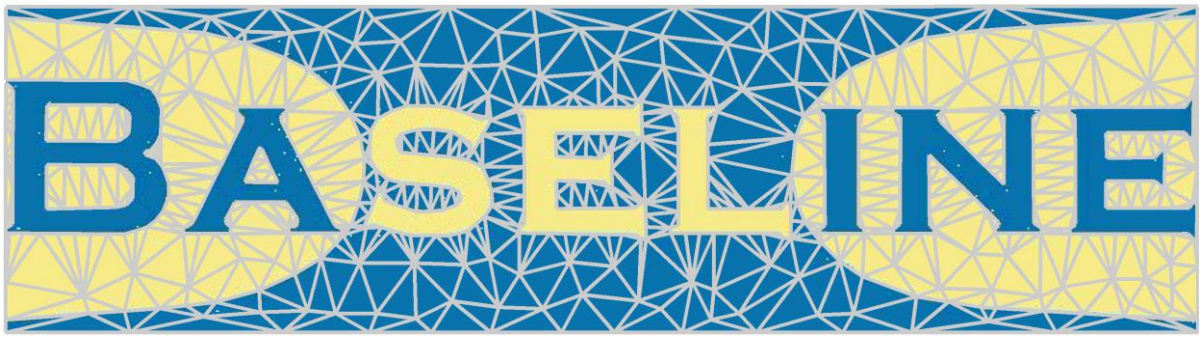
Rijkswaterstaat
Ministry of Infrastructure and Water Management



Dataprotocol Baseline 6.3

Date	March 2023
Status	Final
Valid for	Baseline 6.3.1 or higher versions

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Contents

1 Introduction

1.1 Purpose of the *Dataprotocol*

Baseline 6 is a combination of an extension of ArcGIS and a geographical database. This database is meant for storing, editing, consulting and presenting of data of hydrodynamic systems used in calculations. The ArcGIS extension and database are suitable for usage with ArcGIS Desktop 10.3.1 or higher (hereafter ArcGIS).

Baseline 5 was updated to Baseline 6 since 2017. The application is completely revised as is the *Dataprotocol*. In 2018 a further update of the *Dataprotocol* became necessary. This document contains the fully revised *Dataprotocol* for use in Baseline 6.3. The update has led to a significantly different *Dataprotocol* compared to Baseline 5. The main difference is the removal of most double-stored data as were present in Baseline 5.

1.2 Reading Guide

The dataprotocol gives an overview of all files that can be included in a Baseline 6 database. These files should meet certain technical and substantive demands before these files can be included in the database. These demands and the sources used to fill the files are described in this document. Besides a further description of each file is given. The structure of the protocol largely corresponds to the structure of the Baseline database.

Chapter 2 describes some general remarks which are usefull for working with File Geodatabases en Feature Classes in Baseline. The use of the protocol is further described, and some guidelines are given. It is recommended to read chapter 2 before working with Baseline, the other chapters can be used as reference. On the ESRI website (http://support.esri.com/GISDictionary) more information about the general GIS terms, such as Feature Class and File Geodatabase can be found.

Chapter 3 to 9 give a description of the used Feature Datasets and their contents.
Chapter 10 describes the *Dataprotocol* used for D-HYDRO Suite while the remaining chapters 11 and 12 describe the input for the assimilation of measures and for the batch functions.

2 General remarks

2.1 Introduction

This chapter presents general remarks for the use of the File Geodatabases and Feature Classes in Baseline 6. The cases discussed are valid for the majority of the files which are described in this protocol. Besides this, the general requirements of using Feature Classes are presented. At last, there is a discuusion on which also can be used and how these sources can be used for filling the Feature Classes.

2.2 Use of the Dataprotocol

The Dataprotocol and the Baseline 6 User Manual are available for Baseline 6 users. This Dataprotocol is intended as a reference work. The protocol contains, per file in the Baseline 6 database, information about the content, function and how the file can be generated.

The *Dataprotocol* contains all files which are used in the complete Baseline-workflow. This also contains some background information and user information. Appendix A contains an overview of the Baseline 6 database. For more background information available see the manual and the so-called "Dienstspecificaties Baseline" [Volleberg et al., 2009].

When elevations are mentioned, heights in meters relative to a reference level are meant. In the Netherlands the chosen reference level is "Normaal Amsterdams Peil" or NAP. However, any other reference level can be used within Baseline.

2.3 General requirements of File and folder names

The following characters are not allowed in file- and folder names (see also https://docs.microsoft.com/en-us/windows/win32/fileio/naming-a-file).
Use any character in the current code page for a name, including Unicode characters and characters in the extended character set (128–255), except for the following:
< (less than)
> (greater than)
: (colon)
" (double quote)
/ (forward slash)
\ (backslash)
| (vertical bar or pipe)
? (question mark)
* (asterisk)
Integer value zero, sometimes referred to as the ASCII NUL character.

2.4 General requirements of Feature Classes

With the migration of Baseline 5 to Baseline 6 the names of fields, Feature Classes and Feature Datasets are translated in English and occasionally slightly changed. An overview of the changes is presented in Appendix D.

2.4.1 File characteristics

Every Feature Class in the database contains the mandatory field OBJECTID. This is an automatically generated field and cannot be edited or deleted. A second mandatory field which automatically is generated is the field Shape. In this field the type of geometry is stated. This field also cannot be edited or removed.

All Feature Classes within the database should be *Single-part*. The meaning of *Single-part* is that each element (polygon, polyline of point) represents a record in the attribute table. When this is not the case the element is a *Multi-part feature. Multi-parts* should be converted to *Single-parts*. This can be done easily with ArcTool *Multipart to Singlepart* in ArcToolbox *Datamanagement/Features* or by the command *Explode* in editing mode. It is recommended to dissolve all objects within a Feature Class.

2.4.2 Geographical projection

Each file in the Baseline File geodatabase contains a geographical projection. In the Netherlands the default projection is the "Rijksdriehoeksstelsel" but all (projected) coordinate systems are possible. The properties and parameters of these projections are incorporated in coordinate systems. The projection can be chosen by using the function *datamanagement/set projection.* By choosing a projection all template geodatabases within Baseline are converted to the chosen projection.

In addition to projected coordinate systems, for the usage of Baseline data on the European continantal shelf a new set of non-projected Baseline templates is added named variant_sea and measure_sea. These templates are in WGS1984 coordinates. In ArcGis no terrains can be build from non-projected data. Therefor the datamodel of both variant_sea and measure_sea contain grid data in stead of terraindata and are thus slightly different from the former land variant and measure templates. This is further explained in appendix E.

2.4.3 Spatial tolerances

Spatial tolerances are pre-set properties of a Feature dataset of Feature Class. Elements with a spacing within the spatial tolerance are considered as a single element. The default spatial tolerance in ArcGIS and Baseline is 0.001 m (1 mm).

2.4.4 Spatial domain

The spatial domain describes the minimal and maximal values for coordinates. Between these coordinates spatial data can be saved in the database. The default ArcGIS domain is used.

2.4.5 Polygon Feature Classes

Boundaries of records in a polygon Feature Class may not overlap. The only exception is the Feature Class *Measure_contours_poly.* This Feature Class contains in the case of a variant a stacking of *measure contours* (in order of mixing).

Each polygon contains the mandatory fields SHAPE_LENGTH and SHAPE_AREA. These fields are automatically generated by ArcGIS and cannot be edited or deleted.

2.4.6 Polyline Feature Classes with elevation data

The Feature Classes in the Feature Dataset Elevation are 3d-lines, 3d-routes or 2d-routes (weirs) with an event table. 3d-lines consist of a line where elevation data is connected to each vertex. Every route contains an unique number. This number is connected to the corresponding points, which are stored in so-called events. Events are tables which are stored in the File Geodatabase outside the Feature Dataset Elevation. In the case of 3d-routes the crest height of these lines is connected to each vertex (similar to 3d-lines) where other information is available in the eventtable. In the case of 2d-routes all information is available in the eventtable.

In order to work correctly with these information Baseline has some additional requirements. The distance between the line and point should be less than 5 meters. The route and corresponding points should have the same number.

Every polyline Feature Class contains the mandatory field SHAPE_LENGTH. This field is automatically generated by ArcGIS and cannot be edited or deleted.

As mentioned in paragraph 2.3.3 the default spatial tolerance in ArcGIS and Baseline is 0.001 m (1 mm). The default precision of the field MEASURE of events is 4 decimals. The location of an event along a route can vary from 0.000% to 100.0000% (the percentage means the relative location along the route measured from the beginning of the route). Combining the 1 mm tolerance and the measure precision the maximum route length is 1000 meters. Longer routes might result in the coincidence of 2 events along the route. When longer routes are used it is recommended that the events on the routes have an interval of at least 1 cm in case of a 10 kilometre route and 10 cm in case of a 100 kilometre route.

2.4.7 Point Feature Classes

When points are generated from rasterfiles (like AHN), they contain an equal spacing to the four neighbouring points. Due to the natural neighbour routine used for constructing elevation models this can lead to non-reproducible results. Therefore, a tool in the Baseline Toolbox is available which shifts each point less than a millimetre in a random way. In this the spacing is not exactly equal anymore.

2.5 Sources

2.5.1 Introduction

Different data sources can be used to fill the Baseline Feature Classes. In this section several sources are described. Also a short explanation is given on how to use these sources. This explanation is not comprehensive, it just gives an idea of the possibilities

2.5.2 DTB-NAT

DTB-NAT is an abbreviation of "Digitaal Topografisch Bestand van de natte infrastructuur" and contains digital topographical data about rivers, coasts and riverbanks that are under management of Rijkswaterstaat. DTB-NAT has a scale of 1:1000 and consists of information about the location of dikes, quays, sluices, riverbanks and groynes. Besides locations also the heights of these structures and ground level are present. DTB-NAT can be obtained via the service Data-ICT of Rijkswaterstaat (CIV). How to fill Baseline from DTB-NAT is described more thoroughly in the Dienstspecificaties Invoer Baseline (Volleberg *et al.*, 2009), which can be downloadeded via www.helpdeskwater.nl

2.5.3 TOP10NL

Top10NL is a nationwide topographical database of the Dutch Kadaster. Top10NL is available on scales of 1:5000 or 1:25000. The database is a collection of Feature Classes representing roads, railroads, waterbodies, buildings and terrain etc. The separate Feature Classes are distinguished with objecttype and elementcodes. TOP10NL consists of separate layers, comparable with DTB-NAT. The element of interest can easily be selected from the database and added to the Baseline Feature Class. TOP10NL can be downloaded via the Kadaster website (https://www.kadaster.nl/-/top10nl)

2.5.4 AHN

The AHN (Actueel Hoogtebestand Nederland) is a nationwide gridfile containing the elevation of the Netherlands. It is obtained with laser altimetry with a density of 10 points per square meter. The resolution of AHN varies from 0.5x0.5, 5x5, 25x25 to 100x100 meter. The vertical precision is 5 cm. AHN is open source and dowloadable via for instance www.pdok.nl.

Elevation data can be added to Baseline by converting the AHN raster into points and using preparation tool 07. "reposition points in regular grid" to shift equally spaced points (also mentioned in paragraph 2.3.7).

2.5.5 Ecotopes

The vegetation is schematized using the so-called "ecotopenkartering". This "ecotopenkartering" is updated every six years and contains information about the land use of certain areas. This update is done using aerial aerial photographs in combination with flow information of the area.

3 Elevation

3.1 Terrain_edge_3d_lines

Name : *Terrain_edge_3d_lines*
Location : baseline/<area>/<variant>/baseline.gdb/elevation
Features : 3d-polylines
Fields : NUMBER (Long Integer): unique number of polyline
CHARACTERISTICS (Text, 100): Description of the source.
Content : Contains nodes and curvature lines.

3.1.1 Source

The location and elevation of terrain edges can be derived from DTB-NAT or other sources. For more information see section 2.5.

3.1.2 Explanation

Structure:
Continuous polylines with the (crest)elevation connected to the vertices. When terrain edges are present in waterbodies the location is on a specific distance of the edge of the waterbody with a certain depth in relation with the groundlevel. This is a Baseline specific definition used by Rijkswaterstaat. It is advised to round all elevation values to 2 decimals.

Specific requirements:
-

Relation with other Feature Classes:
Terrain edges in waterbodies are dependent on land_use_polygons/GROUNDLEVEL.
Terrain_edge_3d_lines is part of elevation_model_terrain.

3.2 Terrain_jump_3d_routes

Name : *Terrain_jump_3d_routes*
Location : baseline/<area>/<variant>/baseline.gdb/elevation
Features : 3d-routes and events on the routes
Fields : *Route Fields:*
NUMBER (Long Integer): unique number of polyline
CHARACTERISTICS (Text, 100): Description of the source.
Event fields:
NUMBER (Long Integer): unique number of corresponding route
CHARACTERISTICS (Text, 100): Description of the source.
MEASURE (Double): M-value of the event on corresponding route
ELEVATION LEFT (Double): groundlevel left
ELEVATION RIGHT (Double): groundlevel right
CREST_WIDHT (Double): Crest width (default 10 meter)
SLOPE_LEFT (Double): SLOPE LEFTSIDE (default 4, means 1:4)
SLOPE_RIGHT (Double): SLOPE RIGHTSIDE (default 4, means 1:4)
ROUGHNESS_CODE (Long Integer): default 0
All elevations are relative to a referencelevel in meters
Content : Terrainjumps with events on the routes

3.2.1 Source

The location and elevation can be derived from DTB-NAT or other sources. For more information see section 2.5.

3.2.2 Explanation

Structure:

Continuous 3d-routes with the (crest)elevation connected to the vertices and an eventtable attached. This eventtable contains data about elevation left and right of the jump. This is derived according to the direction of the route (from the start to the end of the route). Terrainjumps are used for an abrupt change in height in the field (a slope steeper than 1:7). It can be seen as the edge of a plateau as well.

Specific requirements:

Elevation left and right should be lower or equal to the crest elevation. The crest elevation (Z) should be equal to ELEVATION_LEFT or ELEVATION_RIGHT. It is advised to round all elevation values to 2 decimals. CREST_WITH, SLOPE_LEFT, SLOPE_RIGHT and ROUGHNESS_CODE should contain a numerical value. If this is not the case this wil result in an error in D-Hydro Suite

Relation with other Feature Classes:

Terrain_jump_3d_routes is part of elevation_model_terrain.
Terrain_jump_3d_routes is converted to fixed_weirs.pliz.

3.3 Elevated_line_routes

Name	:	*Elevated_line_routes*
Location	:	baseline/<area>/<variant>/baseline.gdb/elevation
Features	:	3d-routes and events on the routes
Field	:	*Route Fields:* NUMBER (Long Integer): unique number of polyline CHARACTERISTICS (Text, 100): Description of the source. TYPE (Long Integer): domain *elevated_line_type*: 1 = Groyne 2 = Local embankment 3 = Primary embankment *Event fields:* NUMBER (Long Integer): unique number of corresponding route CHARACTERISTICS (Text, 100): Description of the source. MEASURE (Double): M-value of the event on corresponding route ELEVATION CREST (Double): groundlevel crest ELEVATION LEFT (Double): groundlevel left ELEVATION RIGHT (Double): groundlevel right CREST_WIDHT (Double): Crest width (default 3 meter) SLOPE_LEFT (Double): SLOPE LEFTSIDE (default 4, means 1:4) SLOPE_RIGHT (Double): SLOPE RIGHTSIDE (default 4, means 1:4) ROUGHNESS_CODE (Long Integer): default 0 All elevations are relative to a referencelevel in meters
Content	:	Weirs with events on the routes

3.3.1 Source

The location and height can be derived from DTB-NAT or other sources. For more information see section 2.5.

