include, as relevant:

- surveys and detailed design;
- specialist inputs;
- land-access or management arrangements;
- restoration or habitat-creation works;
- planting, propagation or translocation;
- monitoring;
- maintenance and aftercare;
- stakeholder engagement; and
- longer-term management, where required by the approved action.

The BAP shall identify the responsible party and applicable implementation or funding arrangement for each confirmed action.

Cost and funding requirements shall be proportionate to the confirmed Lot-specific actions. The identification of a potential action in an earlier Project-level study shall not by itself establish a separate funding commitment.

6.1.2 Legal, Permitting, Land and Stakeholder Requirements

The BAP shall identify the legal, permitting, land-access and stakeholder requirements relevant to proposed compensation or biodiversity offset measures, where applicable.

Before final selection of an action or site, the following should be assessed as relevant:

- land ownership, tenure and access;
- compatibility with existing land use;
- applicable permits and approvals;
- forestry, conservation and other competent-authority requirements;
- stakeholder and land-user considerations;
- potential social implications;
- availability and security of the proposed site; and
- arrangements required for maintenance, monitoring or longer-term management.

Stakeholder and competent-authority engagement shall be undertaken where necessary to confirm the feasibility and implementability of the proposed action.

No candidate site or action identified at Project level should be treated as a confirmed Lot-specific commitment until the applicable feasibility, land, permitting, stakeholder and approval requirements have been addressed.

6.2 Implementation Schedule

The BAP shall include an implementation schedule covering the preparation, implementation, monitoring, maintenance and follow-up of the confirmed biodiversity actions.

The schedule shall be aligned with the final construction programme and shall reflect, as relevant:

- ecological survey windows;
- biodiversity-sensitive construction activities;
- relevant breeding, migration, wintering or other seasonal sensitivities;
- seed collection or propagation periods;
- appropriate planting and restoration seasons;
- dependencies between surveys, design, approvals and implementation;
- timing of compensation or offset measures relative to the relevant Project impact, where applicable;
- monitoring requirements; and
- maintenance or longer-term management requirements, where applicable.

Indicative seasonal periods identified in Project-level biodiversity studies shall be reviewed and refined using updated Lot-specific information and qualified specialist advice.

Where practicable and technically appropriate, biodiversity actions should be implemented sufficiently early to reduce unnecessary temporal gaps between the Project impact and the intended ecological outcome.

BAP Action	Location / Biodiversity Feature	Predecessor / Dependency	Timing / Ecological Window	Responsible Party	Estimated Cost / Cost Basis	Implementation / Funding Arrangement	Status / Remarks
[Action]	[Feature / location]	[Survey / design / approval / other action]	[Timing]	[Party]	[Cost basis]	[Arrangement]	[Status]

6.3 Monitoring, Evaluation and Adaptive Management

The Lot-specific BAP shall establish monitoring arrangements sufficient to evaluate the implementation and effectiveness of confirmed biodiversity actions and to identify the need for corrective or adaptive management.

Monitoring should distinguish, where relevant, between:

- implementation indicators – whether an agreed action has been completed;
- ecological performance indicators – whether habitat or species conditions are responding as intended; and
- outcome indicators – whether the intended biodiversity outcome or applicable biodiversity objective is being achieved.

For each relevant action, the BAP shall identify:

Action / Feature	Baseline / Reference Condition	Indicator	Monitoring Method	Indicative Timing / Frequency	Performance / Trigger Criterion	Responsible Party	Adaptive / Corrective Action
[Action / feature]	[Baseline]	[Indicator]	[Method]	[Timing / frequency]	[Target / trigger / criterion]	[Party]	[Adaptive response]

Monitoring shall address, where relevant:

- habitat condition;
- restoration or rehabilitation performance;
- species presence, abundance or habitat use;
- ecological connectivity;
- invasive alien species;
- wildlife mortality or collision;
- aquatic or riparian conditions;
- species-specific conservation actions; and
- other parameters directly linked to the relevant biodiversity action or objective.

Monitoring methods, timing and frequency shall be proportionate to the biodiversity feature, ecological sensitivity, seasonality and action being implemented.

Fixed frequencies or success thresholds shall not be assumed unless supported by the applicable assessment, approved action or other Project requirement.

Where monitoring identifies material underperformance, unexpected biodiversity impacts or changed ecological conditions, the Contractor shall investigate the cause and implement appropriate corrective or adaptive measures.

Any material changes to BAP actions arising from adaptive management shall be documented together with the basis for the change and applicable follow-up monitoring.

