

16 ENVIRONMENTAL MANAGEMENT

16.1 Introduction and purpose

The Environmental Impact Assessment has established the potential significant effects associated with the Scheme and how these can be avoided, reduced or mitigated and how environmental enhancement can be provided. To ensure these measures are properly implemented and to ensure compliance with relevant legislation and the Scheme's Environmental Management System (EMS) it is essential there is effective environmental management throughout the construction, operation and aftercare of the Scheme.

16.2 Environmental Management System (EMS)

The JV Team will operate a Scheme-specific Environmental Management System (EMS) in compliance with BS EN ISO 14001 and ISO 14004, and the requirements of Volume 10 of the DMRB.

16.3 Construction Environmental Management Plan (CEMP)

The Construction Environmental Management Plan (CEMP) would form the basis for environmental management of the Scheme. It would ensure that environmental issues are properly addressed initially through the construction phase and establishes the basis for ensuring environmental issues and commitments are dealt with during operation and aftercare of the Scheme. The draft contents of the Construction Environmental Management Plan (CEMP) is provided in ES Volume 3, Appendix L.1.

The CEMP would be a 'live' document that will be developed further during Key Stage 4 (leading up to public inquiry if one is required) and Key Stage 6 (during construction) in consultation with the Statutory Environmental Bodies (SEBs). Some of the licences, method statements and the draft Register of Commitments (ROC) that would form part of the CEMP have been developed already.

A draft ROC will be provided. This would be used to keep track of all the relevant Scheme commitments and to ensure they are fulfilled. The draft ROC lists relevant commitments from legislation and commitments made within this ES (principally taken from the mitigation sections of each topic chapter). It displays ownership of each commitment made and timescales in which they should be addressed. It would be developed further during Key Stages 4 and 6 and may include further commitments made from:

- The outcomes of consultation with the landowners, SEBs and other stakeholders,
- Findings of additional surveys or supplementary information,
- Commitments made during the public inquiry (should one be required).

The ROC would be implemented through the CEMP and the Environmental Landscape and Ecology Aftercare and Management Plan (ELEAMP).

16.4 Environmental Landscape and Ecology Aftercare and Management Plan

The Environmental Landscape and Ecology Aftercare and Management Plan would be implemented by the Contractor for 5 years following the completion of Environmental Design Works. The plan shall include the following:

- Protection, management and maintenance of existing retained vegetation;
- Protection, management and maintenance of new planting, and seeding;
- Protection, management and maintenance of ecological measures, including habitat and species protection measures;
- Habitat creation areas;
- Details of areas where Japanese Knotweed or other pernicious weeds may be buried for monitoring purposes;
- Summary schedule of activities and monitoring required including timetable;
- Procedure for monitoring compliance;
- Procedures for reporting on completion and establishment of measures during the aftercare period e.g. reporting programme, site inspections, involvement of NMTWRA, reporting on success and establishment.

16.5 Maintenance Environmental Management Plan

A Maintenance Environmental Management Plan (MEMP) setting out a proposed strategy for the future maintenance and management of all Environmental Areas (including landscape and ecological areas) would be prepared for the 10-year period commencing at the issue of the Maintenance Certificate.

The MEMP shall include, but shall not be limited to, the following:

- Strategies for the regular maintenance of all Environmental Areas;
- A timetable for the implementation of each regular maintenance operation during a typical 12-month period, together with an overall 10 year timetable showing any variation to the regular maintenance tasks during the period of the MEMP and with any 20 year objectives;
- A timetable showing the anticipated date at which the Environmental Function attributed to each Environmental Area would be achieved during the 20-year period of the MEMP. (Note: This shall include the date at which any existing Environmental Area has already achieved its Environmental Function during the Contract Period, together with any additional performance criteria over and above that contained within the relevant section of DMRB Volume 10);
- A timetable showing the regular monitoring requirements for each Environmental Area, including those in relation to habitats and species and/or water quality, as agreed with the relevant Statutory and Non-Statutory bodies (e.g. NRW);
- Any supporting information as considered appropriate by the Contractor including agreements made with third parties, (copy correspondence to be included); conclusions of the Environmental Performance Reports.

16.6 Environmental Master Plan

The environmental mitigation measures proposed within this ES are illustrated on the Environmental Masterplan (refer to Volume 2, Figure 16.1) and follow the 'Functions' and 'Elements' methodology as outlined in DMRB Volume 10, Section 0^{16.1, 16.2, 16.3}.

All mitigation measures have been ascribed the purpose or Environmental 'Function' and the nature or Landscape or Environmental 'Element'. These are described as follows:

Environmental Functions

The codes identify the objectives to the various features of the highway estate. This includes the ability, when appropriate, to ascribe highway and structural elements an environmental function that would inform its design and influence maintenance techniques.

Landscape Elements

The codes describe the core Elements of the 'soft estate' such as grass, planting, wetland, hedges. It also contains provision for inclusion of 'hard' landscape features, such as decorative railings, feature paving materials, where these are there for specific landscape reasons.

Environmental Elements

The codes describe non-landscape features, enabling the description of such 'elements' as Noise Attenuation measures, Water Quality controls, Protected Species, and legislated elements such as Injurious Weeds and Pests. Many of these elements interact closely with landscape functions and elements. In addition to the Environmental Functions and Elements the Environmental Masterplan includes Planning and Policy features which takes account of the relevant planning constraints.

16.7 Roles and Responsibilities

16.7.1 Environmental Coordinator

The Contractor's Environmental Co-ordinator shall have a prominent role in the project delivery and co-ordinate the activities of the environmental specialists through the Environmental Assessment process and be responsible for the production and update of:

- The Environmental Statement;
- The Environmental Proposal Plans;
- The Assessments of Implications on European Sites (AIES) (if appropriate);
- Licences and consents (where relevant);
- The Construction Environmental Management Plan (CEMP) including its ongoing review and update throughout the contract period;
- Environmental elements of the Register of Commitments (ROC);
- Environmental elements of the Specification for Highways Works Appendices;
- The Maintenance Environmental Management Plan (MEMP).

The Environmental Coordinator shall:

- Be a full-time member of the *Designers* site staff. He shall spend at least one full (7.5 hour) day on site every week during Key Stage 6 and shall be supported by the Environmental Clerk of Works (ECOW).

- Have the authority to direct members of the *Contractor's* site staff on environmental issues.
- Have the authority to halt works that he or the ECOW believes to be detrimental to the environment, not in accordance with commitments made by the Welsh Government or in contravention of any consents and licences granted for the purpose of undertaking works within, adjacent or affecting environmental areas.
- Not be replaced except with the written approval of the Welsh Government.
- Be familiar with the process of highway design, construction, and supervision and have an appropriate level of knowledge of good industry practice.
- Be responsible for the production of the Construction Environmental Management Plan (CEMP) and its continual update and also be responsible for the handover of the Maintenance Environmental Management Plan (MEMP) to the Trunk Road Agent on completion of the aftercare period.
- Be responsible for the production of clear and concise Method Statements required to meet licence conditions and requirements for European Protected Species, UK Protected Species, Discharge Consents and other measures made to comply with statutory provisions.
- Responsible for overseeing and auditing the implementation of the EMS, CEMP, environmental mitigation measures and aftercare.
- Responsible for ensuring that adequate environmental training is provided for the Contractor's staff.
- Assist in the development and delivery of environmental training for site personnel and subcontractors.
- Report on compliance with sustainable construction objectives, targets and records.
- Report on compliance and monitoring of commitments resulting from the statutory procedures, including any from a Local Public Inquiry (if appropriate).
- Ensure consistency and compliance with legislation, policy and guidance.
- Provide advice and liaise with the construction team to ensure that environmental risks are identified and appropriate controls are developed and included within method statements.
- Provide a schedule and procedures for monitoring and reporting.
- Provide an Environmental Monitoring Report for each year of construction and Environmental Performance Report for each year of the aftercare period.

16.7.2 Environmental Clerk of Works

The Environmental Clerk of Works shall support the Environmental Co-ordinator during construction and after care. He / she is the Environmental Coordinator's representative on site and is responsible for overseeing construction activities to ensure all environmental commitments are met and compliance with the conditions of all licences and permits. He / she shall be a member of the Designer's site staff, be based on site full time and shall:

- Have the authority to direct members of the Contractor's site staff on environmental issues.
- Not be replaced except with the written approval of the Welsh Government.

