BIODIVERSITY NET GAIN

Toolkit User Guide v2.2

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1. INTRODUCTION

1.1.   THE BIODIVERSITY TOOLKITS

1.1.1.1.   This document sets out the steps for running a biodiversity unit calculation. Biodiversity Net Gain (BNG) is a target for development projects, in which biodiversity losses are outweighed by measures taken to avoid, minimise or compensate impacts of the project. Delivering BNG requires the project to follow the 10 Good Practice Principles[1] and published UK guidance[2]. This guide describes how to measure baseline biodiversity units, and the change in biodiversity units, using two biodiversity toolkits produced for Scottish and Southern Energy Renewables (SSER), and details the following steps:

- STEP 1: ASSESSMENT OF THE BIODIVERSITY BASELINE
- STEP 2: INFORM AVOIDANCE, MITIGATION AND COMPENSATION PROPOSALS
- STEP 3: ASSESSMENT OF POST DEVELOPMENT BIODIVERSITY
- STEP 4: PRODUCTION OF THE FINAL REPORTS

1.1.1.2.   SSER have produced two toolkits; the Site Optioneering Toolkit, and the Project Toolkit. Together these are called 'the biodiversity toolkits'.
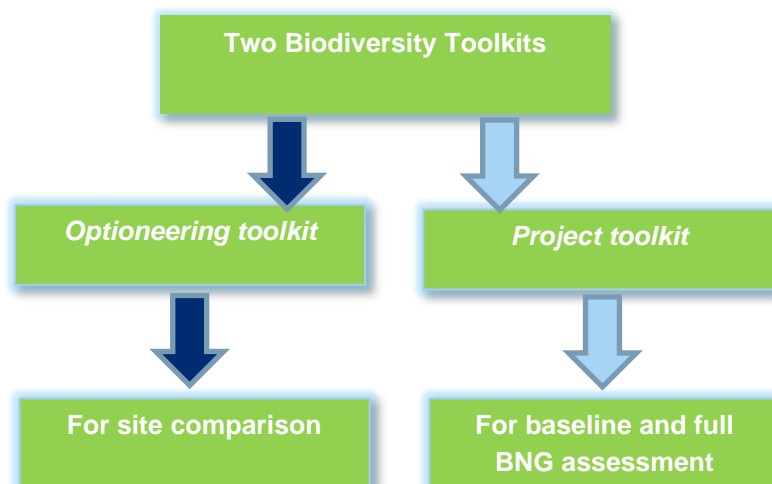
1.1.1.3.   The biodiversity toolkits are Microsoft Excel spreadsheets that will enable quantitative biodiversity assessments. The toolkits can be used to assess the biodiversity impacts of a given development scheme or to assess the biodiversity benefits of a corresponding landscaping or offsetting scheme to help optimise their design.

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[1] CIEEM, CIRIA, IEMA (2016) Biodiversity Net Gain – Good practice principles for development. Available: https://cieem.net/resource/biodiversity-net-gain-good-practice-principles-for-development/

[2] CIEEM, CIRIA, IEMA (2019) Biodiversity Net Gain – Good practice principles for development. A Practical Guide. Available: http://cieem.net/resource/biodiversity-net-gain-good-practice-principles-for-development-a-practical-guide/

1.2. DEVELOPMENT OF THE BIODIVERSITY TOOLKITS

1.2.1.1. The SSER toolkit is based on the latest iteration of a toolkit produced by Scottish and Southern Electricity Networks SSEN and the latest Biodiversity Metric (version 3.1)[3] by Natural England.

1.2.1.2. The toolkit produced by SSEN itself is based on the Biodiversity Metric produced by (at the time) Defra. The SSEN toolkit brought together elements of the Defra Metric 2012[4] and then Natural England in 2019 (Biodiversity Metric 2.0)[5] in the first instance. Since production of the SSEN toolkit, work was taken forward by Natural England on the Biodiversity Metric such that versions 3.0 and 3.1 have since been produced, where 3.1 was released in April 2022.

1.2.1.3. Following publication of the new 3.1 metric, SSER reviewed and adapted the new metric to update the SSEN toolkit, producing a new, bespoke toolkit to SSER.

1.2.1.4. The guide to SSER's Site Optioneering Toolkit can be found in **section 3.**

1.2.1.5. The guide to SSER's Project Toolkit can be found in **section 4.**

1.3. REQUIREMENTS FOR A BNG ASSESSMENT

1.3.1.1. The following is a list of the information required to complete a BNG assessment:

- The red line boundary for the development (ensuring this covers all areas used for temporary construction works);
- Plans covering all areas direct and indirect impacts of the development (ensuring this covers all areas affected during the construction period);
- Temporary works plans clearly showing areas of permanent or temporary habitat loss;
- Landscape plan or reinstatement plans showing the permanent development and planting information for the areas of habitat to be created or enhanced;
- Area or length of each habitat including irreplaceable habitat;
- Phase 1, Fossitt or UKHab information for each habitat; and
- Habitat Condition Assessment (HCA) score for each habitat.

1.3.1.2. Habitat surveys, HCAs and net gain assessments must be carried out by a competent person who can confidently identify the positive and negative indicator species for the habitat types within the area and at the time of year the survey is undertaken. It is recommended that surveyors are therefore 'capable' or above under the Chartered Institute of Ecology and Environmental Management (CIEEM) Competency Framework for 'Surveying'[6].

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[3] Natural England (2022) The Biodiversity Metric 3.1 (JP039) [online]. Available: http://publications.naturalengland.org.uk/publication/6049804846366720

[4] Defra (2012). Technical paper: The metric for the biodiversity offsetting pilot in England [online]. Available: https://www.gov.uk/government/publications/technical-paper-the-metric-for-the-biodiversity-offsetting-pilot-in-england

[5] Natural England (2019). ARCHIVE SITE for the Biodiversity Metric 2.0 and the Biodiversity Metric 3.0 [online]. Available: http://publications.naturalengland.org.uk/publication/5850908674228224

[6] CIEEM (2021) Competency Framework [online]. Available at: https://cieem.net/resource/competency-framework/ [accessed 26/07/2022]

1.3.1.3.   Habitat surveys can be undertaken throughout the year with the optimal survey season between April to September inclusive (for most habitats). Some habitats will have distinct optimal survey seasons where indicator species may be more evident. If surveys are completed out with the optimal survey seasons, a precautionary approach must be taken to identify condition of the habitat, this may mean over-valuing baseline habitats.

2. BIODIVERSITY ASSESSMENT OVERVIEW

2.1. THE MITIGATION HIERARCHY

2.1.1.1.   The principles of the Mitigation Hierarchy underpin the BNG process and should be considered throughout each assessment step.

The Mitigation Hierarchy

- *Avoidance* – measure taken to avoid potential biodiversity impacts

- *Minimisation* – measures taken to reduce the duration, intensity, extent and/or likelihood of impacts that can't be avoided

- *On-site restoration* - measures taken to enhance or recreate habitats after development impacts where avoidance or mitigation is not possible

- *Offset – (off-site compensation)* – measures taken to compensate for any residual, adverse impacts after full implementation of the previous three steps of the Mitigation Hierarchy

2.1.1.2.   The information gathered from the biodiversity baseline is used to inform avoidance, mitigation and compensation measures proposed for the project. The aim is to minimise the ecological impacts and provide opportunities for enhancing biodiversity.

2.1.1.3.   It is the people responsible for the design of the project (engineers, landscape architects etc) to identify the type of impact caused by the scheme. This may already be set out in an Ecological Impact Assessment (EcIA) which will identify whether impacts on biodiversity are direct or indirect, temporary or permanent, or as a result of cumulative impacts.

2.2. CALCULATING BIODIVERSITY AND LINEAR UNITS

2.2.1. BASELINE BIODIVERSITY

AREA HABITATS

2.2.1.1.   A biodiversity unit (BU) is the nominal figure used to quantify the biodiversity of a habitat. It represents the distinctiveness, condition, connectivity, strategic significance, and the area of a habitat. Also included within the assessment is information on the habitat type. Representing biodiversity via biodiversity units means that the post-development biodiversity can be easily compared to the baseline biodiversity, aiding the user to assess whether or not a development is designed to deliver No Net Loss or Net Gain. Based on the Natural England guidance, the basic formula for calculating biodiversity units is:

Distinctiveness Score x Condition Score x Area (ha) x Connectivity[7] x Strategic Significance = Biodiversity Units

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[7] See also section 2.2.6, CONNECTIVITY

2.2.1.2.   As well as the Biodiversity Unit calculation, the overall assessment for a BNG development will include the collection of information on habitat type and species, habitat features such as invasive non-native species, suitability for protected species and whether the habitat is considered irreplaceable. This information should be detailed in the biodiversity reports.

LINEAR HABITATS

2.2.1.3.   The calculation for Linear Habitats produces Linear Units rather than Biodiversity Units. The calculation remains the same, except area is replaced by Length (measured in km):

Distinctiveness Score x Condition Score x Length (m) x Connectivity x Strategic Significance = Linear Units

2.2.1.4.   The Natural England Metric 3.1 uses a separate condition assessment for river and canal habitats which utilises the MoRPh (Modular River Physical Survey) methodology. SSER's toolkit deviates from Metric 3.1 regarding the condition assessment methodology for canals and rivers and does not utilise the MoRPh methodology. The assessment method for rivers is to be further determined once greater information is available on its use in England. A recommended approach to the condition assessment of rivers is detailed in section 2.2. CONDITION below.

2.2.1.5.   In both toolkits the Biodiversity/Linear Units are calculated using the following characteristics of the habitats:

- Habitat area (hectares) or length (kilometres);
- Distinctiveness;
- Condition;
- Connectivity; and
- Strategic significance.

2.2.1.6.   These characteristics are described in the Glossary (**Appendix A**).

Go to **Appendix A** for definitions to understand more about:

- Biodiversity Units and Linear Units

- Distinctiveness

- Condition

- Strategic significance

- Connectivity

2.2.1.7.   The HCA guidance and criteria for Phase 1 habitat surveys and UKHab habitat surveys are provided by **Appendix B**. It should be noted that the Phase 1 habitat type F2 Marginal and inundation is not included within the toolkit. The HCA method should follow the latest published version of HCA at the time of survey, which advises that the habitat type it is within is to be used.

2.2.1.8.   Each characteristic is given a numerical value. These are set out in the toolkits and in Appendices. These values are multiplied together to calculate biodiversity units and/or linear units. The units for the habitats before the development (the baseline) can be compared to the units post-development to identify whether the

development delivers a net gain in biodiversity. The calculation and a worked example of a baseline calculation can be seen **Figure 1**[8]; post development can be seen in **Figure 3**, POST-DEVELOPMENT BIODIVERSITY below.

PRE – Baseline biodiversity calculation

Habitat parcel
Measure of biodiversity quality
Risk factor
Value in biodiversity units
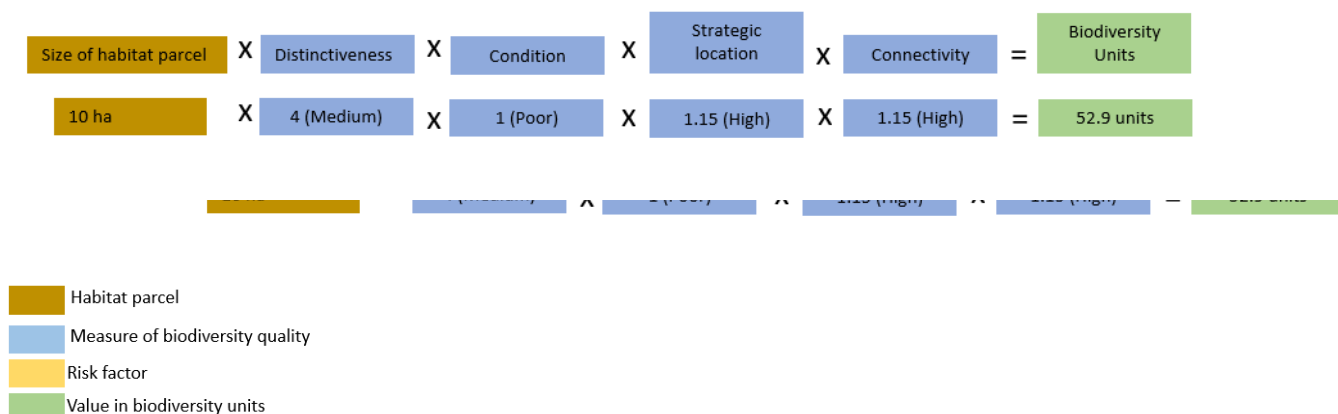
Figure 1 - Baseline biodiversity unit calculation

2.2.2. AREAS INCLUDED WITHIN THE ASSESSMENT

2.2.2.1.   For the purpose of the biodiversity assessment, SSER defines the biodiversity assessment boundary as habitats that are negatively and positively affected by the development, which includes:

- All areas subject to permanent and temporary direct impacts on habitat type and/or condition.

- Area of temporary or permanent indirect impacts on habitat type and condition; and

- Any areas being used to compensate for biodiversity impacts (offsets).

2.2.2.2.   How the biodiversity assessment boundary is determined affects the BNG requirement and will likely differ from the red line planning boundary. Any habitats that are maintained at baseline habitat type and condition with no direct or indirect impacts are considered retained and are to be excluded from the biodiversity assessment boundary. Additionally, habitats temporarily impacted by the development which are returned to their existing habitat type and condition within two years of impact are also considered retained and are to be excluded from the biodiversity assessment boundary. For example, a temporary construction compound in place for 6 months on poor condition g4 modified grassland will result in the loss of the habitat for 6 months with 1 year time to target condition for recovery to baseline habitat type and condition. The total impact of the temporary compound is 1.5 years and therefore assessed as retained, as would return to its existing habitat type and condition within 2 years. In the same scenario the loss of g3c other neutral grassland in poor condition would have a recovery time of two years with total impact of 2.5 years and therefore the area is to be included within the biodiversity assessment boundary.

