



OPW

Oifig na
nOibreacha Poiblí
Office of Public Works

FLOOD RELIEF SCHEME

ENVIRONMENTAL SPATIAL DATA SPECIFICATION

Rev. 3.2 – July 2020

**Flood Risk Management Data Management
Office of Public Works**

SPATIAL DATA SPECIFICATION

DOCUMENT CONTROL SHEET

Rev	Status	Notes	Issue Date
-	FINAL		26.11.2018
1	FINAL	Clarifications provided and adjustments made to a number of areas where queries have been received, including <u>but not limited to</u> entries where the attribute is unknown or not applicable, or where an option is not captured in a pre-defined list.	19.02.2019
2	FINAL	Adjustments made to a number of areas, including <u>but not limited to</u> channel reference now required for all layers, project area changed to include polyline and new image layer specification included.	01.03.2019
3	FINAL	Adjustments made to a number of areas, including <u>but not limited to</u> : Inclusion of non-aquatic animals and minor adjustment to additional species in table C2.2. Annex 1 description field added and mosaic habitats to be recorded as pipe () separated fields in table C2.3 and C2.4. Work types amended in table C2.5, River Enhancements. Crayfish, Lamprey and Freshwater Pearl Mussels to be captured in the Key Environmental Data table C2.7. Clarification provided on the use of 'donut' features.	18.07.2019
3.1	FINAL	Adjustments made to a number of areas, including <u>but not limited to</u> : Table C2.5 – River Enhancements removed. New attribute 'record status' included for all Tables. Date and time fields amended to suit a wider range of GIS software.	28.04.2020
3.2	FINAL	Adjustments made to a number of areas, including <u>but not limited to</u> : Field 'p_id' added to capture previous unique object identifier, field record status 'rs' amended and unique object identifier description amended and format made mandatory.	17.07.2020

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GLOSSARY

FRM	Flood Risk Management
FRS	Flood Relief Scheme
GIS	Geographic Information System
ISO	International Organisation for Standardisation
OPW	Office of Public Works
RBD	River Basin District

1. INTRODUCTION

1.1. PURPOSE

All spatial data created for the Project must be produced and submitted according to the specifications documented in this standard specification.

Each submitted spatial dataset becomes part of the permanent archive and serves as a source for updating information on the Office of Public Works (OPW's) enterprise Geographic Information System (GIS), which serves as a National Flood Data Repository. Standardisation allows files and individual data layers originating from a wide number of sources to be integrated with other data components while ensuring consistency of the information managed and disseminated on the GIS. The data dissemination process is semi-automated and therefore a strict adherence to this standard is necessary. Additionally, the OPW needs standard spatial data so that it can share important information with other key stakeholders and make it available as Open Data, where relevant.

The data standards described in this document are intended to support the above needs.

1.2. SCOPE OF SERVICES

This standard encompasses all aspects of environmental spatial data relating to the Project for the OPW enterprise GIS, managed by the Flood Risk Management (FRM) Data Management section.

1.3. NON-COMPLIANCE AND VARIANCES

Any dataset not compliant with this standard will not be accepted by the OPW and will be returned to the Consultant for correction. Situations may arise where data created for the Project may not be covered by this standard. If such situations were to arise, the Consultant must inform the Client Representative immediately and request written guidance from the Client in all such situations. If for some reason it is not possible to adhere to this standard, the party creating the data must request in writing a waiver to this standard. Such waiver request must define the specific section of the standard for which the waiver is requested, the reason for the waiver, the resulting impacts on the use of the data in the GIS, and any alternative approaches that should be considered. In certain instances, the Client may grant such requests and will then submit all the conditions and restrictions in relation to the waiver in writing to the Consultant. A waiver can only be granted when the Consultant has shown that it is necessary to vary from this standard and that the variation does not affect the objective for uniform and consistent data on OPW's enterprise GIS.

IMPORTANT NOTE FOR LOCAL AUTHORITIES: If a Local Authority is the Client for the Project then it must consult with the OPW in relation to any requests from the Consultant for variation from the specification and will not act unilaterally in this regard.

1.4. REVISION HISTORY

As changes of the Spatial Data Standards are necessary and accepted, this document will be updated accordingly. A summary of changes will be found in the document control sheet.

2. DATA MANAGEMENT

2.1. GENERAL DATA QUALITY ELEMENTS

Environmental data for each Project is to be delivered as vector data and specific information in relation to data formats as detailed in this standard must be adhered to.

The International Organisation for Standardisation (ISO) is a worldwide federation of national standards bodies. The ISO produce documents outlining international standards on quality assurance measures for numerous different fields and disciplines. '*ISO 19157 – Geographic information – Data quality*' (ISO 19157) is a comprehensive document outlining quality standards for geographic information. The Consultant shall familiarise themselves with ISO 19157 and take all necessary steps to ensure spatial data deliverables adhere to this ISO standard and best practice industry standards. The following sections of this spatial data specification periodically references specific sections contained in ISO 19157 which must be adhered to.

2.1.1. COMPLETENESS

All spatial data shall be delivered without excess or missing data.

2.1.2. LOGICAL CONSISTENCY

DOMAIN CONSISTENCY

The naming convention for the shapefiles shall follow the convention as set out in Appendix A, using valid entries as set out in Appendix B. When creating a file name only lowercase letters are to be used and underscores shall be used instead of spaces as shown. The use of single quotation marks ('sample_text') or double quotation marks ("sample_text") are used in this document to emphasise filenames, attributes etc. This is entirely for clarity and should not be used in the spatial data.

All file names, file paths, attribute data field headers and attribute data values must only be lowercase letters and underscores shall be used instead of spaces, unless otherwise specified in this standard. File names, file paths and attribute data field headers shall not contain any special characters unless specified in this standard. It is important that attribute entries are not left blank or with null values as this will compromise the quality of the dataset. For string fields, the value 'na' shall be used where the attribute is not applicable to a specific field and the value 'unknown' shall be used if the field is applicable but the value is not known. For date fields, the value '01/01/1900' shall be used if the value is unknown and represented in the format as per default settings in the GIS software used, for example dd/mm/yyyy (ArcGIS) or yyyy-mm-dd (QGIS).