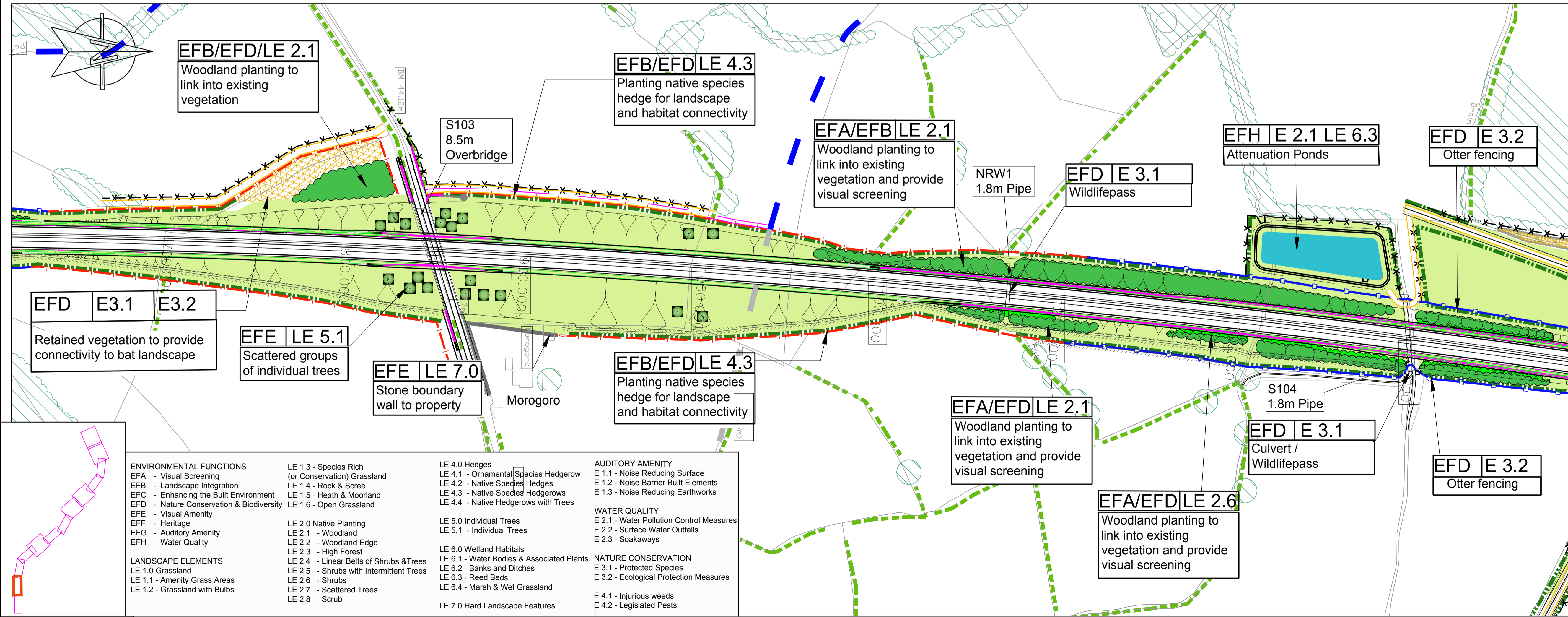
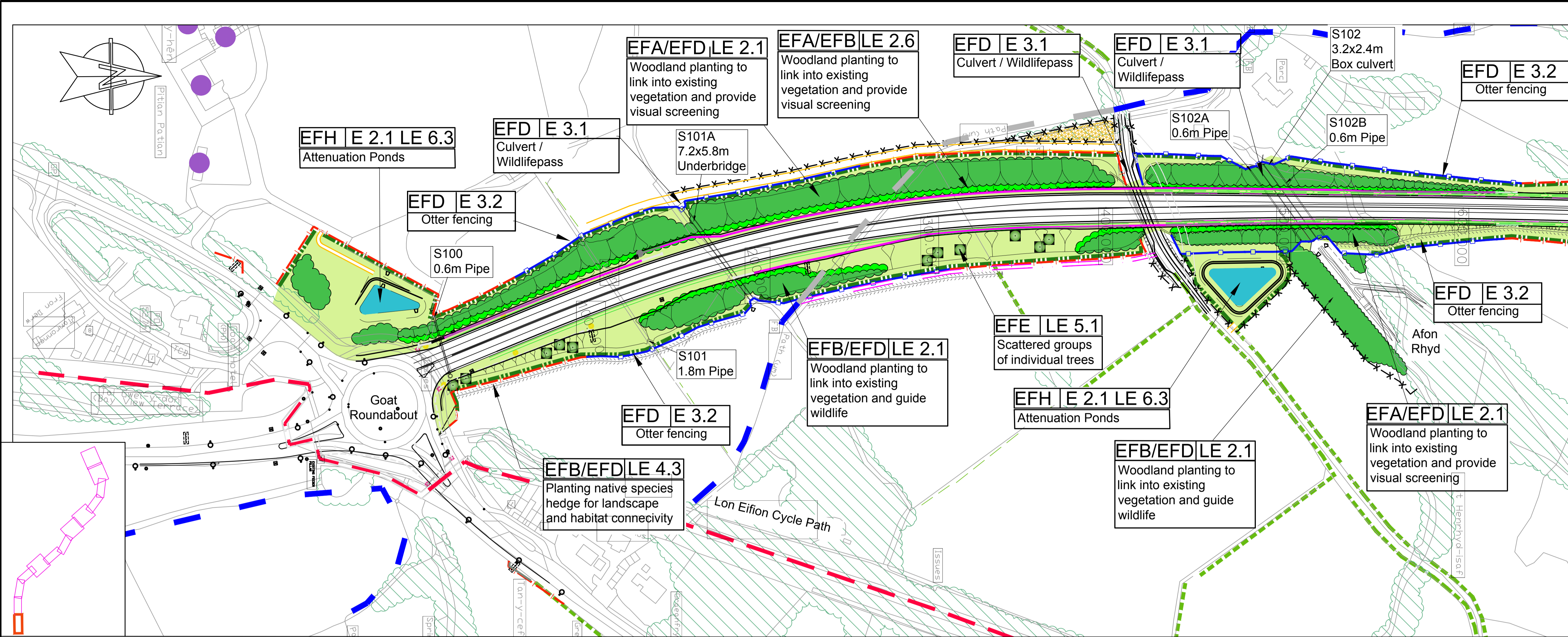
- Be familiar with the process of highway design, construction, and supervision.
- Be experienced in environmental site supervision and have an appropriate level of knowledge of good industry practice.
- Undertake site inspections where necessary.
- Be responsible for ensuring all relevant licences, consents and method statements are in place prior to construction activities.
- Be responsible for maintaining and updating the CEMP and the environmental elements of the ROC.
- Shall promote awareness of the SWMP, identifying opportunities to improve waste management on site and monitoring performance.
- Be responsible for overseeing and auditing the implementation of the CEMP and environmental mitigation measures on site during KS6.
- Be responsible for identifying training needs and providing environmental training including inductions, tool box talks etc. for the Contractor's site staff.
- Be able to demonstrate an understanding of the relevant environmental and ecological legislation and requirements for consents and licences and the constraints that they impose upon the operation and timing of works.
- Ensure consistency and compliance with legislation, policy and guidance during the construction period.
- Monitor construction activities to ensure that identified and appropriate control measures are effective and in compliance with the CEMP.
- Manage the environmental monitoring programme and review of the routine reports.
- Provide advice and assistance to site personnel on environmental matters.
- Undertake monitoring when required.
- Ensure correct procedures are followed in the event of an environmental incident.
- Assist the site foreman in maintaining environmental records.
- Dissemination of waste reduction and waste management procedures to all relevant personnel on site.

16.7.3

Site Foreman

- The site foreman will report on environmental activities to the site environmental representative and will be responsible for the following:
- Implement and maintain environmental controls on site.
- Attend to any spills or environmental incident that may occur on site.
- Report any activity that has resulted, or has the potential to result, in an
- Environmental incident immediately to the site environmental representative / environmental manager;
- Complete daily environmental log; and

- Maintain waste register and ensure correct waste management procedures are being implemented.



NOTES

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KEY:

- Highway Boundary
- On Embankment
- In Cutting
- Vehicle restraint system
- Attenuation Pond
- Post and wire stock proof fencing
- Otter fencing
- Existing Woodland
- Existing Hedgerow
- Native Woodland
- Native Woodland Edge Shrubs
- Retained existing vegetation to be within Welsh Government ownership
- Proposed Native Hedgerow
- Individual trees
- Areas of species rich grassland (EFB/EFD - LE1.3) excluding verges, roundabouts and visibility aisles with highway/amenity grass.
- Area of rock with retained soils placed to encourage natural regeneration
- Category A Trees to be protected.
- Existing Public Right Of Way
- Existing National Cycle Network
- Diverted Public Right Of Way
- Extinguished Public Right Of Way
- Private Means Of Access
- Drainage ditch
- Highway signage | Lighting column
- Listed Building
- Scheduled Ancient Monument

Rev	Date	Description	By	Chk	App

FINAL

Site/Project:
A487 CAERNARFON AND BONTNEWYDD BYPASS

Title:
ENVIRONMENTAL MASTER PLAN (a-i)

