

Shetland Islands Council

Technical Appendix to Water and Drainage Supplementary Guidance – update April 2023

This sheet provides details of some current technical data and information resources that may be helpful when preparing a Flood Risk Assessment or drainage design calculations as part of the planning application process.

If you have any queries please contact Colin Smith on 01595744881 or email Planning.Flooding.Drainage.Coastal@shetland.gov.uk

Coastal Flood Risk

Planning applications which have any part of the site below the 5m contour on the Council's GIS system trigger the need for a more detailed assessment of coastal flood risk.

In general the first stage will be to provide a floor level and possibly cross sections through the development, to a specified level datum, so that the actual level of risk from coastal flooding can be better assessed.

The information given in this guidance is stated relative to the local **Shetland Ordinance Survey Datum**, i.e levels AOD (Lerwick), but care should be taken to ensure that the datum used for survey work is known.

The minimum level for standard development is calculated from combining 3 different elements.

- 1) Coastal Boundary model (1in200 still water + storm surge) – location specific
- +
- 2) Allowance for Climate change – 1.02m for all Shetland assessments
- +
- 3) Freeboard allowance (for wave action and run up) – generally 0.65m

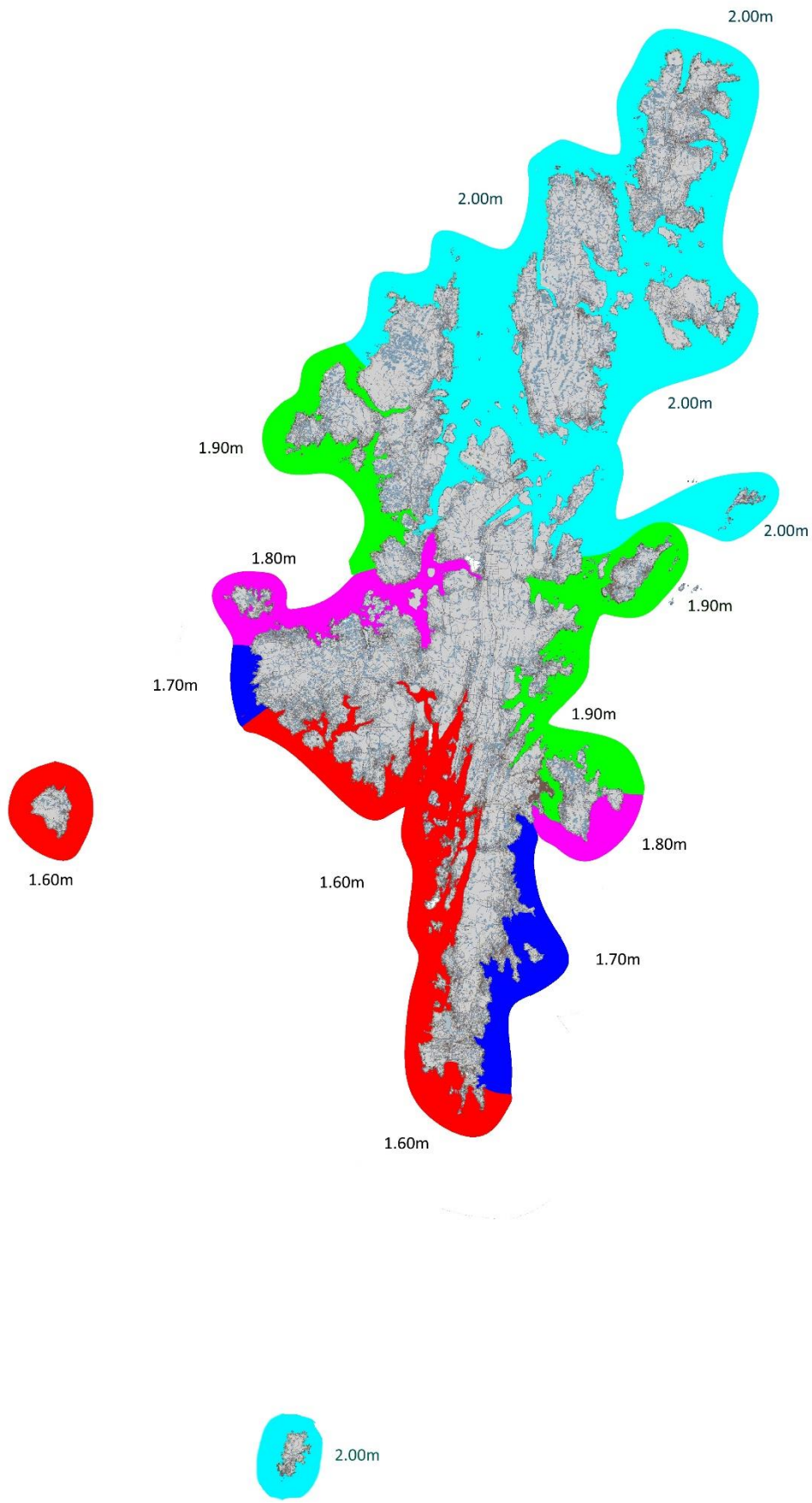
1) Coastal Boundary model

This is a UK wide model of still water tidal levels, including storm surge, at various return periods, currently based on the 2018 publications. Planning applications are assessed at minimum to the 1 in 200 year return period. A full set of point location predictions is available to download in GIS formats from the link below:

[Coastal flood boundary extreme sea levels 2018](#)

The range of levels predicted at the 1 in 200 year return period are also **summarised in the plan below**, for general information.

