

Coastal Assessment Survey Solway North Coast

September and October 1996

Volume 3 of 3: the eastern part of the coast,
case studies, and analysis.

Port Donnel to Gretna

Map sets 40 to 56



A Report for HISTORIC SCOTLAND



by the CENTRE *for* FIELD ARCHAEOLOGY



MAP 40: PORT DONNEL TO PORTLING BAY

Hinterland Geology and Coastal Geomorphology: Castle Hill Point forms a promontory headland comprising of greywackes assigned to the Ross Formation containing Silurian greywackes. Sandstone and silty mud stones are common forming precipitous cliffs. Eastwards from Castle Hill to Needles Eye (a natural arch), till and isolated pockets with fluvioglacial and morainic deposits occur over a high cliff-edge.

Erosion Class: The coastline is exposed but the resilient nature of the underlying geology suggests that erosion is occurring at a slow rate.

Built Heritage & Archaeology: The surviving archaeology of this section is of an industrial nature; Glenstocken Quarry and the related ruined buildings at Gutcher's Isle, and the quarry at Barcloy Hill. Coastal erosion was not evident and no further action is required. A promontory fort (Feachem, 1956) once survived at Portowarren but was destroyed by the erection of a coastguard bungalow and landscape gardening (RCAHMS, NX85SE 2).

Map 40: Hinterland Geology and Coastal Geomorphology

1. KIPFORD ON SCAUR PIER to PORTOBEAGLE BAY

NX 844 540

3km

Low edge (< 5m)

Till and marine sands and gravels

Till occurs on the hinterland at Kipford on Scaur and at Port Donnel (NX 846537) where it outcrops over visible granite rock. Fluvioglacial drift outcrops to the south. The foreshore consists of a mixture of estuarine sands and mud.

2. PORTOBEAGLE BAY to NEEDLES EYE ARCH

NX 873 530

4.5km

Cliff (> 10m)

Till and fluvioglacial drift over visible rock

This is an exposed stretch of irregular coastline with a highly incised cliff-edge. Till occurs over visible rock platform with fluvioglacial deposits and marine sands and gravels evident towards to the east of the unit. The shoreline consists of precipitous cliffs with steeply folding Wenlock series greywackee with natural arches.

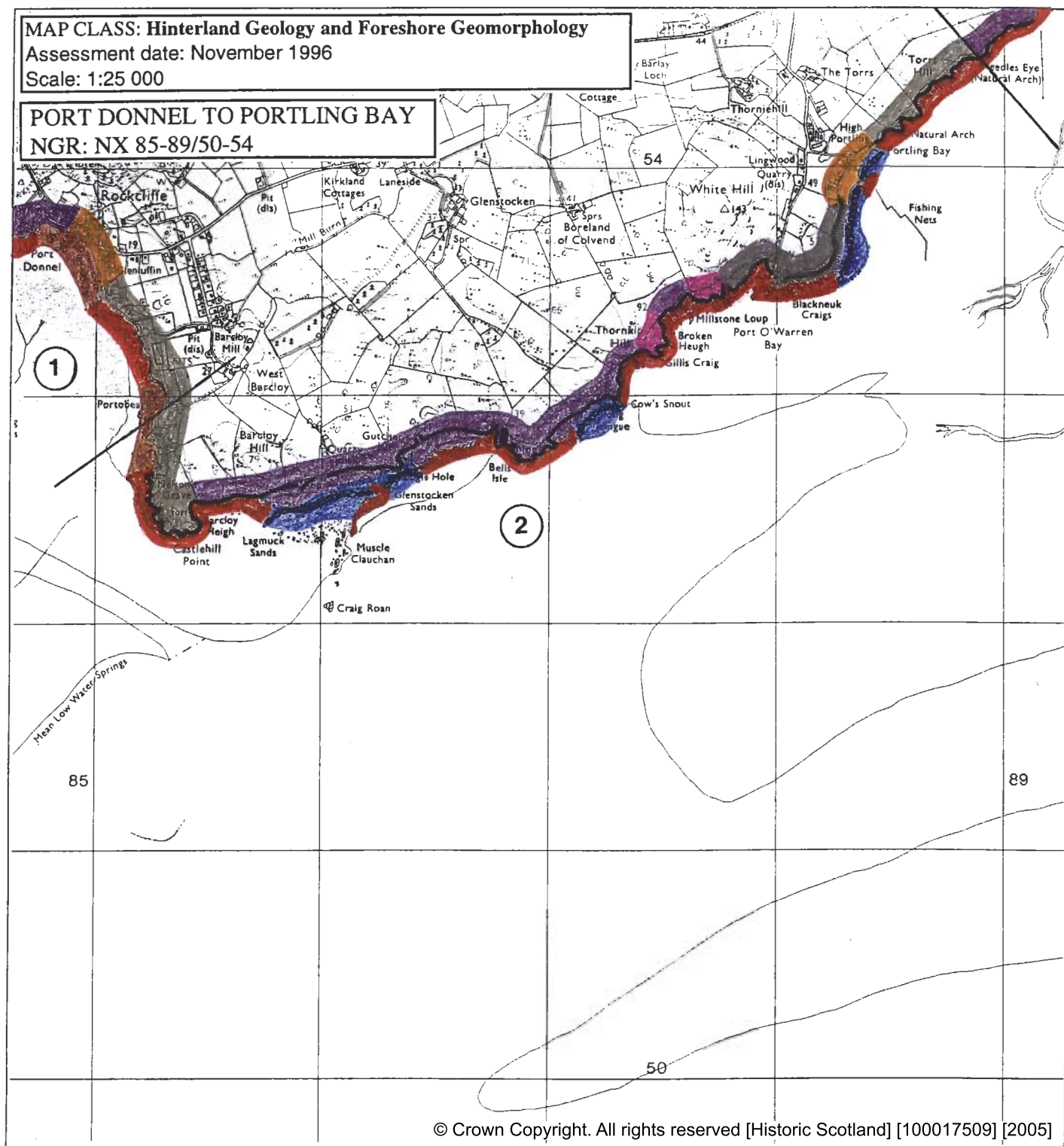
MAP CLASS: Hinterland Geology and Foreshore Geomorphology