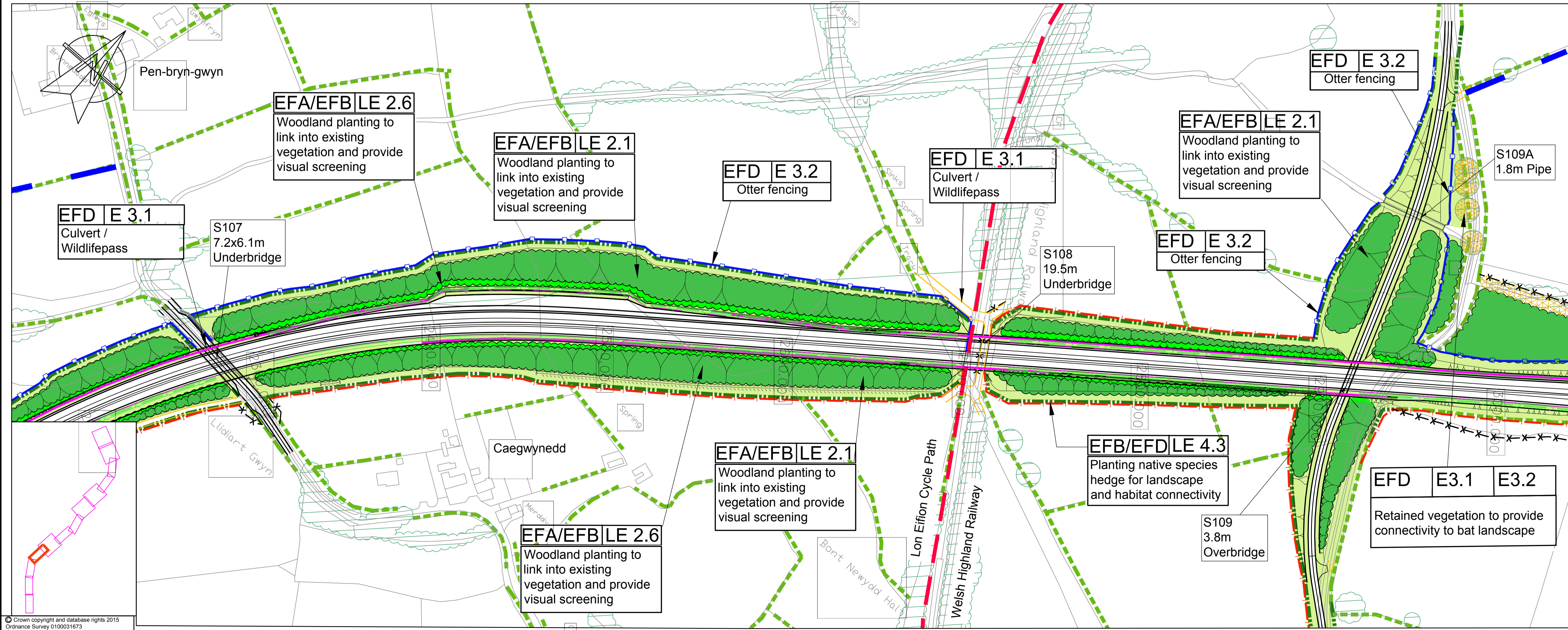
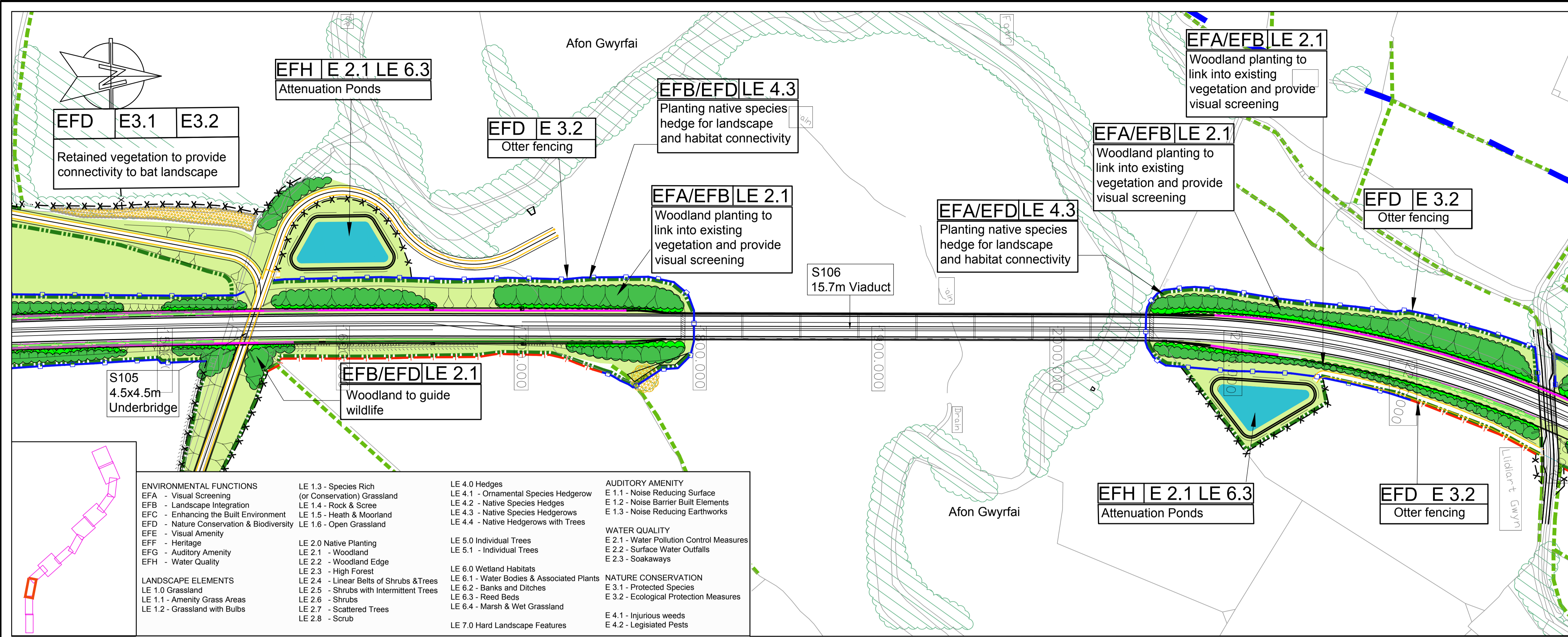
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Figure 16.1a	Revision:

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ENVIRONMENTAL FUNCTIONS	LANDSCAPE ELEMENTS	AUDITORY AMENITY	WATER QUALITY	NATURE CONSERVATION
EFA - Visual Screening	LE 1.0 Grassland	E 1.1 - Noise Reducing Surface	E 2.1 - Water Pollution Control Measures	E 3.1 - Protected Species
EFB - Landscape Integration	LE 1.1 - Amenity Grass Areas	E 1.2 - Noise Barrier Built Elements	E 2.2 - Surface Water Outfalls	E 3.2 - Ecological Protection Measures
EFC - Enhancing the Built Environment	LE 1.2 - Grassland with Bulbs	E 1.3 - Noise Reducing Earthworks	E 2.3 - Soakaways	E 4.1 - Injurious weeds
EFD - Nature Conservation & Biodiversity	LE 1.3 - Species Rich (or Conservation) Grassland			E 4.2 - Legislated Pests
EFE - Visual Amenity	LE 1.4 - Rock & Scree			
EFF - Heritage	LE 1.5 - Heath & Moorland			
EFG - Auditory Amenity	LE 1.6 - Open Grassland			
EFH - Water Quality	LE 2.0 Native Planting			
	LE 2.1 - Woodland			
	LE 2.2 - Woodland Edge			
	LE 2.3 - High Forest			
	LE 2.4 - Linear Belts of Shrubs & Trees			
	LE 2.5 - Shrubs with Intermittent Trees			
	LE 2.6 - Shrubs			
	LE 2.7 - Scattered Trees			
	LE 2.8 - Scrub			
	LE 4.0 Hedges			
	LE 4.1 - Ornamental/Species Hedgerow			
	LE 4.2 - Native Species Hedges			
	LE 4.3 - Native Species Hedgerows			
	LE 4.4 - Native Hedgerows with Trees			
	LE 5.0 Individual Trees			
	LE 5.1 - Individual Trees			
	LE 6.0 Wetland Habitats			
	LE 6.1 - Water Bodies & Associated Plants			
	LE 6.2 - Banks and Ditches			
	LE 6.3 - Reed Beds			
	LE 6.4 - Marsh & Wet Grassland			
	LE 7.0 Hard Landscape Features			



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- Otter fencing
- Existing Woodland
- Existing Hedgerow
- Native Woodland
- Native Woodland Edge Shrubs
- Retained existing vegetation to be within Welsh Government ownership
- Proposed Native Hedgerow
- Individual trees
- Areas of species rich grassland (EFB/EFD - LE1.3) excluding verges, roundabouts and visibility splays with highway/amenity grass.
- Area of rock with retained soils placed to encourage natural regeneration
- Category A Trees to be protected.
- Existing Public Right Of Way
- Existing National Cycle Network
- Diverted Public Right Of Way
- Extinguished Public Right of Way
- Private Means Of Access
- Drainage ditch
- Highway signage | Lighting column
- Listed Building
- Scheduled Ancient Monument

Rev	Date	Description	By	Chk	App

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Ty Glyn, Canol Y Dre, Ruthin Denbighshire Tel: 01824 703661

Site/Project:
A487 CAERNARFON AND BONTNEWYDD BYPASS

Title:
ENVIRONMENTAL MASTER PLAN (a-i)