FORMAT CONSISTENCY

The datasets are to be delivered on a Project Area basis with all the data for each data type, e.g. invasive species plants, to be delivered in one single cleaned and merged file. If the data was originally produced using a break down into sub-areas, the deliverable shall be merged, clipped and cleaned as necessary.

The final delivery of spatial data shall provide continuity with existing spatial data. A project area boundary extent of the surveyed area must be provided to visualise the affected/surveyed extents in the final datasets.

The file structure shall follow the example in Appendix D. If a level is not applicable to a particular data type, this level must be omitted, see example below.

Example Full File Path *
All environmental data: b/sch/ttt/b_sch_ttt_stg_a_rn.shp
All environmental image files: b/sch/images/'filename'.jpeg
* Note that letters shall be replaced with valid options from Appendix B and all required auxiliary files to be provided and the image 'filename' to be replaced by the actual filename.

2.1.3. POSITIONAL ACCURACY

The Consultant shall adhere to best practice industry standards regarding positional accuracy for each type of data deliverable.

2.2. VECTOR DATA QUALITY ELEMENTS

Vector data for each vector data type, as outlined in Appendix A, Table A1.1, shall be supplied to the Client in accordance with this standard. Vector data shall have a valid geometry and be produced for Irish Transverse Mercator (EPSG: 2157) with Malin Head Datum (OSGM15 geoid) for each dataset. Each vector feature shall be accompanied by attributes in an attribute table. In addition to the above general data quality elements, the below quality elements shall be adhered to for vector data. Empty shapefile sample files for the vector data will be made available by the Client on request, which have been produced by the OPW. These sample files will include the specific attribute headings, the correct order of the mandatory attributes and the valid storage type.

2.2.1. LOGICAL CONSISTENCY

CONCEPTUAL CONSISTENCY

The ordering of the attribute fields is critical and shall be kept as described in Appendix C, referencing the field numbers in Tables C2.1 – C2.9. No additional attribute fields shall be included in the attribute tables unless advance agreement is received from the Client. If agreed, additional attribute fields shall always be included after the mandatory attribute fields at the end of the attribute table in a consistent order.

DOMAIN CONSISTENCY

Attribute data field headers and attribute data values shall comply with the naming convention, domain constraints and ordering as described in Appendix C, Tables C2.1 – C2.9. Attribute domain constraints, specifying valid attribute values for the vector data types, are detailed in Appendix B & C and these shall strictly be adhered to.

If the dataset was originally based on a sub-area basis and subsequently merged into a full project area, the sub-area number shall be captured in the relevant attribute field for each feature. If there was only one area for the entire Project, the number '01' shall be entered into the relevant attribute field for all features.

FORMAT CONSISTENCY

The vector data shall be delivered in ESRI shapefile format (.shp) and include all the required auxiliary files, including but not limited to the .prj file for embedding a co-ordinate system and .xml for required metadata. The data object types for vector data will be polygon, polyline and point. All spatial vector data deliverables shall adhere to the specified data object types in Appendix A, Table A1.1.

TOPOLOGICAL CONSISTENCY

Topology is used to define the spatial relationship between features in one or more feature classes through a set of predefined rules, see Table 2.1. The submitted data must be topologically correct according to Table 2.1 below.

Table 2.1 – Topology Rules *

Rule	Description	Geometries Affected
Must Not Overlap	Polygons can share edges or vertices. This rule is used when an area cannot belong to two or more polygons.	Polygons
Must Not Have Gaps	All polygons must form a continuous surface. Use this rule on data that must completely cover an area.	Polygons
Must Not Have Duplicates	This Rule requires that there will be no duplication of geometries, for example: <ul style="list-style-type: none">- A square Polygon will have only 4 vertices- A Polyline will have a single vertices at each change in direction- A Point feature will have a single geometry representing it	Polygons Polylines Points
Must Not Intersect	This rule requires that line features from the same feature class do not cross or overlap each other. Lines can share end vertices.	Polylines
Must Not Have Dangles	This rule requires that where the end vertices of two polylines of the same feature class meet should be connected. An endpoint that is not connected to another line is called a dangle, similar to polygon gaps.	Polylines
Must Not Have Pseudonodes	Lines that connect to themselves are said to have pseudonodes, creating erroneous loops.	Polylines
Must Not Self Intersect	This rule requires that line features do not cross or overlap themselves, resulting in false intersections.	Polylines

Must Be Single-Part	This rule requires that all geometries must be single-part geometry features and not multi-part (except where the purpose is to create donut features).	Polygons Polylines Points
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*** IMPORTANT NOTE:** The supplied geometry shall also be a valid geometry in accordance with all generally accepted standards and must additionally pass the testing using the GDAL:ogr2ogr library (or any subsequent versions of this library). Particular attention is required when creating donut features.

2.2.2. METADATA

INSPIRE compliant metadata shall accompany the vector data using an embedded .xml file, native to the shapefile suite of files. Metadata shall contain elements as required in current versions of ISO 19115 – Geographic Information – Metadata - Part 1 and 2.

3. QUALITY ASSURANCE REQUIREMENTS

3.1. QUALITY CONTROL TESTING

All spatial datasets shall be tested on an individual pass/fail basis by the consultant with a 100% pass rate required for each data quality element and data type. Each dataset shall get a Boolean value of one (1) if it passed with a 100% pass rate and zero (0) if it failed.

In addition, an aggregated data quality assessment shall decide if the overall data deliverable has passed or failed the quality testing, according to section J.2, Annex J of ISO 19157, see example below.

Aggregated Data Quality Results (ADQR)

$ADQR = v_1 * v_2 * v_3 * \dots v_n$, where n is the number of data quality elements

If ADQR = 1, the overall dataset quality is deemed fully conformant.

