

Solutions for Land – Sea Interoperability

CMIP

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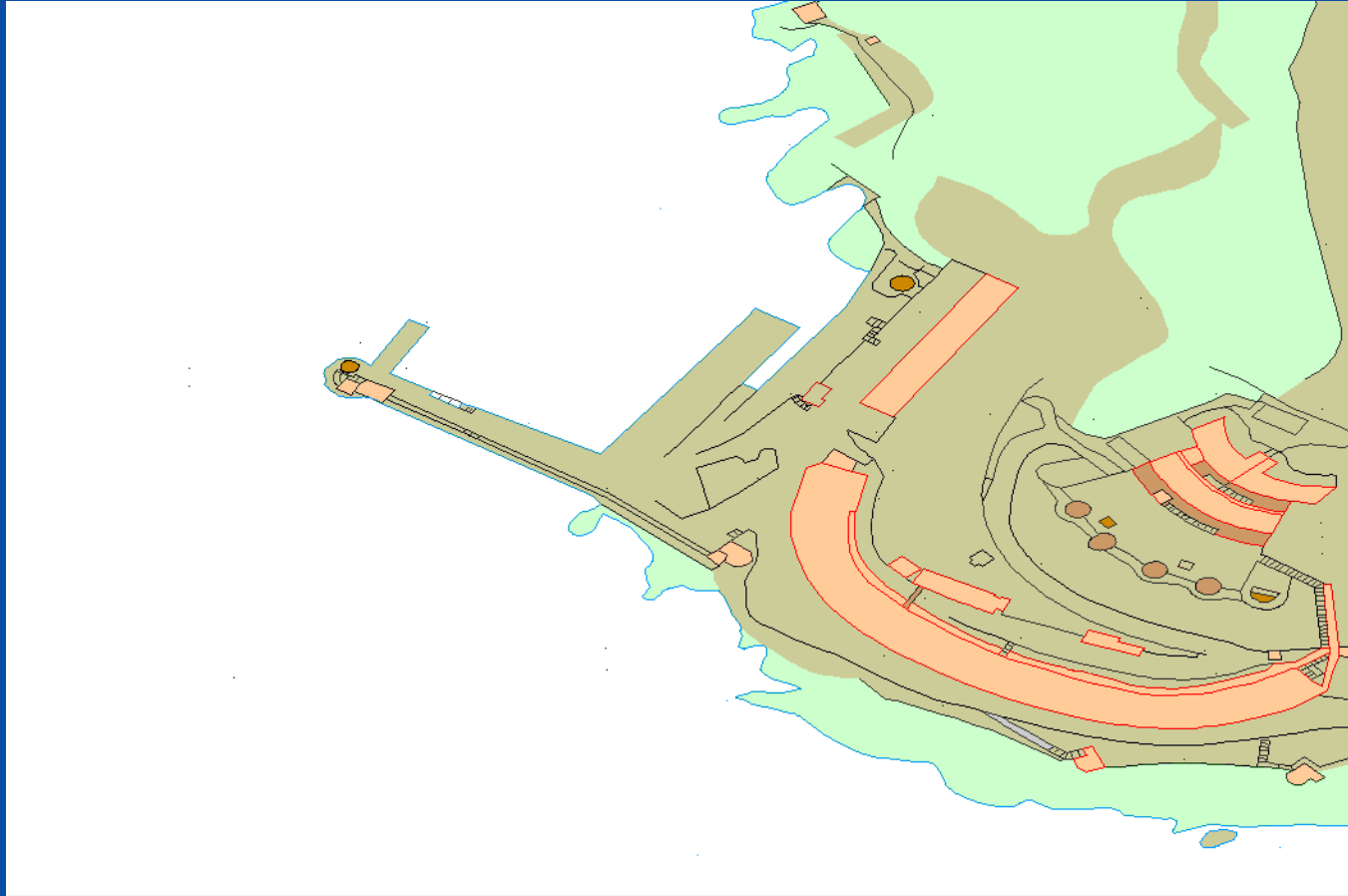
Coastal Mapping Improvement Programme

- Aims
 - To resolve inconsistencies between hydrographic and topographic mapping
 - To harmonise the mapped representation of the coastal zone
 - To produce a seamless representation of the coastal zone
- Work is being undertaken in the UK using:
 - Digital topographic mapping from Ordnance Survey (OS MasterMap)
 - Digital marine charting from UK Hydrographic Office (ENC)
- Ultimately we are seeking to identify the authority for particular feature types
 - Loosely, OS above the MHW line, and UKHO below the MHW line