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Figure 16.1b P01.1

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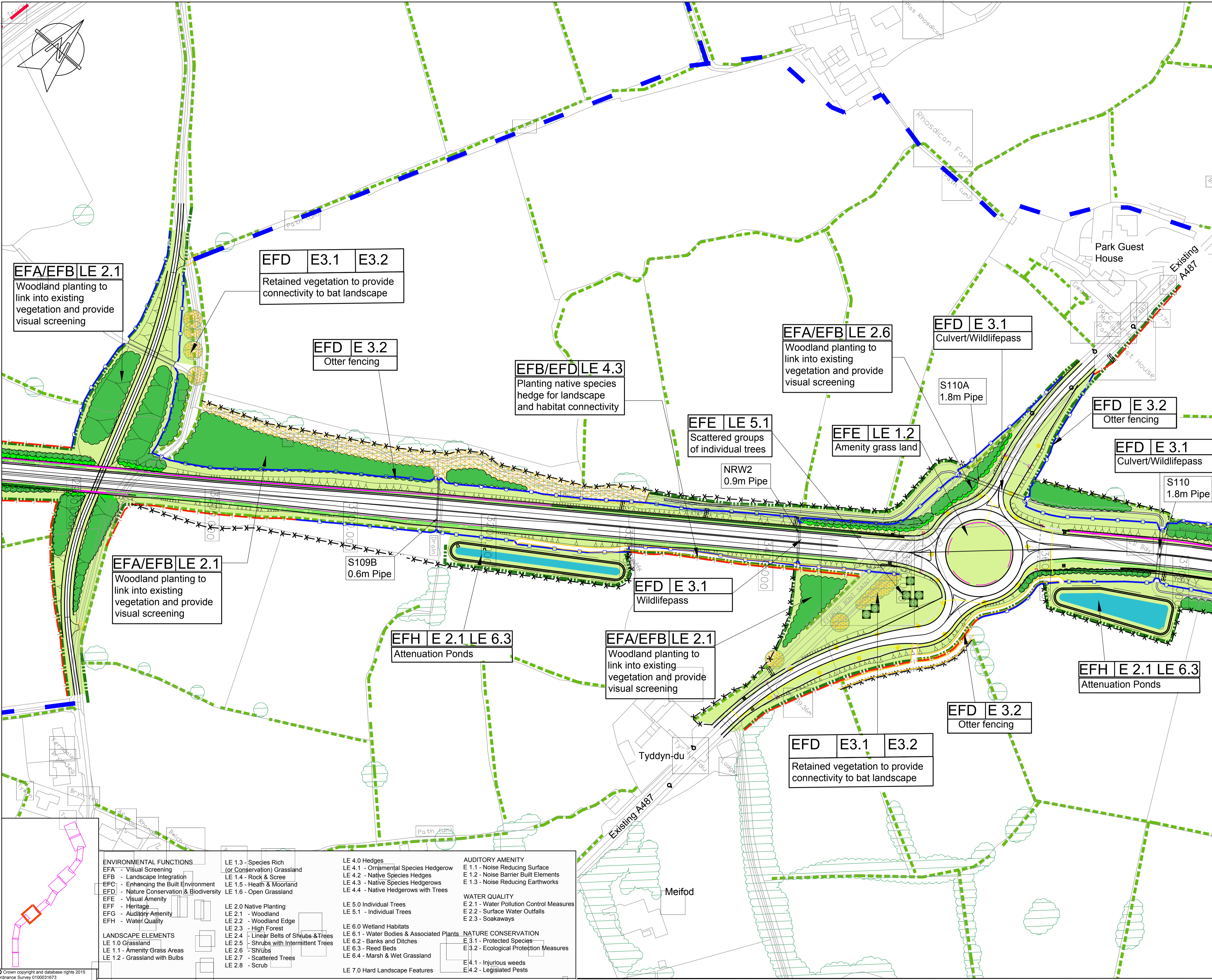
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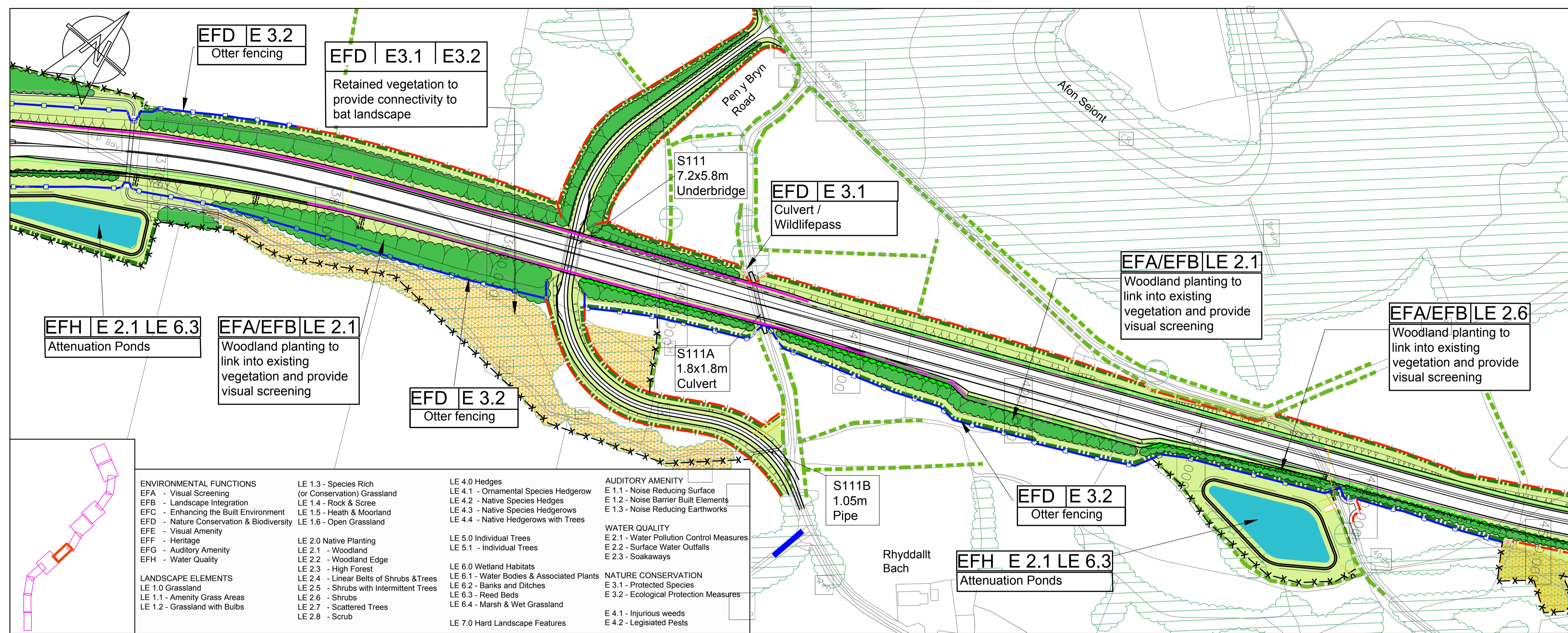
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Figure 16.1c P01.1



ENVIRONMENTAL FUNCTIONS		LANDSCAPE ELEMENTS		AUDITORY AMENITY		WATER QUALITY		NATURE CONSERVATION	
EFA - Visual Screening	LE 1.3 - Species Rich (or Conservation) Grassland	LE 1.0 Grassland	LE 2.0 Native Planting	LE 4.0 Hedges	E 1.1 - Noise Reducing Surface	E 2.1 - Water Pollution Control Measures	E 3.1 - Protected Species	E 4.1 - Injurious weeds	E 3.1 - Protected Species
EFB - Landscape Integration	LE 1.4 - Rock & Scree	LE 1.1 - Amenity Grass Areas	LE 2.1 - Woodland	LE 4.1 - Ornamental Species Hedgerow	E 1.2 - Noise Barrier Built Elements	E 2.2 - Surface Water Outfalls	E 3.2 - Ecological Protection Measures	E 4.2 - Legislated Pests	E 3.2 - Ecological Protection Measures
EFC - Enhancing the Built Environment	LE 1.5 - Heath & Moorland	LE 1.2 - Grassland with Bulbs	LE 2.2 - Woodland Edge	LE 4.2 - Native Species Hedges	E 1.3 - Noise Reducing Earthworks	E 2.3 - Soakaways			
EFD - Nature Conservation & Biodiversity	LE 1.6 - Open Grassland		LE 2.3 - High Forest	LE 4.3 - Native Species Hedgerows					
EFE - Visual Amenity			LE 2.4 - Linear Belts of Shrubs & Trees	LE 4.4 - Native Hedgerows with Trees					
EFF - Heritage			LE 2.5 - Shrubs with Intermittent Trees	LE 5.0 Individual Trees					
EFG - Auditory Amenity			LE 2.6 - Shrubs	LE 5.1 - Individual Trees					
EFH - Water Quality			LE 2.7 - Scattered Trees	LE 6.0 Wetland Habitats					
			LE 2.8 - Scrub	LE 6.1 - Water Bodies & Associated Plants					
				LE 6.2 - Banks and Ditches					
				LE 6.3 - Reed Beds					
				LE 6.4 - Marsh & Wet Grassland					
				LE 7.0 Hard Landscape Features					



