Natural England Joint Publication JP039

Biodiversity Metric 3.0
QGIS template and import tool
USER GUIDE

Beta Test

First published July 2021

www.gov.uk/natural-england

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ISBN 978-1-78354-790-6

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APPENDICES

1.0 INTRODUCTION

1.1 A QGIS template, data standard, GIS import tool and this guidance document have been created by FPCR on behalf of Natural England and is intended to be freely distributed as an optional addition to the Biodiversity Metric 3.0.

What is the purpose of the tool?

1.2 This tool has been designed with the dual purposes of reducing the time required to input data into the Biodiversity Metric, whilst also providing a standardised methodology which produces shareable outputs that track the life cycle of each parcel of land. By utilising a standardised QGIS template, data can be recorded in a format which is consistent with the data requirements to carry out a Biodiversity Metric Calculation. The raw data can then be imported and organised within the import tool before being directly exported to a Biodiversity Metric 3.0 workbook. Additional benefits of this standardised approach include enhanced data validation, automated graphic generation, and a consistent and transparent workflow.

1.3 The use of the tool and this standardised approach will allow for easier interrogation of data between consultant ecologists, their clients, developers and Local Planning Authorities.

1.4 QGIS software has been selected for the freely available template as the most widely used freely available GIS software in the environmental consultancy sector. The GIS import tool is compatible with the QGIS raw data outputs and other GIS software outputs in a compatible format.

Other approaches

1.5 Whilst the standardised approach detailed in this guidance provides suitable methodology, it is recognised that practitioners may undertake mapping and initial data compilation utilising alternative workflows and software packages. To this end, a data standard has been supplied which will allow outputs from these approaches to be standardised, providing compatibility with the import tool. This will allow practitioners utilising alternative data creation methodologies to still benefit from the automated import functionality of the import tool.

Required level of competence

1.6 The QGIS template guidance is aimed at practitioners with an existing working knowledge of QGIS software. Existing skills should include creating and editing spatial data, layer edits and working with attribute tables. Users intending to use the QGIS template to carry out a Biodiversity Metric 3.0 calculation should do so alongside, and in strict accordance with, the Biodiversity Metric 3.0 guidance[1].

1.7 The import tool can be utilised with a basic level of competence in Microsoft Excel.

Limitation of guidance

1.8 These instructions provide details of how to utilise the functionality of the QGIS template and import tool.

[1] Biodiversity Metric 3.0 - Auditing and accounting for biodiversity: User guide

1.9 The scope of this guidance does not aim to instruct on broader use of QGIS or MS Excel. As such complimentary techniques such as adding base maps or setting up composer manager outputs are not detailed.

1.10 A wide range of free online QGIS tutorials are available which can be accessed to assist in any skill gaps practitioners may experience.

Limitations of the tool

1.11 The tool has been developed and tested in QGIS version 3.10 (the latest long-term release at time of writing). Compatibility issues may arise if working with other versions of QGIS.

1.12 Where feasible, variables / inputs within the QGIS template have been restricted to pre-defined responses. This does not replace the need for expertise in selecting appropriate responses and users should ensure they are familiar with current Biodiversity Metric 3.0 guidance to assist in making appropriate assessments and setting feasible targets.

1.13 The import tool requires input data to be prepared to conform with the data standard and stored in a CSV format. Separate Comma Separated Values (CSV) files are required for each metric type (Habitats, Hedgerows and Rivers) and for on-site and off-site data.

1.14 When exporting data from the import tool users should select a Biodiversity Metric 3.0 workbook. The export data will override any existing data, so users may wish to make multiple versions of the workbook to sequentially track changes made.

2.0 QGIS - DIGITISING DATA

2.1 Users should complete separate QGIS template files for on and off-site data and conduct the following data creation methodology independently for each location. Prior to creating features within the template, users should first import any necessary vector and raster layers required to inform the assessment. This could include satellite imagery, detailed maps, and site plans.

2.2 Data creation within the QGIS template is set up to reflect the three categories as defined in Biodiversity Metric 3.0 (Habitats, Hedgerows and Rivers). Appendix A summarises the input functionality options within the QGIS template. The data standard (Appendix B) sets out a full list of variables and response options.

2.3 There is a fundamental difference between linear and area-based habitats and the way they are treated in the template. For area-based habitat data, individual polygons will always have definable values for both baseline and proposed variables, excluding a specific scenario allowing for the area of rivers. For the linear data categories (Hedgerows and Rivers), individual polylines will lack certain values in either the baseline or proposed variables if they are to be lost or created.

2.4 An exception to the rule that all area-based polygons will contain details for both the baseline and proposed is the area of rivers wider than 5 metre. Rivers with a width greater than 5m should be mapped as “River Area”. The area covered by the river feature will then be excluded from the import tool and metric (see section 8 of the Biodiversity Metric 3.0 user guide for full details).

2.5 To account for this, additional response options have been provided for created and lost linear habitats. It should be noted that the stylings for these options are visible within the relevant master layers, however they are not visible within the styles for baseline or proposed layers.

2.6 When mapping area-based habitats, green walls and street trees are treated separately. Green walls exist in a 2-dimensional vertical space and are not mappable within this QGIS template. Details for any green walls should be manually entered into the Biodiversity Metric 3.0 metric. Street trees are an overlay habitat type whose areas form an additive component of calculations within the metric. It is possible to map these in the QGIS template, and a summary table has been provided to give area totals. However, there is no import/export functionality for this data through the import tool, and users will be required to manually enter this data in the Biodiversity Metric 3.0 metric.

Baseline data

2.7 It is recommended that users input data in two phases: the first phase being the baseline data entry and the second phase being the proposed outcomes.

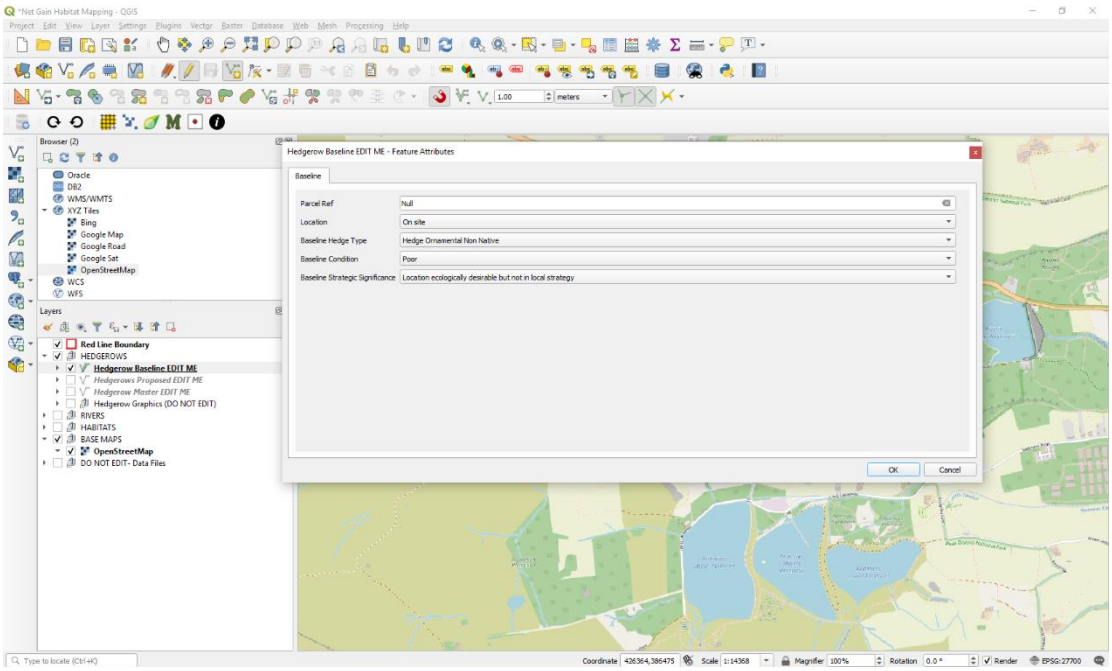
2.8 Users can input data to either the relevant baseline or master layers (Habitats / Hedgerows / Rivers). The input layers are linked, and will all update regardless of which is edited, however the stylings and the editable variables differ between layers.

2.9 Baseline data can be entered in one of three ways.

Option 1: Individual feature creation (hedgerows and rivers).

2.10 Features can be created individually. This methodology is suited for linear features (hedgerows and rivers), although could feasibly be applied to habitat polygons if felt appropriate. However, there may be greater chance of discrepancies between site total area and the sum of the habitat

areas using this method depending on user competence. Each time the user creates a new feature they are presented with a dialogue box with several editable variables. If working in the baseline layer this will be restricted to baseline variables. If working in the master layer the user will be presented with two tabs, one for baseline variables and one for proposed variables.