6.4 Reporting Requirements

BAP reporting shall provide sufficient evidence to demonstrate implementation and effectiveness of the applicable biodiversity actions while avoiding unnecessary duplication of the Project's existing E&S reporting arrangements.

Reporting shall address, as applicable:

- implementation status of BAP actions;
- implementation of compensation or offset actions, where applicable;
- performance against applicable indicators and criteria;
- progress toward applicable biodiversity objectives, including NNL or NG where specifically established;
- monitoring results and trends;
- corrective and adaptive management actions;
- relevant stakeholder and authority engagement;
- outstanding biodiversity risks or actions;
- material changes affecting BAP implementation; and
- significant biodiversity incidents or unexpected impacts.

Reports shall be supported by appropriate evidence, which may include:

- monitoring data;
- survey results;
- maps and GIS information;
- photographs;
- inspection records;
- specialist records; and
- records of completed biodiversity actions.

BAP implementation and monitoring information should normally be incorporated into the applicable Contractor E&S reporting arrangements rather than creating a separate parallel reporting system.

Additional or targeted reporting may be provided where required by the Employer, World Bank or applicable Project E&S instruments.

Reporting and monitoring frequency shall be proportionate to the ecological sensitivity of the relevant biodiversity feature and the nature of the action being monitored.

Seasonal monitoring or reporting may be appropriate for features such as migratory birds, breeding species, flora with restricted survey windows or other seasonally sensitive receptors.

Significant biodiversity incidents shall be reported in accordance with the applicable Project incident-notification and reporting requirements.

6.5 Handover and Long-Term Management

The Lot-specific BAP shall identify biodiversity obligations that continue beyond construction and define the arrangements for their transfer to AYGM and, where applicable, TCDD or another designated responsible entity.

The handover process shall support continuity of relevant biodiversity management, monitoring, maintenance and follow-up requirements during the transition from construction to operation.

Handover shall include, as applicable:

- outstanding biodiversity monitoring commitments;
- restoration and other biodiversity-management requirements, including offset-related requirements where applicable;
- maintenance and aftercare obligations;
- outstanding performance, completion or ecological criteria;
- GIS datasets, biodiversity-monitoring data and relevant survey records;
- permits, approvals, agreements and land-management arrangements;
- stakeholder or authority commitments relevant to ongoing biodiversity actions;

- outstanding corrective or adaptive management actions;
- applicable longer-term management, resource or funding arrangements; and
- other biodiversity-related requirements requiring continuation after completion of construction.

The Contractor shall provide sufficient records and evidence to demonstrate the implementation status and performance of each biodiversity action at the time of handover.

Where restoration, compensation, offset or other biodiversity actions require monitoring or management beyond the construction period, the BAP shall identify, as applicable:

- the biodiversity feature and measure concerned;
- implementation status;
- remaining monitoring or maintenance requirements;
- applicable performance criteria;
- supporting records and data;
- the proposed post-handover responsible entity; and
- agreed follow-up arrangements.

Responsibilities shall only be transferred where the relevant receiving entity has been identified and the applicable handover arrangements have been agreed through the Project review and approval process.

Transfer of responsibility shall not by itself constitute completion of a biodiversity action where outstanding ecological, monitoring, maintenance or management requirements remain.

7. Best Management Practices and Additional Conservation Measures

The Lot-specific BAP may include additional conservation and enhancement measures that support applicable biodiversity objectives and may provide wider biodiversity benefits beyond the measures required to address direct Project impacts. Where NNL or NG objectives have been established as applicable to a particular biodiversity feature, relevant additional conservation measures may also contribute to those objectives.

These measures shall be clearly distinguished from:

- mandatory mitigation measures under the finalized ESMP, C-ESMP and Lot-specific BMP;
- compensation or offset measures required for significant residual impacts; and
- measures necessary to achieve any applicable approved biodiversity targets or commitments.

The Project-level biodiversity studies have identified a range of potential wider conservation and enhancement measures for further consideration. These include actions related to birds, terrestrial fauna, flora, aquatic habitats, ecological connectivity, research and conservation partnerships. Such measures should be treated as potential options and shall not constitute Lot-specific commitments unless their applicability has been confirmed through the relevant assessment and review process.