If ADQR = 0, the overall dataset is deemed non-conformant.

Both manual and automated quality controls shall be performed by the Consultant to ensure that the data is correct and in accordance with this standard.

3.2. QUALITY CONTROL REPORT

A standalone quality control report shall be submitted with each data delivery, detailing each of the quality elements outlined in this standard specification and the result for each data type and quality element, referencing the specific revision. Furthermore, any variations to the standard that affects the data, as agreed in advance with the Client, must be detailed in the report.

The evaluation and reporting of data quality shall use the standard data quality measures detailed in Annex D of ISO 19157 and as described below and in section 3.1 above:

- Completeness - Refer to section D.2, Annex D of ISO 19157 regarding reporting of commission and omission of data.
- Logical Consistency - Refer to section D.3, Annex D of ISO 19157 regarding reporting of conceptual consistency, domain consistency, format consistency and topological consistency of data.
- Positional Accuracy - Refer to section D.4, Annex D of ISO 19157 regarding reporting of positional accuracy of data.
- Temporal Quality - Refer to section D.5, Annex D of ISO 19157 regarding reporting of accuracy of time measurement, temporal consistency and temporal validity of data.
- Thematic Accuracy - Refer to section D.6, Annex D of ISO 19157 regarding reporting of classification correctness, non-quantitative attribute correctness and quantitative attribute accuracy of data.
- Usability Element – All other data quality measures should be reported under the usability element.

A data control report must be submitted for each stage of the project as data is submitted and updated for each revision of data, marked with the current revision number of the dataset assessed.

4. DATA DELIVERY

4.1. DELIVERY CONTENT

All required datasets shall be delivered as one single delivery for each stage of the Project with one revision number used consistent across the entire deliverable. If there are parts of the data delivery that after delivery does not pass the Client's quality control, the Consultant will be required to correct the data and resubmit the entire data deliverable together with a detailed description of corrections made. Once the data has been accepted as final by the Client, a full re-delivery of the final data shall take place, where the revision number shall be consistent across the entire deliverable.

4.2. DELIVERY FORMAT

All spatial data and associated quality control reports shall be delivered in a stable electronic media format and be transported in a secure manner to the Client. Electronic file transfer shall not be used, unless further agreed with the Client.

4.3. OWNERSHIP OF DATA

All spatial data shall be created exclusively for the use and ownership of the Client, who can grant further rights of use of the data. Unrestricted use of the data shall automatically extend to the OPW, where a Local Authority is the Client.

A1. APPENDIX A - FILE NAMING

Table A1.1 – File Naming Convention and Data Format & Object Types for Spatial data

Data Type	File Naming Convention	Data Format & Object Type
Invasive Species Plants	b_sch_ttt_stg_a_rn	ESRI Shapefile - Point
Invasive Species Animals	b_sch_ttt_stg_a_rn	ESRI Shapefile - Point
Habitat Mapping - Area Features	b_sch_ttt_stg_a_rn	ESRI Shapefile - Polygon
Habitat Mapping - Line Features	b_sch_ttt_stg_a_rn	ESRI Shapefile - Polyline
Ecological Enhancements	b_sch_ttt_stg_a_rn	ESRI Shapefile - Point
Key Environmental Data	b_sch_ttt_stg_a_rn	ESRI Shapefile - Point
Supplementary Environmental Data	b_sch_ttt_stg_a_rn	ESRI Shapefile - Point
Project Area	b_sch_ttt_stg_a_rn	ESRI Shapefile - Polygon
Image Locations	b_sch_ttt_stg_a_rn	ESRI Shapefile - Point

B1. APPENDIX B - FILE NAME CODE / ATTRIBUTE FIELD VALUES

The below section contains valid file name codes and attribute field values for attributes that are common with the file name codes. Attribute field values that are layer specific or not contained in a file name will be specified in the relevant sections for each data type in Appendix C.

inv_id, hab_id, ece_id, ked_id, sed_id, pae_id, img_id

= **Unique Object Identifier** for each single spatial entity in each of the layers.

For new records, this identifier **must** follow the format `yyyymmdd_ttt_#####`, where `ttt` is the data type and `#####` is a sequential number to ensure a unique id within the layer, e.g. 20190101_ifl_000001, 20190101_ifl_000002, 20190101_ifl_000003 etc. for individual entities in the invasive species plants layer that were created on 2019-01-01.

New records include a new observation or a substantially altered, split or merged record, where all resulting records shall receive a new Unique Object Identifier. Topological or minor location correction or an attribute amendment of an existing record **shall not be considered a new record** but constitutes a modified record. For attribute amendments, only amendments affecting the record type/description fields shall further be considered as a modified record. For example, a record that has the same outline as the previous observation, i.e. the geometry is unchanged, but the type or habitat has changed shall be considered a modified record.

rs = Record Status, where one of the following codes shall be used to indicate the status of the recording:

- **nr** = New Record
- **mr** = Modified Existing Record, to be used if the record has been confirmed but modified, with important exceptions as described in the New records paragraph above.
- **cr** = Confirmed Existing Record (not modified)
- **er** = Existing Record (not new, modified nor confirmed)

p_id = previous unique object identifier, which is to remain unchanged by consultants, **except** where existing geometries are substantially altered, split or merged. In these cases:

1. A new Unique Object Identifier must be created for each of the resultant records,
2. The field record status shall be updated to '*nr*' for each of the resultant records,
3. The "p_id" field shall be updated with **ALL** the previous records original unique object identifiers, separated by a pipe symbol '|', for each of the resultant records.