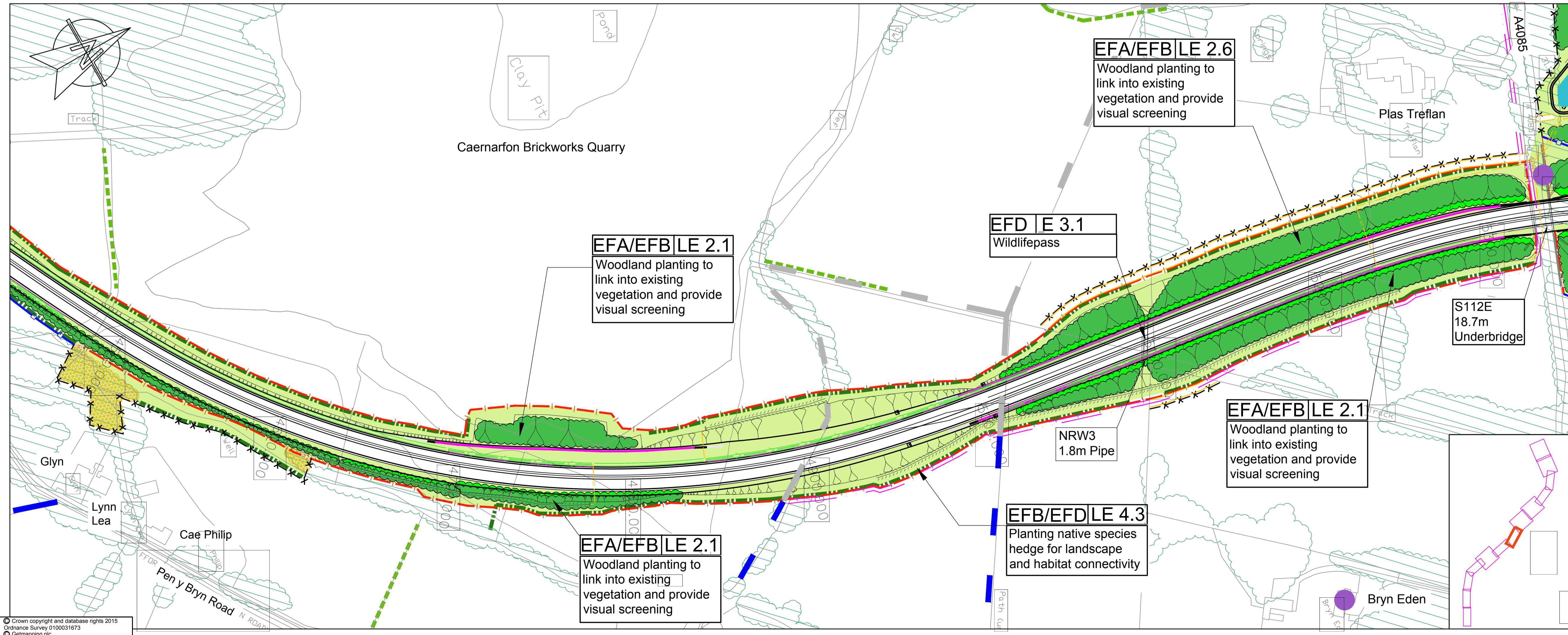
ENVIRONMENTAL FUNCTIONS	LANDSCAPE ELEMENTS	LE 1.3 - Species Rich (or Conservation) Grassland	LE 1.4 - Rock & Scree	LE 1.5 - Heath & Moorland	LE 1.6 - Open Grassland	LE 2.0 Native Planting	LE 2.1 - Woodland	LE 2.2 - Woodland Edge	LE 2.3 - High Forest	LE 2.4 - Linear Belts of Shrubs & Trees	LE 2.5 - Shrubs with Intermittent Trees	LE 2.6 - Shrubs	LE 2.7 - Scattered Trees	LE 2.8 - Scrub	LE 4.0 Hedges	LE 4.1 - Ornamental Species Hedgerow	LE 4.2 - Native Species Hedges	LE 4.3 - Native Species Hedgerows	LE 4.4 - Native Hedgerows with Trees	LE 5.0 Individual Trees	LE 5.1 - Individual Trees	LE 6.0 Wetland Habitats	LE 6.1 - Water Bodies & Associated Plants	LE 6.2 - Banks and Ditches	LE 6.3 - Reed Beds	LE 6.4 - Marsh & Wet Grassland	LE 7.0 Hard Landscape Features	AUDITORY AMENITY	E 1.1 - Noise Reducing Surface	E 1.2 - Noise Barrier Built Elements	E 1.3 - Noise Reducing Earthworks	WATER QUALITY	E 2.1 - Water Pollution Control Measures	E 2.2 - Surface Water Outfalls	E 2.3 - Soakaways	NATURE CONSERVATION	E 3.1 - Protected Species	E 3.2 - Ecological Protection Measures	E 4.1 - Injurious weeds	E 4.2 - Legislated Pests
EFA - Visual Screening	LE 1.0 Grassland	LE 1.3 - Species Rich (or Conservation) Grassland	LE 1.4 - Rock & Scree	LE 1.5 - Heath & Moorland	LE 1.6 - Open Grassland	LE 2.0 Native Planting	LE 2.1 - Woodland	LE 2.2 - Woodland Edge	LE 2.3 - High Forest	LE 2.4 - Linear Belts of Shrubs & Trees	LE 2.5 - Shrubs with Intermittent Trees	LE 2.6 - Shrubs	LE 2.7 - Scattered Trees	LE 2.8 - Scrub	LE 4.0 Hedges	LE 4.1 - Ornamental Species Hedgerow	LE 4.2 - Native Species Hedges	LE 4.3 - Native Species Hedgerows	LE 4.4 - Native Hedgerows with Trees	LE 5.0 Individual Trees	LE 5.1 - Individual Trees	LE 6.0 Wetland Habitats	LE 6.1 - Water Bodies & Associated Plants	LE 6.2 - Banks and Ditches	LE 6.3 - Reed Beds	LE 6.4 - Marsh & Wet Grassland	LE 7.0 Hard Landscape Features	AUDITORY AMENITY	E 1.1 - Noise Reducing Surface	E 1.2 - Noise Barrier Built Elements	E 1.3 - Noise Reducing Earthworks	WATER QUALITY	E 2.1 - Water Pollution Control Measures	E 2.2 - Surface Water Outfalls	E 2.3 - Soakaways	NATURE CONSERVATION	E 3.1 - Protected Species	E 3.2 - Ecological Protection Measures	E 4.1 - Injurious weeds	E 4.2 - Legislated Pests

NOTES (A1)

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KEY:

	Highway Boundary
	On Embankment
	In Cutting
	Vehicle restraint system
	Attenuation Pond
	Post and wire stock proof fencing
	Otter fencing
	Existing Woodland
	Existing Hedgerow
	Native Woodland
	Native Woodland Edge Shrubs
	Retained existing vegetation to be within Welsh Government ownership
	Proposed Native Hedgerow
	Individual trees
	Areas of species rich grassland (EFB/efd - LE1.3) excluding verges, roundabouts and visibility splays with highway/amenity grass.
	Area of rock with retained soils placed to encourage natural regeneration
	Category A Trees to be protected.
	Existing Public Right Of Way
	Existing National Cycle Network
	Diverted Public Right Of Way
	Extinguished Public Right Of Way
	Private Means Of Access
	Drainage ditch
	Highway signage Lighting column
	Listed Building
	Scheduled Ancient Monument