Data Inconsistencies

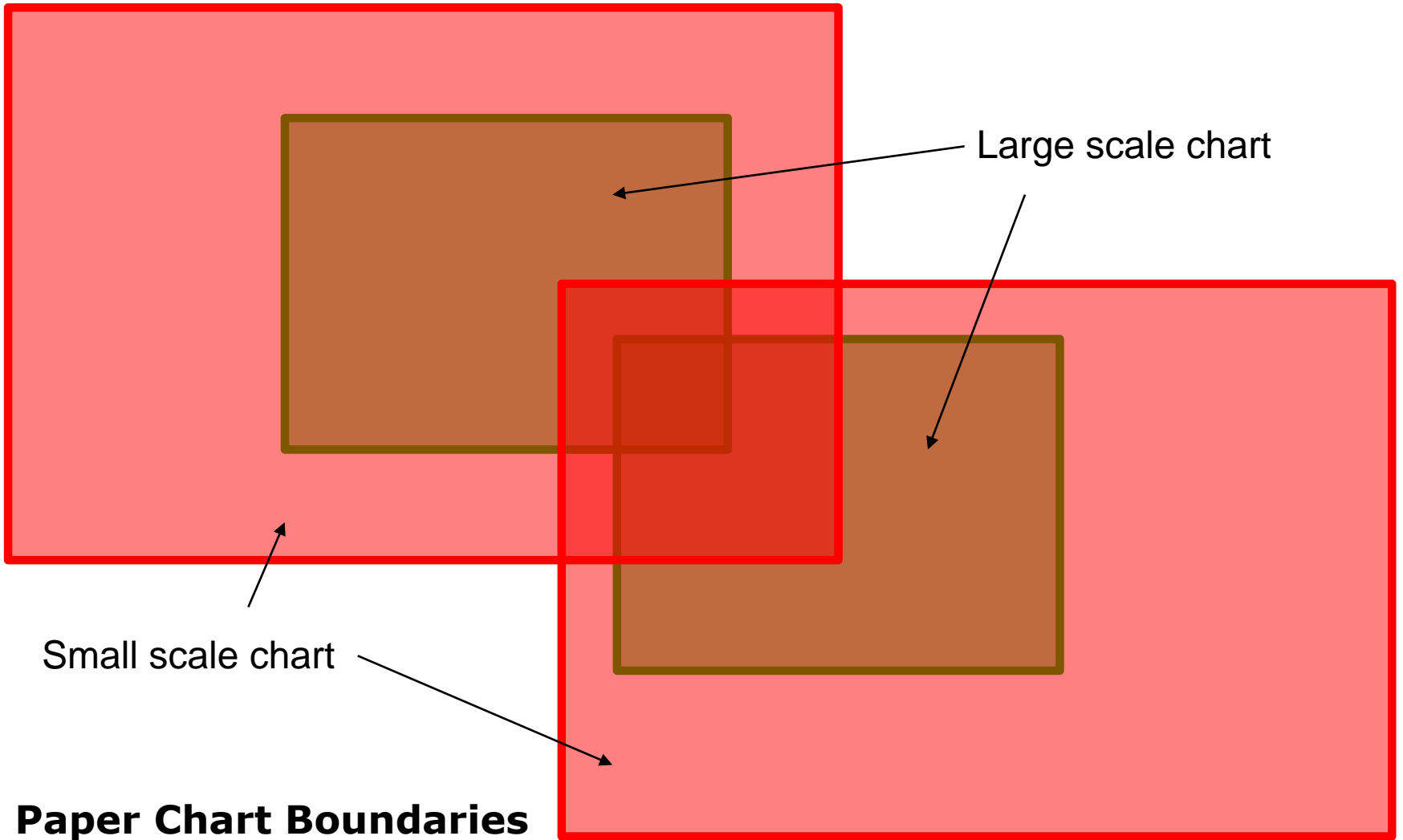
- The use of different vertical CRS
- Differences in data collation periods
- Different interpretations of primary sources such as aerial photographs
- Different interpretations of low water (OS = MLW, UKHO = CD or LAT)
- Different data capture scales
- Different data purposes
 - Topographic mapping intended for a wide range of applications
 - Charts intended for navigation