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[8]   Defra. (2019). Introduction to the Test Biodiversity Metric.

2.2.2.3.   . In accordance with the Statutory Metric, retained habitat that cannot be maintained at the baseline condition due to indirect impacts over the course of the project timeframe should be assessed as lost or retained with a reduction in habitat condition. For example upland heath habitat surrounding a permanent access track could require ongoing intervention to mitigate indirect impacts on condition due to habitat drying

A *biodiversity offset* is conservation action taken to compensate for residual developmental impacts following appropriate avoidance and mitigation. An offset can be outside of the development site.

2.2.3. IRREPLACEABLE HABITATS AND NATIONALLY PROTECTED SITES

2.2.3.1.   Irreplaceable habitats and nationally protected sites (e.g. Sites of Special Scientific Interest; SSSI) within a scheme boundary must be identified. Impacts to these areas should be avoided, mitigated and, as a last resort, compensated for following national legislation, policy and guidelines.

2.2.3.2.   Designated sites, irreplaceable habitats and compensation for them should be included within the biodiversity unit calculations and included within the toolkit. This includes foraging habitats for qualifying species of a Special Protection Area (SPA) when the habitat is outside the SPA. Inclusion of these areas within the net gain calculations and toolkit is required to provide a complete picture of all habitats present on site. Irreplaceable habitats and nationally protected sites will require bespoke compensation should habitats be negatively affected by works. By including irreplaceable habitat within the toolkit, information can be provided on habitat compensation requirements from which bespoke compensation cannot go below and which provides the starting point for the negotiation with stakeholders of suitable compensation.

2.2.3.3.   Irreplaceable peatland in Scotland has been considered by SSER as all areas of blanket bog or raised bog where the condition score cannot be increased e.g. good condition, which is assumed to mean 'active' blanket bog/raised bog.[9].

2.2.3.4.   If woodland habitat is found to be on the Ancient Woodland Inventory (AWI)[10] during desk studies and it is deemed to be of high distinctiveness, then this should be checked on site by a suitably qualified ecologist to assess if the habitats are classed as ancient woodland. If both areas match and the surveyor has found no reason to suggest the woodland is not ancient, then the area(s) should be classed as irreplaceable habitat. This applies to the area used to compensate for irreplaceable habitat as well.

2.2.3.5.   If any woodland habitat on site matches with the AWI boundaries (including all AWI classifications) but the surveyor has questions over the validity of the area being ancient woodland, then a specialist survey should be commissioned to establish whether the habitat is ancient and therefore irreplaceable.

2.2.3.6.   Long-established woodlands of plantation origin (LEPO) are not included as irreplaceable habitats. However, as these woodlands can be as ecologically rich as

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[9]   CIRIA, IEMA & CIEEM (2019) Biodiversity Net Gain Good Practice Principles A Practical Guide. CIRIA, London

[10]   The Scottish Government (2015). Ancient Woodland Inventory (Scotland). Available: https://data.gov.uk/dataset/c2f57ed9-5601-4864-af5f-a6e73e977f54/ancient-woodland-inventory-scotland

ancient woodlands[11], expert judgement from the ecologist should be used to determine how these habitats should be further assessed.

2.2.3.7. Projects affecting protected species must fully comply with legislation and planning policy. If the project involves habitat creation or enhancement for a protected species licence, those habitats are to be included in the biodiversity unit calculation to capture the biodiversity losses and gains that they contribute to a project.

2.2.4. DISTINCTIVENESS

2.2.4.1. Distinctiveness is automatically populated depending on the UKHab or Phase 1 classification. It is dependent on the rarity, species richness, designations and the habitats ability to support species which are not found in other habitats. Distinctiveness can be assigned as very high, high, medium, low and very low with corresponding multiples of 8, 6, 4, 2 and 0 respectively.

2.2.5. CONDITION

2.2.5.1. Condition is a measure of the habitat quality in relation to the ecological optimum of the habitat type and allows for direct comparisons of habitat quality to be made for the same habitat type. It is determined by set condition criteria which are specific to the habitat type. Individual areas of habitat should be identified based on contiguous habitat type and condition e.g. a homogenous woodland of one habitat type which has two different habitat conditions must be split into the two individual areas.

2.2.5.2. HCA follows the Natural England Metric 3.1, excluding river and stream habitats (See definitions in **Appendix A**). All habitat types must be assigned a condition category of good, fairly good, moderate, fairly low or low.

2.2.5.3. The Natural England Metric 3.1 uses a separate condition assessment for river and canal habitats which utilises the MoRPh (Modular River Physical Survey) methodology. SSER's toolkit deviates from Metric 3.1 regarding the condition assessment methodology for canals and rivers and does not utilise the MoRPh methodology. River methodology is to be further determined. In the meantime, it is recommended that the condition is related to distinctiveness of the habitat, i.e.

- High distinctiveness = good condition

- Moderate distinctiveness = moderate condition

- Low distinctiveness = low condition

2.2.5.4. Each habitat type has a specific condition sheet (HCA sheets in Appendix B). For area-based habitats, once the broad habitat type has been identified, the corresponding condition sheet should be identified using Table TS1-1 in Natural England's Metric 3.1 Technical Supplement[12] / Appendix B. Some low or very low distinctiveness habitats do not require a condition assessment and where applicable,

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[11] NatureScot (undated). A guide to understanding the Scottish Ancient Woodland Inventory (AWI). Available: https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-awi#:~:text=Long%2Destablished%20woodlands%20of%20plantation,as%20rich%20as%20Ancient%20Woodland.

[12] Natural England (2019). ARCHIVE SITE for the Biodiversity Metric 3.1 [online]. Available: http://publications.naturalengland.org.uk/publication/5850908674228224

these are marked as 'Condition Assessment N/A'. Condition assessment sheets for linear habitats of lines of trees and hedgerows can also be identified using Table TS1-2 in Natural England Metric 3.1 Technical Supplement[13]/ Appendix B.

2.2.5.5.   Some condition sheets include 'essential' criteria which must be met to achieve a specific habitat condition. Figure 2 shows the essential criteria for wetland habitat types as an example.

2.2.5.6.   Where a habitat condition cannot be identified because habitat has recently been destroyed, a precautionary approach is to be adopted whereby habitat type is identified from credible sources e.g. mapping or aerial imagery. The habitat type is required to be determined before the corresponding condition assessment sheet can be selected. Therefore, habitat condition should be identified based on remaining field evidence or any other pre-existing information of the destroyed habitat where possible or else should assume 'good' condition using the precautionary principle.

Condition Assessment Criteria	
CORE CRITERIA - Applicable to **all wetland habitat types**:	
1	The water table is at or near the surface throughout the year, this could be open water or saturation of soil at the surface. There is no artificial drainage, unless specifically to maintain water levels as specified above. **NB - this criterion is essential for achieving good condition.**

Figure 2 - Condition assessment example of mandatory requirement to achieve a certain condition

2.2.6. CONNECTIVITY

2.2.6.1.   Connectivity is a measure of the proximity of the habitat to similar related habitats which was added to the previous Natural England Metric 2.0[14] and has since been removed from the Natural England Metric 3.1. The connectivity measure remains within the SSER toolkits and conforms to the Natural England Metric 2.0 specifications until further information regarding its application within both England and Scotland has been evaluated. The definitions of connectivity can be found in Appendix A.

2.2.6.2.   When working out the connectivity, use Table 2 section 4.7 to apply a simplified approach for assigning a connectivity score whereby high and very high distinctiveness habitats are assigned a 'medium' connectivity score and all other habitats are assigned a 'low' connectivity score. Where a connectivity assessment is not appropriate such as for arable crops, a connectivity score should not be assigned. Under these circumstances, N/A should be entered into the toolkits which will be calculated as neutral with no multiplier.

2.2.7. STRATEGIC SIGNIFICANCE

2.2.7.1.   Strategic significance identifies the local significance of the habitat or area and contributes to the quality component of a habitat like distinctiveness, condition and connectivity.

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13   Natural England (2019). ARCHIVE SITE for the Biodiversity Metric 3.1 [online]. Available: http://publications.naturalengland.org.uk/publication/5850908674228224

14   IAN CROSHER A , SUSANNAH GOLD B , MAX HEAVER D , MATT HEYDON A , LAUREN MOORE D , STEPHEN PANKS A, SARAH SCOTT C , DAVE STONE A & NICK WHITE A . 2019. The Biodiversity Metric 2.0: auditing and accounting for biodiversity value. User guide (Beta Version, July 2019). Natural England.

2.2.7.2.   Each habitat parcel is assigned a strategic significance category depending on if the habitat or area is included within any local plans, policies or strategies or is ecologically valuable.

2.2.7.3.   Strategic significance should be worked out for each individual habitat separately using Table 1 which is based on the Natural England 3.1 and amended in line with the Statutory Metric for medium significance. Strategic significance should not be identified on a site wide basis. The exception is when a local area is formally identified with importance for biodiversity within a local policy, plan or strategy but does not formally include individual habitats. In such instances the strategic significance should be assigned using Table 1 for all habitats within the formally identified areas. When professional judgement has been used to assign 'medium' strategic significance for habitats or areas not identified with a local plan, policy or strategy, the justification used should be included within the 'Notes' section of the toolkit. The definition of strategic significance can be found in **Appendix A**.

Table 1 - Strategic Significance categories

Strategic Significance Category	Strategic Significance Definition	Score
High	The habitat and/or location is formally identified in local strategy, plan or policy such as Local Plans spatial biodiversity policies, Local Biodiversity Action Plans, and green infrastructure strategies.	1.15
Medium (No suitable documents identified for assigning strategic significance)	Strategic significance can be recorded as medium if the habitat and/or location is considered ecologically desirable with the following criteria met: • The habitat type is ecologically desirable within the location. • The habitat provides ecological connectivity to other strategically significant areas. • Professional judgement determines the habitat and location as ecologically desirable	1.1
Low	The habitat and/or location is not identified in a local strategy, plan or policy OR no strategy or plan is in place in the area.	1

2.2.7.4.   An example of how to assign strategic significance from the Natural England Metric 3.1 user guide is "if woodland is planted in an area that has been identified in a Local Nature Recovery Strategy as a strategic corridor between two existing areas of woodland it would be of high strategic significance; if the same location was not recognised in a local plan or strategy but the woodland would still create a strategic corridor this would be of medium strategic significance; if the woodland was in a location not recognised in a local plan or strategy and was isolated from other woodland habitat it would be of low strategic significance.

2.2.8. RISK MULTIPLIERS

2.2.8.1.   Habitat creation and enhancement during the BNG process is not without risks and uncertainties. To mitigate for these risks, the toolkit includes risk multipliers. The risk multipliers are included in the post-development biodiversity calculations, reducing the number of units generated by an area of compensation habitat.

2.2.8.2.   The risk factors do not cover all eventualities but provide a numerical value for the main risks to delivering biodiversity gains. The toolkit sets out three risk factors: how difficult it is to create or enhance a habitat (delivery risk), time taken for created or enhanced habitats to reach target condition (temporal risk) and distance of habitat compensation from the development footprint (spatial risk).

DELIVERY RISK

2.2.8.3.   The delivery risk is the risk associated with the difficulty to create or restore a habitat and the uncertainty of outcome this creates. This risk will vary between habitat types due to ecological factors and the level of available information and techniques to create habitats within a realistic timeline. This risk is addressed by the habitat-specific 'difficulty' multiplier. See Table 2, section 4.7.

TEMPORAL RISK

2.2.8.4.   In delivering compensation for habitat loss, the timing of the impact may not coincide with the new habitat reaching the required quality or level of maturity, which could result in loss of biodiversity for a period of time. Additionally, there may be a time gap between the habitat loss and the start of the creation or enhancement of new habitat. Where possible, the development should prevent this additional time gap, for example, enhancement of habitats or creation of offsets out with the development area could begin prior to development.

2.2.8.5.   Where this is not possible and is justified, this additional time gap needs to be accounted for. These two time lags together are called the Temporal Risk. For example, a development clears an area of woodland. Five years later it implements its compensation, which will take 25 years to reach target condition. So, the time to target condition is 30 years and the assigned risk factor for this is 0.343. A summarised list of the years to target condition and risk factors are listed in Table 3 section 4.7.

2.2.8.6.   The time to target condition will vary depending on the habitat type, change scenario and the management practices used. Average time to target condition values are listed in **Appendices D-F.**

SPATIAL RISK

2.2.8.7.   Spatial risk is the risk associated with delivering compensation for the loss of a habitat at distance from that loss (i.e. generally the greater distance can mean a greater risk as the compensation will have lower connectivity to the original habitat) The spatial risk factor is applied to the post-development Biodiversity Unit calculation when the compensation for habitat loss is being delivered at distances outside of the development site. Spatial risk multipliers can be seen in Table 4 section 4.7.

POST-DEVELOPMENT BIODIVERSITY

2.2.8.8.   The Post-Development calculations should assess the following for habitats within the development site:

1.   Areas of no change:

- • Which areas will be retained with no action (i.e. no habitat enhancement)

2. Areas of loss:
   - • Which areas will be permanently lost to development (i.e. no habitat creation)
   - • Which areas will be temporarily lost due to the construction phase and then reinstated (i.e. habitat creation)

3. Areas of change:
   - • Which areas will have action to increase biodiversity units improving the condition and possibly the distinctiveness of a broad habitat type (i.e. habitat enhancement)
   - • Which areas will have action to increase biodiversity units by changing one habitat to another (habitat creation).