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- Native Woodland
- Native Woodland Edge Shrubs
- Retained existing vegetation to be within Welsh Government ownership
- Proposed Native Hedgerow
- Individual trees
- Areas of species rich grassland (EFB/efd - LE 1.3) excluding verges, roundabouts and visibility splays with highway/amenity grass.
- Area of rock with retained soils placed to encourage natural regeneration
- Category A Trees to be protected.
- Existing Public Right Of Way
- Existing National Cycle Network
- Diverted Public Right of Way
- Extinguished Public Right of Way
- Private Means Of Access
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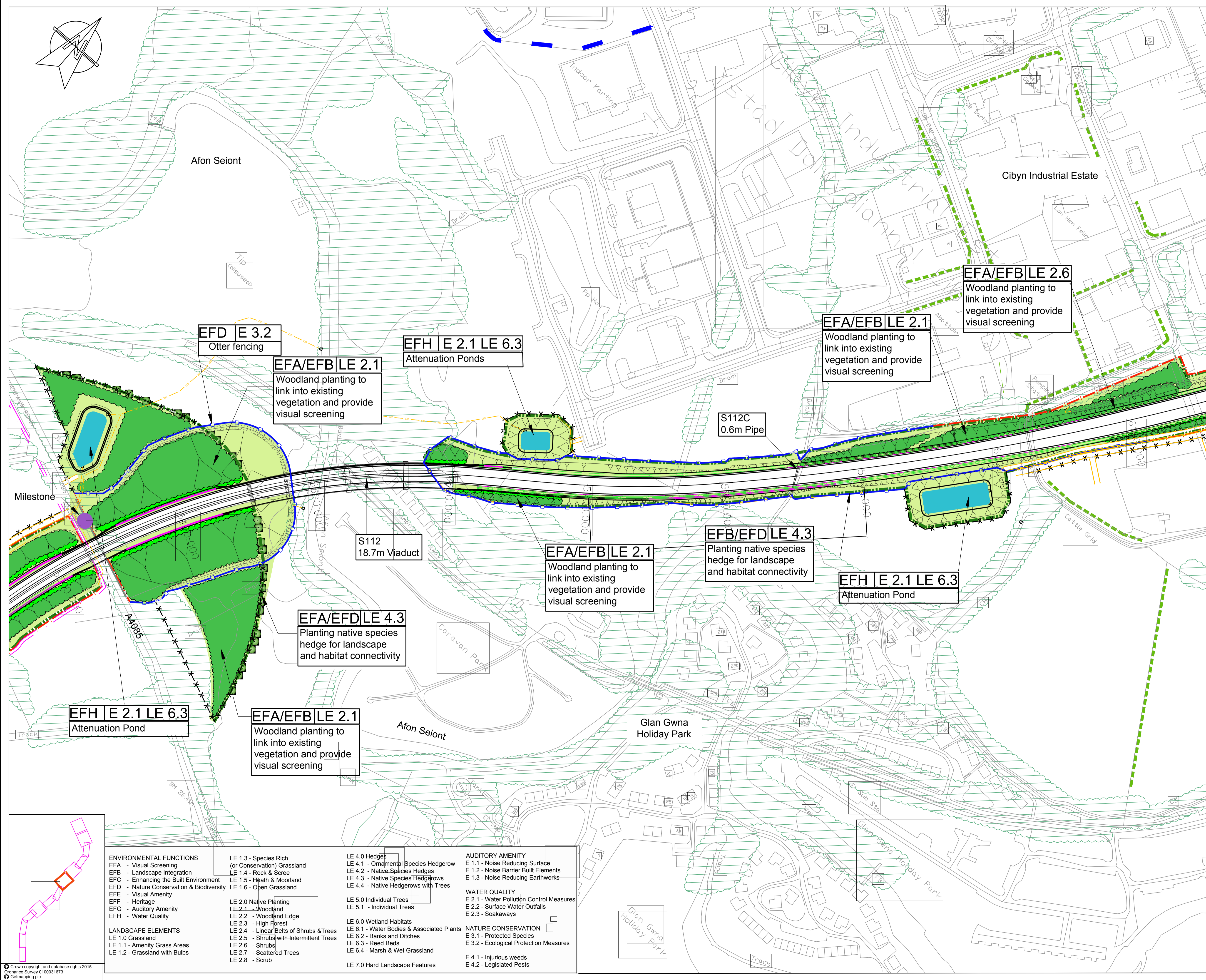
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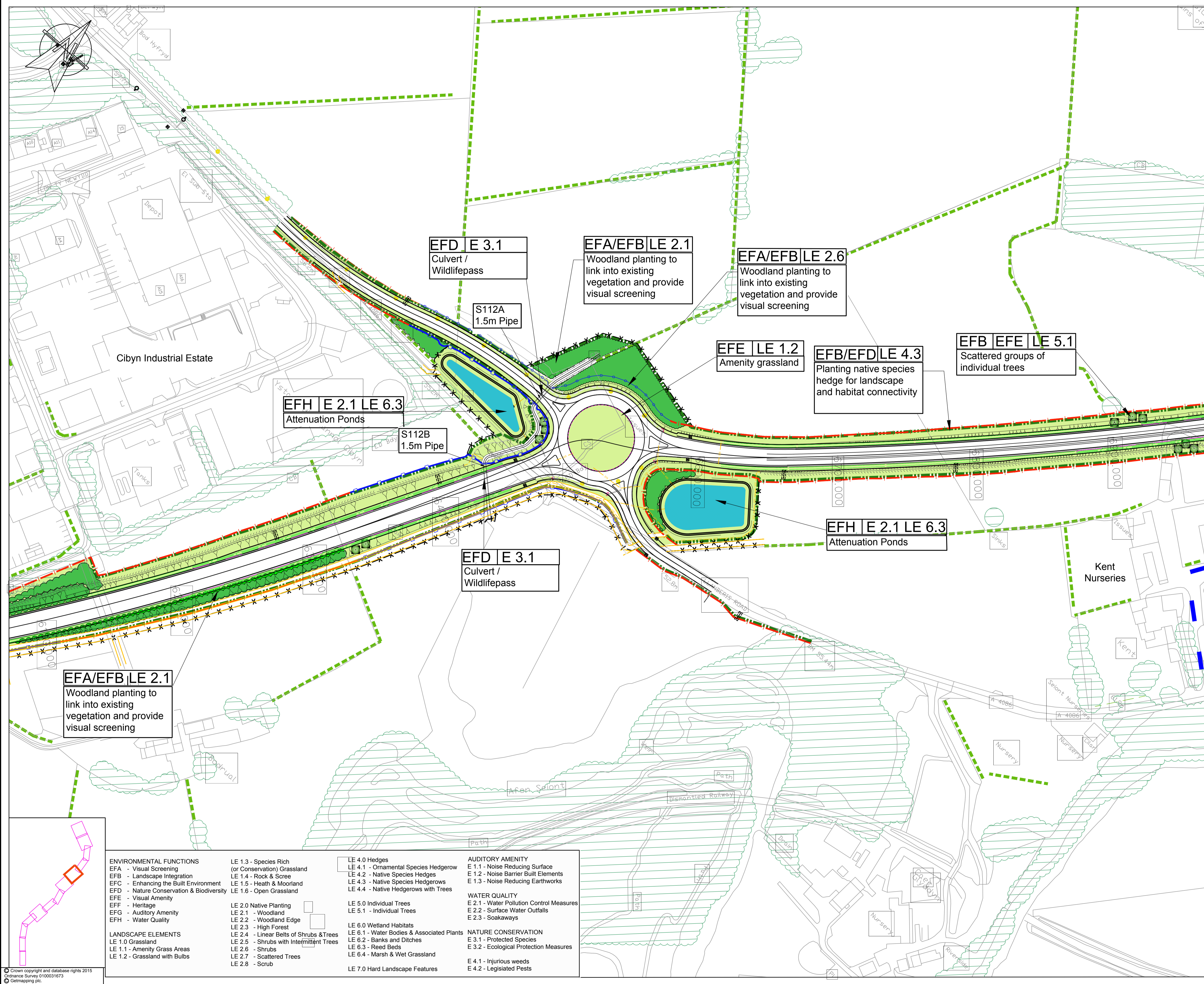
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ENVIRONMENTAL FUNCTIONS	LANDSCAPE ELEMENTS	AUDITORY AMENITY	NATURE CONSERVATION
EFA - Visual Screening	LE 1.0 Grassland	E 1.1 - Noise Reducing Surface	E 3.1 - Protected Species
EFB - Landscape Integration	LE 1.1 - Amenity Grass Areas	E 1.2 - Noise Barrier Built Elements	E 3.2 - Ecological Protection Measures
EFC - Enhancing the Built Environment	LE 1.2 - Grassland with Bulbs	E 1.3 - Noise Reducing Earthworks	E 4.1 - Injurious weeds
efd - Nature Conservation & Biodiversity	LE 1.3 - Species Rich (or Conservation) Grassland		E 4.2 - Legislated Pests
EFE - Visual Amenity	LE 1.4 - Rock & Scree		
EFF - Heritage	LE 1.5 - Heath & Moorland		
efg - Auditory Amenity	LE 1.6 - Open Grassland		
efh - Water Quality	LE 2.0 Native Planting		
	LE 2.1 - Woodland		
	LE 2.2 - Woodland Edge		
	LE 2.3 - High Forest		
	LE 2.4 - Linear Belts of Shrubs & Trees		
	LE 2.5 - Shrubs with Intermittent Trees		
	LE 2.6 - Shrubs		
	LE 2.7 - Scattered Trees		
	LE 2.8 - Scrub		
	LE 4.0 Hedges		
	LE 4.1 - Ornamental Species Hedgerow		
	LE 4.2 - Native Species Hedges		
	LE 4.3 - Native Species Hedgerows		
	LE 4.4 - Native Hedgerows with Trees		
	LE 5.0 Individual Trees		
	LE 5.1 - Individual Trees		
	LE 6.0 Wetland Habitats		
	LE 6.1 - Water Bodies & Associated Plants		
	LE 6.2 - Banks and Ditches		
	LE 6.3 - Reed Beds		
	LE 6.4 - Marsh & Wet Grassland		
	LE 7.0 Hard Landscape Features		

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KEY:

- Highway Boundary
- On Embankment
- In Cutting
- Vehicle restraint system
- Attenuation Pond
- Post and wire stock proof fencing
- Otter fencing
- Existing Woodland
- Existing Hedgerow
- Native Woodland
- Native Woodland Edge Shrubs
- Retained existing vegetation to be within Welsh Government ownership
- Proposed Native Hedgerow
- Individual trees
- Areas of species rich grassland (EFB/EFD - LE1.3) excluding verges, roundabouts and visibility splays with highway/amenity grass.
- Area of rock with retained soils placed to encourage natural regeneration
- Category A Trees to be protected.
- Existing Public Right Of Way
- Existing National Cycle Network
- Diverted Public Right Of Way
- Extinguished Public Right Of Way
- Private Means Of Access
- Drainage ditch
- Highway signage | Lighting column
- Listed Building
- Scheduled Ancient Monument

Rev	Date	Description	By	Chk	App

FINAL

Site/Project:
A487 CAERNARFON AND BONTNEWYDD BYPASS

Title:
ENVIRONMENTAL MASTER PLAN (a-i)

Drawn: EMK	Checked: PMcC
Designed: ---	Approved: PMcC
Date: 29/06/16	Scale: 1:1250
Container Number:	Sheet: 6 of 9
Figure 16.1f	Revision:

ENVIRONMENTAL FUNCTIONS

- EFA - Visual Screening
- EFB - Landscape Integration
- EFC - Enhancing the Built Environment
- EFD - Nature Conservation & Biodiversity
- EFE - Visual Amenity
- EFF - Heritage
- EFG - Auditory Amenity
- EFH - Water Quality

LANDSCAPE ELEMENTS

- LE 1.0 Grassland
- LE 1.1 - Amenity Grass Areas
- LE 1.2 - Grassland with Bulbs
- LE 1.3 - Species Rich (or Conservation) Grassland
- LE 1.4 - Rock & Scree
- LE 1.5 - Heath & Moorland
- LE 1.6 - Open Grassland
- LE 2.0 Native Planting
- LE 2.1 - Woodland
- LE 2.2 - Woodland Edge
- LE 2.3 - High Forest
- LE 2.4 - Linear Belts of Shrubs & Trees
- LE 2.5 - Shrubs with Intermittent Trees
- LE 2.6 - Shrubs
- LE 2.7 - Scattered Trees
- LE 2.8 - Scrub
- LE 3.1 Protected Species
- LE 3.2 - Ecological Protection Measures
- LE 3.3 - Injurious weeds
- LE 3.4 - Legislated Pests
- LE 4.0 Hedges
- LE 4.1 - Ornamental Species Hedgerow
- LE 4.2 - Native Species Hedges
- LE 4.3 - Native Species Hedgerows
- LE 4.4 - Native Hedgerows with Trees
- LE 5.0 Individual Trees
- LE 5.1 - Individual Trees
- LE 6.0 Wetland Habitats
- LE 6.1 - Water Bodies & Associated Plants
- LE 6.2 - Banks and Ditches
- LE 6.3 - Reed Beds
- LE 6.4 - Marsh & Wet Grassland
- LE 7.0 Hard Landscape Features