3.3.2 Explanation

Structure:
Continuous 3d-routes with the (crest)elevation connected to the vertices and an eventtable attached. This eventtable contains data about elevation left and right of the jump. This is derived according to the direction of the route (from the start to the end of the route). An Elevated_line_route is used to present a weir and has two main functions in a hydrodynamic computation. Firstly, blocking the flow and prevention to inundation, and secondly when the weir is inundated, adding energy losses to the flow (dependending on the difference between crest elevation and groundlevel, the slope and the roughness).

Specific requirements:
Elevation left and right should be lower or equal to the crest elevation. It is advised to round all elevation values to 2 decimals. CREST_WITH, SLOPE_LEFT, SLOPE_RIGHT and ROUGHNESS_CODE should contain a numerical value. If this is not the case this wil result in an error in D-Hydro Suite

Relation with other Feature Classes bestanden:
Elevated_line_routes are converted to fixed_weirs.pliz.

3.4 Surfacelevel_points

Name	:	*Surfacelevel_points*
Location	:	baseline/<area>/<variant>/baseline.gdb/elevation
Features	:	points
Fields	:	ELEVATION (Double): Groundlevel relative to a reference level CHARACTERISTICS (Text, 100): Description of the source.
Content	:	Included are only those points that actually lie in the floodplain and not on line-shaped elevations such as terrain edges, weirs or terrainjumps. The density of the points is variable. All height relative to a reference level in meters.

3.4.1 Source

The location and height can be derived from DTB-NAT or other sources. For more information see section 2.4.

3.4.2 Explanation

Generation:
Surfacelevel points are points which are located at dry areas of the watersystem (under average conditions). These points should not be present within 5 meters from weirs and 2,5 meters from terrainjumps and terrain edges.

Specific requirements:
-
Relation with other Feature Classes:
Surfacelevel_points is part of elevation_model_terrain.
Surfacelevel points have a relation with section_polygons (should be within section 3), land_use_polygons (should not be within lakes, harbours etc.), elevated_lines_routes (should not be present within 5 meters), terrain_jump_3d_routes (should not be present within 2.5 meters), and terrain_edges_3d_lines (should not be present within 2.5 meters).

3.5 Waterbody_bedlevel_points

Name	:	*Waterbody_bedlevel_points*
Location	:	baseline/<area>/<variant>/baseline.gdb/elevation
Features	:	points
Fields	:	ELEVATION (Double): Groundlevel relative to a reference level CHARACTERISTICS (Text, 100): Description of the source.
Content	:	Waterbody bedlevel points contain height measurements of the waterbodies in the floodplain. These points are already converted from raster data to points. All heights are relative to a referencelevel in meters

3.5.1 Source

The location and height can be derived from DTB-NAT or other sources. For more information see section 2.5.

3.5.2 Explanation

Generation:

Waterbody bedlevel points are points which are located in waterbodies. These points should not be present within 5 meters from weirs and 2,5 meters from terrainjumps and terrain edges. Between structures in the river bathymetry data is often not available. Gaps in data can be filled with data from the designdrawings. The elevation at the location of the structure should be lower than the crest level of the structure.

Specific requirements:

Waterbody bedlevel points should have a full coverage of the waterbody.

Relation to other Feature Classes:

Waterbody_bedlevel_points is part of elevation_model_terrain.
Waterbody bedlevel points have a relation with section_polygons (should be within section 3), land_use_polygons (should be within lakes, harbours etc.), elevated_lines_routes (should not be present within 5 meters), terrain_jump_3d_routes (should not be present within 2.5 meters), and terrain_edges_3d_lines (should not be present within 2.5 meters).

3.6 Bedlevel_points

Name	:	*Bedlevel_points*
Location	:	baseline/<area>/<variant>/baseline.gdb/elevation
Features	:	points
Fields	:	ELEVATION (Double): Groundlevel relative to a reference level. CHARACTERISTICS (Text, 100): Description of the source.
Content	:	Bedlevel points contains height measurements of the main waterbody. These points are already converted from bathymetric data to points. All heights are relative to a referencelevel in meters

3.6.1 Source

The location and height can be derived from DTB-NAT or other sources. For more information see section 2.5.

3.6.2 Explanation

Generation:

Bedlevel points are points which are located in the main waterbody. These points should not be present within 5 meters from weirs and 2,5 meters from terrainjumps and terrain edges. Close to

structures and in lock chambers bathymetry data often is not available. Gaps in data can be filled with data from the designdrawings. The elevation should be lower than the threshold of the structure.

Specific requirements:
Bedlevel points should have a full coverage of the water body.

Relation to other Feature Classes:
Bedlevel_points is part of elevation_model_terrain.
Bedlevel points have a relation with section_polygons (should be within section 1 or 2), elevated_lines_routes (should not be present within 5 meters), terrain_jump_3d_routes (should not be present within 2.5 meters), and terrain_edges_3d_lines (should not be present within 2.5 meters).

3.7 Elevation_model_terrain (only in land variants)

Name	:	Elevation_model_terrain
Location	:	baseline/<area>/<variant>/baseline.gdb/elevation
Features	:	Terrain
Fields	:	None
Content	:	Terrain of elevation heights. Consists of all other features in the Feature Dataset Elevation **except elevated_lines_routes**. A terrain consists of a full cover of the area and is being used to convert to hydrodynamic models.

3.7.1 Sources
Consists of all other features in the Feature Dataset Elevation. The outline of the elevation model is a dissolved version of sections.

3.7.2 Explanation
Structure:
The elevation model terrain is automatically updated when mixing measures.

Specific requirements:
When updating a terrain with data from grids the points should have a non-equal spacing, as can be done using Baseline preparation tool 07. “reposition points in regular grid”.

Relation with other Feature Classes:
The elevation model terrain has relations with all other Feature Classes in the Feature Dataset Elevation except elevated_lines.

3.8 Model_area_polygon

Name	:	Model_area_polygon
Location	:	baseline/<area>/<variant>/baseline.gdb/elevation
Features	:	Polygon
Fields	:	None
Content	:	Model_area_polygon is a merge of all sections and is the outline of the hydrodynamic model.

3.8.1 Source
Model_area_polygon is a merge of all sections_polygons.

3.8.2 Explanation
Model_area_polygon is a merge of all sections, and is generated by Baseline.

This FeatureClass should not be edited by the user!

Specific requirements:
-

Relation to other Feature Classes:
Model_area_polygon has a relation with section_polygons.
Model_area_polygon is part of elevation_model_terrain.

3.9 Elevation_mosaic (only in sea variants)

Name : Elevation_mosaic
Location : baseline/<area>/<variant>/baseline.gdb/
Features : Mosaic dataset
Fields : None
Content: Elevation_mosaic containing elevation_raster and optionally elevation_raster_land.

3.9.1 Sources
Contains 1 or 2 elevation rasters:

1. elevation_raster contains the bathymetry of the Dutch Continental Shelf (resolution equals the EmodNet dataset) outside the domain of Baseline-NL Land.
2. elevation_raster_land is a rasterized version of Elevation_model_terrain (resolution 5x5 metres) and is extracted from Baseline-NL Land by the function "Merge land and sea". This raster is only present when "Merge land and sea" has been run.

3.9.2 Explanation
Structure:
Elevation_mosaic is used to visualize elevation_raster and elevation_raster_land and is automaticalluy generated.

Specific requirements:
-

Relation with other Feature Classes:
Elevation_mosaic has a relation with elevation_raster and elevation_raster_land.

3.10 Elevation_raster (only in sea variants and sea measures)

Name : Elevation_raster
Location : baseline/<area>/<variant>/baseline.gdb/
Features : raster dataset (float, 32 bits unsigned)
Fields : None
Content: : raster containing bathymety.

3.10.1 Sources
Elevation_raster contains the bathymetry of the Dutch Continental Shelf (resolution equals the EmodNet 2018 dataset) outside the domain of Baseline-NL Land.

3.10.2 Explanation
Generation:
Derived form EmodNet data.

Specific requirements:
Elevation_raster in a sea variant can be modified by assimilating sea measures, the elevation_raster of measures is used to update/overwrite cell values in the elevation_raster of the variant (which resolution is maintained).

Relation with other Feature Classes:
Elevation_raster in dsea variants is complementary to Elevation_raster_land.

3.11 Elevation_raster_land (only in merged sea variants)

Name	:	Elevation_raster_land
Location	:	baseline/<area>/<variant>/baseline.gdb/
Features	:	raster dataset (float, 32 bits unsigned)
Fields	:	None
Content:	:	raster containing elevation information.

3.11.1 Sources
Elevation_raster_land is a rasterized version of Elevation_model_terrain (resolution 5x5 metres) and is extracted from Baseline-NL Land by the function "Merge land and sea". This raster is only present when "Merge land and sea" has been run.

3.11.2 Explanation
Generation:
Elevation_raster_land is automatically generated by the function "Merge land and sea.

Specific requirements:
Elevation_raster_land should not be edited.

Relation with other Feature Classes:
Elevation_raster_land in sea variants is complementary to Elevation_raster.

4 Erase_polygons

4.1 Erase-polygons

Name	:	*erase_<Feature Class>*
Location	:	baseline/<area>/<variant>/baseline.gdb/erase_polygons
Features	:	Polygon
Fields	:	CHARACTERISTICS (Text, 100): Description of the source
Content	:	This polygon/polygons describe(s) the area where the specific Feature Class should be erased. The Feature Class in which the erase will be performed is given by <Feature Class>.

4.1.1 Source

The *erase_<Feature Class>* is made outside Baseline by users.

4.1.2 Explanation

Structure:

The erase_polygons are made outside Baseline. The polygon must accurately describe the area that needs to be erased. The following erase_polygons are possible according to Baseline protocol:

- erase_terrain_edge_3d_lines
- erase_surfacelevel_points
- erase_terrain_jump_3d
- erase_waterbody_bedlevel_points
- erase_elevated_line
- erase_cross_section_lines
- erase_flow_blocking_lines
- erase_source_sink_points
- erase_output_location_points
- erase_structure_lines
- erase_branch_1d_lines
- erase_section_polygons
- erase_land_use_lines
- erase_land_use_points
- erase_land_use_polygons
- erase_D50_points
- erase_dredging_polygons
- erase_suppletion_polygons
- erase_flow_blocking_polygons
- erase_calibration_section_polygons
- erase_bedlevel_points
- erase_bridge

Specific requirements:

All erase-polygons must fall within the extent described by measure_contours_polygons. Erase-polygons can excist of multiple polygons, without overlap.
Erase-polygons are only permitted in a Baseline measure. The use of erase_calibration_section_polygons should be avoided while calibration_section_polygons is used for calibration purposes.

Relation with other files:

Each erase-polygon must fall within measure_contours.
Erase-polygons has a relation with the Feature Class from which they will erase the data.
Erase-polygons has a relation with erase_list.txt.

5 Locations

5.1 Bridge_routes

Name : Bridge_routes
Location : baseline/<area>/<variant>/baseline.gdb/locations
Features : routes and events on the routes
Fields : *Route Fields:*
NUMBER (Long Integer): unique number of polyline
NAME (Text,100): Name of the bridge
CHARACTERISTICS (Text, 100): Description of the source.
Event fields:
NUMBER (Long Integer): unique number of corresponding route
CHARACTERISTICS (Text, 100): Description of the source.
MEASURE (Double): M-value of the event on corresponding route
DIAMETER (Double): diameter of the pillar in meters
CP (Double): resistance coefficient; (1.0 = smooth cilinder, for other coefficients see article "Simplified applications of the Rehboch backwater formula for bridges"((Reh, 1957-1958))

Content : Bridges routes with pillars as events on the routes.

5.1.1 Source

The location should be made manually.

5.1.2 Explanation

Structure:
These lines indicates the location of the bridges and their pillars.

Specific requirements:
Route events without corresponding pillar should have a diameter of -999.

Relation with other Feature Classes
-

Is converted with Bas2FM.

5.2 Cross_section _lines

Name : Cross_section_lines
Location : baseline/<area>/<variant>/baseline.gdb/locations
Features : Polyline
Fields : NAME (Text,100): Name of the cross section
CHARACTERISTICS (Text, 100): Description of the source
TYPE (Long Integer): domain *location_type*:
1 = Waterbody kilometer cross section
2 = Output cross section
3 = Measurement cross section
4 = Calibration factor cross section
5 to 10 = other user defined locations
SORTING (Text, 50): Ranking in which Bas2FM converts the cross

section
Content : Locations of cross section transects in hydrodynamic models.

5.2.1 Source
The locations are mostly filled by hand.

5.2.2 Explanation
Structure:
These transects are located across Output_locations_points Type Waterbody kilometer location or filled by hand.

Sorting is according to Arcmap (e.g. 1, 10, 2). Use leading zeros if this is not desirable.

Specific requirements:
For this featureclass the line direction is important. When using cross sections in hydraulic models with a wrong direction negative discharges can be calculated which can have unwanted results for instance with calibrationfactors. The order of vertices determines the direction of the line.

1. A polyline drawn from North to South results in a downstream (positive) direction to the West.
2. A polyline drawn from South to Norht results in a downstream (positive) direction to the East.

It is advised to generate these locations with respect to the ranking of branch and waterbody kilometer.

Relation with other Feature Classes
Type 1, 2 and 3 are linked to the respective Output_location_points.
Is converted with Bas2FM.

5.3 Output_location_points

Name : *Output_location_points*
Location : baseline/<area>/<variant>/baseline.gdb/locations
Features : Points
Fields : NAME (Text,100): Name of the output location
CHARACTERISTICS (Text, 100): Description of the source
TYPE (Long Integer): domain *location_type*:
1 = Waterbody kilometer location
2 = Output location
3 = Measurement location
4 = BOI location (Beoordelings en Ontwerp Instrumentarium)
5 = Waterbody hectometer location
6 = Waterbody 20 meter location
7 to 20 = other user defined locations
SORTING (TEXT,50): Ranking in which Bas2FM converts the outputlocations.
Content : Output locations in hydrodynamic models.

5.3.1 Source
The location can be derived from DTB-NAT or other sources. For more information see section section 2.5.

5.3.2 Explanation
Structure:
Points that indicate where measuring stations and additional output locations are located.

It is advised to generate these points with respect to the ranking of a branch and waterbody.

Sorting is according to Arcmap (e.g. 1, 10, 2). Use leading zeros if this is not desirable.

Specific requirements:
Output locations should be located in the waterbody if they are used for calibration.
The field NAME cannot contain commas or spaces.
It is not allowed to include a location multiple times (within multiple types).

Relation with other Feature Classes
Is converted with Bas2FM.