2.2.8.9. For each of the above steps, data should be collated on habitat type, distinctiveness and condition. The post-development Biodiversity or Linear Units are then calculated as follows:

2.2.8.10. The calculation and a worked example of a post-development calculation can be seen in Figure 2[8].

Pre-Development Biodiversity/Linear Units – Biodiversity/Linear Units lost due to the development + Post-Development Biodiversity/Linear Units (creation and enhancement)

= TOTAL POST-DEVELOPMENT BIODIVERSITY/LINEAR UNITS

POST – intervention biodiversity calculation (for newly created habitat)

Size of habitat parcel	X	Distinctiveness	X	Condition	X	Strategic location	X	Connectivity	X	Difficulty	X	Time to target condition	X	Spatial risk	=	Biodiversity Units
10 ha	X	6 (High)	X	3 (Good)	X	1.15 (High)	X	1.15 (High)	X	0.7 (med)	X	0.8 (5 yrs)	X	0.75	=	99 units

The net effect of an intervention or series of inventions on biodiversity if calculated as follows:

POST units	-	PRE units	=	Outcome
99 units	-	52.9 units	=	46.1 units

Habitat parcel	
Measure of biodiversity quality	
Risk factor	
Value in biodiversity units	

Figure 3 - Post-intervention biodiversity calculation (for newly created habitat)

2.3. INDIRECT IMPACTS

2.3.1.1. Where data is available (for example in an EcIA), areas affected by indirect impacts (such as change in air quality due to the development) should be included in the assessment, with justifications provided for in the Pre- and Post-Development biodiversity units. If these areas have been identified but the data on the change in the habitat due to the indirect impacts are not available, it should be assumed that the habitat decreases in condition by one step.

2.4. DEVELOPMENTS WITH NO IMPACT ON BIODIVERSITY

2.4.1.1.   Development that does not require an ecological survey may still have the potential to deliver benefits for biodiversity. For example, trees and flower beds can be integrated within pavement or hard landscaping schemes, or green roofs and walls included within structures. Where development takes up these opportunities for enhancement the project toolkit should still be used to demonstrate the biodiversity units gained from the creation of the new green space.

2.5. GREEN INFRASTRUCTURE FEATURES

2.5.1.1.   Green infrastructure features, such as green roofs, rain gardens and street trees should be assigned the UKHab or Phase 1 habitat classification that most closely represents the habitat. Green walls consisting of climbing plants should treated as linear habitats and green walls consisting of plug planning should be considered as area-based habitats.

3. SSER'S SITE OPTIONEERING TOOLKIT

3.1. TOOLKIT OVERVIEW

3.1.1.1.   SSER's Site Optioneering Toolkit has been designed to help with decision making and mitigation by allowing the user to compare the baseline biodiversity units (and potential loss) of sites and therefore allow for easier site selection.

3.1.1.2.   The data required from each site for the Site Optioneering Toolkit is a biodiversity baseline identifying the habitats likely to be on site. This can be gained via remote sensing, online maps and/or aerial imagery that covers the strategic option area. This means the results will be estimations of the Biodiversity Units rather than fully accurate baselines.

3.1.1.3.   There are ten available 'Option' tabs (highlighted in green in Figure 4), with each corresponding to a different site option for the selection process.
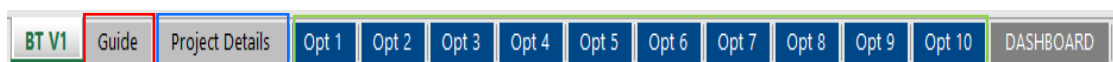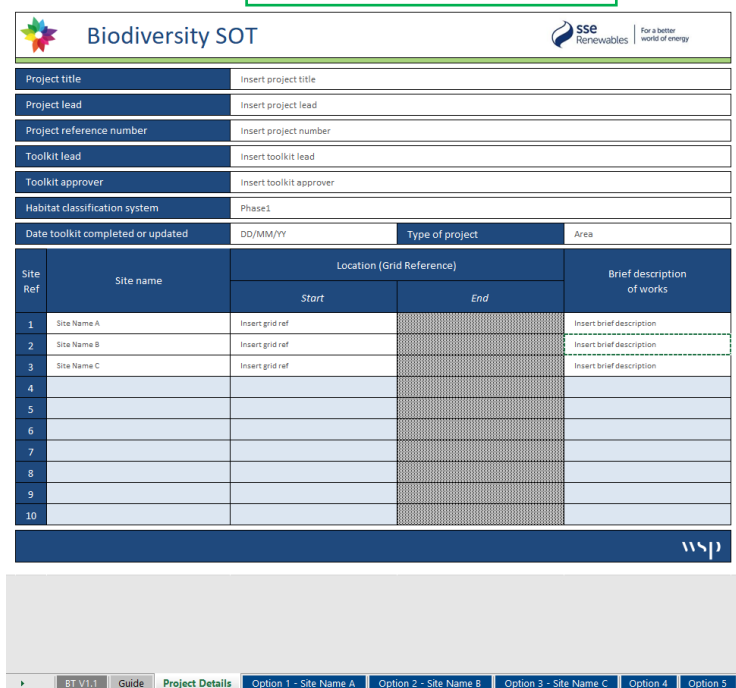
Figure 4 - Biodiversity Optioneering Toolkit tabs

3.1.1.4.   The Optioneering Toolkit contains a number of tabs. The tab titled 'Guide' (as highlighted in red in Figure 3) contains further information on the biodiversity toolkit and its use.

3.2. PROJECT DETAILS TAB

3.2.1.1.   The Project Details tab (highlighted in blue in Figure 3), is shown in detail in Figure 4. Project details can be input into this page, such as project title, project lead and reference number as well as the toolkit lead and approver. There is a drop-down menu for 'Habitat classification system', with the option of either Phase 1 or UKHab data depending on which has been used for the habitat survey and condition assessment.

3.2.1.2. Once a classification system has been chosen in the 'Project Details' tab, the toolkit will adapt to this system and only offer drop-down options related to the chosen system in the Unit Calculation tab.

3.2.1.3. Below the project details is a table where each of the sites (including name and location and a brief description of works) can be input.

3.2.1.4. There is another drop-down for 'Type of project', where the choices are linear or area, depending on what type of habitat is being assessed (e.g. cable route or a wind farm). If linear is chosen, the grey boxes beneath the 'End' of the Location (Grid reference) column will open and become light blue. The end point of the linear route can then be input.

3.2.1.5. The work-through example can be seen in Figure 5. For the purpose of the work-through, the 'Habitat Classification System' will be Phase 1 and the 'Type of project' will be Area. As the 'Type of project' is Area, the 'End' option of the Location (Grid Reference) is greyed out.

3.2.1.6. The name of the Site should be added to the Site name box, this will automatically update the names of the subsequent tabs with the relevant name once the tab is clicked on. The tab name should not be manually changed in the toolkit.

Figure 5 - Project Details tab

3.3. BIODIVERSITY UNIT CALCULATION

3.3.1.1. Within the Options tabs (labelled as Opt 1, Opt 2 etc. as highlighted in green in **Figure 5**), each habitat should be input independently, collated by habitat type, distinctiveness and condition.

In the 'Calculation Units (Area/Linear (H.W))' tab, choose the correct unit type:

Phase1_Area – for use with area habitats

Phase1_Linear_H – for use with linear hedgerow habitats

3.3.1.2.	The distinctiveness column will automatically populate. The rest of the data (condition, connectivity, strategic significance) can then be entered using the drop-down menus (see **Appendix A** for the Glossary). The area or length of habitat is to be input manually (in hectares and kilometres respectively).

3.3.1.3.	The check box should be ticked when the habitat entered is irreplaceable habitat. The checking of this box will then trigger an alert to highlight the requirement to also record information within the notes box to provide details on the irreplaceable habitat. For example, for woodland listed on the AWI, information on the AWI category should be provided, or where woodland is determined as ancient through site surveys, a summary of the rational for this should be provided in the notes box, or a reference given to where to find the relevant information.

3.3.1.4.	Natural England's Metric 3.1 has removed connectivity as a proxy for habitat 'value', however this category remains within the SSER toolkit as part of biodiversity calculations. Connectivity factors in the relationship of a habitat to surrounding habitats while strategic significance takes into account the importance of the surrounding habitat in local legislation and policy. Natural England's Metric 3.1 retains strategic significance as a proxy for habitat value (refer to Section 4.5 for scoring methods for connectivity and strategic significance).

3.3.1.5.	It is recommended that habitats other than ponds with an area of less than 0.01 are not input into the biodiversity calculations as they are not large enough to be considered a viable habitat and be effectively managed to increase overall biodiversity. This is also true for the Project Toolkit.

3.3.1.6.	Once all the details have been input the baseline biodiversity units or linear units will calculate automatically.

3.3.1.7.	Any notes can be added into the 'Notes' box beside each habitat row.

3.3.1.8.	As shown in the worked example in Figure 6, once the habitat type, area, condition, connectivity, strategic significance ratings and irreplaceable habitat status have been input, the toolkit will automatically calculate the biodiversity units including biodiversity units (IRR Units) associated with irreplaceable habitat as highlighted in red in Figure 6.

Figure 6 - Biodiversity Site Optioneering Toolkit- Option 1

There are *two* types of linear unit output. These are kept separate within the calculation in both the Optioneering Toolkit and Biodiversity Toolkit

Watercourse Linear Units

Hedgerow Linear Units
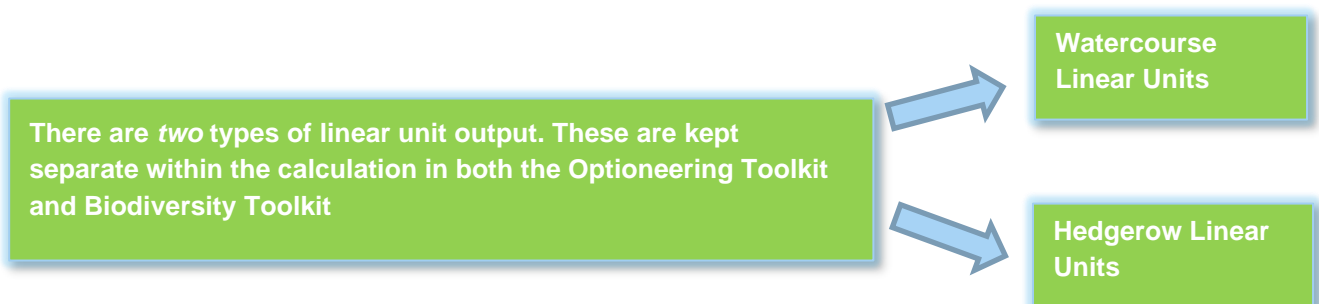
3.3.1.9. If the Calculation Unit had been input as Linear, the toolkit would have calculated 'Linear units'. The length for linear units must be input as kilometres. **Figure 7** shows a worked example with both Watercourse Linear units and Hedgerow Linear units. The toolkit has automatically calculated the Linear Hedgerow Units (H) and the Linear Watercourse Units (W). These scores are treated separately within the toolkit and should remain separate throughout the reporting process. The units are not comparable; indeed they are measured in different units (hectares and kilometres). For this reason net gain should be achieved in each of biodiversity, watercourse and linear units.

Biodiversity SOT

Biodiversity Unit Calculation

Calculate biodiversity and linear (hedgerow (H) and watercourses (W)) units of your site by: (1) establishing the habitat; (2) identifying the condition, connectivity and strategic significance of that habitat, and; (3) entering the hectares (ha) or linear metres (m).

Option 1

Ref	Calculation Units (Area / Linear (H/W))	Phase 1 Habitat	Area or Length of Habitat (ha / km)	Condition Rating	Connectivity Rating	Strategic significance Rating	Irreplaceable Habitat	Distinctiveness Band	IRR Units	IRR Area (%)	Biodiversity Units	Area (%)	Linear Units (H)	Linear Units (W)
	Project Total								0.00	0.00	0.00	100	4.00	21.78
1	Phase1_Linear_H	J2.1.2 : Boundaries : Hedges - Intact - species-poor	1.00	Moderate	Low	Low	No	Low	0.00	0.00	0.00	50.00	4.00	0.00
2	Phase1_Linear_W	G2.1 : Running water : Eutrophic	1.00	Good	Moderate	Medium	No	High	0.00	0.00	0.00	50.00	0.00	21.78

Figure 7 - Biodiversity Site Optioneering Toolkit- Linear Units

3.4.   THE SUMMARY DASHBOARD

3.4.1.1.   The Summary Dashboard tab allows for easy comparison of the Site options and automatically creates side by side bar charts allowing the user to compare the biodiversity and linear (Hedgerow and Watercourse) units. **Figure 8** is an example of a toolkit that has been used to compare 10 Site Options. Adjacent to the bar charts is a summary table (shown in **Figure 9**) summarising the biodiversity and linear units and associated habitat area and length for each Option. Average biodiversity units per hectare and percentage of non-irreplaceable habitats are included for each option. Biodiversity units associated with irreplaceable habitats and the percentage of irreplaceable habitat areas are included separately, shown in purple.
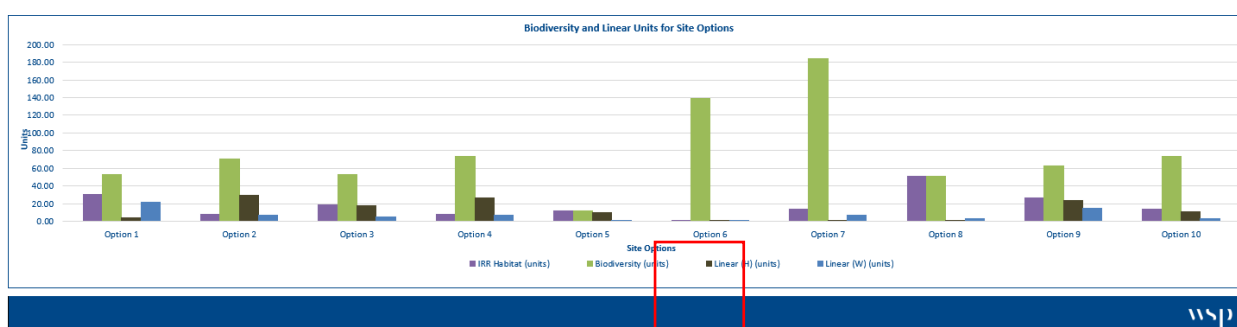
Figure 8 - Biodiversity Site Optioneering Toolkit- Summary Dashboard