7.1 Project-wide / All-Lots Measures

Where relevant, within the applicable Project scope, and technically justified, the BAP may consider or cross-reference Project-wide actions that may provide benefits across several Lots, including:

- support for mitigation of bird collision and electrocution risks associated with relevant infrastructure, where a Project-related need and appropriate implementation mechanism are identified;
- targeted monitoring or conservation support for migratory birds and raptors;
- wildlife rescue, rehabilitation or response arrangements, where justified;
- landscape-scale ecological-connectivity measures;

- biodiversity research and monitoring programmes, where relevant to identified Project impacts or biodiversity objectives;
- collaboration with competent authorities, universities, research organisations and NGOs;
- conservation of flora of conservation importance through seed collection, propagation or ex-situ measures, where justified by the Lot-specific assessment and specialist advice; and
- data-sharing and capacity-building initiatives related to CH features and other biodiversity features of conservation importance.

Such measures shall be incorporated into the Lot-specific BAP only where they are demonstrated to be relevant to the Lot, technically feasible, within the applicable scope of responsibility and proportionate to the identified biodiversity risks and objectives.

Where a Project-wide measure requires participation by more than one Lot, a public authority or another third party, the Lot-specific BAP shall clearly identify the Contractor's specific role and shall not attribute responsibilities outside the Contractor's contractual control.

7.2 Lot-specific Measures

The BAP shall identify additional measures specific to the habitats, species, KBAs or ecological-connectivity features relevant to the respective Lot, where such measures are warranted by the Lot-specific assessment.

These may include, as applicable:

- enhancement of degraded woodland, grassland, wetland or riparian habitats;
- species-specific habitat improvement;
- targeted measures for bats, birds, mammals, reptiles or aquatic species;
- improvement of wildlife movement and crossing opportunities;
- targeted flora conservation actions;
- restoration or enhancement measures within or adjacent to relevant KBAs, where appropriate and feasible; and
- targeted research or monitoring required to address material ecological uncertainties relevant to BAP implementation.

For each measure confirmed for implementation, the BAP shall define the objective, biodiversity feature, location, implementation responsibility, timing, expected outcome, indicator and monitoring requirement.

Measures under this Section shall not be used as substitutes for required mitigation or compensation measures. Where an additional conservation measure is subsequently confirmed as necessary to achieve an approved biodiversity objective or, where applicable, NNL/NG target, it shall be incorporated into the relevant action programme and treated as a formal BAP commitment through the applicable review and approval process.

8. Annexes

The Lot-specific BAP shall include the supporting information necessary to demonstrate the basis, implementation, monitoring and verification of the biodiversity actions defined in the Plan, without unnecessarily duplicating information already contained in the Project BMP, Lot-specific BMP, ESIA or other applicable Project instruments.

As applicable, the annexes shall include:

- Critical Habitat and Biodiversity Features of Conservation Importance Register;
- habitat, species, KBA and ecological-connectivity maps, where relevant to the BAP;

- supplementary and pre-construction survey results or appropriate references to such surveys;
- residual-impact assessment tables;
- biodiversity accounting and NNL/NG calculations, where such accounting or objectives are applicable;
- mitigation hierarchy roadmap;
- Lot-specific Biodiversity Action Matrix;
- compensation and offset feasibility assessments, where applicable;
- candidate and selected offset-site information, where compensation or offset measures are being considered or implemented;
- monitoring and adaptive management plan;
- implementation schedule;
- estimated costs and applicable implementation/funding arrangements for confirmed BAP actions;
- stakeholder-engagement records, where relevant to BAP actions;
- permits, approvals and land-management arrangements, where applicable;
- GIS and spatial datasets, where relevant and available;
- reporting templates;
- completion and handover records, where applicable; and
- cross-references to any separate habitat restoration plan, species-specific action plan or other supporting biodiversity instrument prepared where required.

Supporting information already adequately presented in another approved Project document may be incorporated by clear cross-reference rather than reproduced in full, provided that the Lot-specific BAP remains sufficiently clear and implementable.

At a minimum, the following annex templates should be included.

8.1 Critical Habitat and Biodiversity Features of Conservation Importance Register

The Lot-specific BAP shall maintain a register of the Critical Habitat features and other biodiversity features of conservation importance that are relevant to BAP actions. The register should be based on the applicable Project-level assessments and updated or verified using Lot-specific information, final design and relevant surveys.