5.4 Source_sink_points

Name	:	*Source_sink_points*
Location	:	baseline/<area>/<variant>/baseline.gdb/locations
Features	:	Points
Fields	:	NAME (Text,100): Name of the source/sink. CHARACTERISTICS (Text, 100): Description of the source SORTING (Text, 50): Ranking in which Bas2FM converts the sources/sinks.
Content	:	Lateral (source and sink) points for hydrodynamic models.

5.4.1 Source
The location can be derived from DTB-NAT or other sources. For more information see section 2.5. When using DTB-Nat the following CTE-codes can be used: B034501, B034505, B034507 or B0305

5.4.2 Explanation
Structure:
Points that indicate where water is withdrawn or added to the waterbody.

Specific requirements:
The field NAME cannot contain commas.

Relation with other Feature Classes
Is converted with Bas2FM.

5.5 Structure_lines

Name	:	Structure_lines
Location	:	baseline/<area>/<variant>/baseline.gdb/locations
Features	:	Polyline
Fields	:	NAME (Text,100): Name of the structure CHARACTERISTICS (Text, 100): Description of the source SORTING (Text, 50): Ranking in which Bas2FM converts the structures.
Content	:	Locations of structures that will be converted to hydrodynamic models.

5.5.1 Source

The location can be derived from DTB-NAT or other sources. For more information see section 2.5.

5.5.2 Explanation

Structure:
Lines that indicate where structures (sluices, barrages, long culverts, etc.) are present that are needed in the hydrodynamic model.

Specific requirements:
The field NAME cannot contain commas.
The polyline indicating the structure cannot overlap the Featureclass elevated_line_routes and terrain_jump_3d_routes. The polyline als should be connected to the weir heads.
The crest level of a structure should be higher than the groundlevel. This crest level is defined in the hydrodynamic model.

For this featureclass the line direction is important. When using cross sections in hydraulic models with a wrong direction negative discharges can be calculated which can have unwanted results for instance with calibrationfactors. The order of vertices determines the direction of the line.

1. A polyline drawn from North to South results in a downstream (positive) direction to the West.
2. A polyline drawn from South to Norht results in a downstream (positive) direction to the East.

In the case of long culverts with check valves the line direction might also be of importance.

Relation with other Feature Classes
Is converted with Bas2FM.

6 Metadata

6.1 Measure_contour_polygons

Name	:	Measure_contour_polygons
Location	:	baseline/<area>/<variant>/baseline.gdb/models
Features	:	Polygon
Fields	:	MEASURE (Text, 100): Measure name CHARACTERISTICS (Text, 100): Description of the source
Content	:	This polygon described the area where a measure is being applied. It is used as a file to register the history of a variant.

6.1.1 Source

Measure_contour_polygons is generated with the Baseline preparation tool 08. "Create measure contour". It is the envelope of a measure.

6.1.2 Explanation

Structure:

Measure_contour_polygons is generated with the Baseline preparation tool 08. "Create measure contour". It is the envelope of a measure and can excist of multiple polygons.

Specific requirements:

All Feature Classes of a measure should fit in the measure_contour_polygons.
Measure_contour_polygons is the only Feature Class in a variant that may contain overlapping polygons. The field "MEASURE" must contain the exact name of the measure.

Relation with other Feature Classes:

The Feature Class has a relation with all Feature Classes present in a measure.
Measure_contour_polygons is **not** converted to D-Hydro.

7 Models

7.1 Branch_1d_lines

Name : *Branch_1d_lines*
Location : baseline/<area>/<variant>/baseline.gdb/models
Features : Polylines
Fields : CHARACTERISTICS (Text, 100): Source desription.
SORTING: sorting field, not in use yet.
Content : The location of the center line of a river, canal or channel in a waterbody.

7.1.1 Source

The branch_1d_lines are available via RWS_CIV.

7.1.2 Explanation

Structure:
A continous line at the center of a river, canal or channel in a waterbody.

Specific requirements
-

Relation with other files
-

7.2 Calibration_section_polygons

Name : Calibration_section_polygons
Location : baseline/<area>/<variant>/baseline.gdb/models
Features : Polygon
Fields : CALIBRATION_CODE1 (Long Integer): Calibration code of first Calibration_section_polygon, always filled in
CALIBRATION _CODE2 (Long Integer): Calibration code of first Calibration_section_polygon, always filled in
CALIBRATION_FRACTION1 (Double): Weight of first Calibration_section_polygon, always filled in
CALIBRATION_FRACTION2 (Double): Weight of second Calibration_section_polygon, always filled in
CHARACTERISTICS (Text, 100): Description of the source
Content : Polygons defining a fraction for calibration of calibration_sections_polygons in order to create less abrupt transitions between two adjacent trajectories with different calibrated roughness.

7.2.1 Source

This Feature Class is derived from Calibration_section_input_polygons using tool "Create Smooth transitions" from the Advanced tools.

7.2.2 Explanation

Structure:
These are polygon-shaped elements defining trajectories with smoothed calibration sections.

Specific requirements:

-

Relation with other Feature Classes
Is converted with Bas2FM.

7.3 Calibration_section_input_polygons

Name	:	Calibration_section_input_polygons
Location	:	baseline/<area>/<variant>/baseline.gdb/models
Features	:	Polygon
Fields	:	CALIBRATION_CODE (Long Integer): Calibration code, always filled in CHARACTERISTICS (Text, 100): Description of the source TRANSITION (TEXT, 20): indicates transition between calibrated roughness polygons Smooth (1) = smooth transition between calibrated roughness polygons abrupt (0) = abrupt transition between calibrated roughness polygons
Content	:	Polygons defining areas having a calibrated roughness, formerly *zomerbed*

7.3.1 Source
These polygons are constructed by hand.

7.3.2 Explanation
Structure:
These are polygon-shaped elements defining trajectories with uniform calibrated roughness. The field "TRANSITION" is meant to define the transition in roughness between two or more adjacent trajectories with different calibrated roughness. Because this Featureclass isinitially used to construct *calibration_section_polygons* it is not incorporated in the measure and variant layers.

Specific requirements:
-

Relation with other Feature Classes
This Featureclass is used to construct the Featureclass *calibration_section_polygons* which has smooth transitions between in roughness between two or more adjacent trajectories with different calibrated roughness.

7.4 Flow_blocking_lines

Name	:	Flow_blocking_lines
Location	:	baseline/<area>/<variant>/baseline.gdb/models
Features	:	Polyline
Fields	:	CHARACTERISTICS (Text, 100): Description of the source
Content	:	Polylines which are used to exclude certain areas of the watersystem from simulation with hydrodynamic models

7.4.1 Source
Lines should be drawn manually.

7.4.2 Explanation
Structure:
These are line-shaped elements which do not inundate and always block the flow.

Specific requirements:
-

Relation with other Feature Classes
Is converted with Bas2FM.

7.5 Flow_blocking_polygons

Name : Flow_blocking_polygons
Location : baseline/<area>/<variant>/baseline.gdb/models
Features : Polygon
Fields : CHARACTERISTICS (Text, 100): Description of the source
Content : Polygons which are excluded from simulation with hydrodynamic models

7.5.1 Source

The location can be derived from DTB-NAT or other sources. For more information see section 2.5.

7.5.2 Explanation

Structure:
Polygons which do not inundate. This can also include theoretical areas. This is mainly the case with concessions.

Specific requirements:
-

Relation with other Feature Classes
Is converted with Bas2FM.

7.6 Section_polygons

Name : *Section_polygons*
Location : baseline/<area>/<variant>/baseline.gdb/models
Features : Polygon
Fields : SECTION (Short Integer,2)
1 = main channel of river or main part of waterbody
2 = bank section of river or waterbody
3 = Mostly dry area / floodplain
4 = Retention area (used for SOBEK)
CHARACTERISTICS (Text, 100): Description of the source
Content : The total model area is devided in these sections.

7.6.1 Source

The section_polygons can be derived from DTB-NAT or other sources. For more information see section 2.5. For SOBEK it can be necessary to add retention areas (SECTION = 4)

7.6.2 Explanation

Structure:
The Feature Class section_polygons describes the global mapping of the watersystem in terms of average inundation condition. This description contains three zones. The outline is defined as the border of the water system. In most cases this is the diked area. The adjacent dry zone (under average conditions, the floodplain) is named section 3. The transistionzone from wet to dry is the

bank section of the water body (section 2). This is an arbitrary border because of the dynamics of watersystems. The part of the water system which is constantly inundated under average conditions (section 1) is called the main channel of the river or water body. In the case of a normalised river it is defined as the section between the heads of the groynes (when present) for other water systems this is less easy to define.

When build based on DTB-NAT the borders of the several sections are given by the following CTE-codes. Section=1 is based on the so called "normaallijn". This isn't based on DTB-NAT but on previous Baseline databases. In the case of changes to for instance groynes this line can change. Section=2 is the area between section 1 and CTE-code W09 (oeverlijn) from DTB-NAT. Where Section =3 is the area between Section=2 and CTE-code MD30 (winterbedlijn/kruinlijn winterdijk). The outer boundary of Section=3 must be 10 centimeters placed outside this line to ensure a correct generation of the elevation model.

Specific requirements:
Polygons should be contiguous. Holes are permitted however this will also results in a hole in model_area_polygon and elevation_model_terrain.

Relation with other files:
Model_area_polygon is a merge of all the sections and is the outline of the hydrodynamic model. Sections forms the outer boundary of the elevation model and of hydrodynamic models.

7.7 Initial_water_level_terrain

Name	:	*Initial_water_level_terrain*
Location	:	baseline/<area>/<variant>/baseline.gdb/models
Features	:	Terrain
Fields	:	None
Content	:	Terrain of waterlevels of open water bodies (eg. rivers, lakes, harbours, ponds). The terrain consists of all waterlevels in the area and it is being used to convert to a quick and dirty initial waterlevel field in hydrodynamic models.

7.7.1 Sources
Initial_water_level_terrain is built using the Feature Classes Sections, Land_use_polygons and Elevation_model_terrain. Initial_water_level_terrain contains the following features in the Feature Dataset models:
Initial_water_level_input1 = 3D-terrain_edge at the boundary of waterbodies (a selection of The roughness codes 102, 103, 104, 105, 106, 201, 302, 303, 304, 305 from land_use_polygons
Initial_water_level_input2 =3D-terrain_edge at the outside boundary of section 1 and 2
Initial_water_level_input3 = 3D-terrain_edge at open boundaries
Initial_water_level_input4 = outline of all waterbodies, derived from sections 1 and 2 and waterbodies (a selection of roughness codes 102, 103, 104, 105, 106, 201, 302, 303, 304, 305 from land_use_polygons

7.7.2 Explanation
Structure:
The Initial_water_level_terrain should be updated after mixing measures using Baseline advanced tool "Create initial waterlevel".

Specific requirements:

None.

Relation with other Feature Classes:
Is converted with Bas2FM.

8 Morphology

8.1 D50_points

Not yet implemented in Baseline 6.3.0.

8.2 Dredging_polygons

Not yet implemented in Baseline 6.3.0.

8.3 Suppletion_polygons

Not yet implemented in Baseline 6.3.0.

8.4 Bed_characteristics_polygons

Name	:	*Bed_characteristics_polygons*
Location	:	baseline/<area>/<variant>/baseline.gdb/morphology
Features	:	Polygon
Fields	:	ROUGHNESS_CODE1 (Long Integer): Roughness code of first Bed_characteristics _polygon, always filled in ROUGHNESS_CODE2 (Long Integer): Roughness code of second Bed_characteristics _polygon, always filled in ROUGHNESS _FRACTION1 (Double): Weight of first Bed_characteristics _polygon, always filled in ROUGHNESS _FRACTION2 (Double): Weight of second Bed_characteristics _polygon, always filled in CHARACTERISTICS (Text, 100): Description of the source
Content	:	Polygons defining a fraction for roughness of bed_characteristics _polygon in order to create less abrupt transitions between two adjacent trajectories with different bed characteristics roughness.

8.4.1 Source

This Feature Class is derived from Bed_characteristics_input_polygons using tool "Create Smooth Transitions" from the Advanced tools.

8.4.2 Explanation

Structure:

These are polygon-shaped elements defining trajectories with smoothed roughnesses of bed characteristics.

Specific requirements:

-

Relation with other Feature Classes

Is converted with Bas2FM to *trachytopes.arl*. During bas2fm *land_use_polygons* is updated using *bed_characteristics_polygons* before projection on the *netgeom.nc.*

8.5 Bed_characteristics_input_polygons

Name	:	*Bed_characteristics_input_polygons*
Location	:	baseline/<area>/<variant>/baseline.gdb/ morphology
Features	:	Polygon
Fields	:	ROUGHNESS _CODE (Long Integer): Roughness code, always filled in

CHARACTERISTICS (Text, 100): Description of the source
TRANSITION (TEXT, 20): indicates transition between bed characteristics roughness polygons
Smooth (1) = smooth transition between bed characteristics roughness polygons
abrupt (0) = abrupt transition between bed characteristics roughness polygons

Content : Polygons defining areas having a distinct bed characteristics roughness

8.5.1 Source

These polygons are constructed by hand. In general *bed_characteristics_input_polygons* are a copy of section 1 polygons from s*ection_polygons* which are split in longitudal trajectories having uniform bed characteristics.

8.5.2 Explanation

Structure:

These are polygon-shaped elements defining trajectories with uniform bed characteristics roughness. The field "TRANSITION" is meant to define the transition in roughness between two or more adjacent trajectories with different bed characteristics roughness. Because this Featureclass is initially used to construct *bed_characteristics_polygons* it is not incorporated in the measure and variant layers.

Specific requirements:

-

Relation with other Feature Classes

This Featureclass is used to construct the Featureclass *bed_characteristics_polygons* which has smooth transitions in roughness between two or more adjacent trajectories with different bed characteristics roughness.

9 Roughness

9.1 Land_use_points

Name	:	*Land_use_points*
Location	:	baseline/<area>/<variant>/baseline.gdb/roughness
Features	:	Points
Fields	:	HEIGHT (Double): Height (m relative to groundlevel) DIAMETER (Double): Diameter of trees (m) CHARACTERISTICS (Text, 100): Description of the source
Content	:	Individual trees. With land use points the effect of individual trees on the roughness is presented. Default values are HEIGHT = 9,12 m and DIAMETER = 0,56 m.

9.1.1 Source

The location can be derived from DTB-NAT, ecotopen or other sources. For more information see section 2.5. When using DTB-NAT the CTE-code Q09 should be used.

Explanation
Structure:
Feature Class with points representing individual trees.

Specific requirements:
Values for HEIGHT and DIAMETER should be larger than 0.

Relation with other Feature Classes.
Land_use_points which overlap with land_use_polygons with ROUGHNESS_codes 1231,1232, 1233, 1242, 1244, 1245, 1983, 1984, 1996, 1997 or 1998 should be removed

9.2 Land_use_lines

Name	:	*Land_use_lines*
Location	:	baseline/<gebied>/<variant>/baseline.gdb/roughness
Features	:	Polylines
Fields	:	DENSITY (Short Integer): domain *land_use_density*: 1 = very open 2 = open 3 = dense CHARACTERISTICS (Text, 100): Description of the source HEIGHT (Double): Height of roughness lines relative to groundlevel.
Content	:	All land use line-shaped elements such as hedges. Default values are DENSITY = open and HEIGHT = 4,71 m.