Figure 9 - Biodiversity Site Optioneering Toolkit- Summary Dashboard

3.5. HABITAT TYPES DASHBOARD

3.5.1.1. The Habitat Type Dashboard allows for easy comparison of the Site options with bar charts showing the percentage split of biodiversity units associated the broad habitat type within each option. The Habitat Types dashboard also gives the percentage split of distinctiveness categories for habitat types within each option. **Figure 10** is an example of a toolkit that has been used to compare 10 option sites.
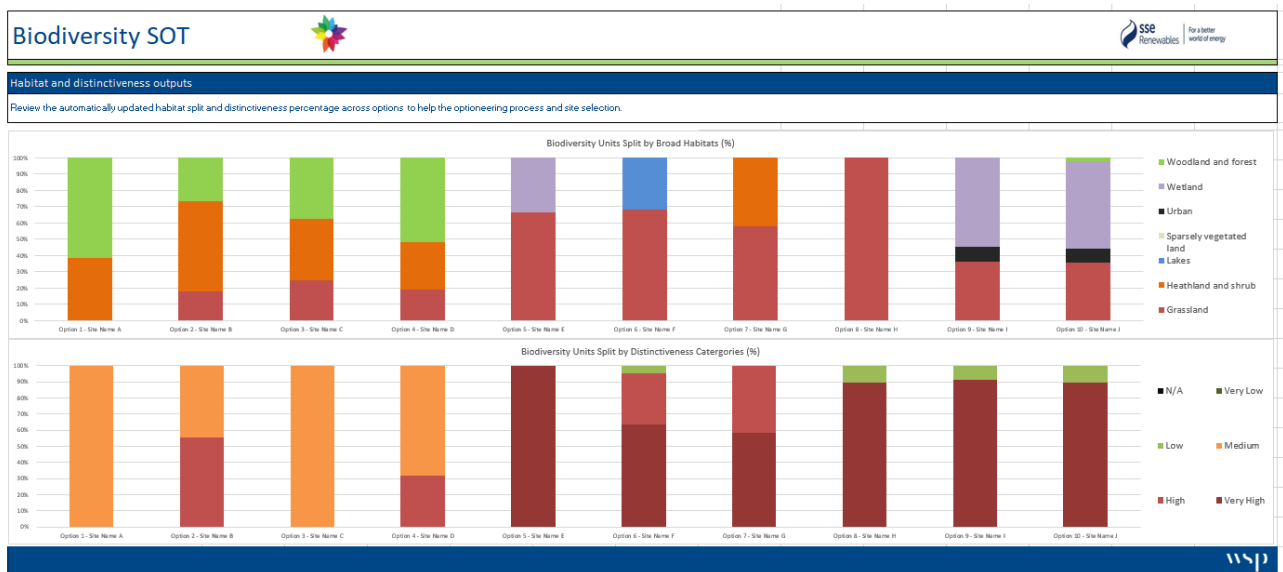
Figure 10 - Biodiversity Site Optioneering Toolkit- Habitat Type Dashboard

3.6. DELIVERABLES

3.6.1.1. The deliverables that accompany the Site Optioneering Toolkit are a Strategic Option Report to highlight areas of irreplaceable / valuable (i.e. high distinctiveness) biodiversity which should be avoided, and the production of a biodiversity hotspot map. The Site Optioneering Toolkit can also be used to deliver a Route Options Report for linear routes. These reports can be used to inform the engineering, land requirements and landscape designs to avoid and mitigate biodiversity impacts as far as possible, and direct development to the site of least biodiversity impact.

3.7. BIODIVERSITY SITE OPTIONEERING TOOLKIT FLOWCHART

3.7.1.1. The flowchart in **Figure 11** is a step-by-step guide to using the Site Optioneering Toolkit.
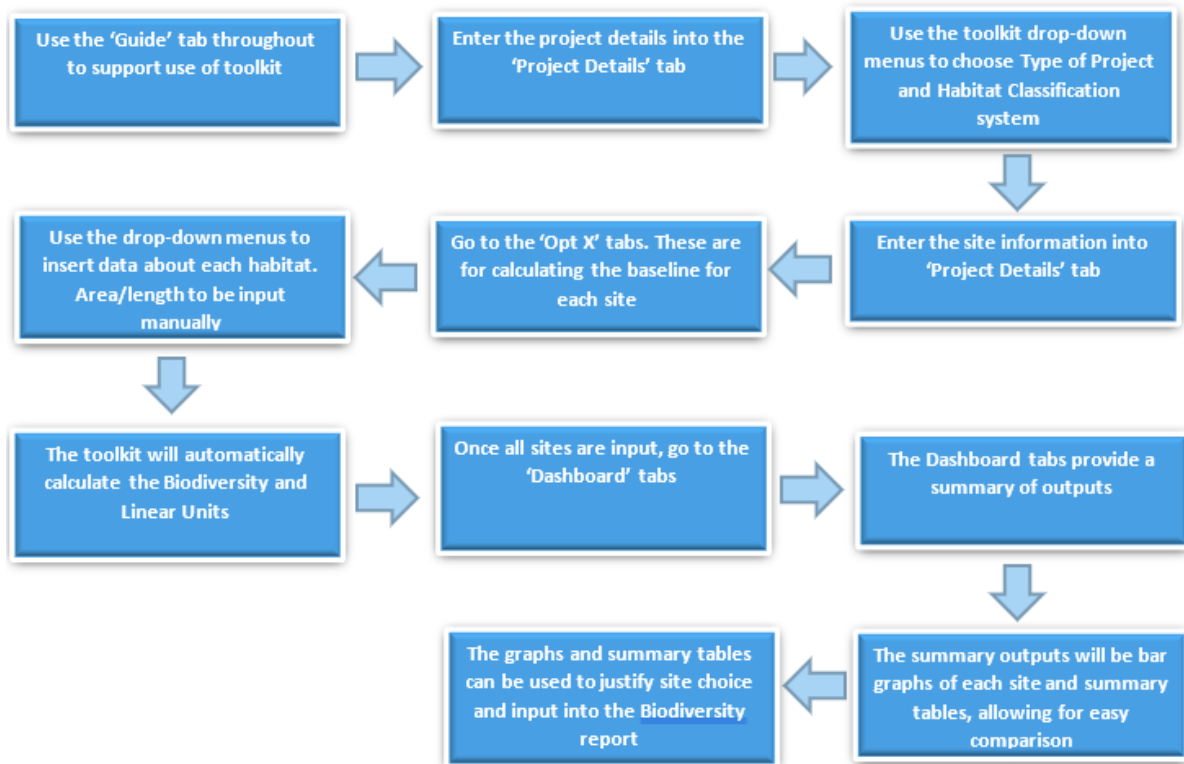
Figure 11 - The Optioneering Toolkit Flowchart

4. SSER'S PROJECT TOOLKIT

4.1.1.1. SSER's Project Toolkit is for use once the site has been selected and is used for calculating the biodiversity units before, during and after works on a specific development site. The deliverables include baseline and full BNG assessments. The toolkit can be used to assess whether a development will reach No Net Loss or Net Gain.

4.1.1.2. The biodiversity toolkit contains a number of tabs. The tab titled 'Guide', as highlighted in red in **Figure 12**, contains further information on the Project Toolkit and its use.
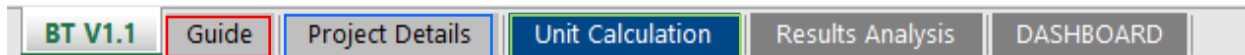
Figure 12 - Biodiversity Toolkit tabs

4.1.1.3. For each habitat type, biodiversity units are calculated based on the approach set out in the Natural England Metric 2.0 and 3.1 (2019 and 2022). The change in biodiversity units or linear units are used as an indicator of a site's change in ecological value overall. The biodiversity units and each type of linear units are kept separate through-out the assessment.

4.1.1.4. Throughout, the assessor should work with people responsible for the design of the project (engineers, landscape architects etc.) to identify the type of impact caused by the scheme. This may already be set out in an EcIA which will identify whether impacts on biodiversity are direct or indirect, temporary or permanent, or as a result of cumulative impacts.

4.2. PROJECT DETAILS TAB

4.2.1.1. Summary information about the project should be entered into the Project Details tab in the toolkit to make it clear what the assessment covers (Figure 13, highlighted in blue). These details include project title, lead and reference number as well as the name of the toolkit lead and approver.

4.2.1.2. In the 'Project Details', there are two drop-down menus. One is for 'Habitat classification system', with the choice between Phase 1 and UKHab. The next drop-down is 'Type of project', with the choice between linear and area. Once the habitat classification system has been chosen, the toolkit will automatically adapt to this and only offer the options that align with the chosen system.

4.2.1.3. For location (Grid Reference), the 'Location end' cell will only open and turn from grey to light blue when the Type of project is Linear. For projects with area habitats, this cell will remain grey and closed.

4.2.1.4. There is also a cell with space to enter a brief description of works. The Project Start Date and Project Duration relate to the commencement of clearance works and the length of time before restoration or creation of habitat commences.

4.2.1.5. A work-through example of the Project Details tab can be seen in Figure 13. Fields in this tab turn white from light blue when they are filled in. This example uses Phase 1 data from an example development and is a step-by-step guide on how to use the Project Toolkit. For this example, the 'Habitat Classification System' used is Phase 1 and the 'Type of project' is Area.

Figure 13 - The Project Details tab

4.3. THE UNIT CALCULATION TAB

4.3.1.1. The Unit Calculation tab (shown in Figure 14) consists of a 'Before works' (*baseline*) section, an 'Action' (During Works) section and an 'After work' actions (Following actions) section as well as summary tables for the Post-development units and Net change in units.

4.3.1.2. In the Unit Calculation tab, the Before works section allows for calculation of the baseline biodiversity units. The details of each habitat should be input into the rows. The options for calculation units (area/linear), habitat type, condition, connectivity, and strategic significance are all selectable from drop-down menus. The area/length of a habitat is to be entered manually as either hectares or kilometres respectively.

4.3.1.3. The check box should be ticked when the habitat entered is irreplaceable habitat. The checking of this box will then trigger an alert to highlight the requirement to also record information within the notes box to provide details on the irreplaceable habitat. For example, for woodland listed on the AWI, information on the AWI category should be provided, or where woodland is determined as ancient through site surveys, a summary of the rational for this should be provided in the notes box, or a reference given to where to find the relevant information.

4.3.1.4. The biodiversity and linear units will be calculated automatically. Linear (H) units relate to the linear units of hedgerows, and Linear (W) relates to the linear units for watercourses.

4.4. BEFORE WORKS (*BASELINE*) CALCULATIONS

4.4.1.1. The information gathered from the biodiversity baseline is used to inform avoidance, mitigation and compensation measures proposed for the project. The aim is to minimise the ecological impacts and provide opportunities for enhancing biodiversity. The deliverable is a Biodiversity Baseline assessment.

4.4.1.2.   The details of each habitat should be input into the rows. The options for calculation units (area/linear), Phase 1/UKHab habitat type, condition, connectivity, and strategic significance are all drop-down menus. The area/length of a habitat is to be input manually.

4.4.1.3.   When the habitat type is input, the distinctiveness will be automatically populated. If there are areas of the same habitat but with differing condition, distinctiveness, or status as irreplaceable habitat, these should be detailed within separate rows (see Figure 14).

4.4.1.4.   After all the data has been input, the biodiversity or linear units will be calculated automatically. Linear (H) Units relates to the linear units of hedgerows, and Linear (W) relates to the linear units for watercourses. This data can then be used in the Biodiversity Baseline Report.

Ref	Ignore Row?	Calculation Units (Area / Linear (H/W))	Phase 1 Habitat	Area or Length of Habitat (ha /km)	Condition Rating	Connectivity Rating	Strategic significance Rating	Irreplaceable Habitat	Distinctiveness Band	Units			
										IRR Units	Biodiversity (Area)	Linear (H)	Linear (W)
Project Total										22.77	21.78	0.00	0.00
1	Active	Phase1_Area	A1.1.1 : Woodland : Broadleaved - semi-natural (High)	1.00	Good	Moderate	High	Yes	High	22.77	-	-	-
2	Active	Phase1_Area	A1.3.1 : Woodland : Mixed - semi-natural (Medium)	1.00	Good	Moderate	Medium	No	High	-	21.78	-	-

Figure 14 - Habitats with different condition, distinctiveness scores and status as irreplaceable habitat should be detailed in separate rows

4.4.1.5.   For the worked example above, the Phase 1 habitat classification has been used. As the Phase 1 habitat classification has been chosen for habitat classification in the Project Details tab, only Phase 1 habitat types will be available in the Unit Calculation tab.

4.4.1.6.   A baseline area may need to be split and segments entered into the toolkit separately if there are different plans for the different segments of the habitat; for example, if half an area of hardstanding was to remain as hardstanding and the other half to be converted to grassland.

4.5.   DEVELOPMENTS WITH NO IMPACT ON BIODIVERSITY

4.5.1.1.   Development that does not require an ecological survey may still have the potential to deliver benefits for biodiversity and the toolkit should still be used to demonstrate the biodiversity units gained from any created habitats.

4.5.1.2.   To do this, enter the habitat type, area and condition into the drop-down menus in the Unit Calculation tab in the Before works (baseline) section. Hardstanding and buildings should be included in this calculation although the distinctiveness of the habitats will be automatically given a zero score. The toolkit will automatically calculate baseline biodiversity units.

4.5.1.3.   Include details from drop down menus in the relevant columns. Where these are the same for multiple areas of habitat, copy and paste to each relevant row.

4.5.1.4.   Include any supporting information in the 'Notes' column for each area of habitat type and condition. This is important for transparency and to help those reviewing and assuring the quality of the calculations.