Examples include but are not limited to:

- A single existing record that is split into two records shall result in two new records, both with new Unique Object Identifiers, a record status of '*nr*' and the previous Unique Object Identifier recorded in each records p_id field.
- Three existing records merged/dissolved into one shall result in a single new record with a new Unique Object Identifier, a record status of '*nr*' and with the original three Unique Object Identifiers recorded in the p_id field, separated by a pipe symbol '|'.
- Topological or minor location correction or an attribute amendment of an existing record **shall not be considered a new record** but constitutes a modified record, with record status '*mr*'. For attribute amendments, only amendments affecting the record type/description fields shall further be considered as a modified record '*mr*'.

b = River Basin District (RBD), where one of the following codes shall be used to denote the appropriate River Basin District:

- e = Eastern
- n = North Western Neagh-Bann
- w = Western
- s = Shannon
- i = South Western (Iardheisceart)
- o = South Eastern (Oirdheisceart)

The above River Basin Districts are from the first cycle of the River Basin Management Plans (2009-2015).

sch = Scheme Code, a 3 digit code that identifies the individual scheme area as supplied by the OPW on request, controlled by the FRM Data Management section. This scheme code will ensure that naming conventions are unique across the individual projects. This code / level must not be left out or blank and '000', i.e. three zeros should be used if unknown or not applicable.

ttt = Data Type, where one of the following codes shall be used as appropriate to define the Spatial Data:

- ifl = Invasive Species Plants,
- ifa = Invasive Species Animals,
- hma = Habitat Mapping – Area Features,
- hml = Habitat Mapping – Line Features,
- ece = Ecological Enhancements,
- ked = Key Environmental Data,
- sed = Supplementary Environmental Data,
- pae = Project Area,
- img = Image Locations

stg = Scheme Stage, referring to the stage at which a Flood Relief Scheme (FRS) works have progressed to at the time of data production:

- s1 = Stage 1
- s2 = Stage 2
- s3 = Stage 3
- na = Stage not applicable, i.e. not a FRS related project.

a = Status, where one of the following codes shall be used to describe the status of the file:

- f = Final status
- c = External draft for circulation and review by external stakeholders
- d = Consultants internal draft

rn = Revision Number, This is a two digit revision number i.e. 01, 02 etc.


C1. APPENDIX C - ATTRIBUTE NAMING

Table C1.1 List of Spatial Data Files and Attributes

Spatial Data File	Data Format & Object Type	Notes
Invasive Species Plants	ESRI Shapefile - Point	See table C2.1
Invasive Species Animals	ESRI Shapefile - Point	See table C2.2
Habitat Mapping – Area Features	ESRI Shapefile - Polygon	See table C2.3
Habitat Mapping – Line Features	ESRI Shapefile - Polyline	See table C2.4
Ecological Enhancements	ESRI Shapefile - Point	See table C2.5
Key Environmental Data	ESRI Shapefile - Point	See table C2.6
Supplementary Environmental Data	ESRI Shapefile - Point	See table C2.7
Project Area	ESRI Shapefile - Polygon	See table C2.8
Image Locations	ESRI Shapefile - Point	See table C2.9

Table C2.1 – Invasive Species Plants Attribute Table

Description: The occurrence of invasive species of plants, including but not limited to those listed in S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011 - Third Schedule non-native species subject to restrictions under Regulations 49 and 50 Part 1: Plants.



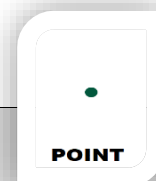
Field No.	Field Name	Field Storage Type	No. Characters	Description
1	inv_id	String	38	Unique Object Identifier for each single spatial entity in the layer, see Appendix B.
2	b	String	1	Code for relevant RBD, see Appendix B.
3	sch	String	3	Code for relevant Scheme, see Appendix B.
4	ttt	String	3	Data Type, see Appendix B.
5	stg	String	2	Scheme Stage, see Appendix B.
6	a	String	1	Status, see Appendix B.
7	rn	String	2	Revision Number, see Appendix B.
8	rs	String	2	Record Status, see Appendix B.
9	inv_spe	String	100	Description of plants according to S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011 - Third Schedule non-native species subject to restrictions under Regulations 49 and 50 Part 1: Plants, including: <ul style="list-style-type: none"> • american skunk-cabbage • a red alga • brazilian giant-rhubarb • broad-leaved rush • cape pondweed • cord-grasses • curly waterweed • dwarf eel-grass • fanwort • floating pennywort • fringed water-lily • giant hogweed • giant knotweed • giant-rhubarb • giant salvinia

				<ul style="list-style-type: none"> • himalayan balsam • himalayan knotweed • hottentot-fig • japanese knotweed • large-flowered waterweed • mile-a-minute weed • new zealand pigmyweed • parrots feather • rhododendron • salmonberry • sea-buckthorn • spanish bluebell • three-cornered leek • wakame • water chestnut • water fern • water lettuce • water-primrose • waterweeds* • wireweed <p>Additional invasive species of plants to be listed by their common name, including:</p> <ul style="list-style-type: none"> • bohemian knotweed • buddleia • canadian waterweed • elodea waterweed • least duckweed • monbretia • nutall's waterweed • snowberry • spartina • winter heliotrope • other** <p>* if not described by canadian, elodea or nutall's waterweed.</p> <p>** if 'other' is selected, include a description of the plant in the "comments" field below.</p>
10	chn	String	100	Channel reference, use OPW channel reference number for existing channels or code used by the

				engineering consultant for new channels.
11	date	Date	10	Date of data capture. Due to the variance in how the Date Field Type can be represented, for example yyyy-mm-dd (Default), yyyy-mm-dd (QGIS) or dd/mm/yyyy (ArcGIS) the default format for any given software should be used.
12	sou	String	100	Source of data, i.e. organisation where data originated, e.g. opw/ifi/npws/relevant consultant.
13	comments	String	254	Additional comments, if any, e.g. location description and scientific name, if required.
14	p_id	String	254	Previous unique object identifier(s), see Appendix B.

Table C2.2 – Invasive Species Animals Attribute Table

Description: The occurrence of invasive species of animals, including but not limited to those animals listed in S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011 - Third Schedule non-native species subject to restrictions under Regulations 49 and 50 Part 2: Animals.