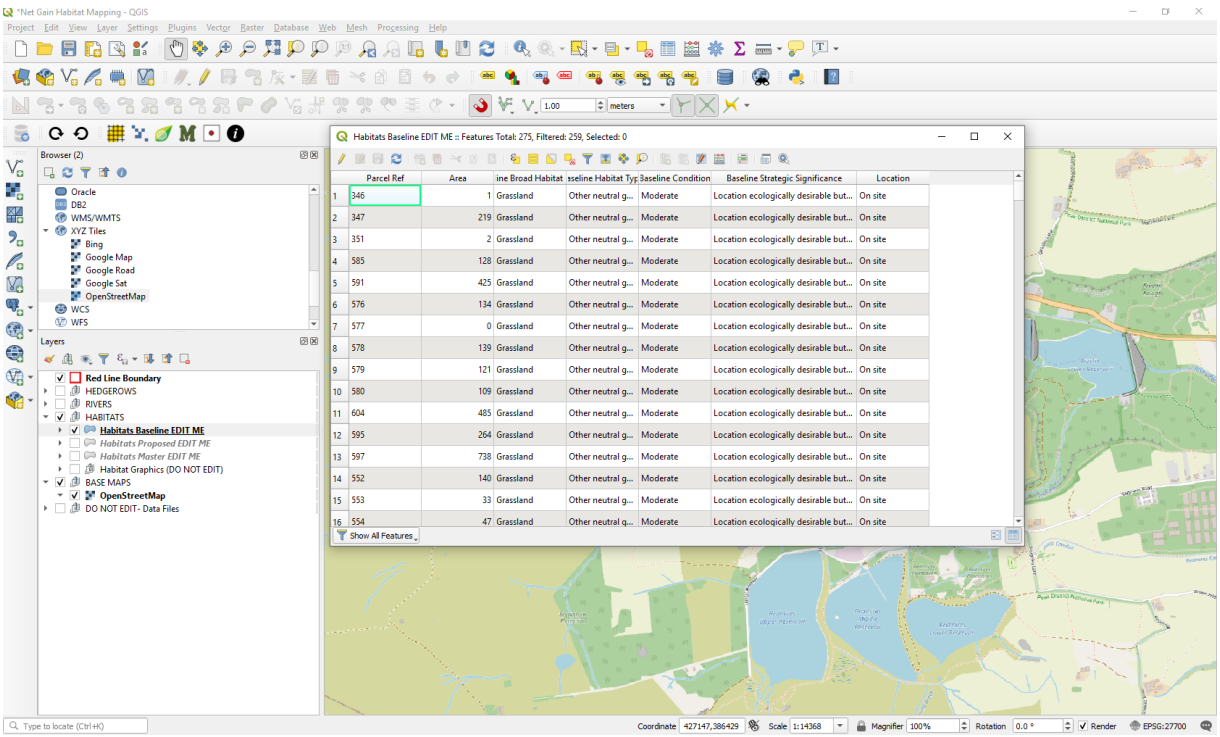


2.11 Users can complete as many or as few of the variables as possible at this stage and can later complete any missing data within the attribute table. Users should note that due to the dependency of restricted variables, values for informative variables must be entered prior to these functioning (e.g. broad habitat type must be entered prior to the specific baseline habitat type). Users can repeat this process until all required features for the baseline have been created.

Option 2: Site creation and refinement (area based habitats)

2.12 An alternative method which is suited to area habitat baseline data entry is to create an initial site wide polygon (the data creation form can be left unfilled at this point). The red line boundary polygon can be copied and pasted for this purpose. This polygon can then be divided using the range of cutting tools available with QGIS to achieve the required resolution of individual features. It is beneficial to adjust the layer transparency settings whilst undertaking this process, allowing the user to trace features from relevant base maps.

2.13 This approach is useful in avoiding potential issues that can arise from creating features individually, such as misaligned or overlapping vertices. Values for each feature can be applied within the attribute table.



Option 3: Import from existing layers.

2.14 If the features have already been created in QGIS but independently from the template (for example using the intersection tool), then the blank geometry can be copied and pasted into the relevant baseline or master layer. Values for each feature can be applied within the attribute table.

Editing notes

2.15 Users should avoid re-shaping polygons as this will alter baseline areas. Instead, users should use the various cutting tools to subdivide features.

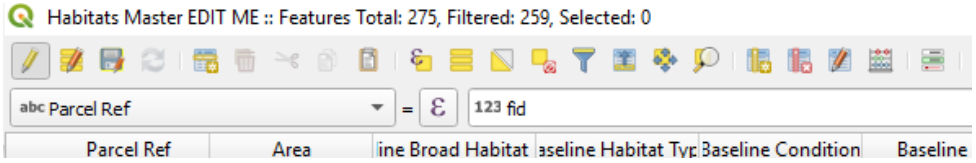
2.16 To aid in workflow efficiency, input variables have been restricted or automated where feasible. For this functionality to work, users need to input variables in a systematic manner, working through the variables in the order given. If altering a feature, users should ensure they adjust all variables for impacted features to avoid creating incorrect value combinations.

2.17 Users should be aware, that due to QGIS limitations, the linked automated fields (Distinctiveness, UKHAB code, Proposed Habitat Source) only visually update when the attribute table is re-opened. However, the underlying data file updates as soon as the edits have been saved, so this restriction does not impact the accuracy of data exports. Additionally, this limitation does not apply to the area and length fields which update automatically whenever a feature is edited.

2.18 Whenever moving between editable layers within a group (i.e., from the baseline to master layer), users should click the refresh button (hotkey: F5) to ensure all layers have synced.

2.19 The 'parcel ref' variable is a useful way to link a habitat parcel between a description of an area in an ecological report and the QGIS Mapping. Values can be manually set by the user or can be automatically generated. Simply leave this variable blank until the end of the data creation process. Once all the required features have been created, the attribute table formula bar can be utilised to

match the values in this variable to those of the hidden 'fid' variable (the 'fid' variable is automatically populated with unique values).



Baseline backup

2.20 It is strongly advised to create a copy of the entire QGIS folder once the baseline data entry has been completed. This back up copy can be duplicated and used for mapping subsequent design revisions.

Proposed data

2.21 Once the baseline data entry has been completed users can proceed to entering the values for the proposed habitats at the site. This is most easily done in the master layers for each of the main categories.

2.22 The methodology for entering proposed data varies slightly between area-based habitats and linear features (Hedgerows and Rivers). For area-based habitat data, all individual features should have the baseline variables already completed. For the linear habitat categories (Hedgerows and Rivers), any newly created features will initially lack baseline values, and these null values should be retrospectively completed on the relevant form or attribute table (i.e., users will need to manually set the baseline line values to the appropriate null responses).

2.23 When viewing the proposed layer, styling is set to reflect the proposed values. Linear features will not be visible in the proposed layers until these habitat values have been defined (i.e., there is no null value styling for linear features).

2.24 Existing baseline features can be subdivided utilising the QGIS edit functions so that the geometry of individual features reflect proposals. Sub-divided features can have their proposed values entered within the attribute table.

2.25 Users should note that while the multi-edit function within QGIS can be used to set appropriate attributes to groups of polygons, some drop-down menus will stack, creating long lists of repeated value options. Any multi-edit functions should be used with caution due to the risk of overwriting the whole range of variables.

Field	Response Description
Site Name	Name of site undergoing assessment.
Survey Date	Date of field survey for habitat classification.
Survey Details	Surveyor details and details of survey undertaken (e.g. Joe Bloggs FISC 4 Phase 1 Habitat Survey).
Comments	Any additional relevant comments, i.e., survey limitations.
Mapped by	Name of the person carrying out the habitat mapping in QGIS.

Company	Name of the organisation undertaking the assessment.
Base Map	Details of the base map used for habitat mapping.

Traceability (assessment details)

2.26 To support traceability, additional assessment detail fields have been included within each of the three master layers.

Graphics styling

2.27 In addition to the baseline and proposed layers, there is a graphics sub-folder in each habitat category with several style layers. Users can utilise these layers to quickly produce their own graphical outputs to assist in data interpretations.

2.28 These additional style layers are linked to the data entry layers, and do not require any additional inputs. They will automatically update each time layer edits to the data input layers are saved.

Rivers enhancement by re-alignment

2.29 A unique workflow exists for the case of "*enhancing by realignment*" in the river's category. Users should familiarise themselves with Section 8 of the Biodiversity Metric 3.0 user guide before using this workflow explained below.

2.30 The geometry of the baseline and proposed features will differ.

2.31 Data is stored in the master layers as normal however additional graphical layers have been provided in a subfolder to illustrate changes.

2.32 The folder labelled "*Enhancement by Realignment (Graphic)*" contains three additional layers which can be used to map the proposed realignment. Users can either copy existing polylines to be enhanced from the "*Rivers Master*" layer and paste them into the "*Realigned Proposed Habitat*" layer before modifying vertices, or manually create a new polyline.

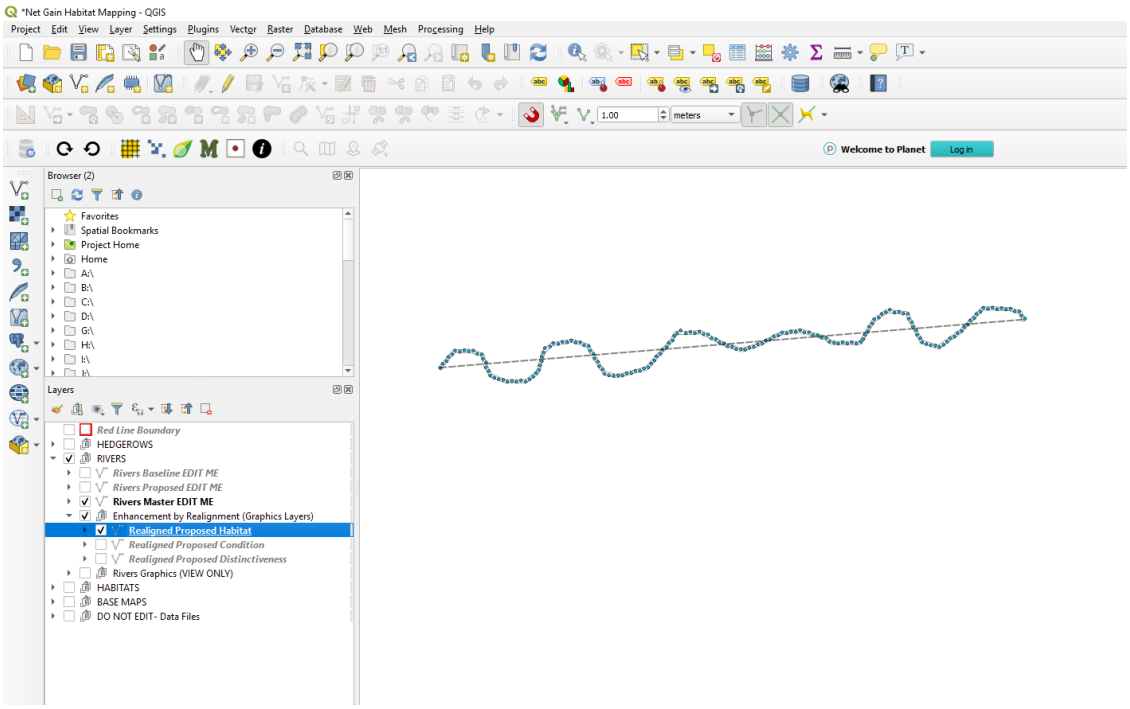
2.33 Variables in the "*Realigned Proposed Habitat*" layer are restricted to proposed options and an additional "Baseline *Parcel Ref*". This should be completed to match the parcel ref for the baseline polyline.