4.6. ACTION (DURING WORKS)

4.6.1.1.   In the Unit Calculation tab, there is an Action (*During works*) (Figure 15) section that allows for the calculation of biodiversity units and/or linear units. Landscape plans can be used to assess what areas of habitat will be retained.

4.6.1.2.   The details entered (the area retained and/or removed) should relate to the adjacent habitat in the Before works (Baseline) segment. After inputting the area retained, the toolkit will automatically calculate the area removed, and will then calculate the biodiversity or linear units that will be retained or lost (whether temporarily or permanently, directly or indirectly) due to the development.

4.6.1.3.   Potential areas for habitat creation should be identified at this stage. The toolkit will provide clarity on the habitats that are negatively affected by the project at this stage. Compensation should be targeted at delivering net gains that are at least ecologically equivalent in type and condition to the habitats lost. This means replacing loss with the same habitat type or one that will still support the species affected but of higher ecological value. For example, replacing semi-improved grassland with unimproved grassland, following the principle of 'like for like or better'.

Action (During Works)									
Area or Length of Habitat		IRR UNITS		Biodiversity Units		Linear Units (H)		Linear Units (W)	
Retained	Removed	Retained	Removed	Retained	Removed	Retained	Removed	Retained	Removed
	0.75	22.77	0.00	5.45	16.34	0.00	0.00	0.00	0.00
1.00	0.00	22.77	0.00	_	-	-	-	-	-
0.25	0.75	-	-	5.45	16.34	-	-	-	-

Figure 15 - Action (*During Works*)

4.6.1.4.   Make sure to insert the area of habitat to be retained in the correct row. For example, if 0.25 hectares of mixed semi-natural woodland (high distinctiveness, good condition, medium strategic significance) was to be retained, it would be input into the 'Action' (*During Works*) in the same row as the habitat in 'Before Works' (*Baseline),* as shown in Figure 15 and Figure 16.

			Before works (Baseline)										Action (During Works)					
Calculation Units (Area / Linear (H/W))	Phase 1 Habitat	Area or Length of Habitat (ha /km)	Condition Rating	Connectivity Rating	Strategic significance Rating	Irreplaceable Habitat	Distinctiveness Band	Units				Area or Length of Habitat		IRR UNITS		Biodiversity Units	
								IRR Units	Biodiversity (Area)	Linear (H)	Linear (W)	Retained	Removed	Retained	Removed	Retained	Removed
								22.77	21.78	0.00	0.00		0.75	22.77	0.00	5.45	16.34
Phase1_Area	A111: Woodland - Broadleaved - semi-natural (High)	1.00	Good	Moderate	High	Yes	High	22.77	-	-	-	1.00	0.00	22.77	0.00	_	-
Phase1_Area	A131: Woodland - Mixed - semi-natural (Medium)	1.00	Good	Moderate	Medium	No	High	-	21.78	-	-	0.25	0.75	-	-	5.45	16.34

Figure 16 - Before works (*Baseline*) and Action (*During works*)

4.6.1.5.   Natural England's Metric 3.1 allows for a discrepancy up to 0.01ha between the baseline and post development areas input into the Metric, though these biodiversity toolkits would allow more. Discrepancies can occur due to rounding errors or mapping inaccuracies and where such discrepancies occur, these should be investigated, and explanations provided within comments boxes. For larger landscape scale projects e.g. overhead line projects or windfarms, a larger discrepancy may be acceptable to account for the accumulated rounding errors. Professional judgement can be used to identify a sufficient tolerance. Full justification

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for any discrepancy allowance of more than 0.01 ha must be provided within the report as part of the limitations section.

4.7. AFTER WORKS (FOLLOWING ACTIONS)

4.7.1.1. The area of the habitat to be created or enhanced, as well as the distinctiveness band, target condition, connectivity and strategic significance should be input into the 'After work' actions (*Following Actions*) section.

4.7.1.2. Biodiversity units and Linear units resulting from the development, including newly created, enhanced and retained habitats, are referred to as post-development biodiversity units / linear units. Data to enable these to be calculated should be gathered from the ecology and landscape plans for the site, as well as other relevant information, for example retained habitat drawings.

After work action	Phase 1 Habitat	Area or Length of Habitat	Target Condition	Connectivity	Strategic significance	Distinctiveness	Difficulty	Time to target condition	Spatial	After works units		
		(ha /km)	*Rating*	*Rating*	*Rating*	*Band*	*Highlighted orange if manually adjusted*	*(Years) Highlighted orange if manually adjusted*		IRR Units	Biodiversity (Area)	Linear (H)
Project Total										0.00	13.97	0.00
Enhancement	A1.1.1 : Woodland - Broadleaved - semi-natural (High)	1.00	Good	Moderate	High	High	High	30+		-	0.86	-
Enhancement	A1.3.1 : Woodland - Mixed - semi-natural (High)	1.00	Good	Moderate	Medium	High	High	30+		-	0.82	-
Creation	A1.1.2 : Woodland - Broadleaved - plantation	1.00	Good	Moderate	High	Medium	Medium	5		-	8.51	-
Creation	D2 : Wet dwarf shrub heath	0.75	Good	Moderate	Medium	High	High	10		-	3.77	-

Figure 17 - Before works (*Baseline*) and Action (*During works*)

4.7.1.3. In the toolkit, select where the habitat is being enhanced or created from the drop-down menu in the 'After Works' (Following Actions) section, which is located in the Unit Calculation tab. In the toolkit the appropriate equation is automatically selected once either Creation or Enhancement are selected in the 'After work action' drop-down menu. The calculations for Creation and Enhancement can be found in **Appendix G**.

Habitat enhancement is the improvement of the condition of an existing habitat, which leads to increased biodiversity value.

Habitat creation is the removal or the loss of the present habitat in the action of creating a new one or creating a new habitat.

4.7.1.4. For the After works calculations, three risk multipliers are factored into the calculations. These are the delivery risk (difficulty), the time to target condition and spatial risk. The toolkit will automatically populate the difficulty and time to target condition values based on the data input within the 'After work' actions section using the values from Metric 3.1. The exception to this is blanket bog which is assigned a medium difficulty for creation. Metric 3.1 assigns a very high difficulty to creation and high difficulty to enhancement for blanket bog. This change from Metric 3.1 is based on experience of blanket bog restoration in a Scottish context.

4.7.1.5. Professional judgement can be used to change the time to target condition or difficulty where it is considered relevant to do so, for example in instances where the location for habitat creation is considered to have an appropriate seedbank within the existing soil which may mean the target condition can be achieved within a shorter time frame. If the auto-assigned time to target condition and difficulty values are manually adjusted, this will flag a requirement within the toolkit to provide a rational

for the change. Full justification for any deviation from Metric 3.1 must be provided within the Notes column within the toolkit, or summary details provided within the toolkit, with full details given in the accompanying report. Each risk factor is given a numerical value. These are set out in the toolkits and in **Appendices C-F**. These numbers are multiplied together to calculate biodiversity units and/or linear units. The units for the habitats before the development can be compared to the units post-development to identify whether the development delivers a No Net Loss or Net Gain in biodiversity.

4.7.1.6.   Delivery risk is the risk associated with the difficulty to create or restore a habitat (Table 2). The delivery risk should be input underneath the 'Difficulty' column.

Table 2- Delivery risk categories and risk multipliers

Difficulty of creation/enhancement	Risk Multiplier
Very High	0.10
High	0.33
Medium	0.67
Low	1

4.7.1.7.   Time to target condition is the number of years it is estimated to take before the restoration, enhancement or creation of a habitat reaches the pre-agreed target quality. The time to target condition will vary depending on the habitat type, habitat management and type of change (i.e. creation or enhancement). Years to target condition are automatically populated within the toolkit and follow Metric 3.1 values. Time to target condition multipliers are shown in Table 3 summarised from Metric 3.1 Table 5-6; see **Appendix C** for the full list of risk multipliers). As with difficulty values, years to target condition can be manually changed from the auto populated values based on professional judgement. Any adjustments must be fully justified within the 'Notes' cells and within the accompanying report. If time to target condition populates as Not possible this shows that that the proposed habitat creation or enhancement is not considered achievable (following the values assigned in metric 3.1), in this event the value should not be edited.

Table 3 - Time to target condition and risk multipliers

Years to target condition	Risk Multiplier
1	0.965
5	0.837
10	0.700
20	0.490
30	0.343

4.7.1.8.   SSER's toolkit follows Natural England's Metric 3.1 and can account for situations where habitats are created in advance or when there may be delays in habitat creation. Evidence of habitat creation in advance or explanations for habitat creations delays must be added to the 'Notes' cells within the toolkits.

4.7.1.9.   For projects where there will be a loss for biodiversity over a period of time, it can be minimised or avoided by initiating offset works prior to any habitat losses. The Project Toolkit can account for 'habitat created in advance' via a reduction in the Time to Target Condition and Difficulty. Similarly, habitat work that would be delayed can be accounted for by increasing the Time to Target Condition.

4.7.1.10.   Any areas of compensation outside of the development site (offsets) will require application of the spatial risk multipliers (Table 4).

Table 4 - Spatial risk categories and risk multipliers

Category	Risk Multiplier
Compensation within LPA or Landscape Character Type (LCT) of impact Site.	1
Compensation outside LPA or LCT of impact Site but within neighbouring LPA and LCT.	0.75
Compensation outside LPA and LCT of the impact Site and outside neighbouring LPA and LCT of Site.	0.5

4.7.1.11.   In situations where habitat will be temporarily impacted by any works and will be fully restored to its baseline condition (or improved) within two years, it can be considered as retained habitat within the toolkit.

4.7.1.12.   To calculate the biodiversity units, enter the target habitat type, target condition and area into the biodiversity Unit Calculation tab in the relevant After Works Actions (Following Actions) cells. Then enter the connectivity rating and the strategic significance rating using the associated drop-down menus. The scores for these ratings will appear automatically. This will calculate the post-development biodiversity or linear units.

4.7.1.13.   Please note that the After-Works Actions (Following Actions) sections are normally filled grey to avoid data entry. To enter details of an area of habitat enhancement or creation into the toolkit, first the Before Works (Baseline) and Action (During Works) sections must be completed. The toolkit will then automatically fill the cells light blue to allow data entry.

4.7.1.14.   A scheme may require more rows for data entry for After work development features in relation to the Before works habitat feature lost / impacted. In this case, simply add new items to the Before works (Baseline) sections. The toolkit will then automatically fill the cells light blue to allow data entry.

4.7.1.15.   As long as hardstanding is included in the assessment, the total areas pre- and post-development should be the same to ensure no gaps or double counting.

Post development				Net change				
Post development units				Net change in units				
IRR UNITS	Biodiversity (Area)	Linear (H)	Linear (W)	IRR (Area)	IRR (Area) %	Biodiversity (Area)	Biodiversity (Area) %	Linear (H)
0.00	43.67	0.00	0.00	0.00		8.97		0.00
-	16.04	-	-	-	-	0.86	+5.66%	-
-	15.34	-	-	-	-	0.82	+5.66%	-
-	8.51	-	-	-	-	6.51	+325.64%	-
-	3.77	-	-	-	-	0.77	+25.78%	-

Figure 18 - Post-development and Net Change segment of Unit Calculation tab

4.7.1.16. At the end of the process, the toolkit will have automatically calculated the Post-development units as well as the Net change in units for each habitat and will allow the user to assess whether a development has delivered in No Net Loss or Net Gain by allowing comparison between post-development units and baseline units.

4.7.1.17. The working example shown in **Figure 18** shows a positive net change in biodiversity units, an increase of 8.97 biodiversity units overall.

4.8. RESULTS ANALYSIS

4.8.1.1. Use the Results Analysis Tab (Figure 11, highlighted red) within the toolkit to view a trading summary which provides details of trading between habitat types and indicates if the project has complied with the trading rules.
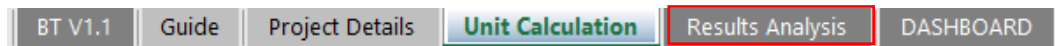
Figure 19 - Biodiversity Toolkit Results Analysis tab

4.8.1.2. The Results Analysis tab provides a review of the trading rules, detailing if the changes in biodiversity units with each distinctiveness band have complied with the trading principles as detailed in the Metric 3.1 User Guide.

Rule 3 - Trading down' must be avoided. Losses of habitat are to be compensated for on a 'like for like' or 'like for better' basis. New or restored habitats should aim to achieve a higher distinctiveness and/or condition than those lost. Losses of irreplaceable or very high distinctiveness habitat cannot adequately be accounted for through the metric.