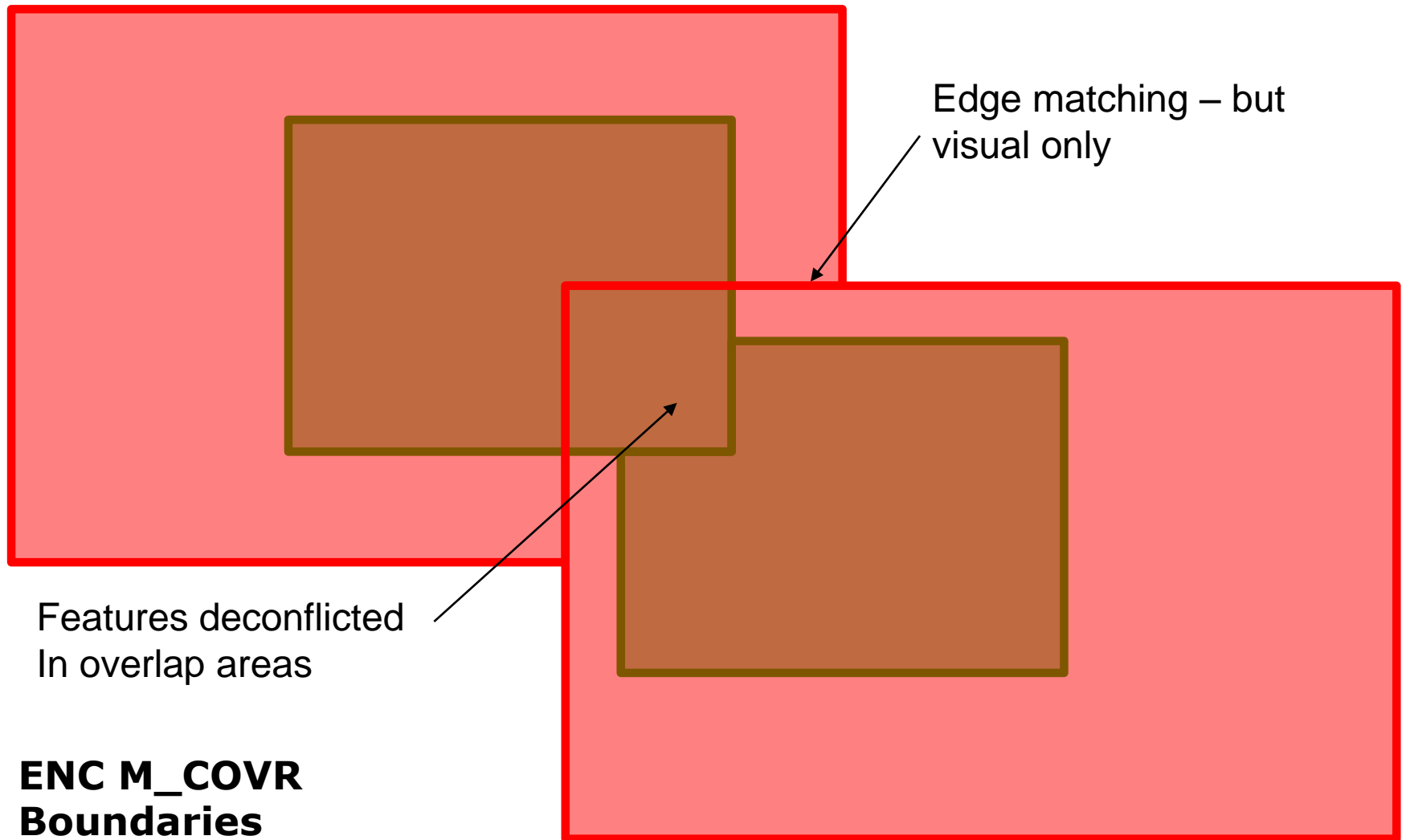
Topographic Information

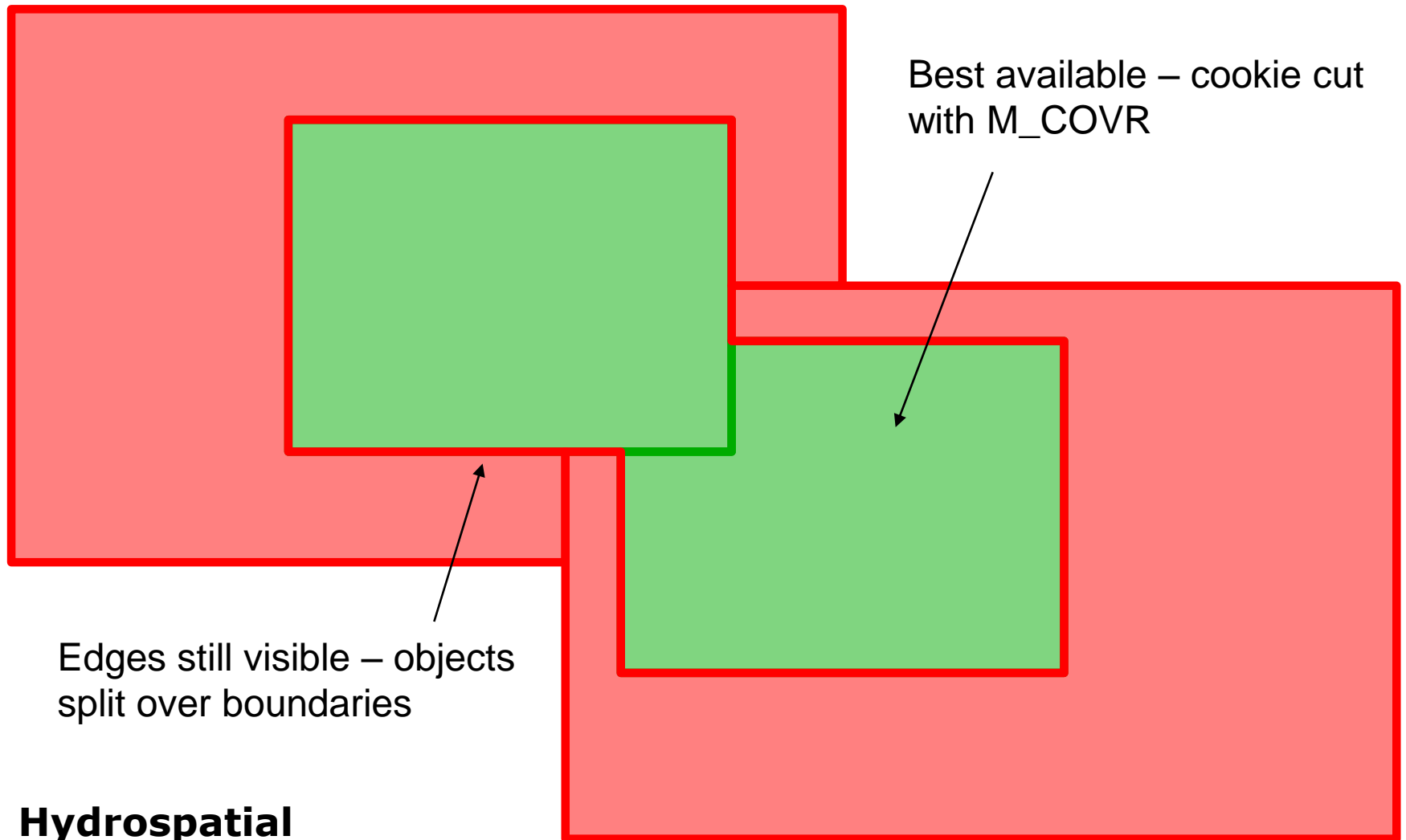


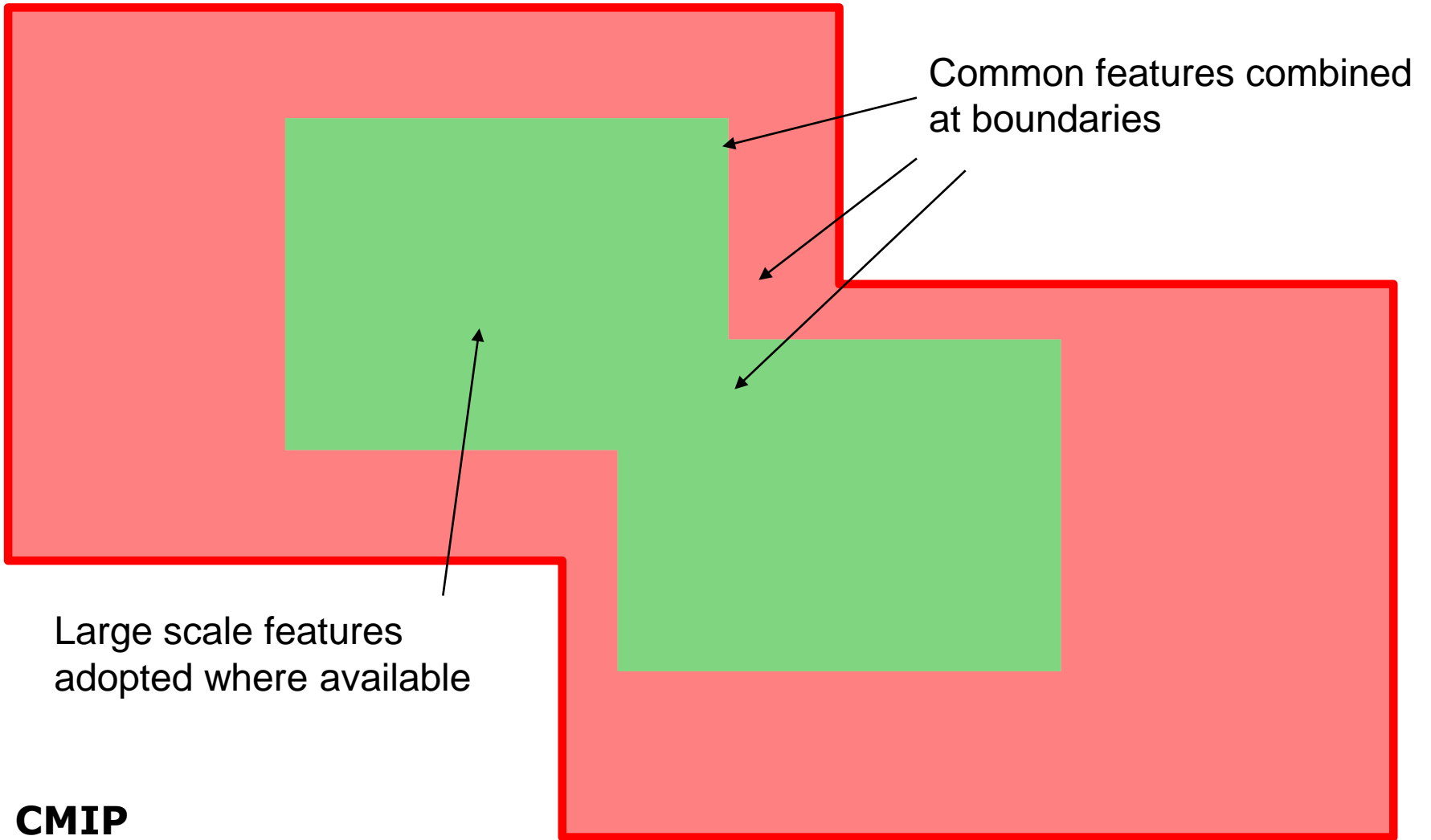
Weakness in Best Available Process

- Best available clipping process results in data where:
 - ENC boundaries are apparent
 - Offsets at edges are apparent
 - Features are lost:
 - Feature represented at lower scale
 - Same feature not represented at higher scale
- Highlighted the need to resolve S57 data Pre-CMIP