2.34 The "*Realigned Proposed Habitat*" layer is linked to the other two layers in this folder; "*Realigned Proposed Condition*" and "*Realigned Proposed Distinctiveness*". Users are only required to enter data in the "*Realigned Proposed Habitat*" layer and all three layers will be populated. Each layer is individually styled to reflect the proposed habitat type, condition and distinctiveness respectively.

2.35 These additional layers can be used to illustrate realigned routes and can be overlayed against the other graphical displays to illustrate the changes. In all other proposed river layers, rivers enhanced by realignment will be styled to a partially transparent dashed black line to allow comparison between the baseline and proposed alignments.

2.36 Data entry into the metric is only partially automated, users will be required to manually override the feature length in the enhancement category of the metric. This will initially be set to match the baseline value by default and requires updating to match the proposed length of the realigned route. When a river or stream is enhanced by realignment the *enhancing by realignment* layer in

the QGIS template is for illustration only. The Rivers and Streams layer CSV export will transpose all data for the purposes of a metric calculation relating to the baseline and post development **except for the new proposed realigned length**. Often this will be a greater length including meanders and additional braids. The attribute table of the "*enhancement by realignment"* layer in QGIS will identify the new length of the digitised enhanced channel or channels which must be noted and manually entered into the baseline tab of the Biodiversity Metric 3.0 under 'Length Enhanced'.



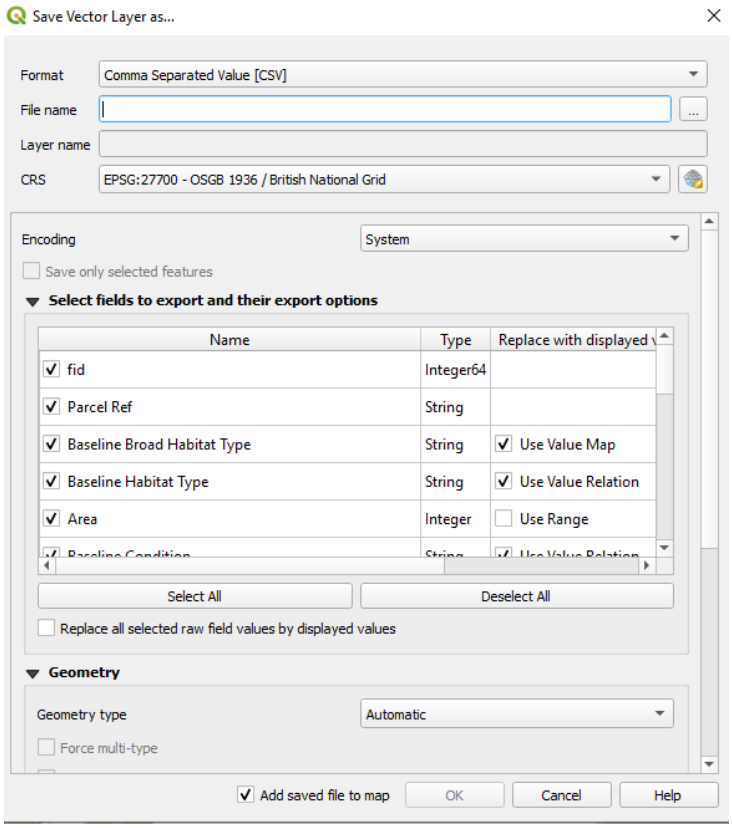
Export data for import to metric

2.37 Once the data entry for all features has been completed the values for each category (Habitats, Hedgerows and Rivers) can be exported as a .csv file. A separate file for each category should be created ("*Enhancement by Realignment*" layers are for illustration only and should not be exported for use with the GIS import tool).

2.38 This can be done by selecting the relevant master layer and performing a 'Save As' through the Layer drop down menu, or by right clicking the relevant layer and selecting 'Export' / 'Save Features As'.

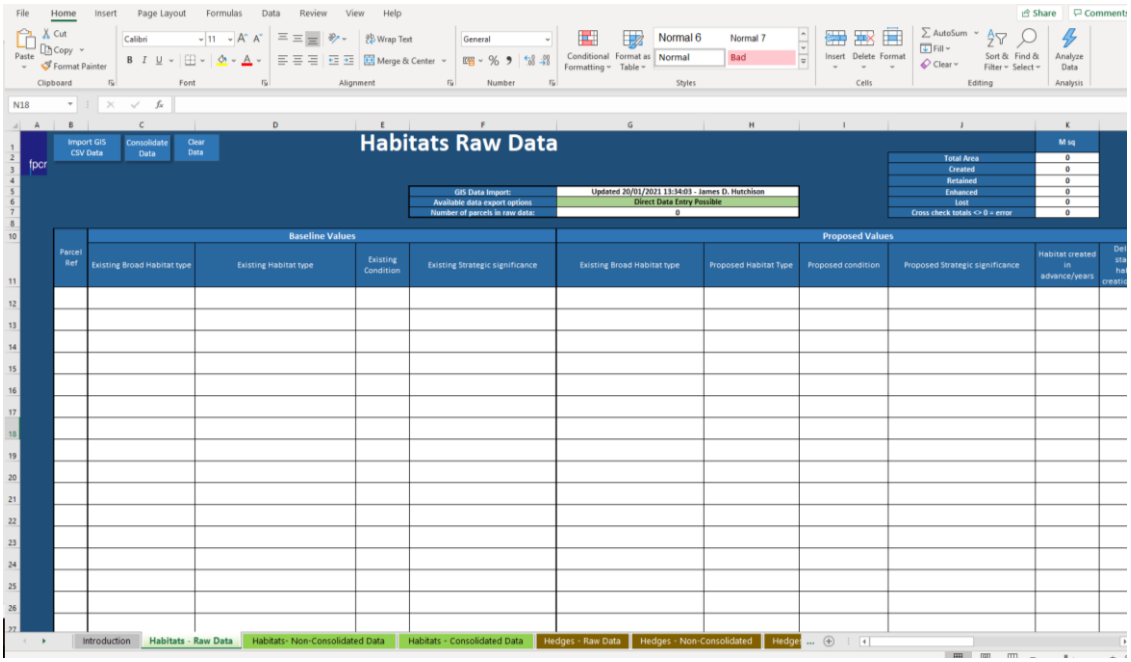
2.39 Exported data files must be named in a specific way to be recognised by the import tool. Each file must contain one of the unique identifiers as follows; Habitats "hab", hedges "hed", and rivers "riv". Suggested file name structures would include the habitat type and a version number:

- Habitats v1.1
- Rivers v1.1
- Hedgerows v1.1


Save Vector Layer as...
Format
Comma Separated Value [CSV]
File name
Layer name
CRS
EPSG:27700 - OSGB 1936 / British National Grid
Encoding
System
Save only selected features
Select fields to export and their export options
Name
Type
Replace with displayed v
fid
Integer64
Parcel Ref
String
Baseline Broad Habitat Type
String
Use Value Map
Baseline Habitat Type
String
Use Value Relation
Area
Integer
Use Range
Select All
Deselect All
Replace all selected raw field values by displayed values
Geometry
Geometry type
Automatic
Force multi-type
Add saved file to map
OK
Cancel
Help

3.0 THE IMPORT TOOL

3.1 Open the GIS Import tool and select the desired 'Raw Data' worksheet from the tabs at the bottom of the MS Excel window. There are several action buttons in the top left of the window which can be used in the presented order.



How to import data

From QGIS

3.2 The first step is to use the 'Import GIS CSV Data' button. When clicked, a dialogue box will appear prompting the user to select a CSV file. Click 'OK' then navigate to the file with the relevant data.

3.3 A dialogue box will appear to inform you that the data load is complete. The listed data represents individual features as mapped in QGIS with the ascribed variables listed.

How to consolidate data

3.4 Whilst all features will represent different geospatial values, the other descriptive variables may cluster into groups of identical values (i.e., multiple polygons with identical baseline values proposed to have identical outcomes). Data can be consolidated into these groups for simpler representation within the metric.

3.5 By selecting the consolidate data button the data is processed into groupings with identical variables and listed in the relevant 'Sorted Data' worksheet.

3.6 The Biodiversity Metric 3.0 can accommodate 248 rows of data. Datasets larger than this must be reduced either by splitting the data into more manageable geographic sections or consolidated using the GIS import tool. If the user wishes to track individual polygons with an audit trail through to the metric it is advised not to use the consolidation functionality because they may be merged with other polygons of the same attributes within the same dataset.

3.7 Users should not use the consolidate function when the habitat type 'Artificial hard structures with Integrated Greening of Grey Infrastructure (IGGI)' is used in the baseline or post development due

to limitations of excel and this import tool. If the dataset has more unconsolidated habitat parcels than the metric 3.0 can facilitate, and the presence of this habitat precludes the use of the consolidate function, the redline boundary should be split into more manageable geographic sections. Alternatively, another habitat can be selected in the QGIS template for the purposes of mapping and later changed in the metric.

Error checks

3.8 At the top of each sheet is a table which runs cross checks on the areas present within each retention category accounted for within the GIS CSV data. These provide a rapid assessment of whether there have been any issues with the data import or consolidation process.

3.9 In the event that an error is identified the relevant error check cell will be highlighted red. It should be noted that there are potentially some scenarios where non matching areas are acceptable, such as stacked urban green infrastructure and in some limited cases driven by the areas accounted for by rivers, including restoration by realignment.

K	L	M
Areas	ha	Error Check
Total	1.7792	Data Matches
Created	0.9315	Data Matches
Retained	0.2587	ERROR - Data mismatch
Enhanced	0.5890	Data Matches
Lost	0.9315	Data Matches

Export

3.10 The user must manually set the on site / off site option within the import tool from the buttons at the top of each worksheet.

3.11 Users can choose whether to export data in the consolidated or raw format. Before exporting, users should select the relevant worksheet they wish to use and ensure the location button at the top of is set to the correct value (On Site / Off Site).