9.2.1 Source

The location can be derived from DTB-NAT, ecotopen or other sources. For more information see *section 2.5.* When using DTB-Nat the following CTE-codes should be used: T030101 and T0301.

9.2.2 Explanation

Structure:
Continuous lines to represent line-shaped roughness elements.

For the description of DENSITY is referred to [Velzen et. al., 2003).
Specific requirements:
-

Relation with other Feature Classes:
Land_use_lines which overlap with land_use_polygons with ROUGHNESS_codes 1231,1232, 1233, 1242, 1244, 1245, 1983, 1984, 1996, 1997 or 1998 should be removed

9.3 Land_use_polygons

Name	:	Land_use_polygons
Location	:	baseline/<area>/<variant>/baseline.gdb/roughness
Features	:	Polygons
Fields	:	ROUGHNESS_CODE (Long Integer): Roughness code, always filled in CHARACTERISTICS (Text, 100): Description of the source, always filled in
Content	:	All land use polygons.

9.3.1 Source
Land_use_polygons is created manually by stacking ectopes, waterbodies, buildings etc or other landuse maps.

9.3.2 Explanation
Structure:
Continuous areas that represent polygon-shaped roughness elements.

Specific requirements:
Appendix B does describe available roughness_codes.

Relation with other files
Land_use_polygons is created using sleutel.asc and ecotopes.

10 D-HYDRO Suite

10.1 Grid: netCDF-file

Name : <name>_net.nc
Location : baseline/<area>/<variant>/baseline.gdb/models
Features : n/a
Fields : n/a.
Content : XY coordinates of grid.

10.1.1 Source
Can be created by D-HYDRO Suite / RGFGRID.

10.2 Grid: netgeom file

Name : <name>_netgeom.nc
Location : baseline/<area>/<variant>/baseline.gdb/models
Features : n/a
Fields : n/a.
Content : XY coordinates of grid, with information about flowlinks.

10.2.1 Source
Can be created by D-HYDRO Suite / RGFGRID.
The method to do this is described in the User Manual Baseline 6.

10.3 Grid: gdb file

Name : <name>.gdb
Location : baseline/<area>/<variant>/baseline.gdb/models
Features : n/a
Fields : n/a.
Content : Featureclasses representing netCDF en netgeom used by bas2fm.

10.3.1 Source
Can be created by Baseline function "Convert netCDF to BAS2FM input".
The method to do this is described in the User Manual Baseline 6.

10.4 Conversion to D-HYDRO Suite

Alle Feature Classes present in the Baseline 6 database can be converted to D-HYDRO Suite inputfiles. How this is done is described in the User Manual Baseline 6.
This is also presented in Appendix C with a flowchart.

11 Assimilation of measures

11.1 Inputlist for Assimilation of measures: measure_list

Name	:	measure_list
Location	:	baseline/<area>/<variant>/metainfo/lists/measure_list.txt
Storage	:	ASCII text-file
Features	:	n/a
Fields	:	n/a
Content	:	List containing all measures which are processed in the mixing proces.

11.1.1 Source
Measure_list.txt is defined by the user.

11.1.2 Explanation
Structure:
Measure_list is a list of all measures which are processed in the mixing proces. Using a "#" defines a comment. When this is done before defining a measure it will be considered a comment thus the specific measure will not be a part of the mixing process.

Example:
Comments and other lines starting with # will be ignored in the mixing proces.
../../rijn-maatr/mtr_rijn-1
#../../rijn-maatr /mtr_rijn-2
../../rijn-maatr /mtr_rijn-3

Specific requirements:
The location of measure_list is baseline/<area>/<variant>/metainfo/lists/.
No empty lines are allowed.

Relation with other files:
-

11.2 Inputlist for Assimilation of measures: erase_list

Name	:	erase_list.txt
Location	:	baseline/<area>/<maatregel)>/lists/erase_list.txt
Storage	:	ASCII text-file
Features	:	n/a
Fields	:	n/a
Content	:	This file is part of a Baseline-measure. It is a list with the names of all erase-Feature classes which should be used during the mixing process to cut Feature classes of the variant. Through reading this file Baseline recognizes which Feature Classes should be used to erase data from the variant before new data is added.

11.2.1 Source
This list is generated with the Baseline inputmodule.

11.2.2 Explanation
Structure:
This file is part of a Baseline-measure. It is a list with the names of all erase-Feature classes which should be used during the mixing process to cut Feature classes of the variant. Through reading this file Baseline recognizes which Feature Classes should be used to erase data from the variant before new data is added. A "#" defines a line as a comment. This line will be ignored during het mixing process.

Example erase_list:
#erase_polygons/*erase_terrain_edge_3d_lines*
erase_polygons/*erase_surfacelevel_points*
erase_polygons/*erase_elevated_line*

Specific requirements:
The location of erase_list is baseline/<area>/<variant>/metainfo/lists.
No empty lines are allowed. A line cannot start with a slash forward or backward.

Relation with other files:
All Feature Classes named in the erase_list should be available in the measure.

11.3 Inputlist for Assimilation of measures: append_list

Name	:	append_list.txt
Location		:baseline/<area>/<maatregel)>/lists/append_list.txt
Storage	:	ASCII textfileFeatures : n/a
Fields	:	n/a
Content	:	This file is part of a Baseline-measure. It is a list with the names of all Feature classes which should be used during the mixing process to append after erasing in the variant. Through reading this file Baseline recognizes which Feature Classes should be used to add data to the variant.

11.3.1 Source
This list is generated with the Baseline inputmodule.

11.3.2 Explanation
Structure:
The append_list contains the names of all Feature Classes of the Baseline measure which should be added to the variant. A "#" defines a line as a comment. This line will be ignored during the mixing process.

Example append_list:
#elevation/*waterbody_bedlevel_points*
elevation/*elevated_line*
roughness/*land_use_lines*

Specific requirements:
The location of append_list is baseline/<area>/<variant>/metainfo/lists.
No empty lines are allowed. A line cannot start with a slash forward or backward. All Feature classes present in the append_list should be present in the Baseline measure. All Feature Classes present in the append_list should fit the Baseline protocol.

Relation with other Feature Classes:
All Feature Classes named in the append_list should be available in the measure.

12 Baseline in Batch mode

12.1 Inputlist for batch mode: variant_list

Name	:	variant_list.txt
Location	:	baseline/<area>/variant_list.txt
Storage	:	ASCII text-file
Features	:	n/a
Fields	:	n/a
Content	:	List of all variants which are processed during the batch.

12.1.1 Source
This list is being created by the user. This can be done using the Baseline application but also using a text-editor.

12.1.2 Explanation
Structure:
The variant_list contains all variants that should be processed during the batch mode.
A "#" defines a line as a comment. This line will be ignored during the batch mode.

Example of variant_list.txt:
Variant1
Variant2
#End of this list

Specific requirements:
The *variant_list* should be located in baseline/<gebied>/. The variants to be processed should be stored in the same folder. Empty lines are not allowed.

Relation with other files:
-

12.2 Inputlist for batch mode: batch_list

Name	:	batch_list.txt
Location	:	baseline/<area>/<variant>/metainfo/lists/batch_list.txt
Storage	:	ASCII text-file
Features	:	n/a
Fields	:	n/a
Content	:	List of tasks which will be performed during the batch mode.

12.2.1 Source
This list is being created by the user. This can be done using the Baseline application but also using a text-editor.

12.2.2 Explanation
Structure:

The batch_list.txt contains tasks which will be performed during the batch mode. A "#" defines a line as a comment. This line will be ignored during the batch mode.

Example batch_list.txt:

assim_measures
initialwaterlevel
netcdf
bas2fm
End of list

Specific requirements:

The location of batch_list is baseline/<area>/<variant>/metainfo/lists.
No empty lines are allowed.

Relation with other files:
-

12.3 Inputlist for batch mode: assim_measures_params

Name	:	mixmeasure_list.txt
Location	:	baseline /<area>/<variant>/metainfo/lists/ assim_measures_params.txt
Storage	:	ASCII text-file
Features	:	n/a
Fields	:	n/a
Content	:	Variable (True/False) defines whether variant or measures will be checked before mixing.

12.3.1 Source

This list is being created by the user. This can be done using the Baseline application but also using a text-editor.

12.3.2 Explanation

Structure:
This list contains a variable (True or False). This variable indicates that the Protocol is not checked again if ProtocolCheck.log ends with "ProtocolCheck succeeded". When the variable is set on False all checks are performed anyway and all variants and measures are checked.

Example mixmeasure_list.txt:
True #of False
End mixmeasure_list.txt

Specific requirements:
The location of mixmeasure_list is baseline/<area>/<variant>/metainfo/lists.
No empty lines are allowed.

Relation with other files:
-

12.4 Inputlist for batch mode: netcdf_params

Name	:	netcdf_list.txt
Location	:	baseline /<area>/<variant>/metainfo/lists/ netcdf_params.txt
Storage	:	ASCII text-file
Features	:	n/a
Fields	:	n/a
Content	:	List of netcdf, netgeom and output folder.

12.4.1 Source

This list is being created by the user. This can be done using the Baseline application but also using a text-editor.

12.4.2 Explanation

Structure:
This list contains 3 parameters.

Example netcdf_list.txt:

 # In: grid netCDF
D:\Temp\Baseline\test_data_b6.1\ma_j175_c\models\dflowfm\rali144_net.nc
 # In: netgeom netCDF
D:\Temp\Baseline\test_data_b6.1\ma_j175_c\models\dflowfm\rali144_netgeom.nc
#Output folder where GIS featureclasses needed by bas2fm are stored
D:\Temp\Baseline\test_data_b6.1\ma_j175_c\models\dflowfm
 # End netcdf_list.txt

Specific requirements:
The location of netcdf_list is baseline/<area>/<variant>/metainfo/lists.
No empty lines are allowed.

Relation with other files:
-

12.5 Inputlist for batch mode: Bas2FM_params

Name	:	bas2FM_list.txt
Location	:	baseline /<area>/<variant>/metainfo/lists/bas2fm_params.txt
Storage	:	ASCII tekst bestand
Features	:	n.v.t.
Fields	:	n.v.t.
Content	:	

12.5.1 Source

This list is being created by the user. This can be done using the Baseline application but also using a tekst-editer.

12.5.2 Explanation

Structure:
The list contains indicators which Feature Classes should be converted and which run_id is given. Also is listed which netCDF file is used.

Example bas2fm_params.txt (eg: lines with a # are ignored by Baseline):

```
# In: model name
juli
# In: netCDF GDB
D:\Temp\Baseline\test_data_b6.1\ma_j175_c\models\dflowfm\rali144.gdb
# In: grid netCDF
D:\Temp\Baseline\test_data_b6.1\ma_j175_c\models\dflowfm\rali144_net.nc
# In: netgeom netCDF
D:\Temp\Baseline\test_data_b6.1\ma_j175_c\models\dflowfm\rali144_netgeom.nc
# In: model boundary

# Use cdf enclosure if present
False
# Convert Baseline sections outline to enclosure polygon
False
# Update elevation in grid netCDF
True
# Use elevation interpolation (TRUE if gridcell averaging is required)
False
# Elevation on cell nodes or centers
nodes
# Convert fixed weirs
True
# Convert flow blocking polygons
True
# Convert flow blocking lines
True
# Convert land use polygons
True
# Convert land use lines
True
```

 # Convert land use points
True
 # Convert calibration section polygons
False
 # Convert bed characteristics polygons
False
 # Convert bridge
True
 # Convert sources/sinks
True
 # Convert structures
True
 # Convert output locations
True
 # Convert cross sections
True
 # Convert initial water level
False

Specific requirements:

The location of mixmeasure_list is baseline/<area>/<variant>/metainfo/lists.
No empty lines are allowed.

Relation with other files:
-

13 Logfiles

In Baseline 6 all actions are logged and written in separate logfiles.
These files are located in the folder Baseline/<area>/<variant>/metainfo/logs.
In the table below is presented which file is written by which function.

Table 1: Log-file with corresponding function

Function	**Log-bestand**
Conversion Bas2FM	Bas2FM.log
Batch	FunctionBatch.log
Measure assimilation	FunctionAssimilateMeasures.log
Control variant/ProtocolCheck	ProtocolCheck.log
Control variant/ContentCheck	ContentCheck.log

14 References

- Lievense (2020), User Manual Baseline 6.
- Reh, U. (1957-1958), Simplified applications of the Rehboch backwater formula for bridges, Die Wasserschaft: 240-242 (in German).
- Velzen, E.H. et al. (2003), Stromingsweerstand vegetatie in Uiterwaarden, Deel 1 Handboek versie 1-2003, RIZA rapport 2003.028.
- Velzen, E.H. et. al. (2003), Stromingsweerstand vegetatie in Uiterwaarden, Deel2 Achtergronddocument versie 1-2003, RIZA rapport 2003.029.
- Volleberg, K.P. *et al.* (2009). Dienstspecificaties Invoer Baseline. RWS-DID.

Appendices

Appendix A: Baseline tree

Baseline
<area>
<variant/measure>
data[1]
export[1]
import[1]
layers
variant.lyr/measure.lyr
source
metainfo
lists
<list>.txt
logs
<log>.txt
models
DflowFM[2]
<several directories>
SWAN[2]
<several directories>
baseline.gdb
elevation
locations
metadata
models
morphology
roughness

Remarks:

1. The directories data, import and export are not described in this protocol
2. The directories DflowFM/SWAN are created when the corresponding schematization is added.

Appendix B: Roughness Codes

When converting ecotopes to land_use_polygons a so-called conversion key is used. This key contrains codes of ecotopes with the corresponding Roughness_codes which is used in land_use_polygons. Ecotopes which are not present in the conversion key are ignored in the conversion.

The conversion key is stored in the directory where Baseline is installed (<install-dir>/Deltares/Baseline 6/Template/sleutel.asc). The key can easily be adapted by the user by overwriting the .asc file with a newer version (in case some new codes become available).

The codes of ecotopes consists of 6 types:
RES :RivierenEcotopenStelsel
MES : MerenEcotopenStelsel
BES : BenedenrivierengebiedEcotopenStelsel
ZES : Zoute wateren EcotopenStelsel
LGN4 : Landelijk Grondgebruikersbestand Nederland, vierde uitgave
Atkis : Amtliches Topografisch Kartografisches Information System, grondgebruikskaart voor Duitsland.

The following pages contains a list of existing ectopes, codes and corresponding Roughness_codes of land_use_polygons. This table gives an adequete description which Roughness_code corresponds with each type of land use.