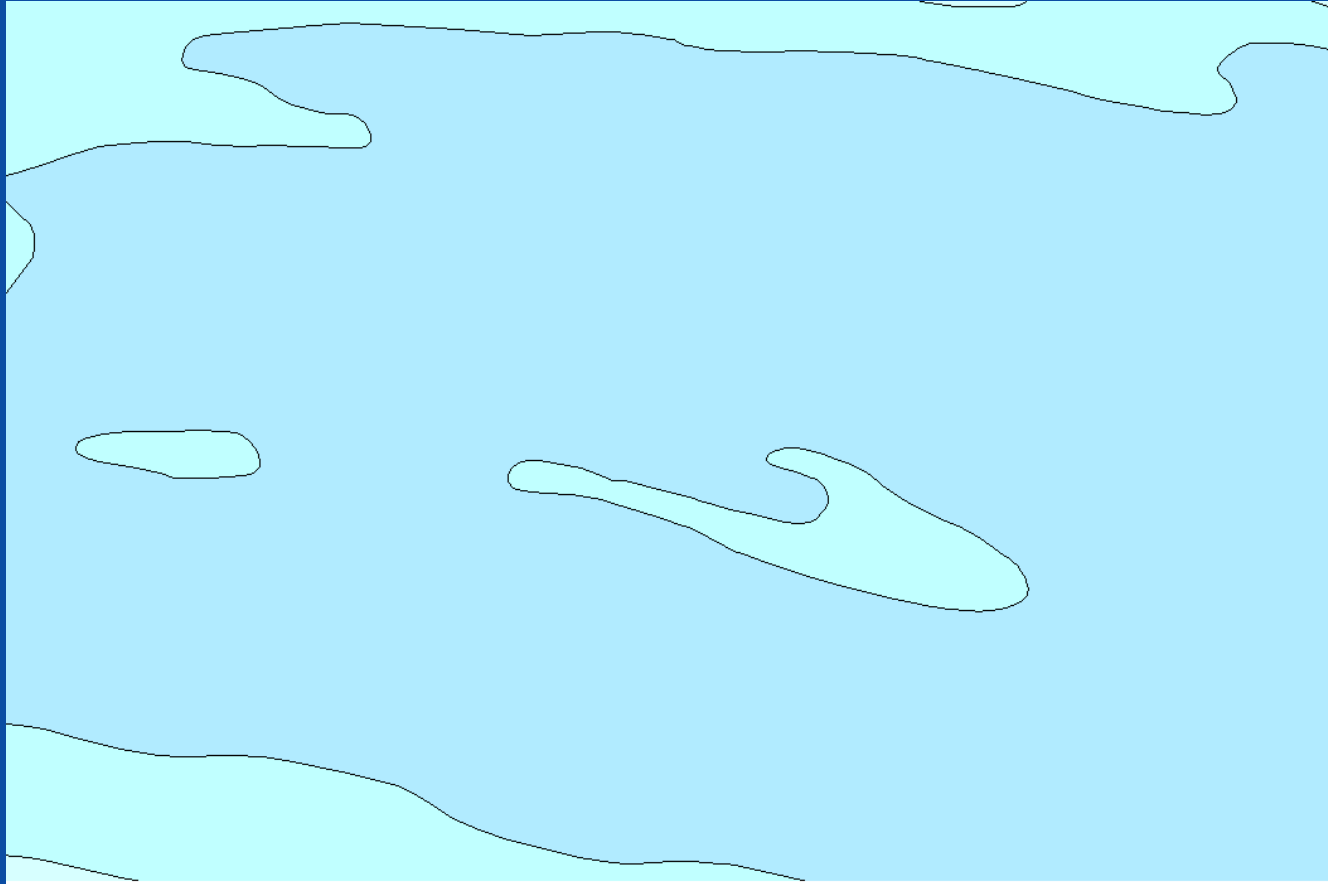




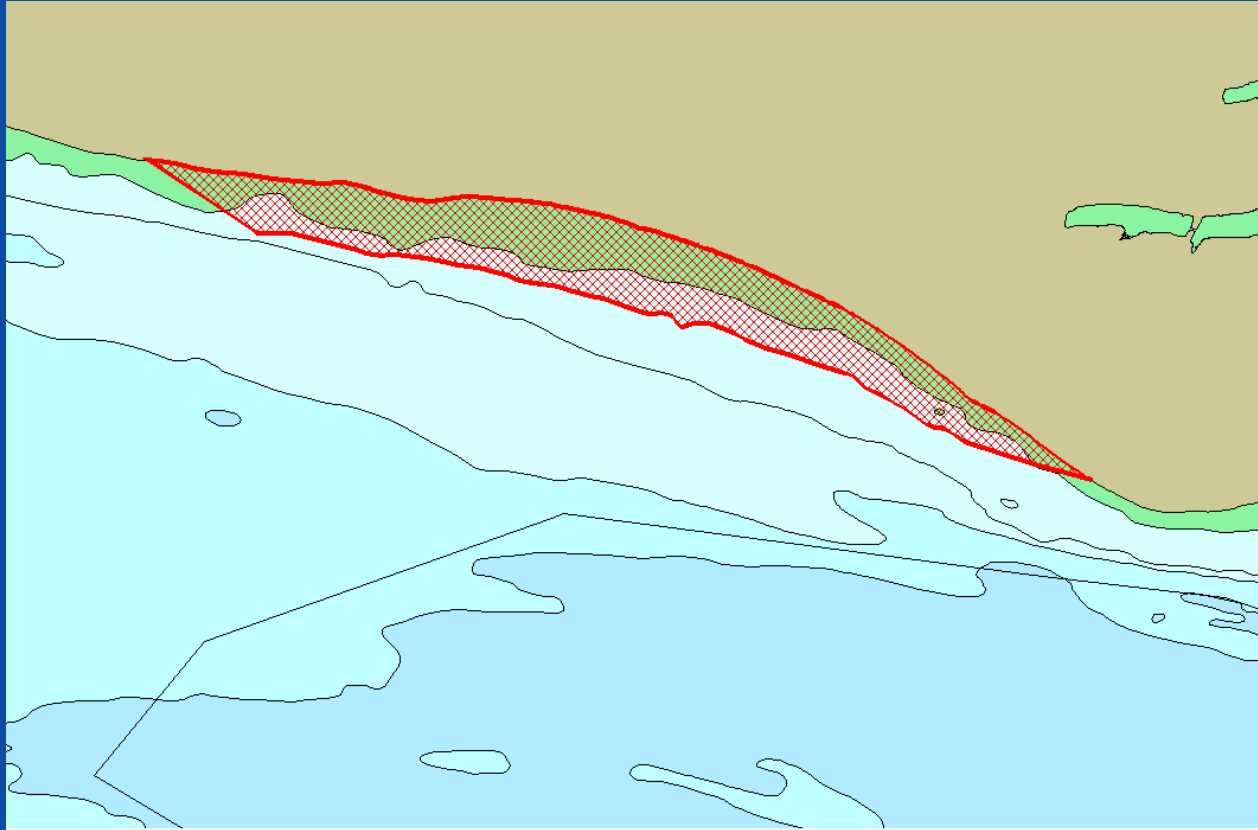




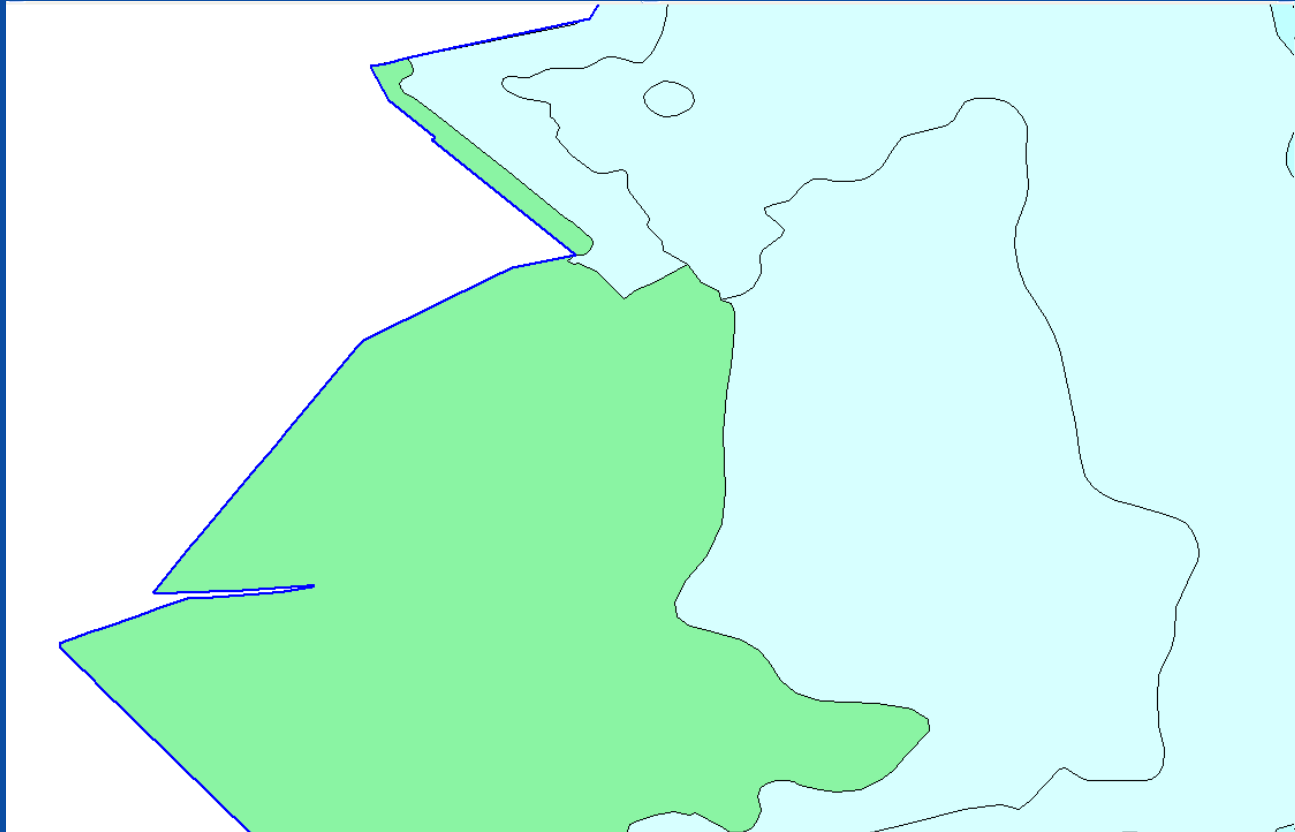
Edge Matching



Object Deconfliction



Process – Land / Sea Integration



Simple Geometry Editing

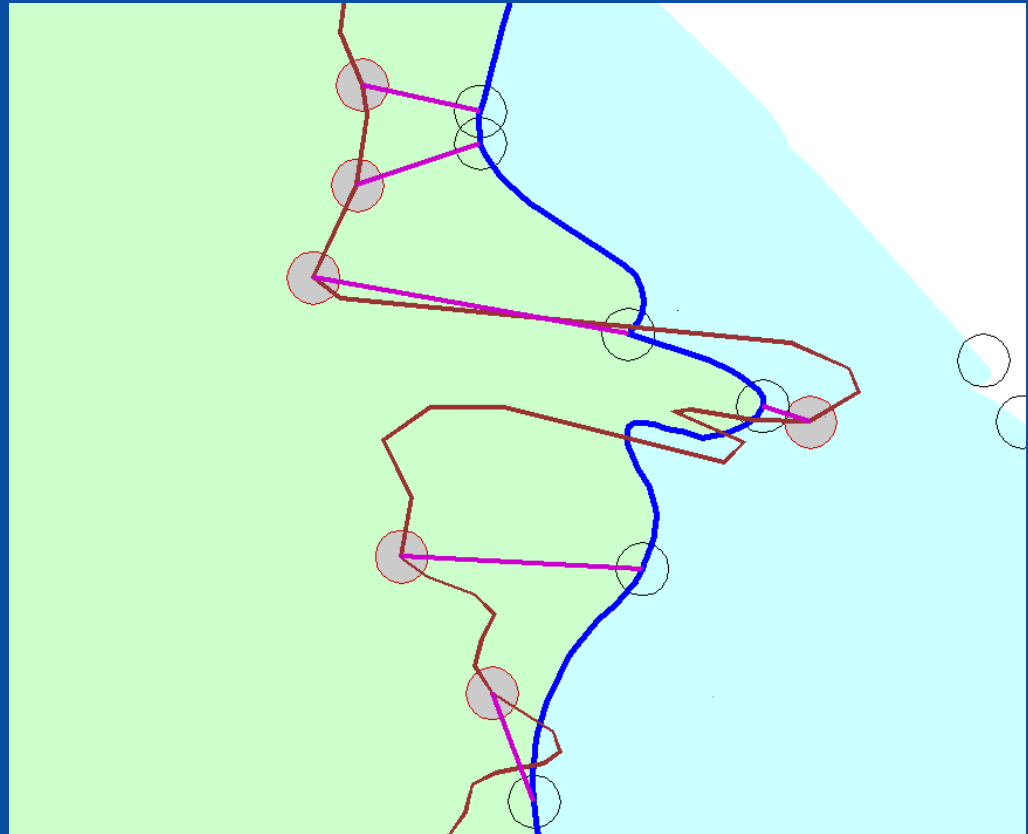
- Editing during the pilot project was done directly on geometry
- This raised several problems:
- Requires clip & movement of objects
 - Painstaking at the coastline
 - Every vertex of every seed requiring adjustment
 - Over 15 objects sharing same path
 - Rounding errors in clip
 - Sub-metre gaps & overlap
- Difficult long-term maintenance