Field No.	Field Name	Field Storage Type	No. Characters	Description
1	inv_id	String	38	Unique Object Identifier for each single spatial entity in the layer, see Appendix B.
2	b	String	1	Code for relevant RBD, see Appendix B.
3	sch	String	3	Code for relevant Scheme, see Appendix B.
4	ttt	String	3	Data Type, see Appendix B.
5	stg	String	2	Scheme Stage, see Appendix B.
6	a	String	1	Status, see Appendix B.
7	rn	String	2	Revision Number, see Appendix B.
8	rs	String	2	Record Status, see Appendix B.
9	inv_spe	String	100	<p>Description of invasive species of animals according to S.I. No. 477/2011 European Communities (Birds and Natural Habitats) Regulations 2011 - Third Schedule non-native species subject to restrictions under Regulations 49 and 50 Part 2: Animals, including:</p> <ul style="list-style-type: none"> • a colonial sea squirt • all freshwater crayfish species except the white-clawed crayfish • american bullfrog • american mink • american oyster drill • asian oyster drill • asian rapa whelk • asian river clam • bay barnacle • black rat • brown hare • brown rat

				<ul style="list-style-type: none"> • canada goose • carp • chinese mitten crab • chinese water deer • chub • common toad • coypu • dace • freshwater shrimp • fox • grey squirrel • greylag goose • harlequin Ladybird • hedgehog • irish stoat • japanese skeleton shrimp • muntjac deer • muskrat • quagga mussel • roach • roe deer • ruddy duck • siberian chipmunk • slipper limpet • stalked sea squirt • tawny owl • wild boar • zebra mussel <p>Additional invasive species of animals to be listed by their common name, including but not limited to:</p> <ul style="list-style-type: none"> • bloody red shrimp • crayfish plague • eel swim bladder nematode • killer shrimp • other* <p>* if 'other' is selected, include a description of the aquatic animal in the "comments" field below.</p>
10	chn	String	100	Channel reference, use OPW channel reference number for existing channels or code used by the engineering consultant for new channels.

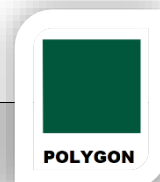
11	date	Date	10	Date of data capture. Due to the variance in how the Date Field Type can be represented, for example yyyyymmdd (Default), yyyy-mm-dd (QGIS) or dd/mm/yyyy (ArcGIS) the default format for any given software should be used.
12	sou	String	100	Source of data, i.e. organisation where data originated, e.g. opw/ifi/npws/relevant consultant.
13	comments	String	254	Additional comments, if any, e.g. location description and scientific name, if required.
14	p_id	String	254	Previous unique object identifier(s), see Appendix B.

Table C2.3 – Habitat Mapping – Area Features Attribute Table

Description: Delineation of habitats according to Fossitt (2000), “A Guide to Habitats in Ireland”, where the feature is naturally described as an area, or a line object (e.g. tree line) where the width of the line object is greater or equal to 4m.

Individually mapped features may occasionally be covered by a number of habitat types, and a mosaic habitat can then be recorded. Mosaic habitats should be listed as pipe (|) separated entries in field 8 and 9 (and 10 & 11, if applicable), using a consistent and descending order according to their percentage of coverage. The area features should generally be delineated to an appropriate scale to minimise the number of habitat types within a single feature and the use of mosaic habitats.

Minor noteworthy species should be described in the additional comments field as required.



Field No.	Field Name	Field Storage Type	No. Characters	Description
1	hab_id	String	38	Unique Object Identifier for each single spatial entity in the layer, see Appendix B.
2	b	String	1	Code for relevant RBD, see Appendix B.
3	sch	String	3	Code for relevant Scheme, see Appendix B.
4	ttt	String	3	Data Type, see Appendix B.
5	stg	String	2	Scheme Stage, see Appendix B.
6	a	String	1	Status, see Appendix B.
7	rn	String	2	Revision Number, see Appendix B.
8	rs	String	2	Record Status, see Appendix B.
9	prc	String	100	Code for the habitats(s) corresponding to appropriate habitat classification code as set out in Fossitt (2000) habitat classification “A Guide to Habitats in Ireland”, e.g. ‘gs4’. In the case of mosaic habitats, use pipe () separated entries, e.g. ‘gs1 gs4 ...’
10	prd	String	254	Description of the habitats(s) corresponding to appropriate habitat classification code as set out in Fossitt (2000) habitat classification “A Guide to Habitats in Ireland”, e.g. ‘wet grassland’.

				<p>In the case of mosaic habitats, use pipe () separated entries, e.g. 'dry calcareous and neutral grassland wet grassland ...'</p> <p>In the case of mosaic habitats, the ordering is to follow field number 8 above.</p>
11	ann	String	254	<p>Potential Annex 1 Habitat codes as set out under the EU Habitats Directive (92/43/EEC), <u>or</u> enter 'na' if not applicable. Provide the <u>EU habitat code and a short description</u>, i.e.:</p> <ul style="list-style-type: none"> • 1110 sandbanks • 1130 estuaries • 1140 tidal mudflats • 1150 lagoons • 1160 large shallow inlets and bays • 1170 reefs • 1210 drift lines • 1220 perennial vegetation of stony • 1230 sea cliffs • 1310 salicornia mud • 1320 spartinion • 1330 atlantic salt meadows • 1410 mediterranean salt meadows • 1420 halophilous scrub • 2110 embryonic shifting dunes • 2120 marram dunes (white dunes) • 2130 fixed dunes (grey dunes) • 2140 decalcified empetrum dunes • 2150 decalcified dune heath • 2170 dunes with creeping willow • 2190 dune slack • 21a0 machair • 3110 oligotrophic soft water lakes