Assessment date: November 1996

Scale: 1:25 000

PORT DONNEL TO PORTLING BAY

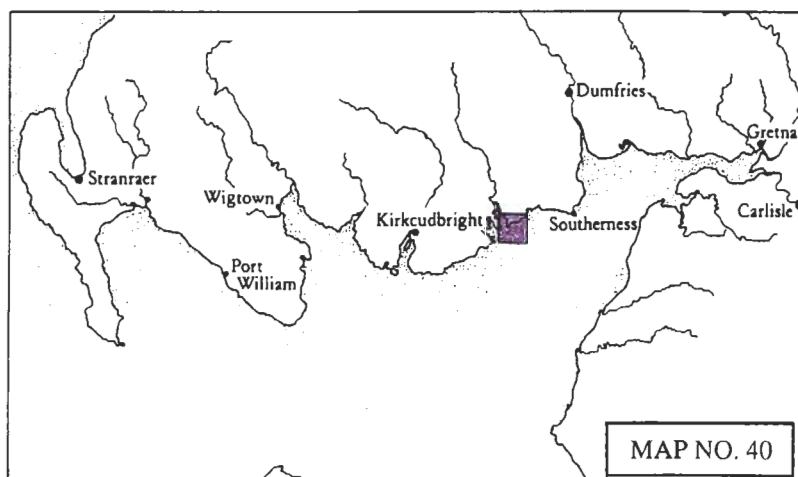
NGR: NX 85-89/50-54



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KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 40: EROSION

1..CASTLE HILL POINT to COWS SNOUT

NX 865 527

2.3km

Eroding or stable

With a highly indented cliff-edge this unit has steep and low outcropping platforms that are being slowly eroded but the cliff-edge appears stable at the present.