Topological Data Model

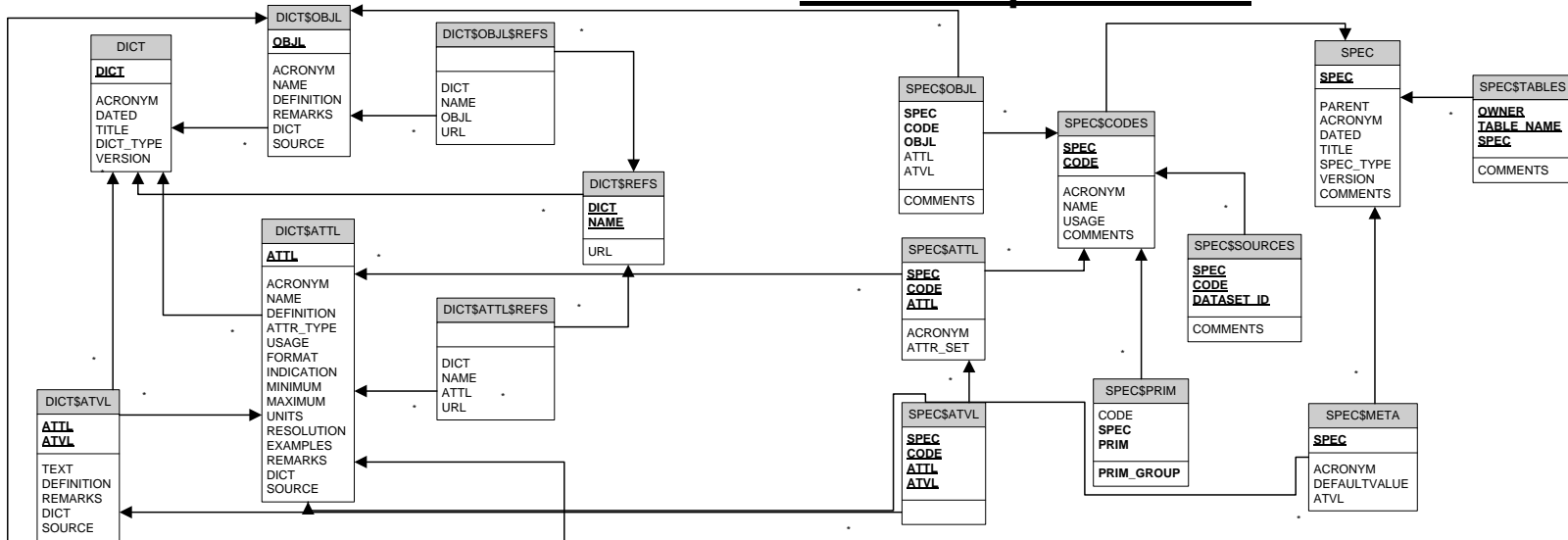
- Objects sit on links & nodes
- Single movement of primitives
 - Moves all attached objects i.e. 1 to many
- Work up-front considerable
 - Mainly due to S57 capture policy
- Ease of long-term maintenance