3.12 Selecting the Export button will trigger a dialogue box instructing the user to select a Biodiversity Metric XLSM file. Select the appropriate Biodiversity Metric 3.0 workbook and click the 'OPEN' button.

3.13 The workbook selected must include "metric" in the file name to be recognised by the import tool.

3.14 When the data has loaded a dialogue box will inform the user that the data has been exported. Click 'OK' and the Biodiversity Metric will be displayed, populated with the imported data.

3.15 Repeat the process for all the required category data (Habitats, Hedgerows and Rivers).

Apple Mac Users

3.16 Users running the import tool on Apple systems must follow an adapted approach when utilising the import tool.

3.17 Before importing CSV files to the import tool, users should open the target CSV file, and close any other CSV files.

3.18 Before exporting to the metric, users should open the desired Metric workbook destination and close any other workbooks.

What you need to do in the metric

3.19 Once the data has been imported to the metric, users should follow the published Biodiversity Metric 3.0 guidance documentation to assist in data interpretation.

3.20 Modifications can either be made within QGIS and then re-imported, or they can be tested within the metric to indicate potential adjustments that could be made to proposals.

3.21 If any rivers are being enhanced by realignment, by default the baseline length will be automatically entered as an enhancement. The user will need to manually add the additional length (see above section - Rivers enhancement by re-alignment).

3.22 Details for street trees and green walls will need to be manually entered.

4.0 DATA FROM ALTERNATIVE SOURCES

4.1 The import tool has been designed to facilitate the import of CSV data from sources other than the QGIS template.

4.2 In order to utilise alternative data sources, outputs must be standardised in a specific manner to achieve compatibility with the import tool.

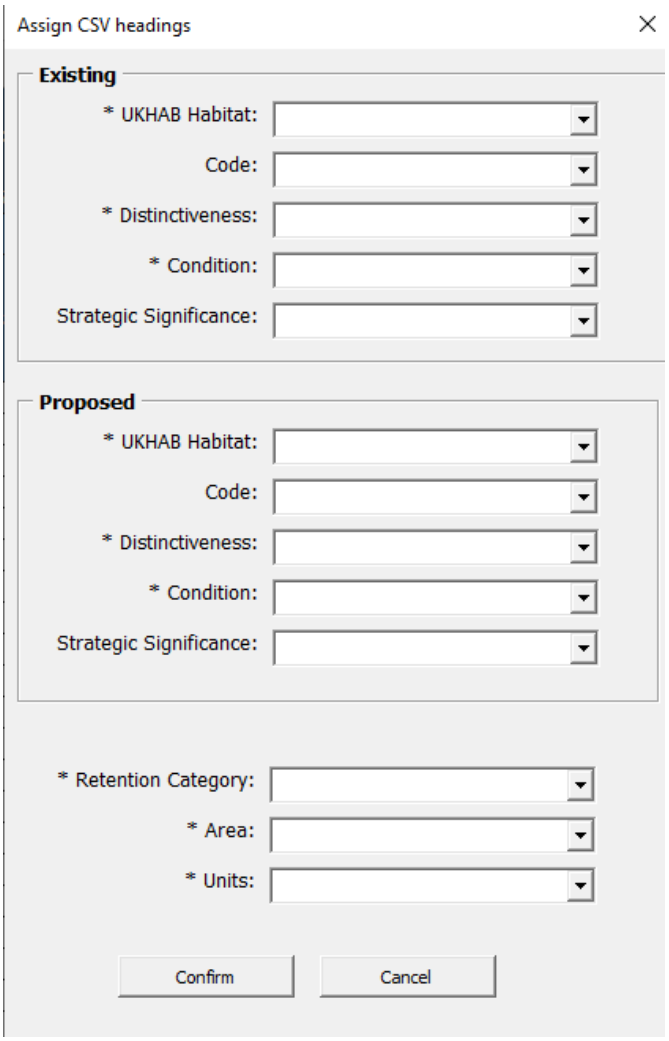
4.3 The data standard provided in Appendix B (separate MS Excel file) details the required variables and possible response options for each habitat category (Habitats, Hedgerows and Rivers). As with the QGIS output a separate CSV file for each habitat type and onsite and offsite data is required. CSV files must be named in accordance with the rules stated above in 2.39.

4.4 If using alternative software packages, it is important that the rules set out within the Biodiversity Metric 3.0 are adhered to when completing mapping. If these rules are not adhered to a wide range of errors can easily be brought into the metric. The import tool does not provide a compatibility or quality check on any data which it is provided with.

Import data from alternative sources

4.5 The user can follow the same initial steps as above. In the relevant raw data worksheet of the Import tool click on the 'Import GIS CSV Data' button. When clicked, a dialogue box will appear prompting the user to select a CSV file. Click 'Ok' then navigate to the file with the relevant data.

4.6 The user will be presented with a table to define which headers apply to each listed variable. These can be selected from the drop-down menus. Those marked with an asterisk are compulsory.



4.7 Once confirmed a dialogue box will appear to inform you that the data load is complete. The listed data represents individual features as listed in the CSV with all the ascribed variables listed.

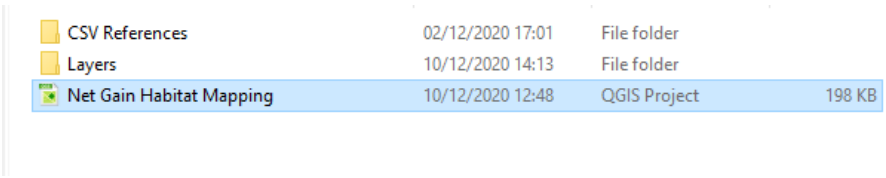
5.0 COMMON ERRORS

Workflow Stage	Error	Summary
QGIS Data Entry	Mis-aligned vertices	A common issue when manually creating individual polygons is that vertices are not accurately aligned. This results in either overlapping polygons or gaps around the edges of features. This results in inconsistencies between habitat measurements and site areas, which leads to erroneous site valuations. Following the data entry guidance for creating a single site wide polygon and then dividing this using the '*split features*' and '*fill ring*' tools in QGIS removes the possibility of this happening. Where this is not possible careful use of snapping and tracing functionality in QGIS can be used to assist in reducing the likelihood of these errors. The 'check validity' tool is useful for identifying errors (Vector/Geometry/Check Validity).
QGIS Data Entry	Missing Data	All fields are required to be completed. Given the staggered nature of data entry (baseline values then proposed values) and the potential for large numbers of features to be created, it is easy to omit data during the data entry process. Users can easily identify missing values by reviewing the attribute tables and sequentially sorting data by column headers.
QGIS Data Entry	Incorrect combination of values	Incorrect values may result from users inputting erroneous data or invalid combinations. Data entry should be made with reference to the Biodiversity Metric 3.0 Guidance to ensure that data conforms to requirements. Invalid combinations may also arise if users edit targeted variables without updating other impacted values. Users should ensure all variables remain valid each time the descriptive values of a feature are edited.
Import tool	CSV data not loading into conversion.	Check the csv files are named following the guidance in 2.39.

Import tool	Area / totals do not match.	Total area represents column total for area data, whilst retention categories are based on which of these are labelled. A mismatch in the cross check of these totals will occur where null values have been encountered. This results when not all data has been labelled with a retention option.