				<ul style="list-style-type: none"> • 3130 soft water lakes with base rich influences • 3140 hard water lakes • 3150 natural eutrophic lakes • 3160 dystrophic lakes • 3180 turloughs • 3260 floating river vegetation • 3270 chenopodium rubri • 4010 wet heath • 4030 dry heaths • 4060 alpine and subalpine heath • 5130 juniper scrub • 6130 calaminarian grassland • 6210 orchid-rich calcareous grassland • 6230 species-rich nardus upland grassland • 6410 molinia meadows • 6430 hydrophilous tall herb • 6510 lowland hay meadows • 7110 raised bog (active) • 7120 degraded raised bogs • 7130 blanket bog (active) • 7140 transition mires • 7150 rhynchosporion depressions • 7210 cladium fen • 7220 petrifying springs • 7230 alkaline fens • 8110 siliceous scree • 8120 eutric scree • 8210 calcareous rocky slopes • 8220 siliceous rocky slopes • 8240 limestone pavement • 8310 caves • 8330 sea caves • 91a0 old oak woodlands • 91s0 bog woodland • 91e0 residual alluvial forests • 91j0 taxus baccata woods <p>In the case of mosaic habitats, use pipe () separated entries, e.g. '1110</p>
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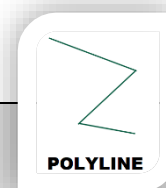
				sandbanks 1130 estuaries ...'
12	and	String	254	<p>Appropriate Annex 1 Habitat <u>descriptions</u> as set out under the EU Habitats Directive (92/43/EEC), <u>or</u> enter 'na' if not applicable.</p> <p>In the case of mosaic habitats, use pipe () separated entries.</p> <p>In the case of mosaic habitats, the ordering is to follow field number 10 above.</p>
13	chn	String	100	Channel reference, use OPW channel reference number for existing channels or code used by the engineering consultant for new channels.
14	date	Date	10	<p>Date of data capture.</p> <p>Due to the variance in how the Date Field Type can be represented, for example yyyy-mm-dd (Default), yyyy-mm-dd (QGIS) or dd/mm/yyyy (ArcGIS) the default format for any given software should be used.</p>
15	sou	String	100	Source of data, i.e. organisation where data originated, e.g. opw/ifi/npws/relevant consultant.
16	comments	String	254	Additional comments, if any, e.g. location description or other noteworthy species.
17	p_id	String	254	Previous unique object identifier(s), see Appendix B.

Table C2.4 – Habitat Mapping – Line Features Attribute Table

Description: Delineation of habitats according to Fossitt (2000), “A Guide to Habitats in Ireland”, where the feature is naturally described as a line where the width of the line object is less than 4m.

Individually mapped features may occasionally be covered by a number of habitat types, and a mosaic habitat can then be recorded. Mosaic habitats should be listed as pipe (|) separated entries in field 8 and 9 (and 10 & 11, if applicable), using a consistent and descending order according to their percentage of coverage. The line features should generally be delineated to an appropriate scale to minimise the number of habitat types within a single feature and the use of mosaic habitats.

Minor noteworthy species should be described in the additional comments field as required.



Field No.	Field Name	Field Storage Type	No. Characters	Description
1	hab_id	String	38	Unique Object Identifier for each single spatial entity in the layer, see Appendix B.
2	b	String	1	Code for relevant RBD, see Appendix B.
3	sch	String	3	Code for relevant Scheme, see Appendix B.
4	ttt	String	3	Data Type, see Appendix B.
5	stg	String	2	Scheme Stage, see Appendix B.
6	a	String	1	Status, see Appendix B.
7	rn	String	2	Revision Number, see Appendix B.
8	rs	String	2	Record Status, see Appendix B.
9	prc	String	100	Code for the habitats(s) corresponding to appropriate habitat classification code as set out in Fossitt (2000) habitat classification “A Guide to Habitats in Ireland”, e.g. ‘gs4’. In the case of mosaic habitats, use pipe () separated entries, e.g. ‘gs1 gs4 ...’
10	prd	String	254	Description of the habitats(s) corresponding to appropriate habitat classification code as set out in Fossitt (2000) habitat classification “A Guide to Habitats in Ireland”, e.g. ‘wet grassland’.

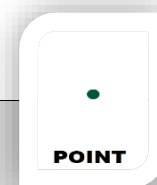
				<p>In the case of mosaic habitats, use pipe () separated entries, e.g. 'dry calcareous and neutral grassland wet grassland ...'</p> <p>In the case of mosaic habitats, the ordering is to follow field number 8 above.</p>
11	ann	String	254	<p>Potential Annex 1 Habitat codes as set out under the EU Habitats Directive (92/43/EEC), <u>or</u> enter 'na' if not applicable. Provide the <u>EU habitat code and a short description</u>, i.e.:</p> <ul style="list-style-type: none"> • 1110 sandbanks • 1130 estuaries • 1140 tidal mudflats • 1150 lagoons • 1160 large shallow inlets and bays • 1170 reefs • 1210 drift lines • 1220 perennial vegetation of stony • 1230 sea cliffs • 1310 salicornia mud • 1320 spartinion • 1330 atlantic salt meadows • 1410 mediterranean salt meadows • 1420 halophilous scrub • 2110 embryonic shifting dunes • 2120 marram dunes (white dunes) • 2130 fixed dunes (grey dunes) • 2140 decalcified empetrum dunes • 2150 decalcified dune heath • 2170 dunes with creeping willow • 2190 dune slack • 21a0 machair • 3110 oligotrophic soft water lakes