Topological Editing

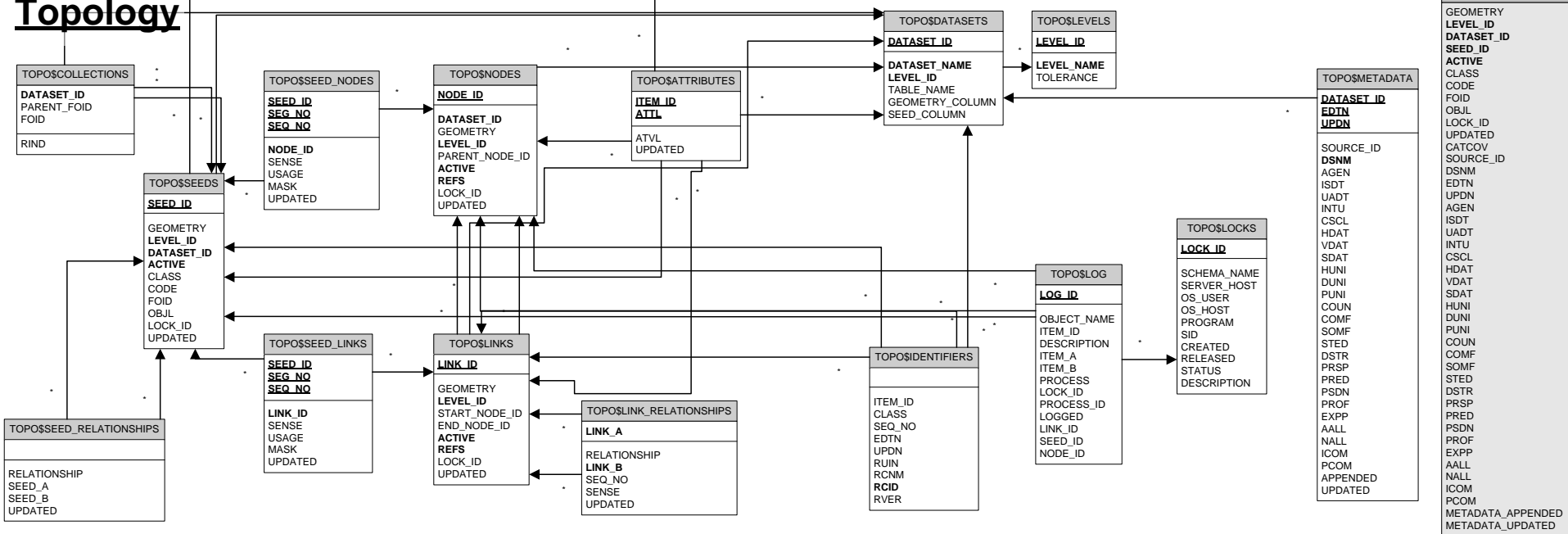
- Editing ENC coastline to match topographic coastline
- Topographic coastline in blue
- Nodes on ENC line are snapped to nodes on topographic line



Dictionary

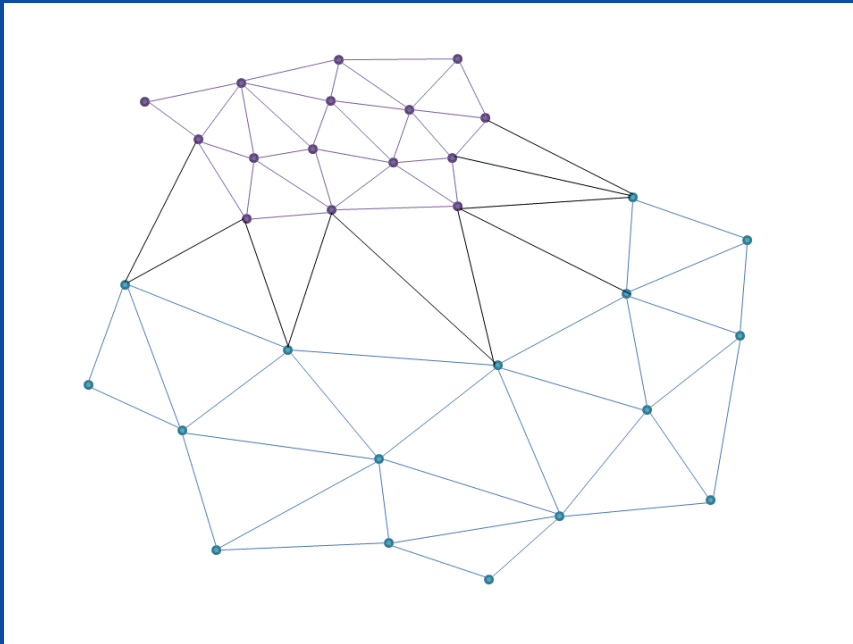


Topology



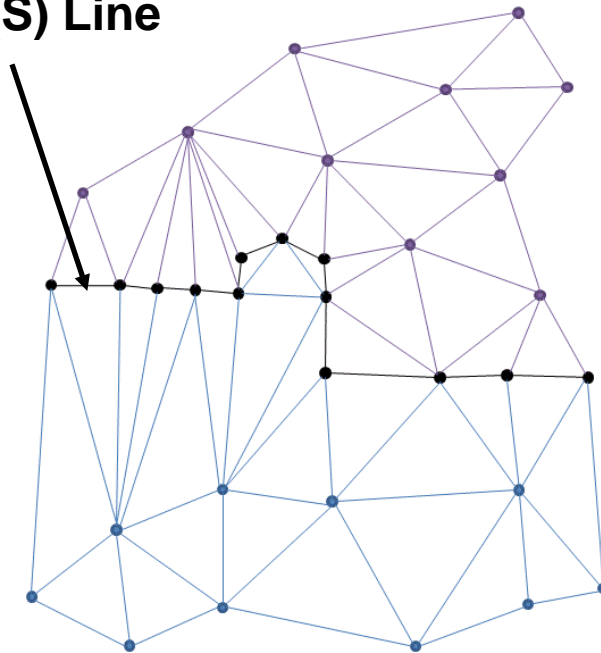
Elevation

- Seeking to build a seamless elevation surface
- Combining topographic elevation with bathymetric elevation
- Work is at an early stage



Elevation Integration

MHW(S) Line



Feature Catalogue

- Aim to decide on authoritative sources for certain feature types
 - OS Mooring Point = Pile or Mooring Facility
 - Mean Low Water Line
 - Shoreline constructions
- Work is planned in the near future
- Start by reviewing feature catalogue overlaps

CMIP Process Benefits

- Data capture policy altered so that not all shoreline constructions are considered land – better real world representation
- Optimised best available process
- Object geometry may consist of more than one scale band geometry
- Improved seamless nature at the coastline
- Single object represents a single real world object
- Persistent unique identification for objects
- Overall – seamless data across the coastal zone
- Although example here are using British topographic mapping data the principles are widely applicable

Further Work

- Elevation harmonisation
- Feature catalogue harmonisation