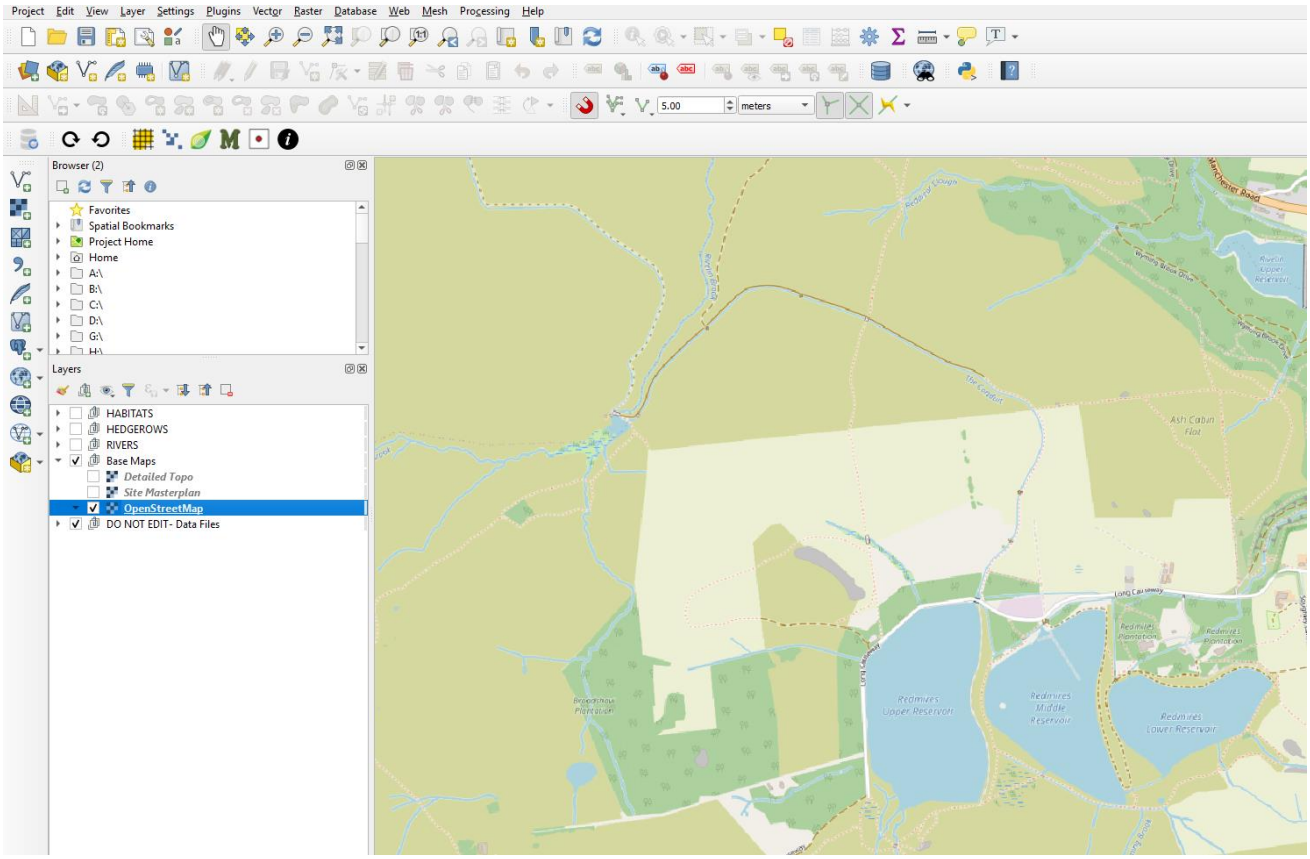
6.0 EXAMPLE WORKFLOW

Open the QGIS template



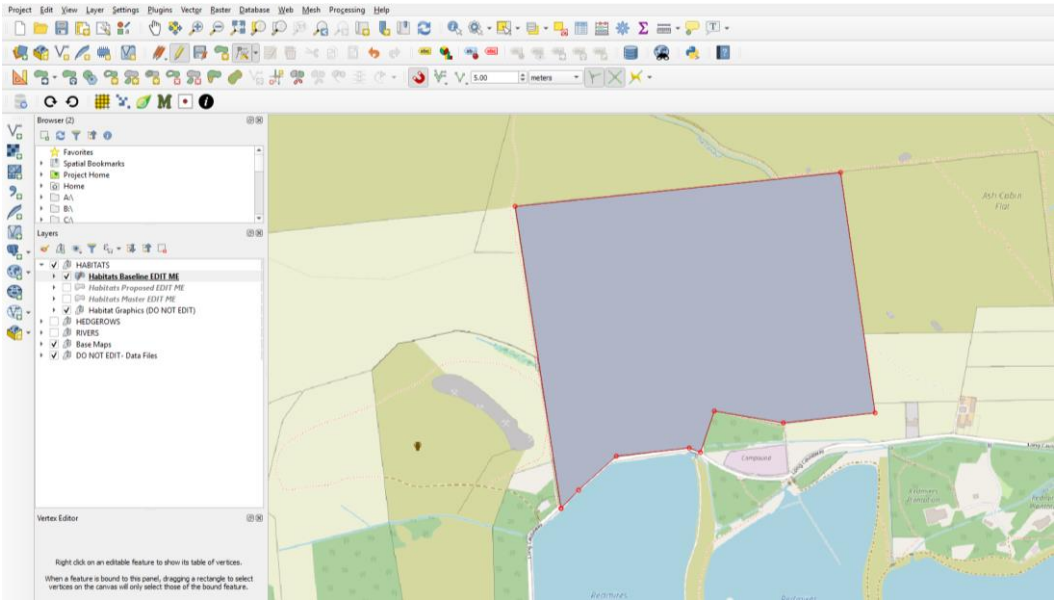
6.1 Import relevant base and reference layers.

You can import existing layers (Layer / Add Layer / Add Raster Layer) or georeference in new raster data (Raster / georeferencer.).



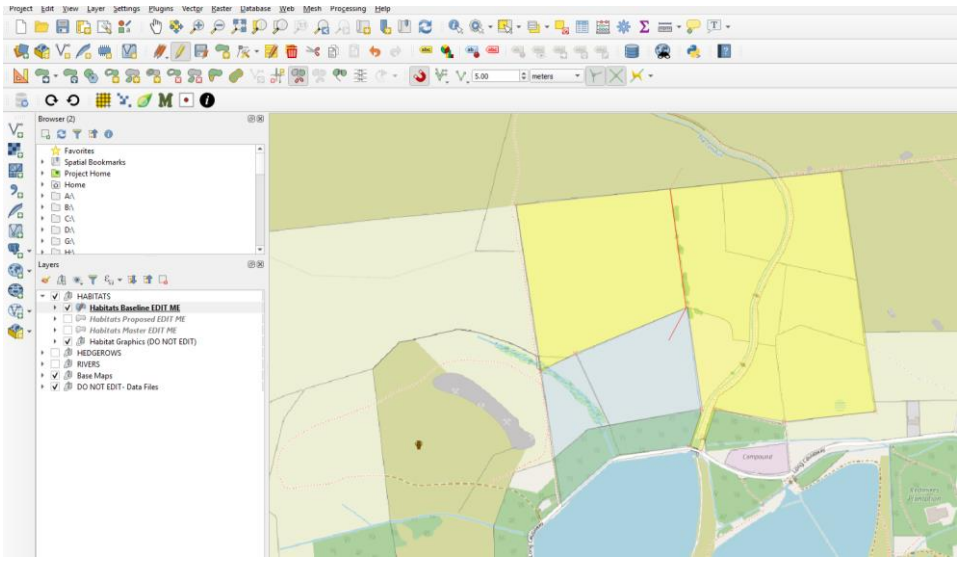
6.2 Create a site wide baseline habitat polygon.

You can use the 'create feature' tool  *or copy and paste from an existing site boundary layer. Leave the values blank for the site wide feature.*



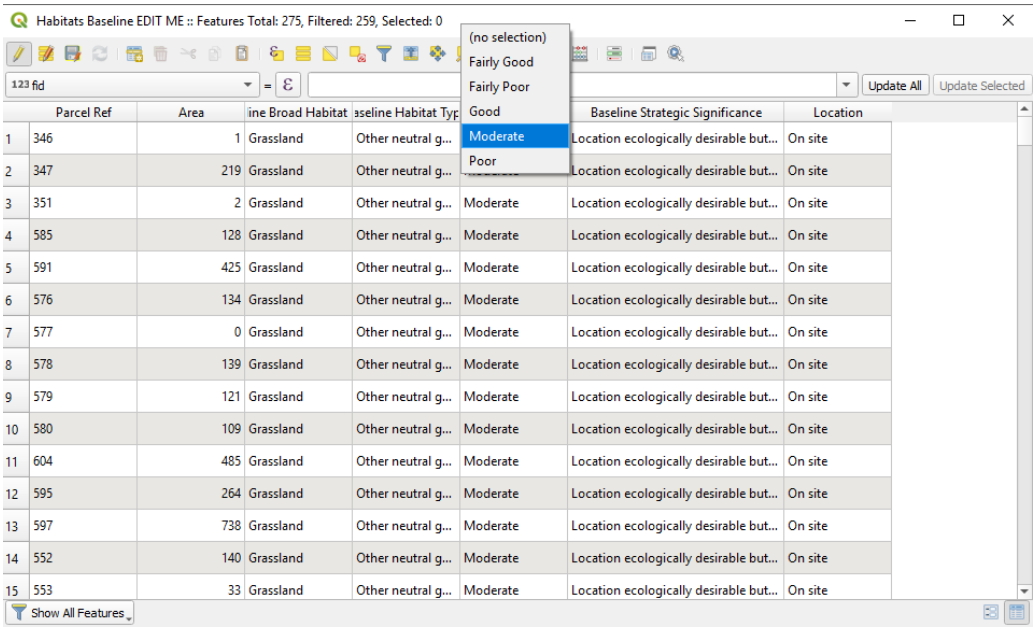
6.3 Adjust the layer transparency to allow the base map to be visible and then divide the feature to match baseline habitats.

Use the 'split features'  *and 'fill ring'*  *tools to cut out polygons.*



6.4 Once the site has be mapped adjust the values within the attribute table.

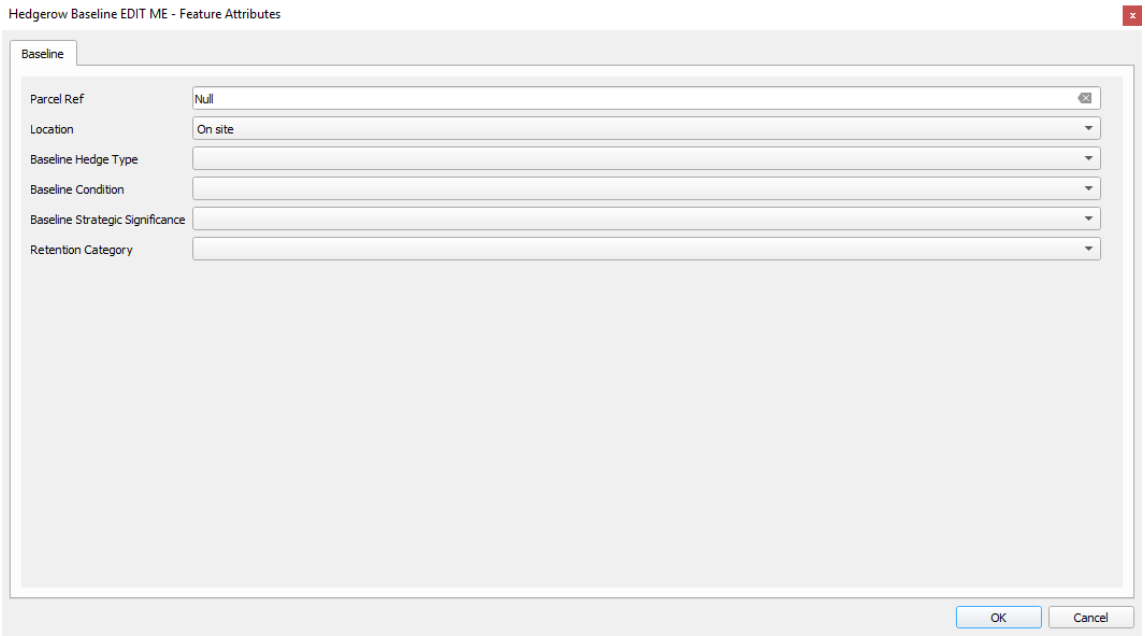
As many variables are linked, it is important to work through the attribute table in a logical order, going from left to right.