Codes RES (Rivieren) ecotopenstelsel:

Ecotoop-code	**Description ecotoop-code**	**Roughness_code**	**Description Roughness_code**
RZd-1	Diepe bedding	102	Diepe bedding
RZo-1	Ondiepe grindbedding	111	Kribvakstrand / Zandbank / Grindbank
RZo-2	Ondiepe zandbedding	111	Kribvakstrand / Zandbank / Grindbank
RZo-3	Ondiepe getijdebedding	111	Kribvakstrand / Zandbank / Grindbank
RZs-1	Grindbank	111	Kribvakstrand / Zandbank / Grindbank
RZs-2	Zandplaat/zandstrand	111	Kribvakstrand / Zandbank / Grindbank
RZs-3	Slikplaten/slikkige oever	106	Plas / Haven / Slikkige oever
RZs-4	Biezenoever	1805	Biezen
RZs-5	Afslagoever/steiloever	112	Ruwe oever
RZs-6	Krib/strekdam/stenen oever	113	Steenbekleding
ROb-1	Oeverwal hardhoutooibos	1244	Hardhoutooibos
ROb-2	Oeverwal doornstruweel	1233	Doornstruweel
ROb-3	Oeverwal zachthoutooibos	1245	Zachthoutooibos
ROb-4	Oeverwal zachthoutstruweel	1231	Zachthoutstruweel

Ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
ROb-5	Oeverwal produktiebos	1242	Zachthoutproductiebos
ROb-5h	Oeverwal produktiebos (hardhout)	1241	Hardhoutproductiebos
ROb-5z	Oeverwal produktiebos (zachthout)/griend	1242	Zachthoutproductiebos
ROr-1	Oeverwal met rivierduinvorming	1250	Pioniervegetatie
ROr-2	Oeverwalruigte	1212	Droge ruigte
ROr-2a	Soortenarme oeverwalruigte	1211	Akkerdistelruigte
ROr-2r	Structuurrijke oeverwalruigte	1212	Droge ruigte
ROr-3	Oeverwal akker	121	Akker
ROr-4	Bebouwde / verharde oeverwal	114	Bebouwd / verhard
ROr-4b	Bebouwde oeverwal	114	Bebouwd / verhard
ROr-4v	Verharde oeverwal	114	Bebouwd / verhard
ROg-1	Oeverwal stroomdalgrasland	1202	Natuurlijk gras- en hooiland
ROg-2	Oeverwal hooiland	1202	Natuurlijk gras- en hooiland
ROg-3	Oeverwal produktiegrasland	1201	Productiegrasland
ROh-1	Oeverwalstroomdalgrasland met heggen	1202	Natuurlijk gras- en hooiland
ROh-2	Oeverwal produktiegrasland met heggen	1201	Productiegrasland
ROh-3	Oeverwal akker met heggen	121	Akker
ROk-1	Onbegroeide oeverwal	1250	Pioniervegetatie
RUb-1	Uiterwaard hardhoutooibos	1244	Hardhoutooibos
RUb-2	Uiterwaard doornstruweel	1233	Doornstruweel
RUb-3	Uiterwaard zachthoutooibos	1245	Zachthoutooibos
RUb-4	Uiterwaard zachthoutstruweel	1231	Zachthoutstruweel
RUb-5	Uiterwaard hardhout produktiebos	1241	Hardhoutproductiebos
RUb-6	Uiterwaard zachthout produktiebos/griend	1242	Zachthoutproductiebos
RUr-1	Structuurrijke uiterwaardruigte	1212	Droge ruigte
RUr-2	Soortenarme uiterwaardruigte	1211	Akkerdistelruigte
RUr-3	Uiterwaard akker	121	Akker
RUr-4	Bebouwde / verharde uiterwaard	114	Bebouwd / verhard
RUr-4b	Bebouwde uiterwaard	114	Bebouwd / verhard
RUr-4v	Verharde uiterwaard	114	Bebouwd / verhard
RUg-1	Structuurrijk uiterwaardgrasland	1202	Natuurlijk gras- en hooiland
RUg-2	Uiterwaard hooiland	1202	Natuurlijk gras- en hooiland
RUg-3	Uiterwaard produktiegrasland	1201	Productiegrasland
RUh-2	Uiterwaard produktiegrasland met heggen	1201	Productiegrasland
RUh-3	Uiterwaard akker met heggen	121	Akker

Ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
RUk-1	Onbegroeide uiterwaard	1250	Pioniervegetatie
RMb-1	Moerassig hardhoutooibos	1244	Hardhoutooibos
RMb-2	Moerassig zachthoutooibos	1245	Zachthoutooibos
RMb-3	Moerassig zachthoutstruweel	1231	Zachthoutstruweel
RMb-4	Moerassig broekbos/struweel	1231	Zachthoutstruweel
RMr-1	Moerasruigte	1804	Rietgras
RMr-2	Rietmoeras	1807	Riet
RMr-3	Kwelmoeras	1801	Natte ruigte
RMg-1	Moerassig uiterwaardgrasland	1202	Natuurlijk gras- en hooiland
RMg-2	Moerassig produktiegrasland	1201	Productiegrasland
RMg-3	Kwelgrasland	1202	Natuurlijk gras- en hooiland
RWn-1	Zandige nevengeul	105	Nevengeul
RWn-2	Kleiige nevengeul	104	Strang
RWn-3	Getijdekreek	104	Strang
RWs-1	Aangekoppelde strang	104	Strang
RWs-2	Afgesloten/stagnante strang	104	Strang
RWs-3	Stagnante strang	104	Strang
RWs-4	Kwelgeul	104	Strang
RWs-5	Beekstrang	104	Strang
RWp-1	Aangekoppeld zand/grindgat	106	Plas / Haven / Slikkige oever
RWp-2	Afgesloten zand/grindgat	106	Plas / Haven / Slikkige oever
RWp-3	Klein diep water/kolk	106	Plas / Haven / Slikkige oever
RWp-4	Haven	106	Plas / Haven / Slikkige oever
RHb-1	Hoogwatervrij bos	1244	Hardhoutooibos
RHb-1h	Hoogwatervrij bos (hardhout)	1244	Hardhoutooibos
RHb-1z	Hoogwatervrij bos (zachthout)	1245	Zachthoutooibos
RHb-2	Hoogwatervrij struweel	1233	Doornstruweel
RHb-2h	Hoogwatervrij (doorn)struweel	1233	Doornstruweel
RHb-2z	Hoogwatervrij (zachthout)struweel	1231	Zachthoutstruweel
RHb-3	Hoogwatervrij produktiebos	1242	Zachthoutproductiebos
RHb-3h	Hoogwatervrij produktiebos (hardhout)	1241	Hardhoutproductiebos
RHb-3z	Hoogwatervrij produktiebos (zachthout)	1242	Zachthoutproductiebos
RHr-1	Ruigte op hoogwatervrij terrein	1212	Droge ruigte
RHr-1a	Soortenarme ruigte op hoogwatervrij terrein	1211	Akkerdistelruigte
RHr-1r	Structuurrijke ruigte op hoogwatervrij terrein	1212	Droge ruigte
RHr-2	Hoogwatervrije akker	121	Akker

Ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
RHr-3	Bebouwd / verhard hoogwatervrij terrein	114	Bebouwd / verhard
RHr-3b	Bebouwd hoogwatervrij terrein	114	Bebouwd / verhard
RHr-3v	Verhard hoogwatervrij terrein	114	Bebouwd / verhard
RHg-1	Hoogwatervrij schraalgrasland	1202	Natuurlijk gras- en hooiland
RHg-2	Hoogwatervrij hooiland	1202	Natuurlijk gras- en hooiland
RHg-3	Hoogwatervrij produktiegrasland	1201	Productiegrasland
RHh-1	Hoogwatervrij schraalgrasland met heggen	1202	Natuurlijk gras- en hooiland
RHh-2	Hoogwatervrij produktiegrasland met heggen	1201	Productiegrasland
RHh-3	Hoogwatervrije akker met heggen	121	Akker
RHk-1	Onbegroeid hoogwatervrij terrein	1250	Pioniervegetatie

Codes MES (Meren) ecotopenstelsel (# no elevation data known):

ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
MZn-0	Zeer diep open water (geen waterplantgegevens) (geen mosselgegevens)	302	Diepe meerbodem
MZn-1	Zeer diep open water (geen waterplantgegevens) zonder driehoeksmosselen	302	Diepe meerbodem
MZn-2	Zeer diep open water (geen waterplantgegevens) met driehoeksmosselen	302	Diepe meerbodem
MZw-2	Zeer diep open water met ondergedoken waterplanten	302	Diepe meerbodem
MZz	Zeer diep open water	302	Diepe meerbodem
MZz-0	Zeer diep open water zonder begroeiing (geen mosselgegevens)	302	Diepe meerbodem
MZz-1	Zeer diep open water zonder begroeiing zonder driehoeksmosselen	302	Diepe meerbodem
MZz-2	Zeer diep open water zonder begroeiing met driehoeksmosselen	302	Diepe meerbodem
MDn-0	Diep open water (geen waterplantgegevens) (geen mosselgegevens)	302	Diepe meerbodem
MDn-1	Diep open water (geen waterplantgegevens) zonder driehoeksmosselen	302	Diepe meerbodem
MDn-2	Diep open water (geen waterplantgegevens) met driehoeksmosselen	302	Diepe meerbodem
MDw-0	Diep open water met waterplanten (geen mosselgegevens)	302	Diepe meerbodem
MDw-1	Diep open water met waterplanten zonder driehoeksmosselen	302	Diepe meerbodem
MDz	Diep open water	302	Diepe meerbodem
MDz-0	Diep open water zonder begroeiing (geen mosselgegevens)	302	Diepe meerbodem
MDz-1	Diep open water zonder begroeiing zonder driehoeksmosselen	302	Diepe meerbodem
MDz-2	Diep open water zonder begroeiing met driehoeksmosselen	302	Diepe meerbodem
MMn-0	Matig diep open water (geen waterplantgegevens) (geen mosselgegevens)	302	Diepe meerbodem
MMn-1	Matig diep open water (geen	302	Diepe meerbodem

ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
	waterplantgegevens) zonder		
MMn-1	Matig diep open water (geen waterplantgegevens) zonder driehoeksmosselen	302	Diepe meerbodem
MMn-2	Matig diep open water (geen waterplantgegevens) met driehoeksmosselen	302	Diepe meerbodem
MMw-0	Matig diep open water met waterplanten (geen mosselgegevens)	302	Diepe meerbodem
MMw-1	Matig diep open water met waterplanten zonder driehoeksmosselen	302	Diepe meerbodem
MMw-2	Matig diep open water met waterplanten met driehoeksmosselen	302	Diepe meerbodem
MMz	Matig diep open water zonder begroeiing	302	Diepe meerbodem
MMz-0	Matig diep open water zonder begroeiing (geen mosselgegevens)	302	Diepe meerbodem
MMz-1	Matig diep open water zonder begroeiing zonder driehoeksmosselen	302	Diepe meerbodem
MMz-2	Matig diep open water zonder begroeiing met driehoeksmosselen	302	Diepe meerbodem
MMz-3	Haven	106	Plas / haven / slikkige oever
MNw-2	Open water met ondergedoken waterplanten (geen diepte-informatie)	303	Ondiepe meerbodem
MNz	Open water (geen diepte-informatie)	302	Water
MOh-1	Ondiep open water met helofyten	1806	Lisdodde
MOh-4	Ondiep open water met riet	1807	Riet
MOn-0	Ondiep open water (geen waterplantgegevens) (geen mosselgegevens)	303	Ondiepe meerbodem
MOn-1	Ondiep open water (geen waterplantgegevens) zonder driehoeksmosselen	303	Ondiepe meerbodem
MOn-2	Ondiep open water (geen waterplantgegevens) met driehoeksmosselen	303	Ondiepe meerbodem
MOw-0	Ondiep open water met waterplanten (geen	303	Ondiepe meerbodem

	mosselgegevens)		
MOw-1	Ondiep open water met waterplanten zonder driehoeksmosselen	303	Ondiepe meerbodem
MOw-2	Ondiep open water met waterplanten met driehoeksmosselen	303	Ondiepe meerbodem
MOz	Ondiep open water zonder begroeiing	303	Ondiepe meerbodem
ecotoop-code	**Description ecotoop-code**	**Roughness_code**	**Description Roughness_code**
MOz-0	Ondiep open water zonder begroeiing (geen mosselgegevens)	303	Ondiepe meerbodem
MOz-1	Ondiep open water zonder begroeiing zonder driehoeksmosselen	303	Ondiepe meerbodem
MOz-2	Ondiep open water zonder begroeiing met driehoeksmosselen	303	Ondiepe meerbodem
MLk-1	Laag gelegen kale bodem	111	Kribvakstrand / Zandbank / Grindbank
MLk-1f	Laag gelegen kale bodem met zoete pioniers	1250	Pioniervegetatie
MLk-1m/b	Laag gelegen kale bodem met zilte pioniers	1250	Pioniervegetatie
MLK-2	Laag gelegen verhard (w.o. krib, strekdam, stenen oever)	113	Steenbekleding
MLk-2b	Laag gelegen bebouwing	113	Steenbekleding
MLk-2v	Laag gelegen verharding	113	Steenbekleding
MLr-1	Laag gelegen biezen	1805	Biezen
MLr-2	Laag gelegen moerasruigte	1804	Rietgras
MLr-2f	Laag gelegen moerasruigte zoete ruigte (pioniers)	1804	Rietgras
MLr-2m/b	Laag gelegen moerasruigte zilte ruigte (pioniers)	1804	Rietgras
MLr-3	Laag gelegen rietmoeras	1807	Riet
MLr-4	Laag gelegen cultuurriet	1807	Riet
MLr-5	Laag gelegen akker	121	Akker
MLg-1	Laag gelegen structuurrijk grasland	1202	Natuurlijk gras- en hooiland
MLg-2	Laag gelegen hooiland	1202	Natuurlijk gras- en hooiland
MLg-3	Laag gelegen produktiegrasland	1201	Productiegrasland
MLb-1	Laag gelegen struweel	1231	Zachthoutstruweel
MLb-2	Laag gelegen natuurlijk bos	1245	Zachthoutooibos
MNb-1	Struweel (geen hoogte-informatie)	1231	Zachthoutstruweel

MNb-2	Natuurlijk bos (geen hoogte-informatie)	1245	Zachthoutooibos
MNb-3	Productiebos (geen hoogte-informatie)	1242	Zachthoutproductiebos
MNg-1	Structuurrijk grasland (geen hoogte-informatie)	1202	Natuurlijk gras- en hooiland
MNg-3	Productiegrasland (geen hoogte-informatie)	1201	Productiegrasland
MNh-4	Open water met riet (geen diepte-informatie)	1807	Riet

ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
MNk-1	Kaal terrein (geen hoogte-informatie)	1250	Pioniervegetatie
MNk-2	Bebouwd/verhard (geen hoogte-informatie)	114	Bebouwd / verhard
MNr-2	Ruigte (geen hoogte-informatie)	1212	Droge ruigte
MNr-3	Riet (geen hoogte-informatie)	1807	Riet
MH#k-1	Hoog gelegen kale bodem#	1250	Pioniervegetatie
MH#k-2b	Hoog gelegen bebouwing#	114	Bebouwd / verhard
MH#k-2v	Hoog gelegen verharding#	114	Bebouwd / verhard
MHk-1	Hoog gelegen kale bodem	1250	Pioniervegetatie
MHk-1f	Hoog gelegen kale bodem met zoete pioniers	1250	Pioniervegetatie
MHk-1m/b	Hoog gelegen kale bodem met zilte pioniers	1250	Pioniervegetatie
MHk-2	Hoog gelegen bebouwd verhard	114	Bebouwd / verhard
MHk-2b	Hoog gelegen bebouwing	114	Bebouwd / verhard
MHk-2v	Hoog gelegen verharding	114	Bebouwd / verhard
MH#r-0	Hoog gelegen biezen#	1805	Biezen
MH#r-1	Hoog gelegen ruigte#	1212	Droge ruigte
MH#r-2	Hoog gelegen riet#	1807	Riet
MH#r-3	Hoog gelegen cultuurriet#	1807	Riet
MH#r-4	Hoog gelegen akker#	121	Akker
MHr-1	Hoog gelegen ruigte	1212	Droge ruigte
MHr-1f	Hoog gelegen zoete ruigte (pioniers)	1203	Verruigd grasland
MHr-1m/b	Hoog gelegen zilte ruigte (pioniers)	1203	Verruigd grasland
MHr-2	Hoog gelegen riet	1807	Riet
MHr-3	Hoog gelegen cultuurriet	1807	Riet
MHr-4	Hoog gelegen akker	121	Akker
MH#g-1	Hoog gelegen structuurrijk grasland#	1202	Natuurlijk gras- en hooiland
MH#g-2	Hoog gelegen hooiland#	1202	Natuurlijk gras- en hooiland
MH#g-3	Hoog gelegen produktiegrasland#	1201	Productiegrasland
MHg-1	Hoog gelegen structuurrijk grasland	1202	Natuurlijk gras- en hooiland

ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
MHg-2	Hoog gelegen hooiland	1202	Natuurlijk gras- en hooiland
MHg-3	Hoog gelegen produktiegrasland	1201	Productiegrasland
MH#b-1	Hoog gelegen struweel#	1233	Doornstruweel
MH#b-2	Hoog gelegen natuurlijk bos#	1244	Hardhoutooibos
MH#b-3	Hoog gelegen produktiebos#	1242	Zachthoutproductiebos
MHb-1	Hoog gelegen struweel	1233	Doornstruweel
MHb-2	Hoog gelegen natuurlijk bos	1244	Hardhoutooibos
MHb-3	Hoog gelegen produktiebos	1242	Zachthoutproductiebos

Codes BES (Benedenrivierengebied) ecotopenstelsel:

ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
BNn-1	Open water zonder vegetatie (geen diepte-, bodem- en mosselgegevens)	304	Diep getijdewater
BZn-1	Zeer diep open water zonder vegetatie (geen bodem- en mosselgegevens)	304	Diep getijdewater
BBz-2	Zeer open water met zandbedding	304	Diep getijdewater
BBz-2b	Zeer diep open water met zandbedding en schelpdierbank	304	Diep getijdewater
BBz-3	Zeer diep open water met slibbedding	304	Diep getijdewater
BBz-3b	Zeer diep open water met slibbedding en schelpdierbank	304	Diep getijdewater
BBz-6	Zeer diep open water met hard substraat (glooiing, bestorting)	304	Diep getijdewater
BDn-1	Diep open water zonder vegetatie (geen bodem- en mosselgegevens)	304	Diep getijdewater
BDn-3	Diep open water met ondergedoken waterplanten (geen bodem- en mosselgegevens)	304	Diep getijdewater
BMn-1	Matig diep open water zonder vegetatie (geen bodem- en mosselgegevens)	304	Diep getijdewater
BMn-3	Matig diep open water met ondergedoken waterplanten (geen bodem- en mosselgegevens)	304	Diep getijdewater
BMn-5	Haven	106	Plas / haven / slikkige oever
BMn-6	Spaarbekken	106	Plas / haven / slikkige oever
BOn-1	Ondiep open water zonder vegetatie (geen bodem- en mosselgegevens)	305	Ondiep getijdewater
BOn-2	Ondiep open water met drijvende waterplanten (geen bodem- en mosselgegevens)	305	Ondiep getijdewater
BOn-3	Ondiep open water met ondergedoken waterplanten (geen bodem- en mosselgegevens)	305	Ondiep getijdewater
BSh-1	Glooiing, bestorting	113	Steenbekleding
BSn-1	Zand- of slijkplaat	111	Kribvakstrand / Zandbank / Grindbank
BSn-4	Zand- of slijkplaat met pioniersvegetatie/biezen	1250	Pioniervegetatie
BBs-2	Zandplaat	111	Kribvakstrand / Zandbank

ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
BBs-2a	Zandplaat met pioniervegetatie/biezen	1250	Pioniervegetatie
BBs-3	Slikken	106	Plas / haven / slikkige oever
BBs-3a	Slikken met pioniervegetatie / biezen	1250	Pioniervegetatie
BBs-5	Afslagoever/steiloever	112	Ruwe oever
BBs-6	Hard substraat (glooiing, bestorting)	113	Steenbekleding
BKr-0	Biezengors	1805	Biezen
BKr-1	Structuurrijke gorsruigte	1804	Rietgras
BKr-2	Rietgors	1807	Riet
BKr-2a	Soortenarm rietgors	1807	Riet
BKr-2b	Soortenrijk rietgors	1807	Riet
BKr-3	Akker op laag gors	121	Akker
BKr-4	Bebouwing/verharing op laag gors	114	Bebouwd/verhard
BKb-2	Vloedbos	1245	Zachthoutooibos
BKb-6	Griend	1232	Griend
BKg-1	Overstromingsgrasland	1202	Natuurlijk gras- en hooiland
BKg-3	Overstromings(produktie)grasland	1201	Productiegrasland
BKk-1	Onbegroeide kom	1250	Pioniervegetatie
BGr-1	Gorsruigte	1212	Droge ruigte
BGr-2	Akker op gors	121	Akker
BGr-3	Bebouwing/verharding op gors	114	Bebouwd/verhard
BGb-3	Overstromingsarm vloedbos	1245	Zachthoutooibos
BGb-6	Griend / productiebos	1232	Griend
BGg-0	Moerassig grasgors	1202	Natuurlijk gras- en hooiland
BGg-1	Structuurrijk grasgors	1202	Natuurlijk gras- en hooiland
BGg-3	Productiegrasland	1201	Productiegrasland
BGk-1	Onbegroeid gors	1250	Pioniervegetatie
BOr-1	Oeverwal met rivierduinvorming	1250	Pioniervegetatie
BHb-1	Hoogwatervrij struweel	1233	Doornstruweel
BHb-2	Hoogwatervrij natuurlijk bos	1244	Hardhoutooibos
BHb-3	Hoogwatervrij produktiebos	1242	Zachthoutproductiebos
BNb-1	Struweel (geen hoogtegegevens)	1231	Zachthoutstruweel
BNb-2	Natuurlijk bos (geen hoogtegegevens)	1245	Zachthoutooibos
BNb-3	Produktiebos (geen hoogtegegevens)	1242	Zachthoutproductiebos
BHr-1	Ruigte op hoogwatervrij terrein	1212	Droge ruigte
BHr-2	Akker op hoogwatervrij terrein	121	Akker
BHr-3	Bebouwing/verharing op hoogwatervrij terrein	114	Bebouwd/verhard

BNr-1	Ruigte (geen hoogtegegevens)	1212	Droge ruigte
ecotoop-code	**Description ecotoop-code**	**Roughness_code**	**Description Roughness_code**
BNr-2	Akker (geen hoogtegegevens)	121	Akker
BNr-3	Bebouwing/verharding (geen hoogtegegevens)	114	Bebouwd/verhard
BHg-1	Hoogwatervrij structuurrijk grasland	1202	Natuurlijk gras- en hooiland
BHg-3	Hoogwatervrij produktiegrasland	1201	Productiegrasland
BNg-1	Structuurrijk grasland (geen hoogtegegevens)	1202	Natuurlijk gras- en hooiland
BNg-3	Produktiegrasland (geen hoogtegegevens)	1201	Productiegrasland
BHk-1	Onbegroeid hoogwatervrij terrein	1250	Pioniervegetatie
BNk-1	Onbegroeid terrein (geen hoogtegegevens)	1250	Pioniervegetatie

Codes LGN4 (Landelijk Grondgebruikersbestand Nederland):

LGN4_Code	Description ecotoop-code	Roughness_code	handboektype
LGN4_1	Agrarische gebied	1201	Productiegrasland
LGN4_2	Agrarische gebied	121	Akker
LGN4_3	Agrarische gebied	121	Akker
LGN4_4	Agrarische gebied	121	Akker
LGN4_5	Agrarische gebied	121	Akker
LGN4_6	Agrarische gebied	121	Akker
LGN4_8	Agrarische gebied	114	Bebouwd / verhard
LGN4_9	Agrarische gebied	1246	Boomgaard laagstam
LGN4_10	Agrarische gebied	121	Akker
LGN4_11	Bos	1244	Hardhoutooibos
LGN4_12	Bos	1243	Productiebos Naaldhout
LGN4_16	Water	106	Plas / Haven / Slikkige oever
LGN4_17	Water	106	Plas / Haven / Slikkige oever
LGN4_18	Bebouwd gebied	114	Bebouwd / verhard
LGN4_19	Bebouwd gebied	114	Bebouwd / verhard
LGN4_20	Bebouwd gebied	1244	Hardhoutooibos
LGN4_21	Bebouwd gebied	1243	Productiebos Naaldhout
LGN4_22	Bebouwd gebied	114	Bebouwd / verhard
LGN4_23	Bebouwd gebied	1201	Productiegrasland
LGN4_24	Bebouwd gebied	1250	Pioniervegetatie
LGN4_25	Infrastructuur	116	Verhard
LGN4_26	Agrarisch gebied	114	Bebouwd / verhard
LGN4_30	Natuur	1303	Verruigd grasland
LGN4_31	Natuur	1250	Pioniervegetatie
LGN4_32	Natuur	1203	Verruigd grasland
LGN4_33	Natuur	1212	Droge ruigte
LGN4_34	Natuur	1212	Droge ruigte
LGN4_35	Natuur	1250	Pioniervegetatie
LGN4_36	Natuur	1212	Droge ruigte
LGN4_37	Natuur	1212	Droge ruigte
LGN4_38	Natuur	1212	Droge ruigte
LGN4_39	Natuur	1203	Verruigd grasland
LGN4_40	Natuur	1245	Zachthoutooibos
LGN4_41	Natuur	1801	Natte ruigte
LGN4_42	Natuur	1807	Riet
LGN4_43	Natuur	1245	Zachthoutooibos
LGN4_44	Natuur	1202	Natuurlijk gras- en hooiland
LGN4_45	Natuur	1212	Droge ruigte
LGN4_46	Natuur	1250	Pioniervegetatie

Atkis: Amtliches Topografisch Kartografisches Information System, grondgebruikskaart voor Duitsland.

ATKIS	Beschrijving ATKIS data	Roughness_code	handboektype
ATK_2111	Wohnbaufläche	115	bebouwd
ATK_2112	Industrie- und Gewerbefläche	115	Bebouwd
ATK_2113	Fläche gemischter Nutzung	115	Bebouwd
ATK_2114	Fl. besonderer funktionaler Prägung	115	Bebouwd
ATK_2121	Bergbaubetrieb	115	Bebouwd
ATK_2122	Deponie	114	Bebouwd / verhard
ATK_2123	Raffinerie	115	Bebouwd
ATK_2126	Kraftwerk	115	Bebouwd
ATK_2127	Umspannstation	115	Bebouwd
ATK_2129	Kläranlage, Klärwerk	115	Bebouwd
ATK_2132	Gärtnerei	115	Bebouwd
ATK_2133	Heizwerk	115	Bebouwd
ATK_2134	Wasserwerk	115	Bebouwd
ATK_2135	Abfallbehandlungsanlage	115	bebouwd
ATK_2201	Sportanlage	114	Bebouwd / verhard
ATK_2202	Freizeitanlage	1820	75% natuurlijkgras + 25 % produktiebos hardhout
ATK_2213	Friedhof	114	Bebouwd / verhard
ATK_2221	Stadion	115	bebouwd
ATK_2222	Sportplatz	116	Verhard
ATK_2223	Schießstand	115	bebouwd
ATK_2224	Schwimmbad,	114	Bebouwd / verhard
ATK_2227	Grünanlage	1820	75% natuurlijkgras + 25 % produktiebos hardhout
ATK_2228	Campingplatz	1821	75% produktiegras + 25 % produktiebos hardhout
ATK_2230	Golfplatz	1821	75% produktiegras + 25 % produktiebos hardhout
ATK_2301	Tagebau, Grube, Steinbruch	114	Bebouwd / verhard
ATK_2302	Halde, Aufschüttung	114	Bebouwd / verhard
ATK_2314	Absetzbecken,Schlammteich	106	Plas / Haven / Slikkige oever
ATK_2345	Schwimmbecken	106	Plas / Haven / Slikkige oever
ATK_3103	Platz	116	Verhard
ATK_3204	Bahnkörper	116	Verhard
ATK_3301	Flughafen	1201	Productiegrasland
ATK_3302	Flugplatz, Landeplatz	1201	Productiegrasland
ATK_3401	Hafen	106	Plas / Haven / Slikkige oever
ATK_3402	Hafenbecken	106	Plas / Haven / Slikkige oever
ATK_3501	Bahnhofsanlage	114	Bebouwd / verhard
ATK_3502	Raststätte	114	Bebouwd / verhard
ATK_3511	Grenzübergang, Zollanlage	115	Bebouwd
ATK_3514	Brücke, Überführung, Unterführung	116	Verhard
ATK_4101	Ackerland	121	Akker
ATK_4102	Grünland	1201	Productiegrasland
ATK_4103	Gartenland	1822	95 %akker + 5 % doornstruweel (1233)

ATKIS	Beschrijving ATKIS data	Roughness_code	handboektype
ATK_4104	Heide	1212	Droge ruigte
ATK_4105	Moor, Moos	1802	0,05 zachthoutooibos en 0,95 natte ruigte met 25% water
ATK_4106	Sumpf, Ried	1804	rietgras met 0,25 water
ATK_4107	Wald, Forst	1244	Hardhoutooibos
ATK_4108	Gehölz	1823	25 % natuurlijk gras + 75 % hardhoutooibos
ATK_4109	Sonderkultur	1246	Boomgaard laagstam
ATK_4110	Brachland	1212	Droge ruigte
ATK_4111	Nasser Boden	1801	Natte ruigte
ATK_4120	Vegetationslose Fläche	111	Kribvakstrand / Zandbank / Grindbank
ATK_4199	Fläche, z.Z. unbestimmbar	101	Default waarde
ATK_5101	Strom, Fluß, Bach	102	Diepe bedding
ATK_5102	Kanal (Schiffahrt)	106	Plas / Haven / Slikkige oever
ATK_5103	Graben, Kanal (Wasserwirtschaft)	106	Plas / Haven / Slikkige oever
ATK_5105	Quelle	106	Plas / Haven / Slikkige oever
ATK_5112	Binnensee, Stausee, Teich	106	Plas / Haven / Slikkige oever
ATK_5202	Stromschnelle	113	Steenbekleding
ATK_5302	Talsperre, Wehr	116	Verhard
ATK_5303	Schleuse	116	Verhard
ATK_5304	Schleusenkammer	106	Plas / Haven / Slikkige oever

Codes ZES (Zoute wateren) ecotopenstelsel:

Ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
B2.122x	Laagdynamisch zacht substraat in het diepe sublitoraal	102	zomerbed
Z2.122x	Laagdynamisch zacht substraat in het diepe sublitoraal	102	zomerbed
B2.223f	Laagdynamisch fijnzandig hoog litoraal	106	plas/haven/slikkige oever
Z2.223f	Laagdynamisch fijnzandig hoog litoraal	106	plas/haven/slikkige oever
B2.223s	Laagdynamisch slibrijk hoog litoraal	106	plas/haven/slikkige oever
Z2.223s	Laagdynamisch slibrijk hoog litoraal	106	plas/haven/slikkige oever
B2.221f	Laagdynamisch fijnzandig laag litoraal	106	plas/haven/slikkige oever
Z2.221f	Laagdynamisch fijnzandig laag litoraal	106	plas/haven/slikkige oever
B2.221s	Laagdynamisch slibrijk laag litoraal	106	plas/haven/slikkige oever
Z2.221s	Laagdynamisch slibrijk laag litoraal	106	plas/haven/slikkige oever
B1.2x1	Laagdynamisch hard substraat in het litoraal	113	steenbekleding
B1.2x2	Hoogdynamisch hard substraat in het litoraal	113	steenbekleding
Z1.2x1	Laagdynamisch hard substraat in het litoraal	113	steenbekleding
Z1.2x2	Hoogdynamisch hard substraat in het litoraal	113	steenbekleding
B2.21f	Hoogdynamisch litoraal	102	zomerbed
Z2.21f	Hoogdynamisch litoraal	102	zomerbed
B2.222f	Laagdynamisch fijnzandig middelhoog litoraal	106	plas/haven/slikkige oever
Z2.222f	Laagdynamisch fijnzandig middelhoog litoraal	106	plas/haven/slikkige oever
B2.222s	Laagdynamisch slibrijk middelhoog litoraal	106	plas/haven/slikkige oever
Z2.222s	Laagdynamisch slibrijk middelhoog litoraal	106	plas/haven/slikkige oever
B2.123x	Laagdynamisch zacht substraat in het ondiepe sublitoraal	102	zomerbed
Z2.123x	Laagdynamisch zacht substraat in het ondiepe sublitoraal	102	zomerbed
B2.11x	Hoogdynamisch zacht substraat in het sublitoraal	102	zomerbed
Z2.11x	Hoogdynamisch zacht substraat in het sublitoraal	102	zomerbed

Ecotoop-code	Description ecotoop-code	Roughness_code	Description Roughness_code
B1.3	Hard substraat in het supralitoraal	113	steenbekleding
Z1.3	Hard substraat in het supralitoraal	113	steenbekleding
B2.3x	Laagdynamisch zacht substraat in het supralitoraal	111	kribvakstrand/zandbank/grindbank
Z2.3x	Laagdynamisch zacht substraat in het supralitoraal	111	kribvakstrand/zandbank/grindbank
B2.31x	Hoogdynamisch supralitoraal	1250	pioniervegetatie
Z2.31x	Hoogdynamisch supralitoraal	1250	pioniervegetatie
B2.321	Pionierzone en potentiële pionierzone	1250	pioniervegetatie
B2.32x	Schor	1804	rietgras
Overig	Overige typen, zoals duinen of andere geomorfologische eenheden	0	onbekend
Z2.321	Pionierzone en potentiële pionierzone	1250	pioniervegetatie
Z2.32x	Schor	1804	rietgras

Codes Vegetatiestructuur en zoutgradiënt van de zoute meren (Grevelingen en Veerse Meer):

Structuur	Zoutgrad	StructOms	ZoutgrOms	Roughness_cod	Handboektype
a		bebouwd/verhard		114	Bebouwd verhard
b1	X	natuurlijk bos	overig	1245	zachthoutooibos
b1		natuurlijk bos		1245	zachthoutooibos
b2		productiebos		1242	zachthoutproductiebos
b4		struweel		1231	zachthoutstruweel
g1	DV	productiegrasland	duinvalleivegetatie	1201	productiegrasland
g1	OG	productiegrasland	overstromingsgrasland	1201	productiegrasland
g1	X	productiegrasland	overig	1201	productiegrasland
g1	ZG	productiegrasland	zilt grasland	1201	productiegrasland
g1	ZP	productiegrasland	zilte pioniervegetatie	1201	productiegrasland
g2	DV	structuurrijk grasland	duinvalleivegetatie	1202	natuurlijk gras en hooiland
g2	OG	structuurrijk grasland	overstromingsgrasland	1202	natuurlijk gras en hooiland
g2	X	structuurrijk grasland	overig	1202	natuurlijk gras en hooiland
g2	ZG	structuurrijk grasland	zilt grasland	1202	natuurlijk gras en hooiland
g2	ZP	structuurrijk grasland	zilte pioniervegetatie	1202	natuurlijk gras en hooiland
g2		structuurrijk grasland		1202	natuurlijk gras en hooiland
g3		akker		121	akker
g4		biezen		1224	biezen
g5		riet en overige helofyten		1807	riet
g6		ruigte		1212	droge ruigte
k4	OG	plaat/strand	overstromingsgrasland	111	kribvakstrand/zandbank/grindbank
k4	X	plaat/strand	overig	111	kribvakstrand/zandbank/grindbank
k4	ZG	plaat/strand	zilt grasland	111	kribvakstrand/zandbank/grindbank
k4	ZP	plaat/strand	zilte pioniervegetatie	111	kribvakstrand/zandbank/grindbank
m		meer		102	zomerbed
o3		gering dynamisch ondiep water		106	plas/haven/slikkige oever
p1	DV	pioniervegetatie	duinvalleivegetatie	1250	pioniervegetatie
p1	OG	pioniervegetatie	overstromingsgrasland	1250	pioniervegetatie
p1	X	pioniervegetatie	overig	1250	pioniervegetatie
p1	ZG	pioniervegetatie	zilt grasland	1250	pioniervegetatie
p1	ZP	pioniervegetatie	zilte pioniervegetatie	1250	pioniervegetatie

Structuur	Zoutgrad	StructOms	ZoutgrOms	Roughness_cod	Handboektype
r		restgroep, tijdelijk kaal door menselijk ingrijpen		1250	pioniervegetatie
t2		eenzijdig aangetakte getijdenkreken		104	strang
t3		geïsoleerde begeleidende wateren		106	plas/haven/slikkige oever
z		geen informatie		0	onbekend

Rough-karak (Waqua table with Roughness codes)

These codes are used within D-Hydro (and in its predecessor Simona) and reserved for this purpose. These codes shouldn't be changed. For a further explanation about these codes read [Velzen et. al., 2003].

Code	**Description**
1-50	Formulering voor bebouwing en hoogwatervrije terreinen
51-100	Niet gedefinieerd
101-300	k- White-Colebrook (wordt naar Chezy omgezet)
101	default waarde
102	diepe bedding
103	ondiepe bedding
104	strang
105	nevengeul
106	plas/haven/slikkige oever
111	kribvakstrand/zandplaat/grindplaat
112	ruwe oever
113	steenbekleding
114	bebouwd/verhard terrein
115	bebouwd terrein
116	verhard terrein
121	akker
122	strooisel
131	vaste laag Nijmegen
132	vaste laag St. Andries
133	bodem kribben Erlecom
141	ketelmeer oost
142	ketelmeer west
143	vossemeer
301-500	k- Manning (wordt naar Chezy omgezet)
301	default waarde
302	diepe meerbodem
303	ondiepe meerbodem
304	Diep getijdewater
305	ondiep getijdewater
501-600	Vaste Chezy waarde

Code	**Description**
501	default waarde
601-900	Formulering voor zomerbed van een rivier
901-1200	Niet gedefinieerd
1201-1400	Door- en overstroomde vegetatie
1201	productiegrasland
1202	natuurlijk gras/hooiland
1203	verruigd grasland
1211	akkerdistelruigte
1212	droge ruigte
1213	dauwbraamruigte
1214	wilgenroosje ruigte
1215	rietruigte
1221	natte ruigte homogeen
1222	zegge homogeen
1223	rietgras homogeen
1224	biezen homogeen
1225	lisdodde homogeen
1226	riet homogeen
1231	zachthoutstruweel
1232	griend
1233	doornstruweel
1241	productiebos hardhout
1242	productiebos zachthout
1243	productiebos naaldhout
1244	hardhoutooibos
1245	zachthoutooibos
1246	boomgaard laagstam
1247	boomgaard hoogstam
1250	pioniervegetatie
1401-1500	Niet gedefinieerd
1501-1600	Door- en overstroomde bomen (inclusief de hoogte ervan)
1501	individuele bomen; hoogte 1.0 meter
1502	individuele bomen; hoogte 2.0 meter

Code	**Description**
1503	individuele bomen; hoogte 3.0 meter
1504	individuele bomen; hoogte 4.0 meter
1505	individuele bomen; hoogte 5.0 meter
1506	individuele bomen; hoogte 6.0 meter
1507	individuele bomen; hoogte 7.0 meter
1508	individuele bomen; hoogte 8.0 meter
1509	individuele bomen; hoogte 9.0 meter
1510	individuele bomen; hoogte 10.0 meter
1601-1700	Door- en overstroomde heggen (inclusief de hoogte ervan)
1601	heggen zeer open; hoogte 1.0 meter
1602	heggen open; hoogte 1.0 meter
1603	heggen dicht; hoogte 1.0 meter
1604	heggen zeer open; hoogte 2.0 meter
1605	heggen open; hoogte 2.0 meter
1606	heggen dicht; hoogte 2.0 meter
1607	heggen zeer open; hoogte 3.0 meter
1608	heggen open; hoogte 3.0 meter
1609	heggen dicht; hoogte 3.0 meter
1610	heggen zeer open; hoogte 4.0 meter
1611	heggen open; hoogte 4.0 meter
1612	heggen dicht; hoogte 4.0 meter
1613	heggen zeer open; hoogte 5.0 meter
1614	heggen open; hoogte 5.0 meter
1615	heggen dicht; hoogte 5.0 meter
1616	heggen zeer open; hoogte 6.0 meter
1617	heggen open; hoogte 6.0 meter
1618	heggen dicht; hoogte 6.0 meter
1701-1800	Niet gedefinieerd
1801-1900	Combinaties 101-600 en 1201-1300
1801	natte ruigte met 0,25 water
1802	0,05 zachthoutooibos en 0,95

Code	**Description**
	natte ruigte met 25% water
1803	zegge met 0,25 strooisel
1804	rietgras met 0,25 water
1805	biezen met 0,25 water
1806	lisdodde met 0,25 water
1807	riet met 0,25 strooisel
1811	pioniervegetatie met 5% zachthoutooibos
1812	natuurlijk grasland met 20% zachthoutooibos
1813	verruigd grasland met 20% zachthoutstruweel
1814	rietgras homogeen met 5% zachthoutstruweel
1815	riet homogeen met 30% zachthoutstruweel
1816	zachthoutstruweel met 20% zachthoutooibos
1817	natte ruigte homogeen met 5% zachthoutooibos
1818	natte ruigte homogeen met 30% zachthoutstruweel
1819	droge ruigte met 10% zachthoutstruweel
1820	natuurlijk grasland met 25% produktiebos hardhout
1821	produktiegrasland met 25% produktiebos hardhout
1822	akker met 5% doornstruweel
1823	natuurlijk grasland met 75% hardhoutooibos
1850	80% zegge
	20% zachthoustruweel
1851	50% natuurlijk gras/hooiland
	50% zachthoutooibos
1852	95% natuurlijk gras/hooiland
	5% zachthoutstruweel
1853	75% natuurlijk gras/hooiland
	25% zachthoutstruweel
1854	90% natuurlijk gras/hooiland
	10% zachthoutstruweel
1855	90% natuurlijk gras/hooiland

Code	**Description**
	10% droge ruigte
1856	5% zachthoutstruweel
	95% 1855
1857	75% natuurlijk gras/hooiland
	25% rietgras homogeen
1858	5% zachthoutooibos
	95% 1857
1892	75% riet homogeen
	25% plas/haven/slikkige oever
1893	20% zachthoutooibos
	80% 1892
1859	85% droge ruigte
	15% zachthoutstruweel
1860	40% kribvak
	60% droge ruigte
1862	20% zachthoutooibos
	60% natuurlijk gras/hooiland
	20% zachthoutstruweel
1863	20% kribvak
	30% droge ruigte
	10% zachthoutooibos
	30% natuurlijk gras/hooiland
	10% zachthoutstruweel
1864	70% natuurlijk gras/hooiland
	30% zachthoutstruweel
1865	83% slikkige oever
	17% zachthoutstruweel
1866	50% zachthoutooibos
	50% rietgras
1867	61% slikkige oever
	13% zachthoutstruweel
	13% zachthoutooibos
	13% rietgras
1868	60% kribvak
	25% slikkige oever
	5% zachthoutstruweel
	5% zachthoutooibos
	5% rietgras
1869	95% verruigd grasland
	5% zachthoutstruweel

Code	**Description**
1870	99% natuurlijk gras/hooiland
	1% zachthoutstruweel
1871	97,5% natuurlijk gras/hooiland
	2,5% zachthoutstruweel
1872	98% natuurlijk gras/hooiland
	2% zachthoutstruweel
1874	20% droge ruigte
	80% zachthoutstruweel
1875	95% droge ruigte
	5% zachthoutstruweel
1876	25% zachthoutstruweel
	75% (natte ruigte met 25% water)
1877	20% zachthoutstruweel
	80% (zegge met 25% strooisel)
1879	90% bebouwd/verhard terrein
	10% zachthoutstruweel
1880	50% zegge
	50% rietgras
1881	85% natuurlijk gras/hooiland
	15% zachthoustruweel
1882	97,5% verruigd grasland
	2,5% zachthoutstruweel
1886	90% verruigd grasland
	10% zachthoustruweel
1887	50% natuurlijk gras/hooiland
	50% droge ruigte
1888	5% zachthoutstruweel
	47,5% natuurlijk gras/hooiland
	47,5% droge ruigte
1889	10% zachthoutstruweel
	45% natuurlijk gras/hooiland
	45% droge ruigte
1890	50% natuurlijk gras/hooiland
	50% zachthoutstruweel
1891	97% verruigd grasland
	3% zachthoutstruweel
1906	90% natuurlijk gras/hooiland
	10% zachthoutooibos
1907	88% kribvakstrand/zandplaat
	12% zachthoutstruweel