Ref.	Biodiversity Feature	Feature Type	Biodiversity Status / Significance	Location / Chainage	Baseline / Reference Condition	Residual Impact	Applicable Biodiversity Objective	BAP Action Ref.
[Ref.]	[Feature]	[Habitat / Flora / Fauna / KBA / Connectivity / Other]	[Critical Habitat / KBA / protected or threatened species / other conservation importance]	[Location / chainage]	[Condition / occurrence / relevant baseline]	[Confirmed significant residual impact, where applicable]	[Avoid / restore / maintain / compensate / NNL or NG where specifically applicable / other]	[Action reference]

Only biodiversity features that are relevant to the Lot-specific BAP should be included. The register is not intended to reproduce the full biodiversity baseline contained in the Project BMP, ESIA or supporting biodiversity assessments.

Where a feature has been identified at Project level but its relevance to the final Lot footprint has not yet been confirmed, this should be clearly indicated and the required verification identified.

NNL or NG should be recorded as an objective only where such an objective has been established as applicable to the relevant feature through the applicable Project assessment and approval process.

8.2 Residual Impact and Biodiversity Accounting Table

The Lot-specific BAP shall summarise the significant residual biodiversity impacts remaining after application of the mitigation hierarchy. Where quantitative biodiversity accounting is required under the applicable Project requirements or approved biodiversity action, the relevant accounting method, target and anticipated outcome shall also be presented.

Biodiversity Feature / Receptor	Residual Impact	Impact Metric / Basis of Assessment	Baseline / Reference Condition	Assessment / Accounting Method, where applicable	Applicable Biodiversity Objective / Target	Expected Outcome / Gain, where applicable	Residual Gap / Further Action Required
[Feature / receptor]	[Nature and magnitude of residual impact]	[Area / habitat condition / population / qualitative assessment / other relevant metric]	[Baseline / reference condition]	[Method or "Not applicable"]	[Applicable objective / target / "Not applicable"]	[Expected outcome / gain, where applicable]	[Gap remaining / further action required / none]

Quantitative biodiversity accounting shall be applied only where it is relevant and supported by an appropriate methodology and sufficient baseline information. Where quantitative accounting is not appropriate, the BAP may use a qualitative or semi-quantitative assessment of the residual impact and required biodiversity action.

Any NNL or NG target included in this table shall be limited to cases where such an objective has been established as applicable to the relevant biodiversity feature through the applicable Project assessment and approval process.

Project-level residual impact calculations or biodiversity accounting undertaken in earlier studies shall be reviewed against the final Lot design, confirmed footprint and updated biodiversity information before being adopted for Lot-specific purposes.

8.3 Biodiversity Action Matrix

The Lot-specific BAP shall include a Biodiversity Action Matrix summarising the actions confirmed as applicable to the relevant Lot. The Matrix should distinguish between Lot-specific actions and any Project-level actions to which the Lot contributes or with which coordination is required.

Biodiversity Feature / Receptor	Objective	Action	P Action Level / Applicability	Location	Responsibility	Timing / Ecological Window	Indicator	S Performance / Completion Criterion	C Estimated Cost / Cost Basis
[Feature / receptor]	[Objective]	[Specific action]	[Lot-specific / Project-level coordination / shared action]	[Location / chainage / area]	[Responsible party]	[Timing / season / construction stage]	[Indicator]	[Criterion / target / completion requirement, where applicable]	[Estimate / included in contract / TBD]

Only actions confirmed as relevant through the Lot-specific assessment and applicable Project requirements should be included as implementation commitments in the Matrix. Project-level actions identified in earlier biodiversity studies should be included only where their applicability to the relevant Lot has been confirmed or where specific coordination or contribution is required.

Where an action relates to compensation or biodiversity offset, the Matrix should identify this clearly and cross-reference the relevant feasibility assessment, approval and monitoring provisions.

Actions already fully addressed through the C-ESMP or Lot-specific BMP should normally be cross-referenced rather than duplicated unless they are necessary to understand or implement the BAP action.

8.4 Offset Feasibility Assessment

Where compensation or biodiversity offset measures are identified as necessary following application of the mitigation hierarchy, the Lot-specific BAP shall assess the feasibility of the relevant candidate actions and/or sites before they are confirmed for implementation.

For each candidate offset or compensation action/site, the assessment shall address, as applicable:

- biodiversity feature and residual impact addressed;
- ecological suitability and ecological relevance to the affected biodiversity feature;
- additional conservation benefit, where relevant;
- expected biodiversity outcome and contribution to the applicable Project biodiversity objective;
- land tenure and access constraints;
- permitting and authority coordination requirements;
- stakeholder considerations;
- implementation feasibility;
- technical feasibility and availability of suitable land or habitat;
- long-term protection and management, where required by the proposed measure;
- delivery risk and uncertainty; and
- indicative cost and resource requirements.