4.8.1.3. The trading summary avoids the need to individually assess changes in habitat type and condition on a parcel-by-parcel basis. Where trading rules have not been met, the toolkit will highlight these habitats in red as shown in Figure 20.
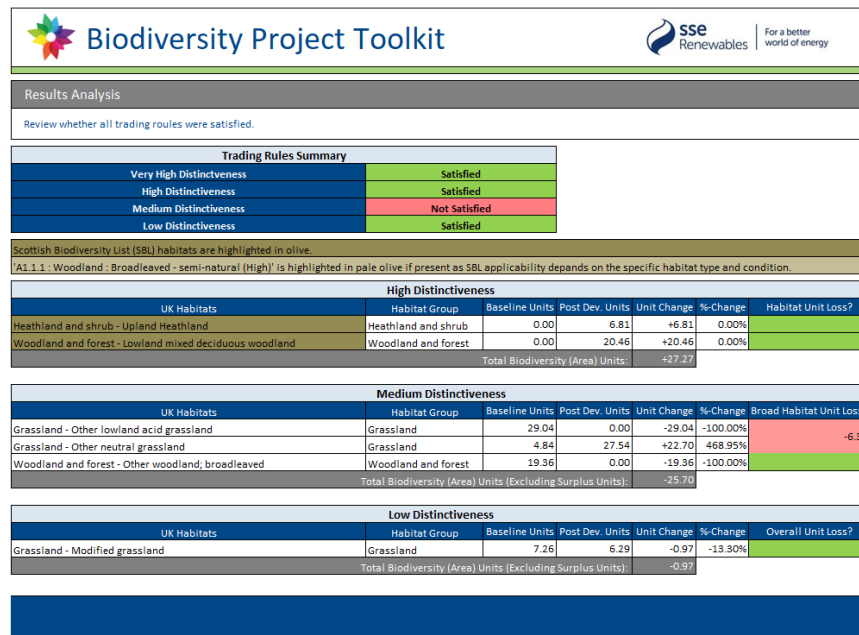
Figure 10 - Trading Rules Summary

4.9. THE DASHBOARD

4.9.1.1.   Use the Dashboard Tab (Figure 11, highlighted red) within the toolkit to support reporting on No Net Loss or Net Gain for biodiversity.
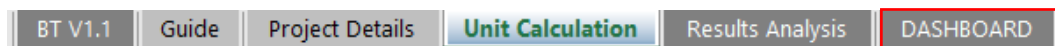
Figure 11 - Biodiversity Toolkit Dashboard tab

4.9.1.2.   The Dashboard tab is automatically populated, providing summary information for reporting and decision-making purposes. These summary tables and charts should be included in the final report. They provide opportunities for monitoring the impacts of development within the project. The final report should also include a short narrative on how the development has followed the ten Good Practice Principles.

4.9.1.3.   It should be noted that the Dashboard will not take into account the loss of priority habitat and the Dashboard may show the development as reaching Net Gain despite the loss of priority habitat. This will need to be detailed in the Biodiversity Report.

Units

Before Works	Units
IRR Habitats (Area)	0.00
Biodiversity (Area)	34.70
Linear Units (H)	0.00
Linear Units (W)	0.00

Post Development	Units
IRR Habitats (Area)	0.00
Biodiversity (Area)	43.67
Linear Units (H)	0.00
Linear Units (W)	0.00

Net Change	Units
IRR Habitats (Area)	0.00
Biodiversity (Area)	+8.97
Linear Units (H)	0.00
Linear Units (W)	0.00

■ Before Works   ■ Post Development

% Change	
IRR Habitats (Area)	-
Biodiversity (Area)	+26%
Linear Units (H)	-
Linear Units (W)	-

Figure 22 - Dashboard

4.9.1.4.   The three tables to the right of the dashboard (22) show the baseline (Before works) and Post-Development Biodiversity units for the development overall as well as the net change. There is also a bar chart that visually demonstrates the change in biodiversity or linear units before works and Post-development. A small table beside the bar chart shows the percentage change in biodiversity and linear units. Irreplaceable habitat is listed separately within the summary tables.

4.9.1.5.   The bar chart and tables on the dashboard can be used within associated biodiversity reports.

4.10. BIODIVERSITY TOOLKIT FLOWCHART

4.10.1.1. Figure is a step-by-step flowchart of how to use the Biodiversity Toolkit from beginning to end.

Figure 23 - Biodiversity Toolkit- Flowchart
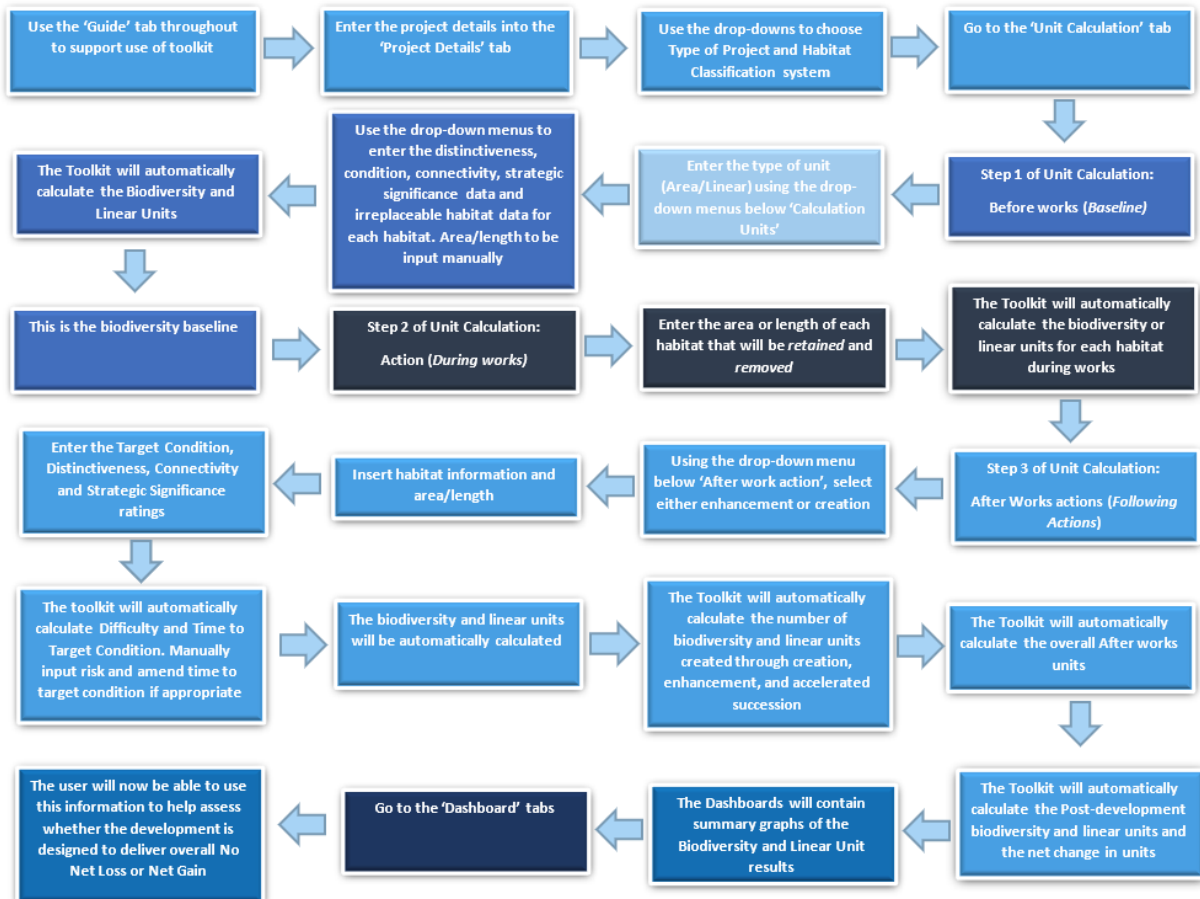
5. PRODUCTION OF THE FINAL REPORTS

5.1. QUALITY ASSURANCE

5.1.1.1. In-house quality assurance should be undertaken after all data has been entered into the toolkit and the associated BNG report has been written to ensure that there are no errors in the data. The quality assurance should be completed by a SSER staff member who is trained in BNG. When completing the toolkit, consultants and contractors should produce an associated report detailing the findings and including any limitations or assumptions made and justifications for any site-specific deviations from defined values based on professional judgment during the assessment process.

5.2. OPTIONEERING REPORT

5.2.1.1. SSER's Site Optioneering Toolkit can be used to inform the site selection process by providing a biodiversity baseline for the different site options. The summary graphs and tables found in the Dashboard tab can be used to inform decisions.

5.3. PROJECT DESIGN REPORTING

5.3.1.1. The calculations quantify the predicted scale and scope of biodiversity unit loss or gain from a scheme design. This should be summarised and communicated to the project design team at the earliest opportunity. This can then be used as part of a design review process to influence built and landscaping design and construction works activities and programme to avoid and minimise impacts and influence the design and timing of onsite landscaping to target required habitat types. This reinforces the application of the mitigation hierarchy.

5.3.1.2. Once the scheme has been finalised, the detailed calculations, inputs and outputs should be included in the suite of documents upon which the decision to progress with the scheme is made. For example, as an appendix to the EcIA. The final copy of the biodiversity project toolkit populated for the project should also be submitted to the determining authority in support of information set out in any reports.

5.4. PROJECT AS-BUILT REPORTING

5.4.1.1. Calculating biodiversity units during the design stage is a prediction of losses and gains in habitat and is not the project's final balance regarding biodiversity units on completion of habitat creation and / or enhancement. These predictions should be validated during project construction by collecting 'as-built' data on the actual losses and gains in habitat. Biodiversity unit calculations should be undertaken as construction progresses to help identify any issues early on and to ensure that the project's biodiversity target remains on track. The 'as-built' biodiversity unit calculation is to be reported on completion of the scheme. Only on delivery of the habitats will the project be able to be assessed as achieving net gain or No Net Loss.

5.4.1.2. Ongoing management will be required to deliver the predicted gains, and a long-term management plan should be detailed in the biodiversity report.

5.5. PROJECT WIDE NO NET LOSS AND NET GAIN FOR BIODIVERSITY

5.5.1.1. Applying the methodology enables a project to identify as either a 'No Net Loss' or 'Net Gain' biodiversity project. Whilst impacts on designated sites, irreplaceable habitats and legally protected species are dealt with separately, project wide claims can only be made where a project has both avoided or fully mitigated[15] for any potential impacts on protected species, SSSIs, SACs, SPAs or Ramsar Sites or irreplaceable habitats, and has post-development units as a percentage of the baseline units that are:

- 95% - 104%: the project can predict it will achieve a project-wide biodiversity **No Net Loss in design** for the habitats assessed.

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[15] To fully mitigate means to put in place actions that completely negate the impacts of the development. For example, putting in place settling ponds that remove sediment and as a result the sediment does not affect the associated wetland.

- 105% or more: the project can predict it will achieve a project-wide biodiversity **Net Gain in design** for the habitats assessed.

| No impacts or fully mitigated impacts on protected species, irreplaceable habitats and protected sites. | + | Post-development units are *95-104%* of the baseline units | → | *No Net Loss* |
| | + | Post-development units are *105% or more* of the baseline units | → | *Net Gain* |
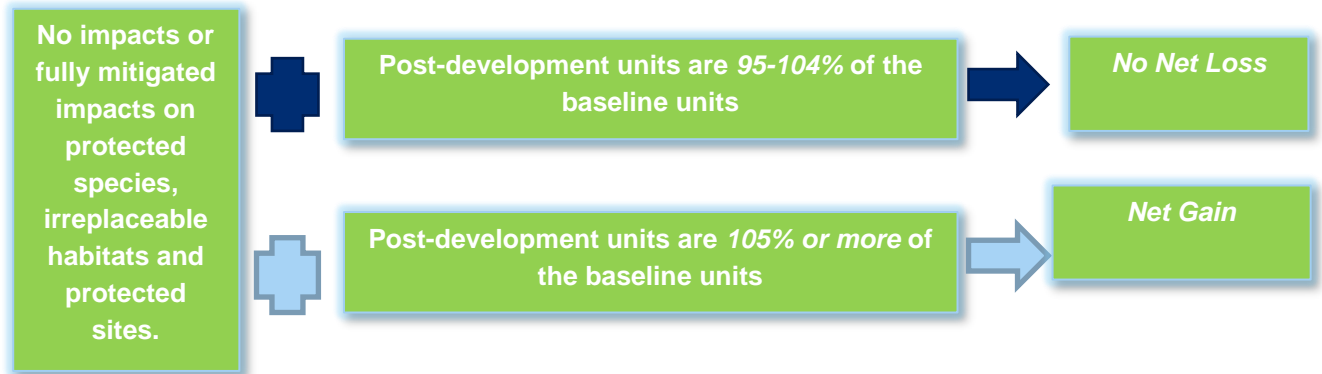
5.5.1.2.   This gain needs to be demonstrated separately for each broad habitat type and each habitat with a high or very high distinctiveness score as well as for the project as a whole in order for the project to be able to claim that it can deliver BNG in design.

5.5.1.3.   Where designated sites, legally protected species or irreplaceable habitats are being negatively affected, project wide claims should not be made, even if these impacts are compensated for. In these situations, projects should aim to achieve net gains in other non-irreplaceable habitats.

5.5.1.4.   It is important to remember that the BNG calculations will predict net gain in design or predict that BNG is possible but will not deliver net gain. Ongoing management must be undertaken in order for a development to reach net gain.