AUDITORY AMENITY

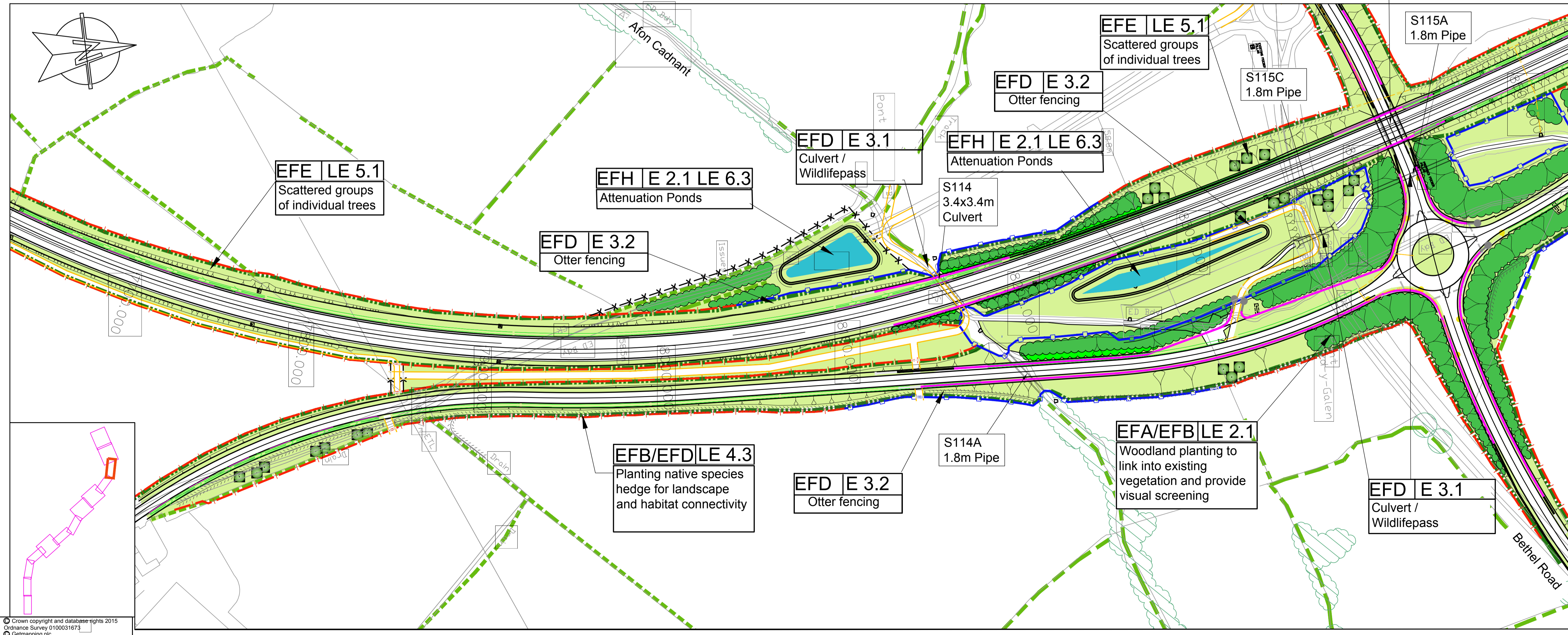
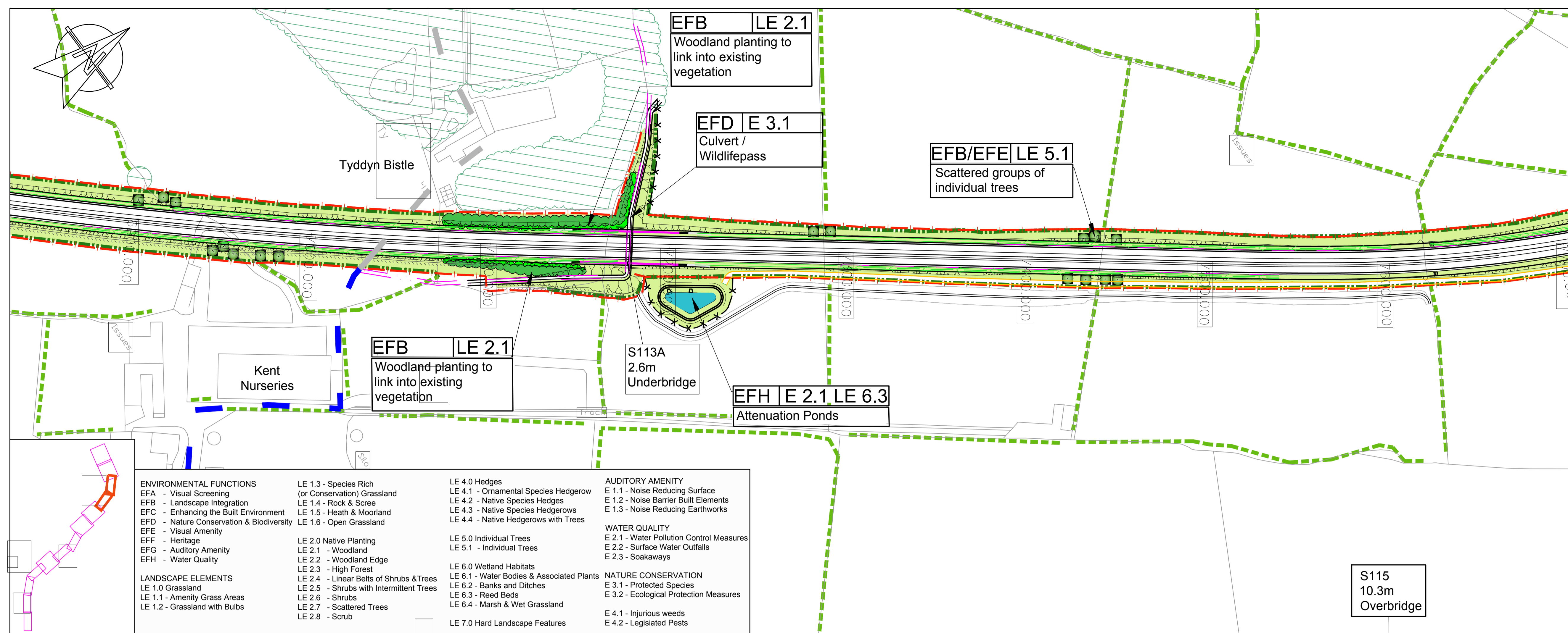
- E 1.1 - Noise Reducing Surface
- E 1.2 - Noise Barrier Built Elements
- E 1.3 - Noise Reducing Earthworks

WATER QUALITY

- E 2.1 - Water Pollution Control Measures
- E 2.2 - Surface Water Outfalls
- E 2.3 - Soakaways

NATURE CONSERVATION

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NOTES

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KEY:

- Highway Boundary
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- In Cutting
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- Attenuation Pond
- Post and wire stock proof fencing
- Otter fencing
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- Existing Hedgerow
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- Retained existing vegetation to be within Welsh Government ownership
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- Existing Public Right Of Way
- Existing National Cycle Network
- Diverted Public Right of Way
- Extinguished Public Right of Way
- Private Means Of Access
- Drainage ditch
- Highway signage | Lighting column
- Listed Building
- Scheduled Ancient Monument

Rev	Date	Description	By	Chk	App

FINAL

ARCADIS | Uywodaeth Cymru Welsh Government | RAMBOLL

Balfour Beatty JONES BROS
CIVIL ENGINEERING UK

WSP | PARSONS BRINCKERHOFF | TACP

Ty Glyn, Canol Y Dre, Ruthin Denbighshire Tel: 01824 703661

Site/Project:
A487 CAERNARFON AND BONTNEWYDD BYPASS

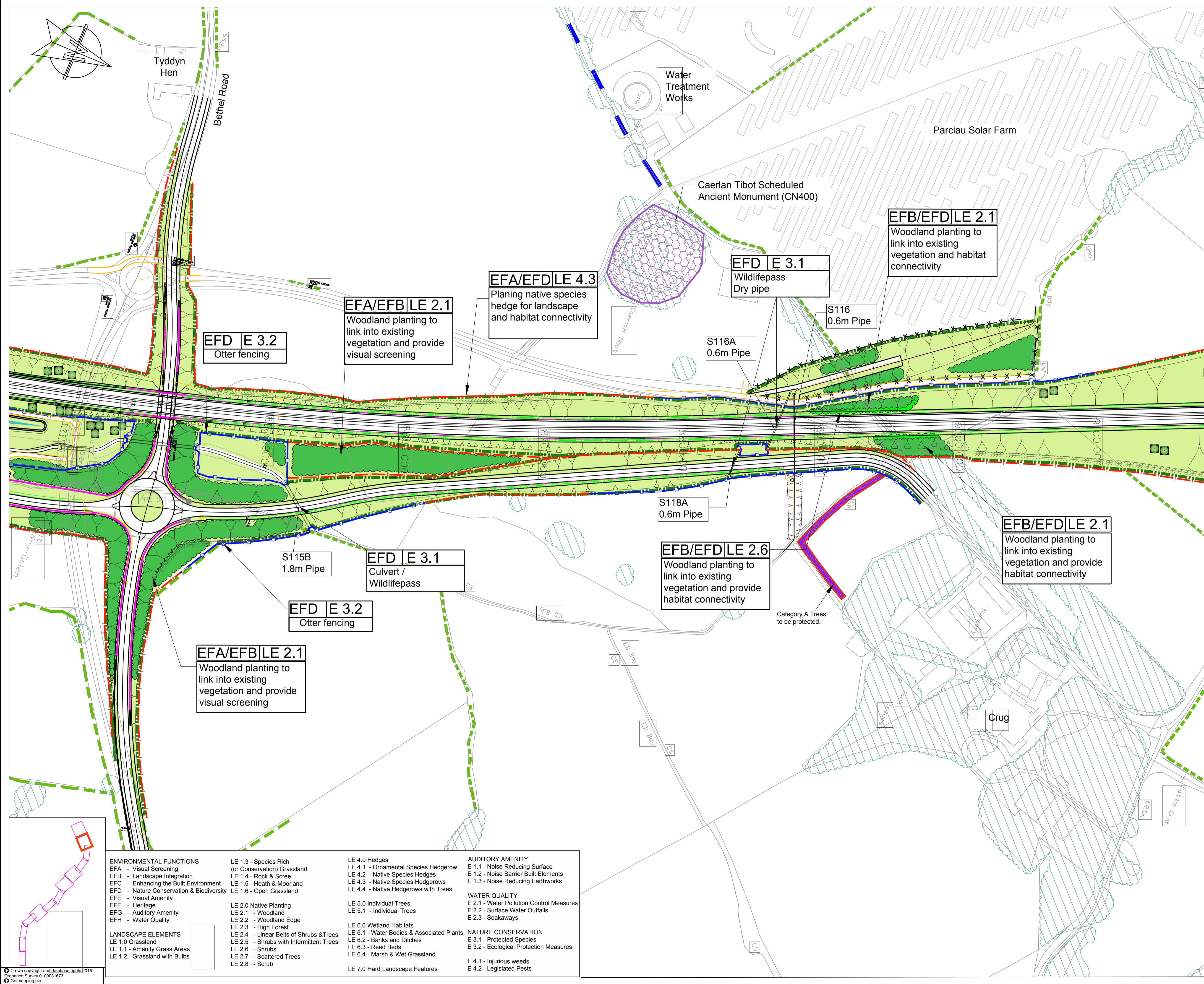
Title:
ENVIRONMENTAL MASTER PLAN (a-i)