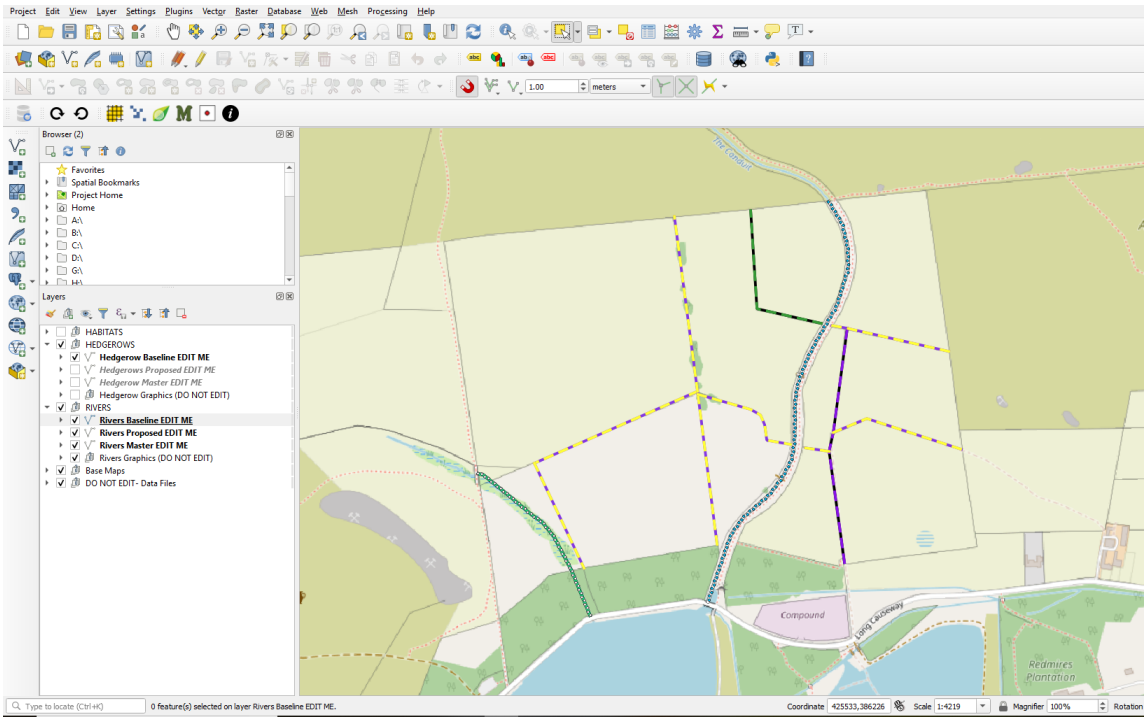


	Parcel Ref	Area	ine Broad Habitat	aseline Habitat Typ		Baseline Strategic Significance	Location
1	346	1	Grassland	Other neutral g...		Location ecologically desirable but...	On site
2	347	219	Grassland	Other neutral g...		Location ecologically desirable but...	On site
3	351	2	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
4	585	128	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
5	591	425	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
6	576	134	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
7	577	0	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
8	578	139	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
9	579	121	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
10	580	109	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
11	604	485	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
12	595	264	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
13	597	738	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
14	552	140	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site
15	553	33	Grassland	Other neutral g...	Moderate	Location ecologically desirable but...	On site

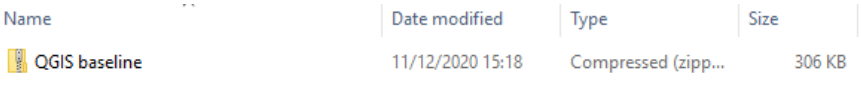
6.5 Next enter the baseline linear features (hedgerows and rivers) using the relevant baseline or master layers. This can be done one feature at a time following the standard creation methodology.

When creating linear features use the  *'add line feature' tool. Each time a feature is added this will trigger a dialogue box for data entry. If working in the baseline layer the user will be presented with baseline specific variables. If working in the master layer, users will be presented with two tabs, one for baseline values and one for proposed values. These can be completed later in the process by using the attribute table to edit the variables.*





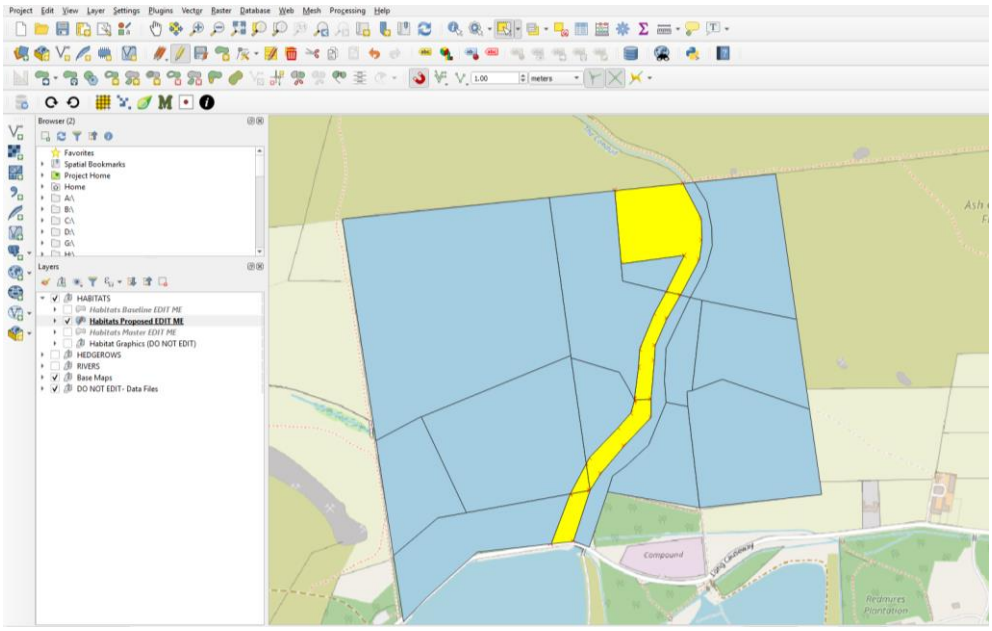
6.6 Once all the baseline data has been created, you are advised to create a backup of the whole QGIS folder.



6.7 The next stage is to map the proposed values. Subdivide the baseline habitat polygons by the extent of the proposed habitats. This is most easily done in the master habitats layer.

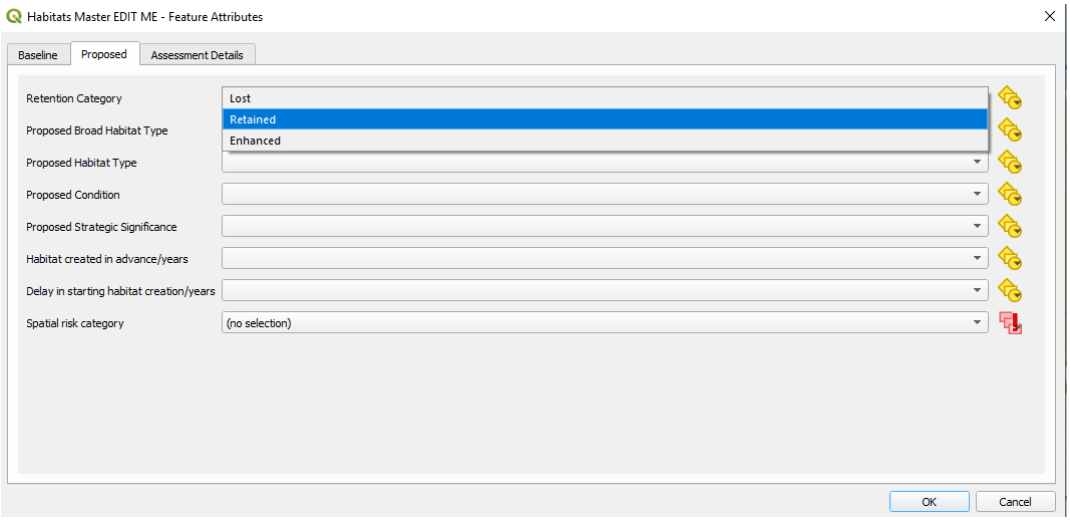
As with baseline edits, layer transparency can be adjusted to allow tracing of proposed features.

Use the 'split features'  *and 'fill ring'*  *tools to cut out polygons.*



6.8 Users can edit the proposed values as they progress.

For features with identical values the multi-edit function can be accessed by selecting desired features and clicking on the button labelled 'Modify the Attributes of all Selected Features Simultaneously'  *. This will present the data entry dialogue box. Users should note that some response variables will stack in the drop-down menus, presenting long lists of identical options.*

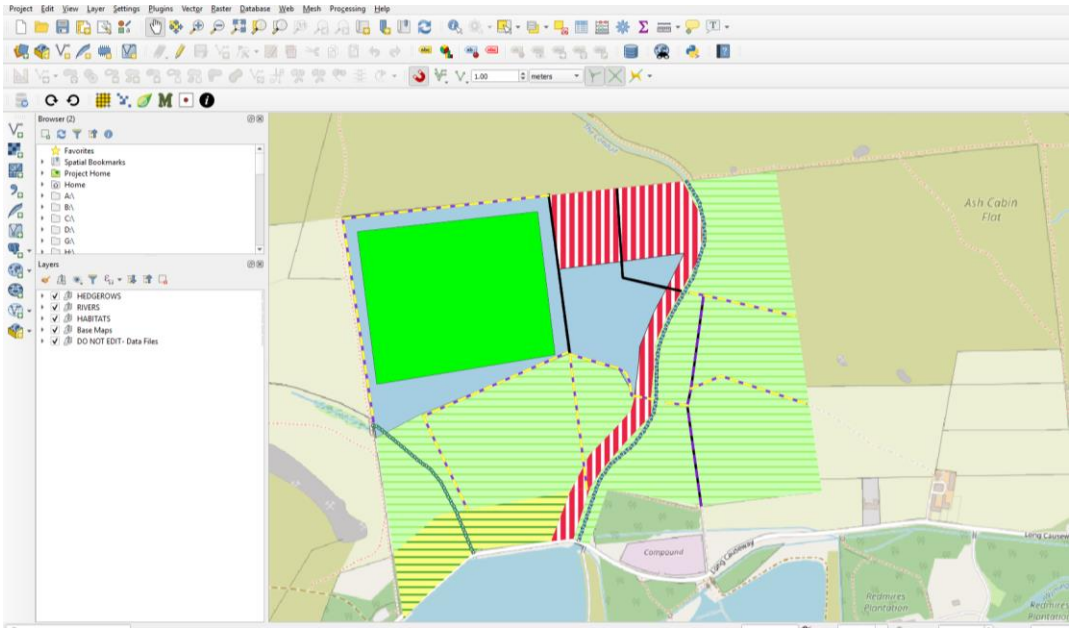


6.9 For linear features user will initially need to work in the relevant master layer (stylings are set to proposed habitats for the proposed layer).