The assessment shall also consider the relationship of the proposed measure to other Project or third-party conservation, restoration or land-management activities, where relevant, to avoid duplication or double counting of outcomes.

Candidate actions or sites identified in Project-level biodiversity studies shall be treated as potential options only. Their inclusion in the Lot-specific BAP shall depend on Lot-specific residual impacts, updated ecological information, feasibility assessment, stakeholder and authority engagement, and the applicable Project review and approval process.

8.5 Monitoring and Adaptive Management Plan

The Lot-specific BAP shall define monitoring arrangements sufficient to evaluate implementation and effectiveness of the applicable BAP actions and to identify the need for corrective or adaptive management. Monitoring requirements shall be proportionate to the relevant biodiversity feature, impact and action and shall, where possible, build on monitoring already required under the Lot-specific BMP and other applicable Project instruments.

Monitoring methods, timing and frequency shall be defined on the basis of the relevant biodiversity feature, ecological sensitivity, seasonality, action being implemented and applicable Project requirements. Fixed monitoring frequencies or performance thresholds shall not be assumed unless supported by the Lot-specific assessment, approved action or other applicable Project requirements.

Action / Feature	Indicator	Baseline / Reference Condition	Monitoring Method	F Indicative Timing / Frequency	S Performance / Trigger Criterion	Responsible Party	Adaptive / Corrective Action
[Action / feature]	[Measurable indicator]	[Baseline / reference condition or applicable source]	[Survey / inspection / monitoring method]	[Season / interval / project stage]	[Target / trigger / acceptable condition, where applicable]	[Responsible party]	[Action to be considered if monitoring indicates underperformance or unexpected impact]

Monitoring results shall be reviewed against the relevant performance or trigger criteria, where established. Where monitoring identifies material underperformance, unexpected biodiversity impacts or changes in site conditions, the Contractor shall review the effectiveness of the relevant measures and implement appropriate corrective or adaptive actions in accordance with the applicable Project requirements.

Any changes to BAP actions arising from adaptive management shall be documented, together with the basis for the change, responsible party and follow-up monitoring requirements.

8.6 Implementation Schedule and Budget

The Lot-specific BAP shall present the timing, dependencies, ecological windows, responsible party, estimated cost and funding arrangement for each BAP action.

The implementation schedule shall be aligned with the final construction programme and, where relevant, shall identify activities that must be completed before specific biodiversity-sensitive works commence, activities linked to seasonal or ecological windows, and monitoring, maintenance or follow-up actions extending beyond construction.

Indicative dates or ecological windows shall be refined on the basis of Lot-specific survey findings, final design, construction sequencing and specialist advice, as applicable.

Cost estimates and funding arrangements shall be proportionate to the confirmed BAP actions. The inclusion of an action in Project-level biodiversity studies shall not, by itself, establish a separate funding commitment for the relevant Lot unless the action is confirmed as applicable through the Lot-specific assessment and approval process.

8.7 Reporting and Handover Templates

Templates shall be provided within the Lot-specific BAP, as applicable, for:

- periodic BAP implementation reporting;
- NNL/NG progress reporting; progress reporting against applicable biodiversity objectives, including NNL/NG objectives where these have been established for the relevant Lot;
- corrective and adaptive action tracking;
- biodiversity action completion and close-out;
- outstanding long-term obligations; outstanding biodiversity actions or longer-term management requirements, where applicable; and
- transfer of monitoring, restoration or offset-management other biodiversity-management responsibilities to AYGM/TCDD or the relevant future operator, where applicable.

The reporting templates should be aligned with the Project's existing E&S reporting arrangements and should not create a separate reporting system where the required information can be incorporated into existing Contractor monitoring and reporting.

Handover documentation should identify, where applicable, the relevant biodiversity feature or measure, its implementation status, outstanding actions, monitoring or maintenance requirements, supporting records, responsible entity following handover, and any agreed follow-up arrangements.

Where compensation or offset measures are implemented and require management or monitoring beyond the construction period, the applicable handover arrangements shall be defined based on the approved measure and the relevant Project requirements.

Biodiversity Measure / Feature	**Location**	**Status at Handover**	**Outstanding Action / Monitoring Requirement**	**Supporting Record / Reference**	**Post-Handover Responsible Entity**	**Follow-up / Remarks**
[Measure / feature]	[Location]	[Completed / ongoing / pending]	[Action / monitoring / maintenance]	[Report / drawing / monitoring record]	[AYGM / TCDD / future operator / other]	[As applicable]