Drawn: EMK	Checked: PMcC
Designed: ---	Approved: PMcC
Date: 29/06/16	Scale: 1:1250
Container Number:	Revision:

Figure 16.1g P01.1

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KEY:

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Rev	Date	Description	By	Chk	App

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Designed: ---	Approved: PMcC
Date: 29/06/16	Scale: 1:1250 A1 Sheet: 8 of 9
Container Number:	Revision:

Figure 16.1h P01.1

ENVIRONMENTAL FUNCTIONS

- EFA - Visual Screening
- EFB - Landscape Integration
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- EFD - Nature Conservation & Biodiversity
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- LE 2.2 - Woodland Edge
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- LE 2.6 - Shrubs
- LE 2.7 - Scattered Trees
- LE 2.8 - Scrub
- LE 4.0 - Hedges
- LE 4.1 - Ornamental Species Hedgerow
- LE 4.2 - Native Species Hedges
- LE 4.3 - Native Species Hedgerows
- LE 4.4 - Native Hedgerows with Trees
- LE 5.0 - Individual Trees
- LE 5.1 - Individual Trees
- LE 6.0 - Wetland Habitats
- LE 6.1 - Water Bodies & Associated Plants
- LE 6.2 - Banks and Ditches
- LE 6.3 - Reed Beds
- LE 6.4 - Marsh & Wet Grassland
- LE 7.0 - Hard Landscape Features

AUDITORY AMENITY

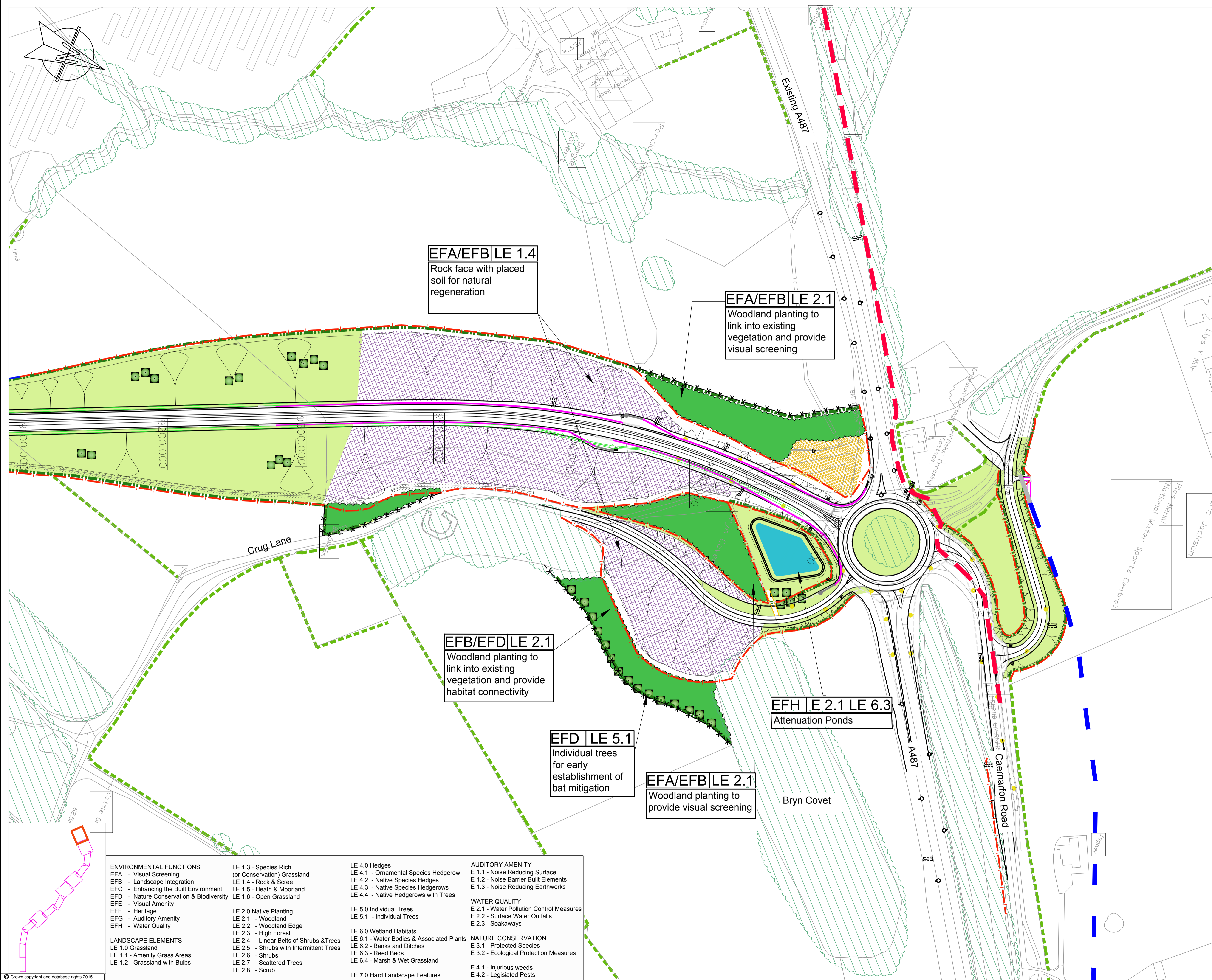
- E 1.1 - Noise Reducing Surface
- E 1.2 - Noise Barrier Built Elements
- E 1.3 - Noise Reducing Earthworks

WATER QUALITY

- E 2.1 - Water Pollution Control Measures
- E 2.2 - Surface Water Outfalls
- E 2.3 - Soakaways

NATURE CONSERVATION

- E 3.1 - Protected Species
- E 3.2 - Ecological Protection Measures
- E 4.1 - Injurious weeds
- E 4.2 - Legislated Pests



NOTES (A1)

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KEY:

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- Extinguished Public Right Of Way
- Private Means Of Access
- Drainage ditch
- Highway signage | Lighting column
- Listed Building
- Scheduled Ancient Monument

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FINAL

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Site/Project:
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ENVIRONMENTAL MASTER PLAN (a-i)

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Figure 16.1i P01.1

ENVIRONMENTAL FUNCTIONS		LANDSCAPE ELEMENTS	
EFA - Visual Screening	LE 1.0 Grassland	LE 1.1 - Amenity Grass Areas	LE 1.2 - Grassland with Bulbs
EFB - Landscape Integration	LE 1.3 - Species Rich (or Conservation) Grassland	LE 1.4 - Rock & Scree	LE 1.5 - Heath & Moorland
EFC - Enhancing the Built Environment	LE 1.6 - Open Grassland	LE 2.0 Native Planting	LE 2.1 - Woodland
efd - Nature Conservation & Biodiversity	LE 2.2 - Woodland Edge	LE 2.3 - High Forest	LE 2.4 - Linear Belts of Shrubs & Trees
EFE - Visual Amenity	LE 2.5 - Shrubs with Intermittent Trees	LE 2.6 - Shrubs	LE 2.7 - Scattered Trees
EFF - Heritage	LE 2.8 - Scrub	LE 4.0 Hedges	LE 4.1 - Ornamental Species Hedgerow
efg - Auditory Amenity	LE 4.2 - Native Species Hedges	LE 4.3 - Native Species Hedgerows	LE 4.4 - Native Hedgerows with Trees
EFH - Water Quality	LE 5.0 Individual Trees	LE 5.1 - Individual Trees	LE 6.0 Wetland Habitats
	LE 6.1 - Water Bodies & Associated Plants	LE 6.2 - Banks and Ditches	LE 6.3 - Reed Beds
	LE 6.4 - Marsh & Wet Grassland	LE 7.0 Hard Landscape Features	
		AUDITORY AMENITY	E 1.1 - Noise Reducing Surface
			E 1.2 - Noise Barrier Built Elements
			E 1.3 - Noise Reducing Earthworks
		WATER QUALITY	E 2.1 - Water Pollution Control Measures
			E 2.2 - Surface Water Outfalls
			E 2.3 - Soakaways
		NATURE CONSERVATION	E 3.1 - Protected Species
			E 3.2 - Ecological Protection Measures
			E 4.1 - Injurious weeds
			E 4.2 - Legislated Pests