6.10 Newly created linear features can be added and existing features sub-divided where there are differences in proposed outcomes (for example partial losses).

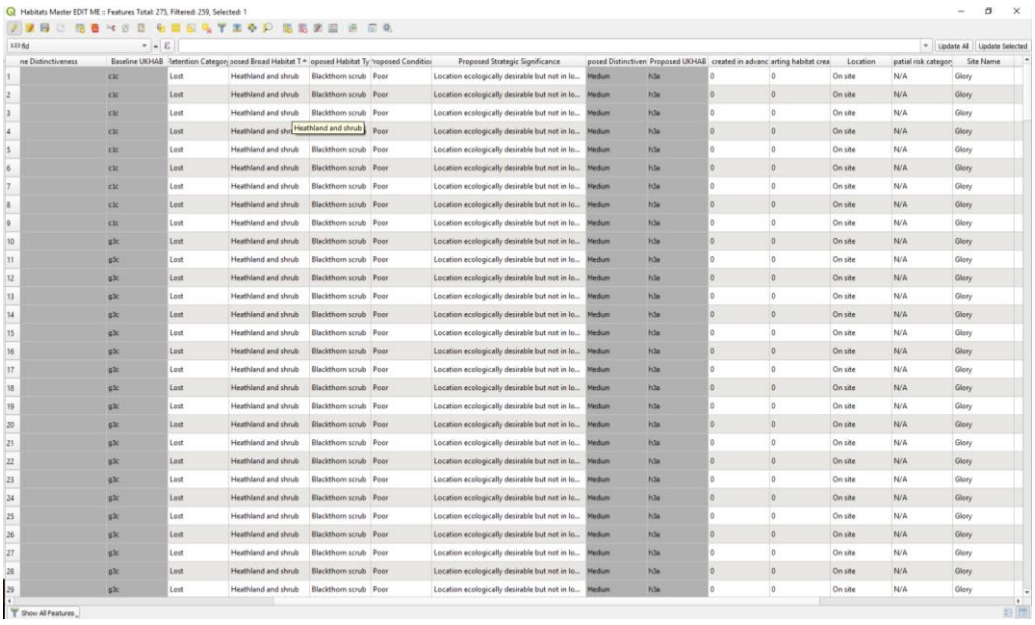
It is important to note that users should not manually delete sections of linear features that are to be lost, rather select the appropriate options within the attribute table to reflect this outcome.

Use the 'add line feature'  *and the 'split features*  *tools to create and divide linear features.*



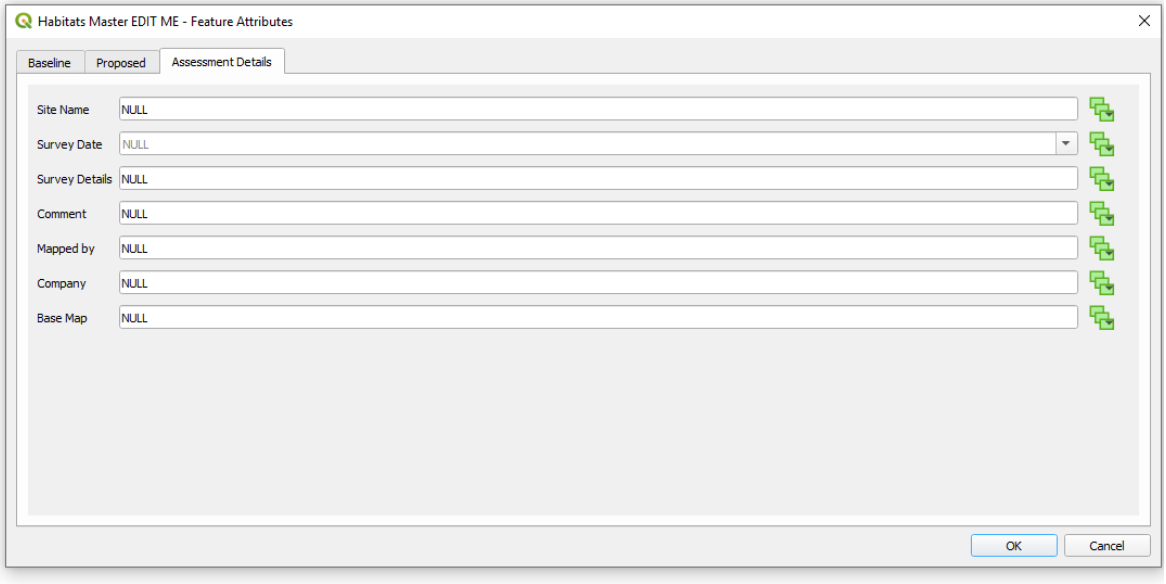
6.11 Once all baseline and proposed data has been entered for all the categories (Habitats, Hedgerows and Rivers), users should review the master layer attribute tables to sense check their inputs and ensure that there is no missing data.

Users can quickly sort data by clicking on column headers in the attribute table. This is useful when checking for blank cells.



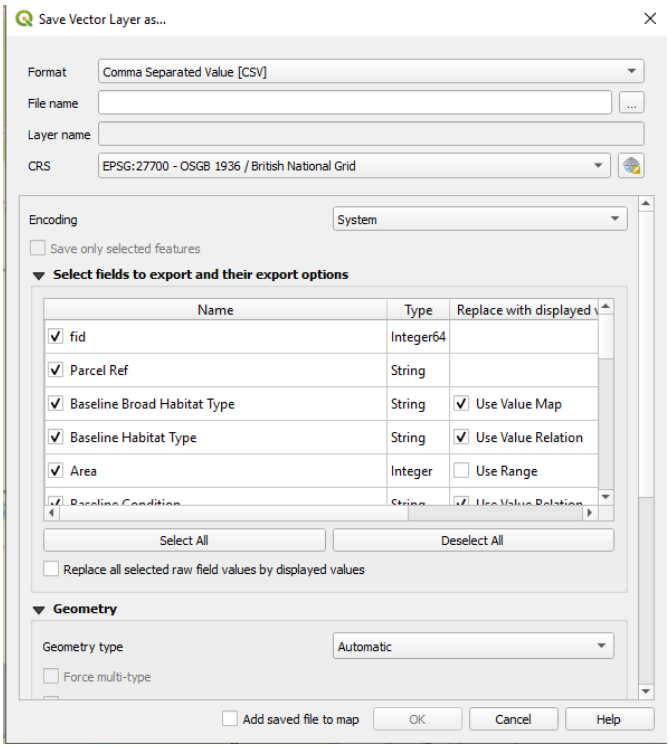
6.12 If not previously completed, users should complete the additional data fields within the master layers.

For features with identical values the multi-edit function can be accessed by selecting desired features and clicking on the button labelled 'Modify the Attributes of all Selected Features Simultaneously'  *.*



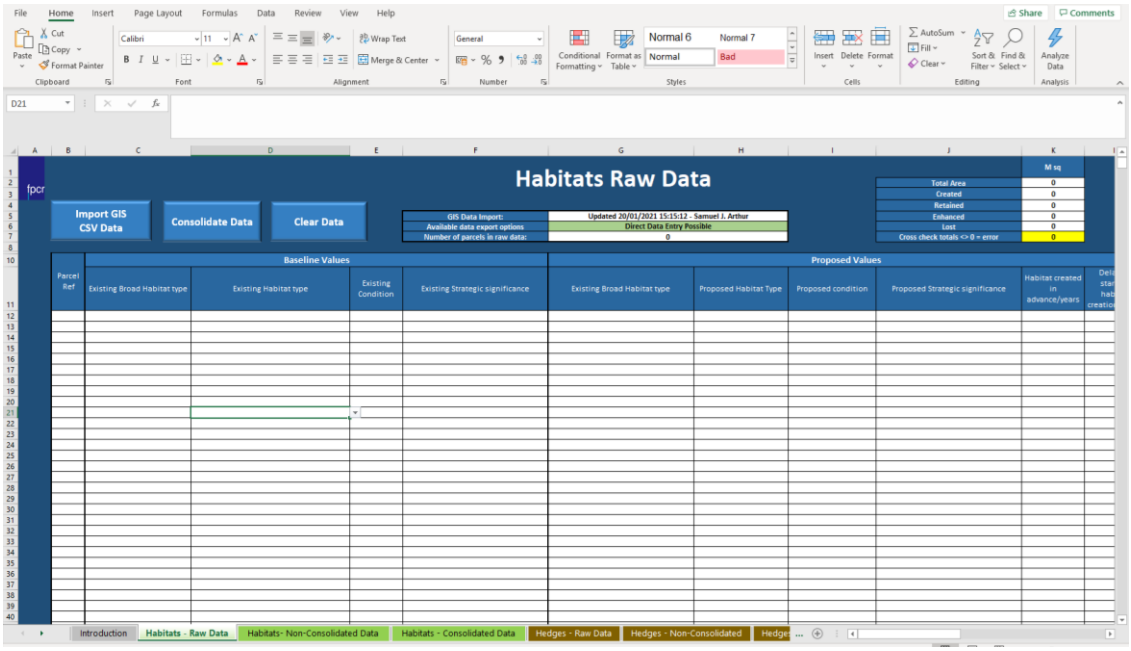
6.13 Once all data entry is complete and saved, and the user is confident that values are accurate, then the data can be exported as a CSV file for each category (Habitats, Hedgerows and Rivers).

Export each master layer by right clicking then selecting "Export", then "Save Features As". On the menu that appears ensure the format is set to - Comma Separated Value [CSV]. You can also de-select the "add saved file to map" option at the bottom of the menu. Select an appropriate file name and save location for your output file.