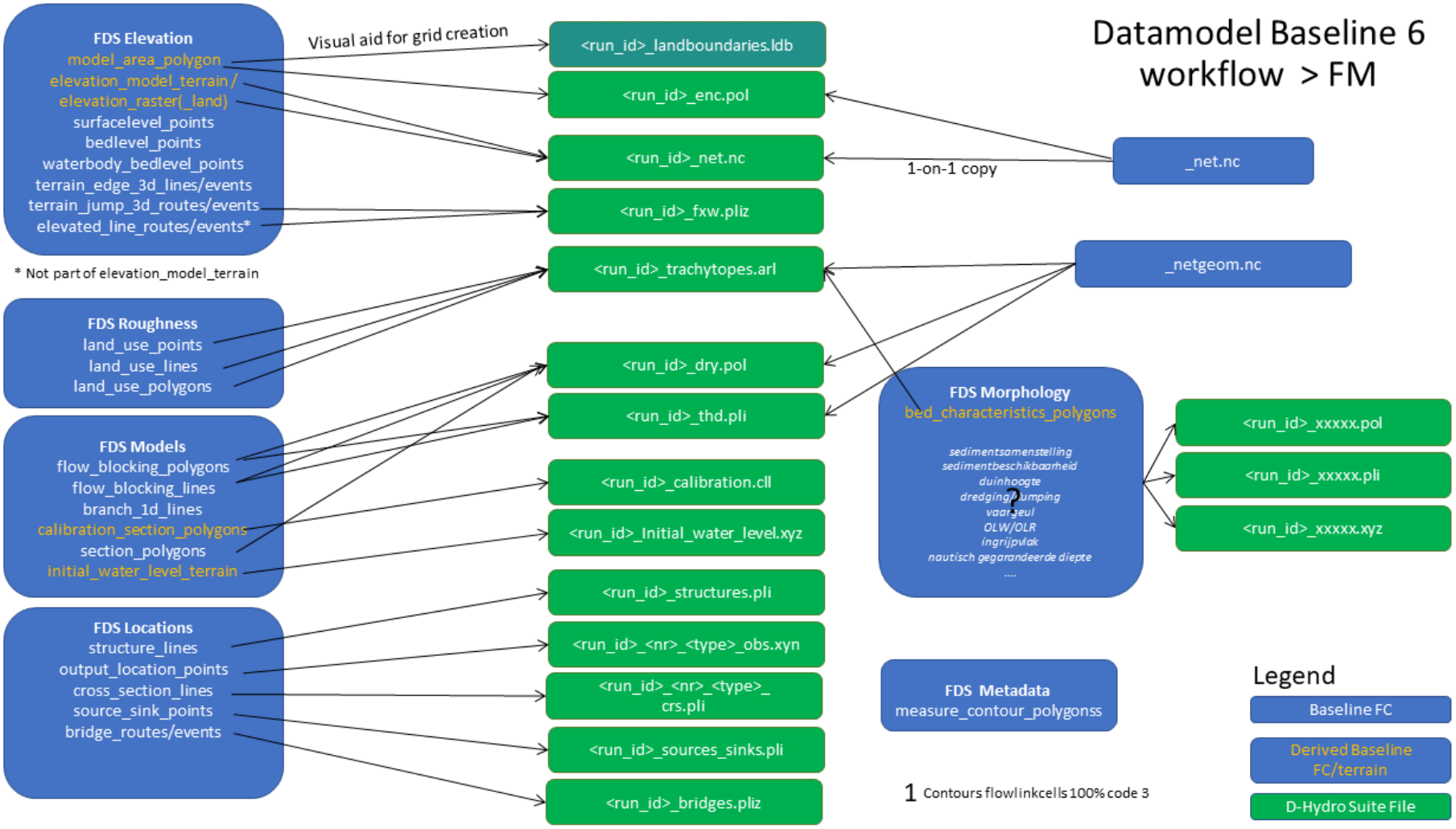
Code	**Description**
1908	80% kribvakstrand/zandplaat
	20% zachthoutstruweel
1909	20% zachthoutooibos
	80% (rietgras met 25% water)
1910	95% natuurlijk gras/hooiland
	5% zachthoutooibos
1911	80% droge ruigte
	20% zachthoutstruweel
1912	80% natuurlijk gras/hooiland
	20% zachthoutstruweel
1913	75% water
	25% riet homogeen
1914	40% kribvakstrand
	48% natuurlijk gras/hooiland
	12% zachthoutstruweel
1915	40% water
	60% zegge homogeen
1916	50% riet homogeen
	20% water
	30% zegge homogeen
1917	95% natuurlijk grasland/hooiland
	5% droge ruigte
1918	90% dauwbraamruigte
	10% zachthoutstruweel
1919	95% rietruigte
	5% zachthoutstruweel
1920	90% rietruigte
	10% zachthoutstruweel
1921	80% natte ruigte met 25% water
	20% zachthoutooibos
1922	80% droge ruigte
	20% zachthoutooibos
1933	95% natte ruigte met 25% water
	5% zachthoutstruweel
1934	90% natte ruigte met 25% water
	10% zachthoutstruweel
1935	80% natte ruigte met 25% water
	20% zachthoutstruweel
1936	95% zegge met 25% strooisel

Code	**Description**
	5% zachthoutstruweel
1937	90% zegge met 25% strooisel
	10% zachthoutstruweel
1938	95% riet met 25% strooisel
	5% zachthoutstruweel
1939	90% riet met 25% strooisel
	10% zachthoutstruweel
1940	80% riet met 25% strooisel
	20% zachthoutstruweel
1941	70% natuurlijk grasland
	30% droge ruigte
1970	Gras 1 (prod. gras & nat. gras)
1971	Gras 2 (zand en akker)
1972	Ruigte 1
1973	Bos 1
1974	Bos 2
1975	Bos 3
1976	Gras 3 (prod. gras, nat. gras, zand en akker)
1981	gras en akker
1982	riet en ruigte
1983	bos
1984	struweel
1989	50% gras en akker
	50% riet en ruigte
1993	25% gras en akker
	75% riet en ruigte
1996	80% gras en akker
	20% struweel
1997	30% gras en akker
	30% riet en ruigte
	40% struweel
1998	10% gras en akker
	30% riet en ruigte
	60% struweel

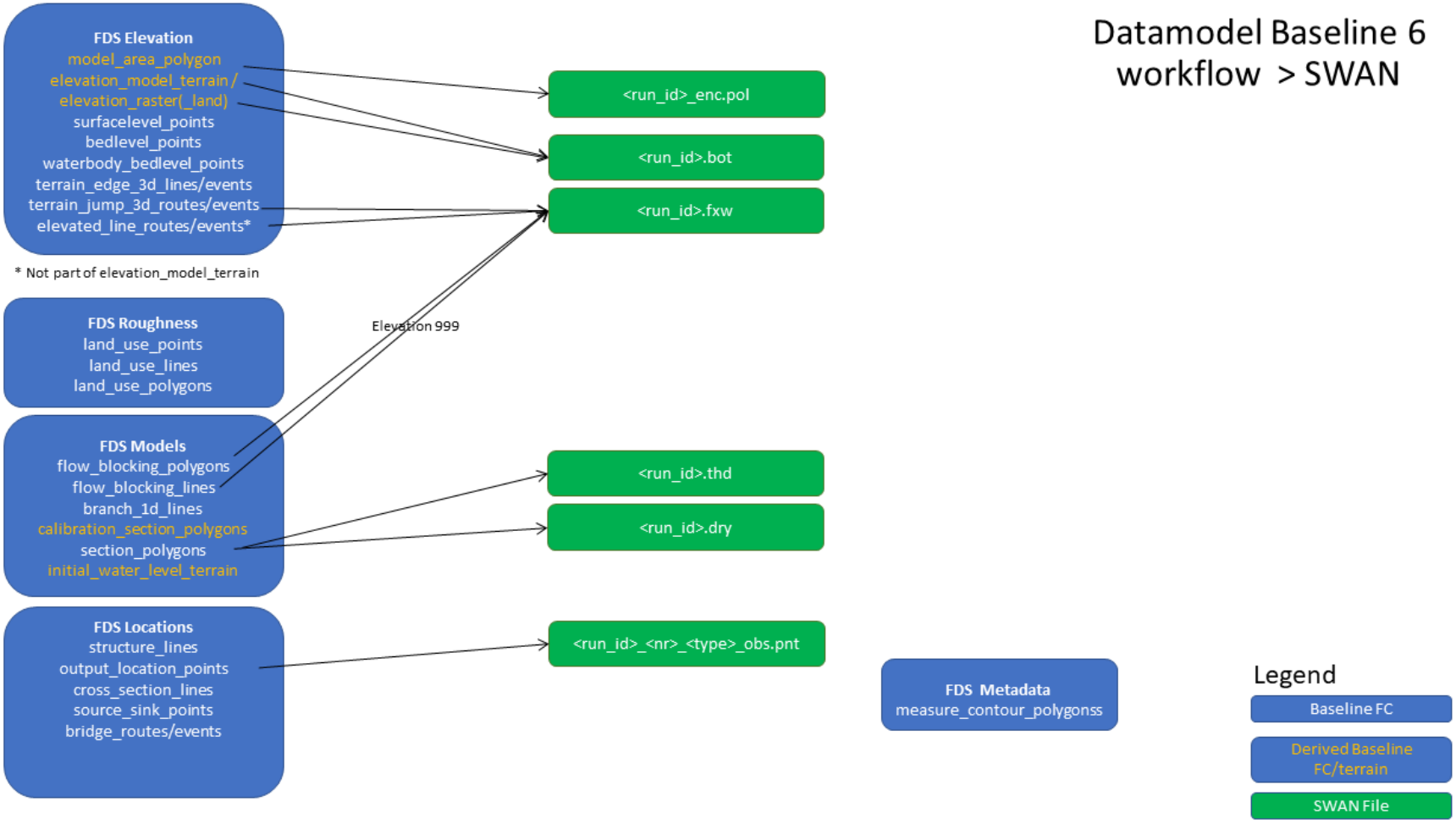
RCODE en CCODE (startend vanaf)	Deelgebieden RWS
2000	Rijntakken
2100	Maas
2200	RijnMaasmonding
2300	OverijsselscheVecht

RCODE en CCODE (startend vanaf)	Deelgebieden RWS
2400	IJsselmeer-IJsselVechtDelta
2500	Markermeer-Gooimeer-Eemmeer
2600	Veluwerandmeren
2700	Volkerak-Zoommeer
2800	Grevelingen
2900	Oosterschelde-VeerseMeer
3000	Westerschelde
3100	Waddenzee
3200	Noordzee
5000	Duitse Rhein

Appendix C1: Flowdiagram Bas2FM



Appendix C2: Flowdiagram SWAN



Appendix D: Protocol changes

Baseline 5		Baseline 6	
FDS	**FC**	**FDS**	**FC**
Grenzen	omtrek_maatregel	metadata	measure_contour_polygons
Grenzen	Secties	models	section_polygons
Hoogtelijnen	Bandijken	elevation	elevated_line_routes (crest) & terrain_edge_3d_lines (toe)
Hoogtelijnen	breuklijnen	elevation	terrain_edge_3d_lines
Hoogtelijnen	Hoogteverschillijnen	elevation	terrain_jump_3d_routes
Hoogtelijnen	Kades	elevation	elevated_line_routes
Hoogtelijnen	Kribben	Elevation	elevated_line_routes
Hoogtemodel	bandijken_lijnen_terrain	-	-
Hoogtemodel	Bodemhoogte	elevation	elevation_model_terrain
Hoogtemodel	Breuklijnen_lijnen_terrain	-	-
Hoogtemodel	Hoogteverschillijnen_lijnen_terrain	-	-
Hoogtemodel	oeverhoogtes_terrain	-	-
Hoogtemodel	plashoogtes_terrain	-	-
Hoogtemodel	sectie_terrain	elevation	model_area_polygon
Hoogtemodel	Winterbedhoogtes_terrain	-	-
Hoogtemodel	Zomerbedhoogtes_terrain	-	-
Hoogtepunten	oeverhoogtes	elevation	surfacelevel_points
Hoogtepunten	Plashoogtes	elevation	waterbody_bedlevel_points
Hoogtepunten	Winterbedhoogtes	elevation	surfacelevel_points
Hoogtepunten	Zomerbedhoogtes	elevation	bedlevel_points
			elevation_mosaic elevation_raster elevation_raster_land
Meetpunten	meetpunten	locations	output_location_points
Meetpunten	uitvoerlocaties	locations	output_location_points
Overig	Bronnen_putten	locations	source_sink_points
Overig	Kunstwerken	locations	structure_lines
riviergeometrie	Rivieras	models	branch_1d_lines
riviergeometrie	rivierkilometer_lijnen	locations	cross_section_lines
riviergeometrie	rivierkilometer_punten	locations	output_location_points
Ruwheid	Bomen	roughness	land_use_points
Ruwheid	Ecotopen	roughness	land_use_polygons
Ruwheid	ecotopen_ruwheid	roughness	land_use_polygons
Ruwheid	Heggen	roughness	land_use_lines
Ruwheid	Hoogwatervrije lijnen	models	flow_blocking_lines

Baseline 5		Baseline 6	
FDS	**FC**	**FDS**	**FC**
Ruwheid	hoogwatervrije vlakken (RUWCODE = 1)	roughness	land_use_polygons
Ruwheid	hoogwatervrije vlakken [RUWCODE =2)	models	flow_blocking_polygons
Ruwheid	hoogwatervrije vlakken (RUWCODE = 3)	locations	bridge_events
Ruwheid	Lanen	roughness	land_use_points
Ruwheid	plassen	roughness	land_use_polygons
Ruwheid	ruwheid_lijnen		
Ruwheid	ruwheid_punten		
Ruwheid	ruwheid_vlakken		
Ruwheid	Zomerbed	models	calibration_section_input_polygons
		models	calibration_section_polygons
		models	cross_section_1d_polygons
		morphology	D50_points
		morphology	dredging_polygons
		morphology	suppletion_polygons
		morphology	bed_characteristics_input_polygons
		morphology	bed_characteristics_polygons

Appendix E: Overview of Featureclasses/Terrains and Rasters in Baseline templates

FDS	FC/Terrain/Raster	Projected variant	Projected measure	(non projected) Sea variant	(non projected) Sea measure
Metadata	measure_contour_polygons	x	x	x	x
Models	section_polygons	x	x	x	x
	calibration_section_input_polygons	x	-	x	-
	calibration_section_polygons	x	x	x	x
	cross_section_1d_polygons	x	x	x	x
	flow_blocking_lines	x	x	x	x
	flow_blocking_polygons	x	x	x	x
	branch_1d_lines	x	x	x	x
Elevation	Model_area_polygon	x	-	-	-
	terrain_jump_3d_routes	x	x	x	x
	elevated_line_routes	x	x	x	x
	terrain_edge_3d_lines	x	x	-	o
	surfacelevel_points	x	x	-	o
	waterbody_bedlevel_points	x	x	-	o
	surfacelevel_points	x	x	-	o
	bedlevel_points	x	x	-	o
	elevation_model_terrain	x	-	-	-
-	elevastion_mosaic	-	-	x	-
-	elevation_raster	-	-	x	x
-	elevation_raster_land	-	-	o	-
Locations	bridge_routes	x	x	x	x
	output_location_points	x	x	x	x
	source_sink_points	x	x	x	x
	structure_lines	x	x	x	x
	cross_section_lines	x	x	x	x
Roughness	land_use_points	x	x	x	x
	land_use_polygons	x	x	x	x
	land_use_lines	x	x	x	x
Morphology	D50_points	x	x	x	x
	dredging_polygons	x	x	x	x
	suppletion_polygons	x	x	x	x
	bed_characteristics_input_polygons	x	-	x	-
	bed_characteristics_polygons	x	x	x	x

FDS	FC/Terrain/Raster	Projected variant	Projected measure	(non projected) Sea variant	(non projected) Sea measure
Erase_polygons	erase_<FC>	-	x	-	x

x = valid FC/Terrain/Raster, o = optional FC/Raster, - = non-valid FC/Terrain/Raster