APPENDIX A: GLOSSARY OF TERMS

Term	Definition
Irreplaceable Habitat	Considered by SSER as all areas of active blanket bog or raised bog.. Woodland listed within the AWI (excluding LEPO) is considered irreplaceable in addition to woodland not listed within the AWI which contains ancient woodland indicators or characteristics and has been assessed by a suitably qualified ecologist as ancient woodland and irreplaceable.
Biodiversity Unit	A Biodiversity Unit is a nominal figure that is derived from a calculation using numerical values assigned for the distinctiveness, condition and size (area), connectivity and strategic significance of a habitat. Post-Development Biodiversity Units are calculated using risk factor multipliers to aid the discussion of loss, impacts avoided and gains of habitat as a result of management and development activities. The tool automatically calculates the number of Biodiversity Units based on the information that the user inputs.
Condition	Condition is one of the measures of habitat quality and measures the area against the ecological optimum of the habitat type and allows for direct comparisons between the same habitat types to be made. Habitat condition can be identified as Good, Fairly Good, Moderate, Fairly Poor and Poor. Condition is assessed using the Metric 3.1 habitat condition assessment criteria for the identified habitat (with the exception of rivers and canals). Some habitat condition assessments include essential criteria which must be met in order to achieve a specific condition. Some low distinctiveness habitats do not require a habitat condition assessment e.g. cropland, bracken etc.
Distinctiveness	Distinctiveness is a collective measure of biodiversity and includes parameters such as species richness, diversity, rarity and the degree to which a habitat supports species rarely found in other habitats (DEFRA 2012). The tool maps out the relevant distinctiveness band (Very High/High / Medium / Low/Very Low) in the habitat matrix and will automatically assign the band to your selection. Phase 1 habitats can have two distinctiveness options. In this case the ecologist should use their expertise to assign a distinctiveness to the habitat. If the necessary information is not available the ecologist should take a precautionary approach and choose the highest distinctiveness.
Connectivity	The relationship of a particular habitat patch to other surrounding similar or related semi-natural habitats facilitating flows of species and ecosystem service, based on the 'structural connectivity' model within the National Biodiversity Climate Change Vulnerability Model. The categories are: Highly aggregated/connected; Moderate aggregation/connectivity and; Low aggregation/connectivity

Priority habitat	Priority habitats are identified as being the most threatened habitats and requiring conservation action by the UK Biodiversity Action Plan (UK BAP), originally written between 1995 and 1999 and revised in 2007.
Strategic significance	Strategic significance gives extra value to habitats that are located in optimum locations for biodiversity and other environmental objectives, such as areas that are the focus of green infrastructure or local biodiversity plans. The categories are;
	High strategic significance;
	Medium strategic significance and;
	Low strategic significance
Geospatial Reference	A reference, generally created by mapping software, for the specific location of a parcel of habitat.
Habitat Creation	The removal or the loss of the present habitat in the action of creating the new one or creating habitat where none was previously present (including bare ground).
	This includes, for example, removing scrub in order to create a wetland habitat or removing hardstanding to create new grassland habitat.
Habitat Enhancement	The improvement of the condition of an existing habitat, thereby increasing the biodiversity value of a habitat type. Enhancement is achieved through measures that improve habitat biodiversity capacity and/or remove factors that detract from its value,
	This includes increasing the diversity of species that can be supported by a habitat, for example by managing improved grassland so that it becomes semi improved grassland, which would seek to increase species diversity.
Local Biodiversity Priorities	Local (county or equivalent) biodiversity, green infrastructure or offsetting strategies. For example, local Biodiversity Action Plans (BAPs).
Linear Unit	A Linear unit is a nominal figure that is derived from a calculation using numerical values assigned for condition and length of a linear habitat.
	In Metric 3.1, distinctiveness, condition, strategic significance and connectivity are assessed for each linear habitat.
	In the toolkit the linear habitats or hedgerows or watercourses are input separately.
Parcel	A defined land area that is used to split different habitats for calculation purposes.
Risk Factors	Any risks to the delivery of biodiversity outcomes and the ongoing management of these outcomes. Within the metric, the risks associated with delivery and the location of the offset are taken into consideration using risk factors, as indicated below (delivery, spatial and temporal).
Risk Factor 1: Difficulty	Difficulty is the risk associated with the difficulty to create or enhance any specific habitat i.e. how hard (Very High / High / Medium / Low) it is to restore / enhance / create the habitat identified. Please note that the level of difficulty differs depending on whether you are creating or restoring the

habitat. The level of difficulty for restoration and recreation for each habitat type is specified in the Metric 3.1 guidance with the exception of blanket bog which is assigned 'Medium' difficulty.

Risk Factor 2: Spatial Risk

Spatial risk is the risk associated with delivering compensation for the loss of a habitat at a distance from that loss (i.e. generally the greater distance can mean a greater risk) and in relation to areas of strategic priority for biodiversity.

Risk Factor 3: Temporal Risk

In delivering compensation for habitat loss, the timing of the impact may not coincide with the new habitat reaching the required quality or level of maturity, which could result in loss of biodiversity for a period of time. Additionally, there may be a time gap between the habitat loss and the start of the creation or enhancement of new habitat. Where possible, the development should prevent this additional time gap through starting creation or enhancement prior to habitat loss. Where this is not possible and is justified, any additional time gap needs to be accounted for. These two-time lags together are called the Temporal Risk. The Temporal Risk categories go from year 0 to year >30.

Target Condition

The condition that the habitat will attain as a result of your actions. There are 18 categories ranging from 'Lower distinctiveness habitats' to 'Good-good.'

APPENDIX B: CONDITION ASSESSMENT

[insert Current version of Habitat Condition Assessment Sheets]

APPENDIX C: TEMPORAL RISK MULTIPLIER VALUES

Year	Time to target multiplier
0	1.000
1	0.965
2	0.931
3	0.899
4	0.867
5	0.837
6	0.808
7	0.779
8	0.752
9	0.726
10	0.700
11	0.676
12	0.652
13	0.629
14	0.607
15	0.586
16	0.566
17	0.546
18	0.527
19	0.508

Year	Time to target multiplier
20	0.490
21	0.473
22	0.457
23	0.441
24	0.425
25	0.410
26	0.396
27	0.382
28	0.369
29	0.356
30	0.343
31	0.331
32	0.320

APPENDIX D: TEMPORAL MULTIPLIER: ENHANCEMENT

TABLE KEY

Code	Related Start Condition-Target Condition
LDH-N/A-O	Lower Distinctiveness Habitat - N/A -Other
LDH-N/A-Ag	Lower Distinctiveness Habitat - N/A -Agricultural
LDH-P	Lower Distinctiveness Habitat - Poor
LDH-FP	Lower Distinctiveness Habitat - Fairly Poor
LDH-Mod	Lower Distinctiveness Habitat - Moderate
LDH-FG	Lower Distinctiveness Habitat - Fairly Good

Code	Related Start Condition-Target Condition
LDH-G	Lower Distinctiveness Habitat - Good
P-FP	Poor - Fairly Poor
P-Mod	Poor - Moderate
P-FG	Poor - Fairly Good
P-G	Poor - Good
FP-Mod	Fairly Poor - Moderate
FP-FG	Fairly Poor - Fairly Good
FP-G	Fairly Poor - Good
Mod-FG	Moderate - Fairly Good

Code	Related Start Condition-Target Condition
Mod-G	Moderate - Good
FG-G	Fairly Good - Good
G-G	Good - Good

TEMPORAL RISK MULTIPLIER VALUES TABLE

Habitat	Idh-n/a-o	Idh-n/a-ag	Idh-p	Idh-fp	Idh-mod	Idh-fg	Idh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Cropland – Arable field margins	1	1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0	
Cropland – Cereal crops	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	
Cropland – Horticulture	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	
Cropland – Intensive orchards	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	

BIODIVERSITY NET GAIN

Habitat	ldh-n/a-o	ldh-n/a-ag	ldh-p	ldh-fp	ldh-mod	ldh-fg	ldh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Cropland – Non-Cereal crops	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Cropland – Temporary grass and clover leys	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Cropland – Traditional orchards			5	10	20	25	30	5	10	20	25	10	15	20	5	10	5	0
Grassland – Bracken			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0
Grassland - Lowland calcareous grassland			10	15	20	25	30	10	15	20	25	10	15	20	10	15	10	0
Grassland - Lowland dry acid grassland			10	12	15	17	20	10	15	18	20	18	15	18	10	10	10	0
Grassland - Lowland meadows			10	12	15	17	20	10	15	18	20	18	15	18	10	10	10	0
Grassland - Modified grassland		1	1	5	10	12	15	5	10	12	25	10	15	20	10	15	10	0
Grassland - Other lowland acid grassland			1	5	10	12	15	5	10	12	25	10	15	20	10	15	10	0

Habitat	ldh-n/a-o	ldh-n/a-ag	ldh-p	ldh-fp	ldh-mod	ldh-fg	ldh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Grassland - Other neutral grassland			1	5	10	12	15	5	10	12	25	10	15	20	10	15	10	0
Grassland - Tall herb communities			1	5	10	12	15	5	10	12	25	10	15	20	10	15	10	0
Grassland - Upland acid grassland			1	5	10	12	15	5	10	12	25	10	15	20	10	15	10	0
Grassland - Upland calcareous grassland			10	12	15	20	25	10	15	18	20	18	15	18	10	10	10	0
Grassland - Upland hay meadows			10	12	15	18	20	10	15	18	20	18	15	18	10	7	10	0
Heathland and shrub - Blackthorn scrub			1	2	3	5	7	1	2	3	5	1	2	3	1	2	1	0
Heathland and shrub - Bramble scrub			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0
Heathland and shrub - Gorse scrub			1	3	5	7	10	1	5	7	10	3	5	3	2	3	2	0
Heathland and shrub - Hawthorn scrub			1	2	3	5	7	1	5	7	10	3	5	3	2	3	2	0

Habitat	ldh-n/a-o	ldh-n/a-ag	ldh-p	ldh-fp	ldh-mod	ldh-fg	ldh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Heathland and shrub - Hazel scrub			5	7	10	12	15	5	7	12	15	12	15	12	5	7	5	0
Heathland and shrub - Lowland Heathland			10	15	20	25	32+	10	15	20	25	10	15	20	10	15	10	0
Heathland and shrub - Mixed scrub			1	2	3	5	7	1	5	7	10	3	5	3	2	3	2	0
Heathland and shrub - Mountain heaths and willow scrub			15	23	25	32	32+	15	23	25	32	32	32	25	20	25	10	0
Heathland and shrub - Rhododendron scrub			1	2	3	5	7	1	2	3	5	1	2	3	1	2	1	0
Heathland and shrub - Sea buckthorn scrub			1	2	3	5	7	1	2	3	5	1	2	3	1	2	1	0
Heathland and shrub - Upland Heathland			10	15	20	25	30	10	15	20	25	10	15	20	10	15	10	0
Rivers and lakes - Aquifer fed naturally fluctuating water bodies			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0

Habitat	Idh-n/a-o	Idh-n/a-ag	Idh-p	Idh-fp	Idh-mod	Idh-fg	Idh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Rivers and lakes - Eutrophic standing waters			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Rivers and lakes - Mesotrophic lakes			3	7	10	15	20	7	10	15	20	15	18	20	10	12	12	0
Rivers and lakes - Natural lake or pond			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0
Rivers and lakes - Oligotrophic and dystrophic lakes			5	10	20	31	32+	7	10	15	20	15	18	20	10	12	12	0
Rivers and lakes - Ponds (Priority Habitat)			1	3	10	15	20	7	10	15	20	15	18	20	10	12	12	0
Rivers and lakes - Reservoirs			1	7	10	15	20	7	10	15	20	15	18	20	10	12	12	0
Sparsely vegetated land - Calaminarian grasslands			5	7	10	15	20	7	10	15	20	20	18	18	10	12	12	0

Habitat	Idh-n/a-o	Idh-n/a-ag	Idh-p	Idh-fp	Idh-mod	Idh-fg	Idh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Sparsely vegetated land - Ephemeral			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0
Sparsely vegetated land - Inland rock outcrop and scree habitats			10	15	20	25	32+	10	15	25	32	20	25	27	15	20	15	0
Sparsely vegetated land - Limestone pavement			32	32	32	32	32+	32	32	32+	32	32	32	32	32	32	32	0
Sparsely vegetated land - Maritime cliff and slopes			10	15	20	25	32+	10	15	20	25	10	15	20	10	15	10	0
Sparsely vegetated land - Other inland rock and scree			14	10	28	7	19	10	15	25	32	20	25	27	15	20	15	0
Urban - Allotments			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Urban - Artificial lake or pond			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0

Habitat	ldh-n/a-o	ldh-n/a-ag	ldh-p	ldh-fp	ldh-mod	ldh-fg	ldh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Urban - Artificial unvegetated, unsealed surface			1	1	1	1	1	1	2	3	5	1	2	3	1	2	1	0
Urban - Bioswale			1	1	1	2	3	1	2	2	3	3	3	3	2	2	2	0
Urban - Brown roof			1	3	5	7	10	1	5	7	10	5	8	10	5	5	3	0
Urban - Built linear features	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Urban - Cemeteries and churchyards			10	12	15	17	20	5	10	15	20	15	15	20	10	15	5	0
Urban - Developed land: sealed surface	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Urban - Extensive green roof			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0
Urban - Façade-bound green wall			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0
Urban - Ground based green wall			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0

Habitat	ldh-n/a-o	ldh-n/a-ag	ldh-p	ldh-fp	ldh-mod	ldh-fg	ldh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Urban - Ground level planters			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Urban - Intensive green roof			1	3	5	8	10	3	5	8	10	3	8	8	3	5	2	0
Urban - Introduced shrub			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Urban - Natural sports pitches	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Urban - Open Mosaic Habitats on Previously Developed Land			2	3	5	7	10	3	5	7	10	5	7	10	3	4	3	0
Urban - Orchard			5	10	15	20	25	5	10	20	25	10	15	20	5	10	5	0
Urban - Rain garden			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Urban - Sand pit quarry or open cast mine			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Urban - Street Tree			20	25	27	30	32+	5	7	10	15	10	12	32	10	20	10	0

Habitat	Idh-n/a-o	Idh-n/a-ag	Idh-p	Idh-fp	Idh-mod	Idh-fg	Idh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Urban - Suburban/ mosaic of developed/ natural surface			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0
Urban - Sustainable urban drainage feature			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0
Urban - Un-vegetated garden	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Urban - Vacant/derelict land/ bareground			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Urban - Vegetated garden			1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0
Urban - Woodland			20	25	27	30	32+	5	10	15	32	15	20	15	10	10	10	0
Wetland - Aquatic marginal vegetation			5	7	10	12	15	5	10	12	15	7	10	12	7	10	5	0
Wetland - Blanket bog			15	25	30	32	32+	10	20	25	30	10	20	20	10	15	10	0
Wetland - Lowland fens			10	12	15	25	30	10	12	15	15	10	15	15	10	10	10	0

Habitat	Idh-n/a-o	Idh-n/a-ag	Idh-p	Idh-fp	Idh-mod	Idh-fg	Idh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Wetland - Lowland raised bog			15	20	30	32	32+	10	20	25	30	10	20	20	10	15	10	0
Wetland - Other swamps			5	7	10	12	15	5	10	12	15	7	10	12	7	10	5	0
Wetland - Purple moor grass and rush pastures			10	12	15	17	20	5	10	15	20	15	15	20	10	15	5	0
Wetland - Reedbeds			5	7	10	12	15	5	10	12	15	7	10	12	7	10	5	0
Wetland - Upland flushes, fens and swamps			15	20	30	25	32+	5	15	20	32	20	15	30	15	20	10	0
Woodland and forest - Felled			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
Woodland and forest - Lowland beech and yew woodland			32	32	32	32	32+ 32+	32	32	32+	32	32	32	32	32	10	0	
Woodland and forest - Lowland mixed deciduous woodland			20	25	32	32	32+	10	15	20 32+	15	20	25	10	15	10	0	