				<ul style="list-style-type: none"> • 3130 soft water lakes with base rich influences • 3140 hard water lakes • 3150 natural eutrophic lakes • 3160 dystrophic lakes • 3180 turloughs • 3260 floating river vegetation • 3270 chenopodium rubri • 4010 wet heath • 4030 dry heaths • 4060 alpine and subalpine heath • 5130 juniper scrub • 6130 calaminarian grassland • 6210 orchid-rich calcareous grassland • 6230 species-rich nardus upland grassland • 6410 molinia meadows • 6430 hydrophilous tall herb • 6510 lowland hay meadows • 7110 raised bog (active) • 7120 degraded raised bogs • 7130 blanket bog (active) • 7140 transition mires • 7150 rhynchosporion depressions • 7210 cladium fen • 7220 petrifying springs • 7230 alkaline fens • 8110 siliceous scree • 8120 eutric scree • 8210 calcareous rocky slopes • 8220 siliceous rocky slopes • 8240 limestone pavement • 8310 caves • 8330 sea caves • 91a0 old oak woodlands • 91s0 bog woodland • 91e0 residual alluvial forests • 91j0 taxus baccata woods <p>In the case of mosaic habitats, use pipe () separated entries, e.g. '1110</p>
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				sandbanks 1130 estuaries ...'
12	and	String	254	<p>Appropriate Annex 1 Habitat <u>descriptions</u> as set out under the EU Habitats Directive (92/43/EEC), <u>or</u> enter 'na' if not applicable.</p> <p>In the case of mosaic habitats, use pipe () separated entries.</p> <p>In the case of mosaic habitats, the ordering is to follow field number 10 above.</p>
13	chn	String	100	Channel reference, use OPW channel reference number for existing channels or code used by the engineering consultant for new channels.
14	date	Date	10	<p>Date of data capture.</p> <p>Due to the variance in how the Date Field Type can be represented, for example yyyyymmdd (Default), yyyy-mm-dd (QGIS) or dd/mm/yyyy (ArcGIS) the default format for any given software should be used.</p>
15	sou	String	100	Source of data, i.e. organisation where data originated, e.g. opw/ifi/npws/relevant consultant.
16	comments	String	254	Additional comments, if any, e.g. location description or other noteworthy species.
17	p_id	String	254	Previous unique object identifier(s), see Appendix B.

Table C2.5 – Ecological Enhancements Attribute Table

Description: Completed Ecological Enhancements provided through artificially constructed terrestrial habitat.

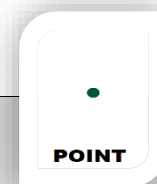


Field No.	Field Name	Field Storage Type	No. Characters	Description
1	ece_id	String	38	Unique Object Identifier for each single spatial entity in the layer, see Appendix B.
2	b	String	1	Code for relevant RBD, see Appendix B.
3	sch	String	3	Code for relevant Scheme, see Appendix B.
4	ttt	String	3	Data Type, see Appendix B.
5	stg	String	2	Scheme Stage, see Appendix B.
6	a	String	1	Status, see Appendix B.
7	rn	String	2	Revision Number, see Appendix B.
8	rs	String	2	Record Status, see Appendix B.
9	ece_type	String	100	<p>Ecological Enhancement Type (constructed terrestrial habitats), including:</p> <ul style="list-style-type: none"> • badger sett – artificial • bat box • constructed wetland • kingfisher nest box • nesting cliff – artificial • otter holt – artificial • sandmartin nest box • other* <p>* if 'other' is selected include a description of the Ecological Enhancement Type in the "comments" field below.</p>
10	chn	String	100	Channel reference, use OPW channel reference number for existing channels or code used by the

				engineering consultant for new channels.
11	date	Date	10	Date of data capture. Due to the variance in how the Date Field Type can be represented, for example yyyyymmdd (Default), yyyy-mm-dd (QGIS) or dd/mm/yyyy (ArcGIS) the default format for any given software should be used.
12	sou	String	100	Source of data, i.e. organisation where data originated, e.g. opw/ifi/npws/relevant consultant.
13	comments	String	254	Additional comments, if any, e.g. location description
14	p_id	String	254	Previous unique object identifier(s), see Appendix B.

Table C2.6 – Key Environmental Data Attribute Table

Description: Natural environmental features that would influence how flood relief or drainage works are progressed, e.g. an otter holt.

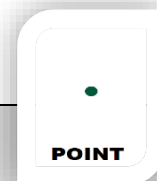


Field No.	Field Name	Field Storage Type	No. Characters	Description
1	ked_id	String	38	Unique Object Identifier for each single spatial entity in the layer, see Appendix B.
2	b	String	1	Code for relevant RBD, see Appendix B.
3	sch	String	3	Code for relevant Scheme, see Appendix B.
4	ttt	String	3	Data Type, see Appendix B.
5	stg	String	2	Scheme Stage, see Appendix B.
6	a	String	1	Status, see Appendix B.
7	rn	String	2	Revision Number, see Appendix B.
8	rs	String	2	Record Status, see Appendix B.
9	ked_type	String	100	<p>Key Environmental Data (natural environmental features) where OPW procedures exist:</p> <ul style="list-style-type: none"> • badger sett • whiteclawed crayfish • floating river vegetation* • lamprey • nesting bank* • otter holt • protected rare plant* • freshwater pearl mussel • swan and duck mussel <p>Additional Key Environmental Data (natural environmental features) to be listed by their common name, including but not limited to:</p> <ul style="list-style-type: none"> • constructed toad scheme pond • otter couch • petrified springs • whorl snail • other*

				* if an option with asterisk is selected, include a description of the Key Environmental Data Type in the “comments” field below.
10	chn	String	100	Channel reference, use OPW channel reference number for existing channels or code used by the engineering consultant for new channels.
11	date	Date	10	Date of data capture. Due to the variance in how the Date Field Type can be represented, for example yyyyymmdd (Default), yyyy-mm-dd (QGIS) or dd/mm/yyyy (ArcGIS) the default format for any given software should be used.
12	sou	String	100	Source of data, i.e. organisation where data originated, e.g. opw/ifi/npws/relevant consultant.
13	comments	String	254	Additional comments, if any, e.g. location description and commentary on the observation.
14	p_id	String	254	Previous unique object identifier(s), see Appendix B.

Table C2.7 – Supplementary Environmental Data Attribute Table

Description: Observations or feature that would not directly influence how flood relief or drainage works are progressed, e.g. otter spraint.