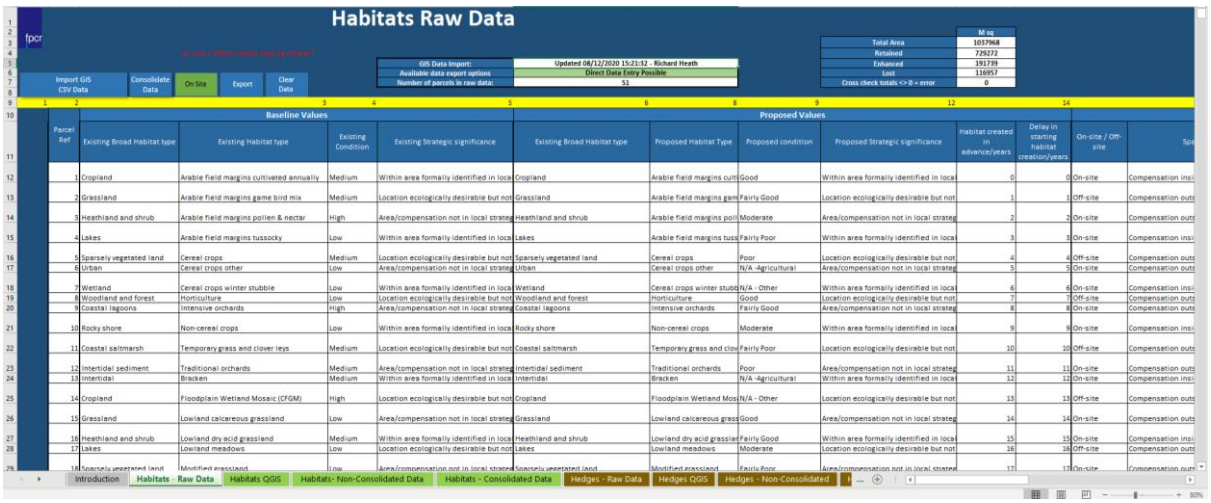


6.14 Open the MS Excel Import tool.

6.15 Select the tab for the relevant category (Habitats, Hedgerows, Rivers). Click on the button at the top labelled "import GIS CSV data". Navigate to the relevant csv file and open.

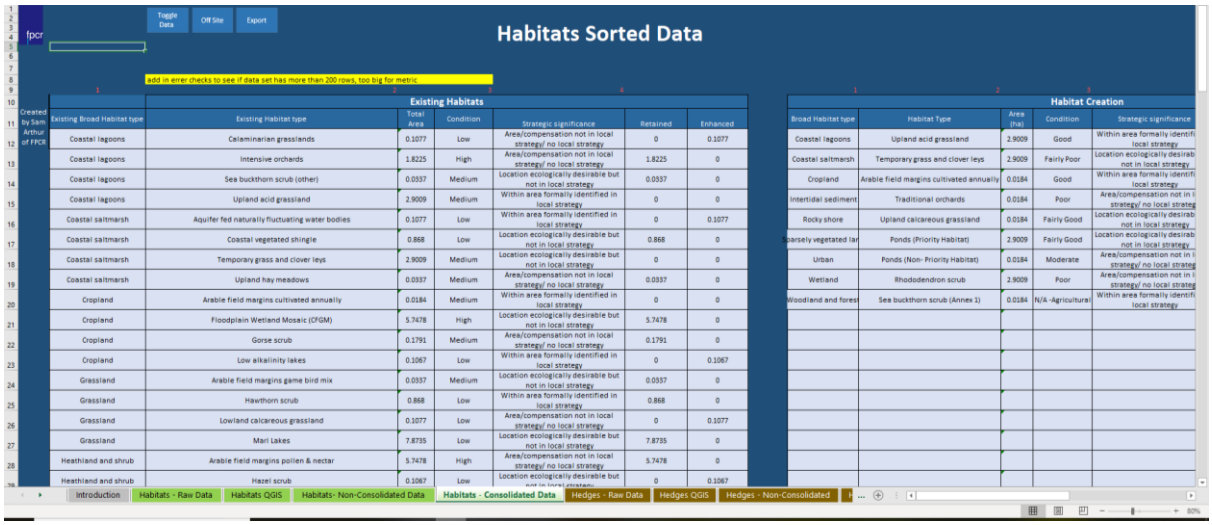


6.16 Once the data has loaded, click the “consolidate data” button.



6.17 Select the consolidated data tab. Click the “export data” button.

If you do not want consolidated data, it is possible to export data from the raw data tab providing there are no more than 248 features (this is the maximum the Biodiversity Metric 3.0 can handle).



6.18 Select a Biodiversity Metric 3.0 workbook to import your data into.

The data will be load into the selected workbook. Repeat the above process for the remaining categories, and export into the same metric file.

Be sure to save the Biodiversity Metric 3.0 Workbook after the data is imported as this is not done automatically.

APPENDIX A: QGIS RESPONSE OPTIONS

Habitats

Variable	Response Options
Parcel Ref	Open edit
Area	Automatically populated
Baseline Broad Habitat Type	Drop-down list
Baseline Habitat Type	Restricted drop-down list (Linked to Baseline Broad Habitat Type)
Baseline Condition	Restricted drop-down list (Linked to Baseline Habitat Type)
Baseline Strategic Significance	Drop-down list
Baseline Distinctiveness	Automatically populated
Baseline UKHAB	Automatically populated
Retention Category	Drop-down list (Default= Lost)
Proposed Habitat Source	Automatically populated
Proposed Broad Habitat Type	Restricted drop-down list (Linked to Baseline Broad Habitat Type and Retention Category)
Proposed Habitat Type	Restricted drop-down list (Linked to Proposed Broad Habitat Type)
Proposed Condition	Restricted drop-down list (Linked to Proposed Habitat Type)
Proposed Strategic Significance	Drop-down list
Proposed Distinctiveness	Automatically populated
Proposed UKHAB	Automatically populated
Habitat created in advance/years	Drop-down list (Default = 0)
Delay in starting habitat creation/years	Drop-down list (Default = 0)
Location	Drop-down list (Default = On site)
Spatial Risk Category	Restricted drop-down list (Linked to Location)
Fid	Hidden Field (Automatically populated)

Hedgerows

Variable	Response Options
Parcel Ref	Open edit
Length	Automatically populated
Baseline Hedge Type	Drop-down list
Baseline Condition	Restricted drop-down list (Linked to Baseline Hedge Type)
Baseline Strategic Significance	Restricted drop-down list (Linked to Baseline Hedge Type)
Baseline Distinctiveness	Automatically populated
Baseline UKHAB	Automatically populated
Retention Category	Restricted drop-down list (Linked to Baseline Hedge Type)
Proposed Hedge Type	Restricted drop-down list (Linked to Baseline Hedge Type and Retention Category)
Proposed Condition	Restricted drop-down list (Linked to Proposed Hedge Type)
Proposed Strategic Significance	Restricted drop-down list (Linked to Proposed Hedge Type)

Proposed Distinctiveness	Automatically populated
Proposed UKHAB	Automatically populated
Habitat created in advance/years	Drop-down list (Default = 0)
Delay in starting habitat creation/years	Drop-down list (Default = 0)
Location	Drop-down list (Default = On site)
Spatial Risk Category	Restricted drop-down list (Linked to Location)
Fid	Hidden Field (Automatically populated)

Rivers

Variable	Response Options
Parcel Ref	Open edit
Length	Automatically populated
Baseline River Type	Drop-down list
Baseline Condition	Restricted drop-down list (Linked to Baseline River Type)
Baseline Strategic Significance	Restricted drop-down list (Linked to Baseline River Type)
Baseline Distinctiveness	Automatically populated
Baseline UKHAB	Automatically populated
Baseline Encroachment into Watercourse	Drop-down list
Baseline Encroachment into Riparian Zone	Drop-down list
Retention Category	Restricted drop-down list (Linked to Baseline River Type)
Enhancement Type	Restricted drop-down list (Linked to Retention Category)
Proposed River Type	Restricted drop-down list (Linked to Baseline River Type and Retention Category)
Proposed Condition	Restricted drop-down list (Linked to Proposed River Type)
Proposed Strategic Significance	Restricted drop-down list (Linked to Proposed River Type)
Proposed Distinctiveness	Automatically populated
Proposed UKHAB	Automatically populated
Proposed Encroachment into Watercourse	Drop-down list
Proposed Encroachment into Riparian Zone	Drop-down list
Habitat created in advance/years	Drop-down list (Default = 0)
Delay in starting habitat creation/years	Drop-down list (Default = 0)
Location	Drop-down list (Default = On site)
Spatial Risk Category	Restricted drop-down list (Linked to Location)
Fid	Hidden Field (Automatically populated)

APPENDIX B: SUMMARY OF LAYERS AND THEIR DEFAULT STYLES (CATEGORY-HABITATS, HEDGEROWS AND RIVERS).

Layer	Style Notes
[Category] Baseline	Baseline UKHAB styling. Features have been assigned to specific, or closest defining UKHAB style.
[Category] Proposed	Proposed UKHAB styling. Features have been assigned to specific, or closest defining UKHAB style.
[Category] Master	Proposed UKHAB styling with additional styling to illustrate features without proposed values.
[Category] Baseline Distinctiveness	Distinctiveness has 5 options (V.High, High, Medium, Low, V.Low). Linear features are restricted by feasibility- Rivers do not have a V.Low category.
[Category] Baseline Condition	Layer specific condition options. Habitats have 6 options (Good, Fairly Good, Moderate, Fairly Poor, Poor, N/A), N/A covering both the 'other' and 'agricultural' variants. Hedgerows have 3 options (Good, Moderate, Poor). Rivers have 5 options (Good, Fairly Good, Moderate, Fairly Poor, Poor).
[Category] Retention	Change from baseline to proposed layers- Lost, Retained, Enhanced (Linear Features have the additional option of 'Created').
[Category] Proposed Distinctiveness	Distinctiveness has 5 options (V.High, High, Medium, Low, V.Low). Linear features are restricted by feasibility- Rivers do not have a V.Low category.
[Category] Proposed Condition	Layer specific condition options. Habitats have 6 options (Good, Fairly Good, Moderate, Fairly Poor, Poor, N/A), N/A covering both the 'other' and 'agricultural' variants. Hedgerows have 3 options (Good, Moderate, Poor). Rivers have 5 options (Good, Fairly Good, Moderate, Fairly Poor, Poor).