Habitat	Idh-n/a-o	Idh-n/a-ag	Idh-p	Idh-fp	Idh-mod	Idh-fg	Idh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Woodland and forest - Native pine woodlands			25	30	32	32	32+	10	15	20	32	15	20	25	10	15	10	0
Woodland and forest - Other coniferous woodland			15	20	25	25	32+	10	15	20	32	15	20	25	10	15	10	0
Woodland and forest - Other Scot's Pine woodland			20	25	32	32	32+	10	15	20	32	15	20	25	10	15	10	0
Woodland and forest - Other woodland: broadleaved			20	25	32	32	32+	10	15	20	32	15	20	25	10	15	10	0
Woodland and forest - Other woodland: mixed			20	25	32	32	32+	10	15	20	32	15	20	25	10	15	10	0
Woodland and forest - Upland birchwoods			15	20	25	30	32+	10	15	20	32	15	20	25	10	15	10	0
Woodland and forest - Upland mixed ashwoods			25	30	32	32	32+	10	15	20	32	15	20	25	10	15	10	0

Habitat	ldh-n/a-o	ldh-n/a-ag	ldh-p	ldh-fp	ldh-mod	ldh-fg	ldh-g	p-fp	p-mod	p-fg	P-g	FP-Mod	fp-fg	FP-G	Mod-fg	mod-g	fg-g	g-g
Woodland and forest - Upland oakwood			32	32	32	32	32+	32	32	32+	32	32	32	32	32	32	32	0
Woodland and forest - Wet woodland			15	20	25	30	32+	10	10	15	32	15	20	25	10	15	10	0
Woodland and forest - Wood-pasture and parkland			20	25	32	32	32+	10	15	20	32	15	20	25	10	15	10	0
Cropland - Arable field margins		1	1	2	3	4	5	1	2	3	5	1	2	3	1	2	1	0

APPENDIX E: TEMPORAL MULTIPLIERS – CREATION

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
Cropland - Arable field margins	5	4	3	2	1	1	
Cropland - Cereal crops	1	1	1	1	1	1	
Cropland - Horticulture	1	1	1	1	1	1	
Cropland - Intensive orchards	1	1	1	1	1	1	
Cropland - Non-cereal crops	1	1	1	1	1	1	
Cropland - Temporary grass and clover leys	1	1	1	1	1	1	
Cropland - Traditional orchards	30	25	20	10	5		
Grassland - Bracken	5	4	3	2	1		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
Grassland - Lowland calcareous grassland	30	25	20	15	10		
Grassland - Lowland dry acid grassland	20	17	15	12	10		
Grassland - Lowland meadows	20	17	15	12	10		
Grassland - Modified grassland	15	12	10	5	1	1	
Grassland - Other lowland acid grassland	15	12	10	5	1		
Grassland - Other neutral grassland	15	12	10	5	1		
Grassland - Tall herb communities	15	12	10	5	1		
Grassland - Upland acid grassland	15	12	10	5	1		
Grassland - Upland	25	20	15	12	10		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
calcareous grassland							
Grassland - Upland hay meadows	20	18	15	12	10		
Heathland and shrub - Blackthorn scrub	7	5	3	2	1		
Heathland and shrub - Bramble scrub	5	4	3	2	1		
Heathland and shrub - Gorse scrub	10	7	5	3	1		
Heathland and shrub - Hawthorn scrub	7	5	3	2	1		
Heathland and shrub - Hazel scrub	15	12	10	7	5		
Heathland and shrub - Lowland Heathland	32	25	20	15	10		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
Heathland and shrub - Mixed scrub	7	5	3	2	1		
Heathland and shrub - Mountain heaths and willow scrub	32	32	25	23	15		
Heathland and shrub - Rhododendron scrub	7	5	3	2	1		
Heathland and shrub - Sea buckthorn scrub	7	5	3	2	1		
Heathland and shrub - Upland Heathland	30	25	20	15	10		
Rivers and lakes - Aquifer fed naturally fluctuating water bodies	5	4	3	2	1		
Rivers and lakes - Eutrophic standing waters	1	1	1	1	1		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
Rivers and lakes - Mesotrophic lakes	20	15	10	7	3		
Rivers and lakes - Natural lake or pond	5	4	3	2	1		
Rivers and lakes - Oligotrophic and dystrophic lakes	32	31	20	10	5		
Rivers and lakes - Ponds (Priority Habitat)	20	15	10	3	1		
Rivers and lakes - Reservoirs	20	15	10	7	1		
Sparsely vegetated land - Calaminarian grasslands	20	15	10	7	5		
Sparsely vegetated land - Ephemeral	5	4	3	2	1		
Sparsely vegetated land - Inland rock	32	25	20	15	10		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
outcrop and scree habitats							
Sparsely vegetated land - Limestone pavement	32	32	32	32	32		
Sparsely vegetated land - Maritime cliff and slopes	32	25	20	15	10		
Sparsely vegetated land - Other inland rock and scree	19	7	28	10	14		
Urban - Allotments	1	1	1	1	1		
Urban - Artificial lake or pond	5	4	3	2	1		
Urban - Artificial unvegetated, unsealed surface	1	1	1	1	1		
Urban - Bioswale	3	2	1	1	1		
Urban - Brown roof	10	7	5	3	1		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
Urban - Built linear features	0	0	0	0	0	0	0
Urban - Cemeteries and churchyards	20	17	15	12	10		
Urban - Developed land: sealed surface	0	0	0	0	0	0	0
Urban - Extensive green roof	5	4	3	2	1		
Urban - Façade-bound green wall	5	4	3	2	1		
Urban - Ground based green wall	5	4	3	2	1		
Urban - Ground level planters	1	1	1	1	1		
Urban - Intensive green roof	10	8	5	3	1		
Urban - Introduced shrub	1	1	1	1	1		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
Urban - Natural sports pitches	1	1	1	1	1	1	1
Urban - Open Mosaic Habitats on Previously Developed Land	10	7	5	3	2		
Urban - Orchard	25	20	15	10	5		
Urban - Rain garden	1	1	1	1	1		
Urban - Sand pit quarry or open cast mine	1	1	1	1	1		
Urban - Street Tree	32	30	27	25	20		
Urban - Suburban/ mosaic of developed/ natural surface	5	4	3	2	1		
Urban - Sustainable urban drainage feature	5	4	3	2	1		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
Urban - Un-vegetated garden	0	0	0	0	0	0	0
Urban - Vacant/derelict land/bareground	1	1	1	1	1		
Urban - Vegetated garden	5	4	3	2	1		
Urban - Woodland	32	30	27	25	20		
Wetland - Aquatic marginal vegetation	15	12	10	7	5		
Wetland - Blanket bog	32	32	30	25	15		
Wetland - Lowland fens	30	25	15	12	10		
Wetland - Lowland raised bog	32	32	30	20	15		
Wetland - Other swamps	15	12	10	7	5		
Wetland - Purple moor	20	17	15	12	10		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
grass and rush pastures							
Wetland - Reedbeds	15	12	10	7	5		
Wetland - Upland flushes, fens and swamps	32	25	30	20	15		
Woodland and forest - Felled	1	1	1	1	1		
Woodland and forest - Lowland beech and yew woodland	32	32	32	32	32		
Woodland and forest - Lowland mixed deciduous woodland	32	32	32	25	20		
Woodland and forest - Native pine woodlands	32	32	32	30	25		
Woodland and forest - Other coniferous woodland	32	32	25	20	15		

Habitat Description	Good	Fairly Good	Moderate	Fairly Poor	Poor	N/A Agricultural	N/A-Other
Woodland and forest - Other Scot's Pine woodland	32	32	32	25	20		
Woodland and forest - Other woodland: broadleaved	32	32	32	25	20		
Woodland and forest - Other woodland: mixed	32	32	32	25	20		
Woodland and forest - Upland birchwoods	32	30	25	20	15		
Woodland and forest - Upland mixed ashwoods	32	32	32	30	25		
Woodland and forest - Upland oakwood	32	32	32	32	32		
Woodland and forest - Wet woodland	32	30	25	20	15		
Woodland and forest - Wood-pasture and parkland	32	32	32	25	20		

APPENDIX F: HEDGEROW DATA

Habitat Description	Distinctiveness Category	Distinctiveness Score	Poor Creation Years	Moderate Creation Years	Good Creation Years	Poor to Moderate Enhanced Years	Enhance Poor to Good Years	Mod to Good Enhanced Years	Creation Difference	Enhancement Difference	Action
Native Species Rich Hedgerow with trees - Associated with bank or ditch	High	6	1	10	20	6	10	4	Low	Low	Avoid, Mitigate or Compensate
Native Species Rich Hedgerow - Associated with bank or ditch	High	6	1	5	10	3	5	2	Low	Low	Avoid, Mitigate or Compensate
Native Species Rich Hedgerow with trees	Medium	4	1	10	20	6	10	4	Low	Low	Mitigate or Compensate

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Habitat Description	Distinctiveness Category	Distinctiveness Score	Poor Creation Years	Moderate Creation Years	Good Creation Years	Poor to Moderate Enhanced Years	Enhance Poor to Good Years	Mod to Good Enhanced Years	Creation Difference	Enhancement Difference	Action
Native Species Rich Hedgerow	Medium	4	1	5	10	3	5	2	Low	Low	Mitigate or Compensate
Native Hedgerow with trees - Associated with bank or ditch	Medium	4	1	10	20	6	10	4	Low	Low	Mitigate or Compensate
Native Hedgerow - Associated with bank or ditch	Medium	4	1	5	10	3	5	2	Low	Low	Mitigate or Compensate
Native Hedgerow with trees	Low	2	1	10	20	6	10	4	Low	Low	Potential to Develop
Native Hedgerow	Low	2	1	5	10	3	5	2	Low	Low	Potential to Develop

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Habitat Description	Distinctiveness Category	Distinctiveness Score	Poor Creation Years	Moderate Creation Years	Good Creation Years	Poor to Moderate Enhanced Years	Enhance Poor to Good Years	Mod to Good Enhanced Years	Creation Difference	Enhancement Difference	Action
Hedge Ornamental Non- Native	V.Low	0	30	30	30	15	15	25	Low	Low	Potential to Develop
Line of Trees (Ecologically Valuable) - with Bank or Ditch	Medium	4	1	20	30	20	30	10	Low	Low	Mitigate or Compensate
Line of Trees (Ecologically Valuable)	Medium	4	1	20	30	20	30	10	Low	Low	Mitigate or Compensate
Line of Trees - Associated with bank or ditch	Low	2	1	20	30	20	30	10	Low	Low	Potential to Develop
Line of Trees	Low	2	1	20	30	20	30	10	Low	Low	Potential to Develop

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APPENDIX G: SITE OPTIONEERING TOOLKIT FLOWCHART

A step-by-step guide of how to use SSE's Site Optioneering Toolkit in order to inform site selection considerations.

Use the 'Guide' tab throughout to support use of toolkit	→ Enter the project details into the 'Project Details' tab	→ Use the toolkit drop-down menus to choose Type of Project and Habitat Classification system	→ Enter the site information into 'Project Details' tab

Once all sites are input, go to the 'Dashboard' tabs ←	The toolkit will automatically calculate the Biodiversity and Linear Units ←	Use the drop-down menus to insert data about each habitat. Area/length to be input manually ←	Go to the 'Opt X' tabs. These are for calculating the baseline for each site

The Dashboard tabs provide a summary of outputs	→ The summary outputs will be bar graphs of each site and summary tables, allowing for easy comparison	→ The graphs and summary tables can be used to justify site choice and input into the Biodiversity report

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APPENDIX H: PROJECT TOOLKIT FLOWCHART

A step-by-step guide of how to use SSE's Biodiversity Toolkit.

| Use the 'Guide' tab throughout to support use of toolkit | → | Enter the project details into the 'Project Details' tab | → | Use the drop-downs to choose Type of Project and Habitat Classification system | → | Go to the 'Unit Calculation' tab |

↓

| The Toolkit will automatically calculate the Biodiversity and Linear Units | ← | Use the drop-down menus to enter the distinctiveness, condition, connectivity,strategic significance data and irreplaceable habitat data for each habitat. Area/length to be input manually | ← | Enter the type of unit (Area/Linear) using the drop-down menus below 'Calculation Units' | ← | Step 1 of Unit Calculation: Before works (*Baseline*) |

↓

| This is the biodiversity baseline | → | Step 2 of Unit Calculation: Action (*During works*) | → | Enter the area or length of each habitat that will be *retained* and *removed* | → | The Toolkit will automatically calculate the biodiversity or linear units for each habitat during works |

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| Enter the Target Condition, Distinctiveness, Connectivity and Strategic Significance ratings | ← | Insert habitat information and area/length | ← | Using the drop-down menu below 'After work action', select either enhancement or creation | ← | Step 3 of Unit Calculation: After Works actions (*Following Actions*) |

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The toolkit will automatically calculate difficulty and Time to target condition. Manually input spatial risk and amend time to target condition if appropriate

The biodiversity and linear units will be automatically calculated

The Toolkit will automatically calculate the number of biodiversity and linear units created through creation, enhancement and accelerated succession

The Toolkit will automatically calculate the overall After works units

The Toolkit will automatically calculate the Post-development biodiversity and linear units and the net change in units

The Dashboards will contain summary graphs of the Biodiversity and Linear Unit results

Go to the 'Dashboard' tabs

The user will now be able to use this information to help assess whether the development is designed to deliver overall No Net Loss or Net Gain

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