For both sources, the levels given relate to the local Shetland datum - AOD (Lerwick)



2) SEPA climate change allowances

This provides UK wide modelling of climate change effects, with the current version published as UKCP18, including regional specific predictions for sea level change. Planning applications are generally assessed including this sea level rise allowance to the year 2100, **which for Shetland is 1.02m.**

A SEPA document covering the coastal flood risk climate change allowances for Planning is linked below:

[Climate change allowances for flood risk assessment in land use planning Version 3](#)

Full data and guidance documents on the UK climate change projections are available to download from the link below:

[UK climate change projections 2018](#)

3) Freeboard allowance

This is intended to cover effects from local wind, wave and run up of breaking water and the like, and **the general figure used in Shetland is currently 0.65m.** There are some less common locations where localised conditions could make a higher or lower figure required but those would be assessed case by case.

There are on-going national modelling and data gathering programmes which may give a better assessment of coastal wave action effects on flood maps in the future.

Level information

Proposed levels related to coastal flooding assessment **must be to a stated datum.**

The data provided here for coastal flood risk is all given relative to OS datum (Lerwick). Surveys that use local benchmarks for their level datum are clear, but modern GPS equipment may be set, or default inadvertently, to using other level projections. There is approximately 240mm difference between the Shetland datum and the UK national (Newlyn) datum, so that becomes a significant difference when considering coastal flood risk to sites that are near the limit.

OS digital mapping GIS layers have recently been revised to not include levels for the historic stone cut benchmarks, as they are no longer inspected/maintained. An archive GIS layer is available online to be downloaded separately:

[OS Benchmarks](#)

OS Maps desktop does appear to currently continue to hold the historic benchmark location and level information:

[OS Maps desktop](#)

Other updates

Rainfall allowance and design rainfalls

Calculations for river and surface water flood risk, and for SUDs drainage design have used Shetland design rainfall figures, with an additional climate change allowances which have changed over time.

The revised SEPA climate change allowances in the 2022 update increases the **uplift on the design rainfall to 40%** for Shetland.

Design rainfalls may vary slightly, depending on the source but, for information, the design rainfalls used internally by the Council's Planning service have now been revised to include the new 40% allowance and are set out below for information:

Design rainfalls +40% climate change (mm)

Return Period (years)	10	30	50	100	200
Time (hours)					
0.5	13.52	16.64	19.75	23.20	27.22
1.0	18.24	22.29	26.33	30.74	35.88
1.5	21.74	26.45	31.15	36.25	42.17
2.0	24.63	29.86	35.08	40.75	47.31
2.5	27.12	32.80	38.49	44.62	51.70
3.0	29.34	35.42	41.50	48.05	55.61
3.5	31.36	37.79	44.23	51.16	59.12
4.0	33.22	39.98	46.75	54.01	62.36
4.5	34.96	42.02	49.08	56.66	65.35
5.0	36.58	43.93	51.27	59.14	68.17

SEPA Flood Risk Assessment checklist

SEPA have informed the Council that full phase 2 FRAs passed to them for assessment will be required to provide all the information listed on their checklist. Previously following the checklist was only a recommendation. The information on this sheet will help meet those requirements for coastal flood risk. For river and surface water flooding the checklist assumes the use of flood modelling software.

Not all applications will require a full FRA to be assessed by SEPA. For smaller developments, or where the information provided is sufficient to address the required risks the internal SIC process may be all that is needed:

[SEPA FRA checklist](#)

Other information

Dynamic Coast

This is a government initiative providing a GIS based website that looks at the changes in soft coastline areas using historic mapping data. There are relatively few lengths of soft coastline where development is likely in Shetland, but this provides another set of information that may be useful in specific cases and recent updates now highlight potential areas of erosion to 2050 and 2100 if those GIS layers are selected:

[Dynamic Coast](#)

They have also produced a report considering specific lengths of Shetland coast where potential erosion issues have been identified:

[Dynamic Coast Shetland report](#)

“The SUDs Manual” Ciria document C753.

This Ciria document is the required design guidance for all forms of SUDs drainage and sets out how to masterplan and select SUDs, carry out design calculations and specific design detailing for SUDs devices. This document also introduces the new method that is required when designing SUDs for water quality treatment.

It is now a large document, but well divided into sections, and now does include some helpful examples of how SUDs can be designed to fit into different development situations, including use of amenity areas for occasional attenuation.

The manual is available as a free pdf for download if you sign up to the Ciria website:

[CIRIA C753 The SUDs Manual](#)