Field No.	Field Name	Field Storage Type	No. Characters	Description
1	sed_id	String	38	Unique Object Identifier for each single spatial entity in the layer, see Appendix B.
2	b	String	1	Code for relevant RBD, see Appendix B.
3	sch	String	3	Code for relevant Scheme, see Appendix B.
4	ttt	String	3	Data Type, see Appendix B.
5	stg	String	2	Scheme Stage, see Appendix B.
6	a	String	1	Status, see Appendix B.
7	rn	String	2	Revision Number, see Appendix B.
8	rs	String	2	Record Status, see Appendix B.
9	sed_type	String	100	Supplementary Environmental Data Type, sightings, signs, possible habitats etc., including: <ul style="list-style-type: none"> • amphibian – any • badger - any • bat - any • birds – any • fish – any • flora – any • foraging area – any • hedgerow - any • insect – any • instream features – any • mammals - any • otter – any • potential habitat – any • riparian features – any • river vegetation – any • tree – any • vegetation - any • wet grassland – any

				<ul style="list-style-type: none"> • other <p>NOTE: Include a description of the Supplementary Environmental Data Type in the “comments” field below, including common name of the species.</p>
10	chn	String	100	Channel reference, use OPW channel reference number for existing channels or code used by the engineering consultant for new channels.
11	date	Date	10	<p>Date of data capture.</p> <p>Due to the variance in how the Date Field Type can be represented, for example yyyyymmdd (Default), yyyy-mm-dd (QGIS) or dd/mm/yyyy (ArcGIS) the default format for any given software should be used.</p>
12	sou	String	100	Source of data, i.e. organisation where data originated, e.g. opw/ifi/npws/relevant consultant.
13	comments	String	254	Additional comments, if any, e.g. location description and commentary on the observation.
14	p_id	String	254	Previous unique object identifier(s), see Appendix B.

Table C2.8 – Project Area Attribute Table

Description: Survey area extent to be a polyline aligned with the channel and covering the length of the survey if it is a channel walkover survey and a polygon covering the survey area extent if it is a survey of an area beyond the channels.



Field No.	Field Name	Field Storage Type	No. Characters	Description
1	pae_id	String	38	Unique Object Identifier for each single spatial entity in the layer, see Appendix B.
2	b	String	1	Code for relevant RBD, see Appendix B.
3	sch	String	3	Code for relevant Scheme, see Appendix B.
4	ttt	String	3	Data Type, see Appendix B.
5	stg	String	2	Scheme Stage, see Appendix B.
6	a	String	1	Status, see Appendix B.
7	rn	String	2	Revision Number, see Appendix B.
8	chn	String	100	Channel reference, use OPW channel reference number for existing channels or code used by the engineering consultant for new channels.
9	date	Date	10	Date of data capture. Due to the variance in how the Date Field Type can be represented, for example yyyy-mm-dd (Default), yyyy-mm-dd (QGIS) or dd/mm/yyyy (ArcGIS) the default format for any given software should be used.
10	sou	String	100	Source of data, i.e. organisation where data originated, e.g. opw/ifi/npws/relevant consultant.
11	comments	String	254	Additional comments on the project area extents, if any.
12	p_id	String	254	Previous unique object identifier(s), see Appendix B.

Table C2.9 – Image Locations Attribute Table

Description: A georeferenced point location file based on the capture location of the images. The point file shall reference the object UUID of the feature that it depicts and have a number of additional attributes as listed below. The referenced image file (JPEG) shall be located separately within the file structure within the 'images' folder, see Appendix D.

Pictures quality and location accuracy - Pictures shall be taken by a handheld GPS enabled smart device with in-built compass to meet the following minimum criteria:

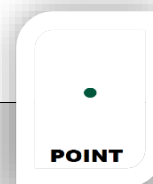
Vertical accuracy: max ± 5 m from the true capture position

Image orientation accuracy: max ± 5 degrees from the true orientation

Image resolution: min 5 Megapixels

Image format: JPEG

Image quality: a sufficient level of zoom and clarity is required to clearly identify the image subject



Field No.	Field Name	Field Storage Type	No. Characters	Description
1	img_id	String	38	Unique Object Identifier for each single spatial entity in the layer, see Appendix B.
3	b	String	1	Code for relevant RBD, see Appendix B.
4	sch	String	3	Code for relevant Scheme, see Appendix B.
5	ttd	String	3	Data Type, see Appendix B.
6	stg	String	2	Scheme Stage, see Appendix B.
7	a	String	1	Status, see Appendix B.
8	rn	String	2	Revision Number, see Appendix B.
9	ref_id	String	38	UUID of the feature that the image represents in the other data sets, e.g. UUID of the point in the Invasive Species Plant layer that the picture represents.
10	ref_ttd	String	3	Data Type of the feature that the image represents in the other data sets, see ttd in Appendix B. For example, 'ifl' if the image depicts an Invasive Species Plant feature.
11	chn	String	100	Channel reference, use OPW channel reference number for existing channels or code used by the

				engineering consultant for new channels.
12	time	String	30	<p>Date and time of data capture to be recorded in a consistent format throughout the data using the relevant Irish time, correctly adjusted to winter/summer time, and a 24 hour clock.</p> <p>Time information <u>must</u> be recorded in the format yyyy-mm-ddthh:mm:ss, for example:</p> <p>2020-02-28t13:15:30</p>
13	sou	String	100	Source of data, i.e. organisation where data originated, e.g. opw/ifi/npws/relevant consultant.
14	path	String	100	Full file path to the location of the file within the folder structure, excluding the file name (i.e. b/sch/images).
15	name	String	50	Full file name of the image, including the file extension but excluding the file path (e.g. img001.jpeg).
16	drctn	real	10,3	Image capture direction in the horizontal plane using either camera inbuilt functionality or equivalent and range between 0-360 degrees angle relative to north.
17	x_coord	real	10,3	X-coordinate of the original location where the image was taken.
18	y_coord	real	10,3	Y-coordinate of the original location where the image was taken.
19	comments	String	254	Additional comments, if any.

D1. APPENDIX D – FILE STRUCTURE