2. COWS SNOUT to SALTPAN ROCKS

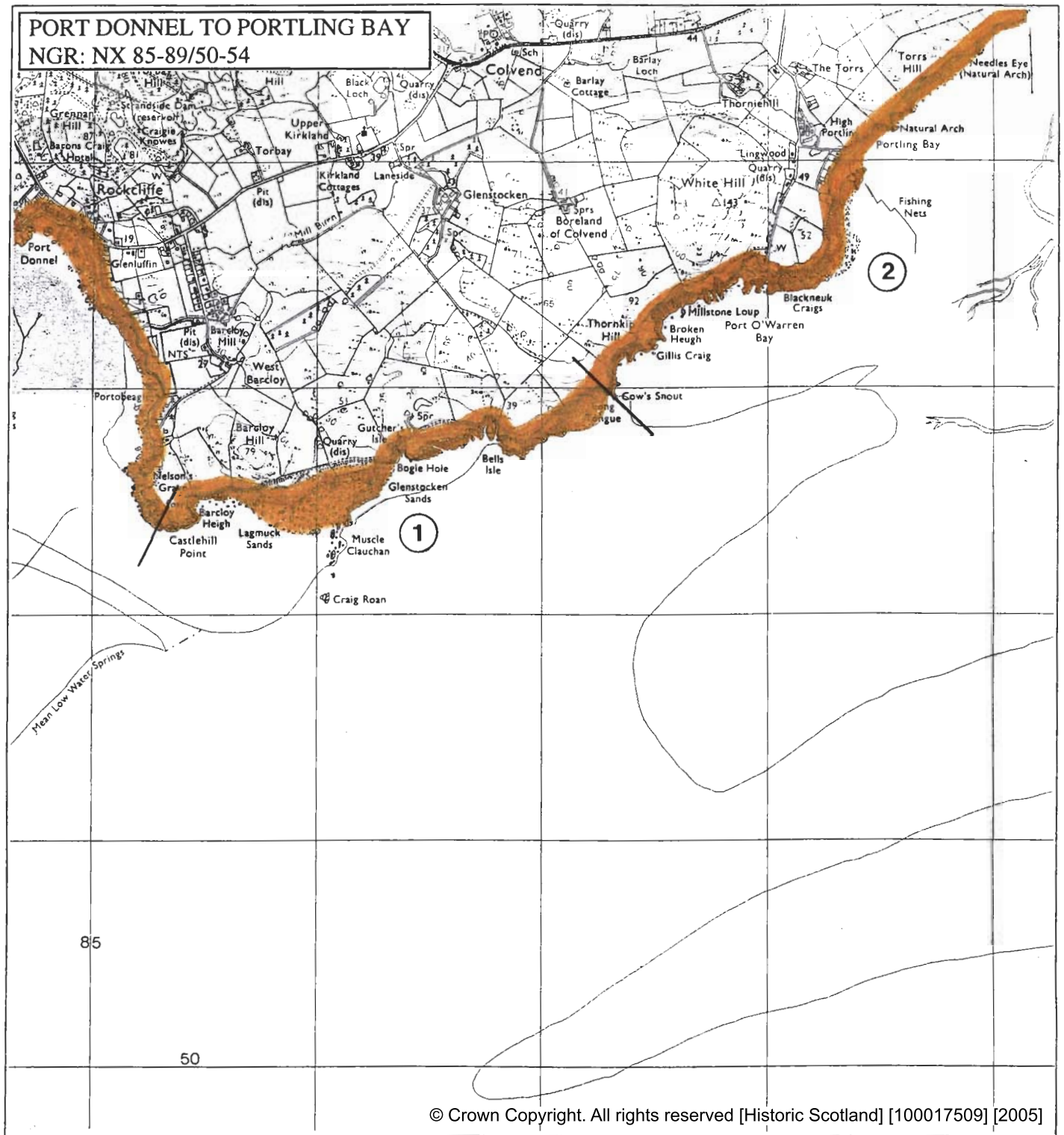
NX 880 535

3km

Eroding or stable

This unit continues to be highly indented with a boulder and shingle shore between rock platforms. Abrasion by rock scour is occurring and the formation of arches suggests erosion is occurring slowly.

PORT DONNEL TO PORTLING BAY NGR: NX 85-89/50-54



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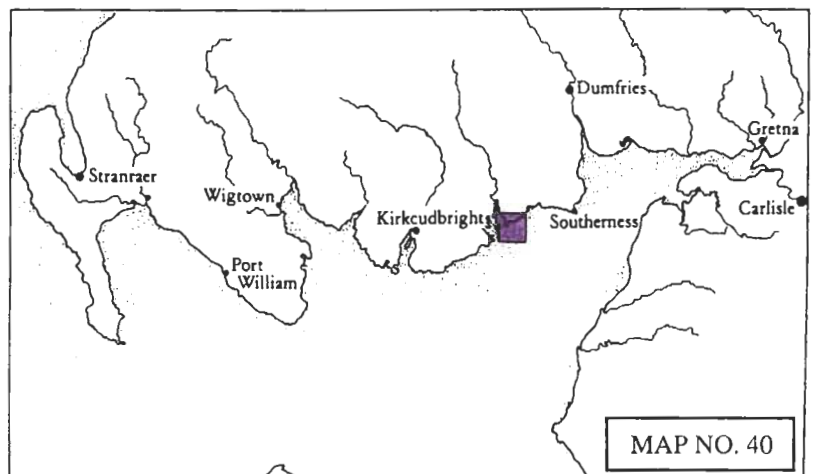
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 10.10.96

Scale 1:25 000



MAP NO. 40

MAP 40: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

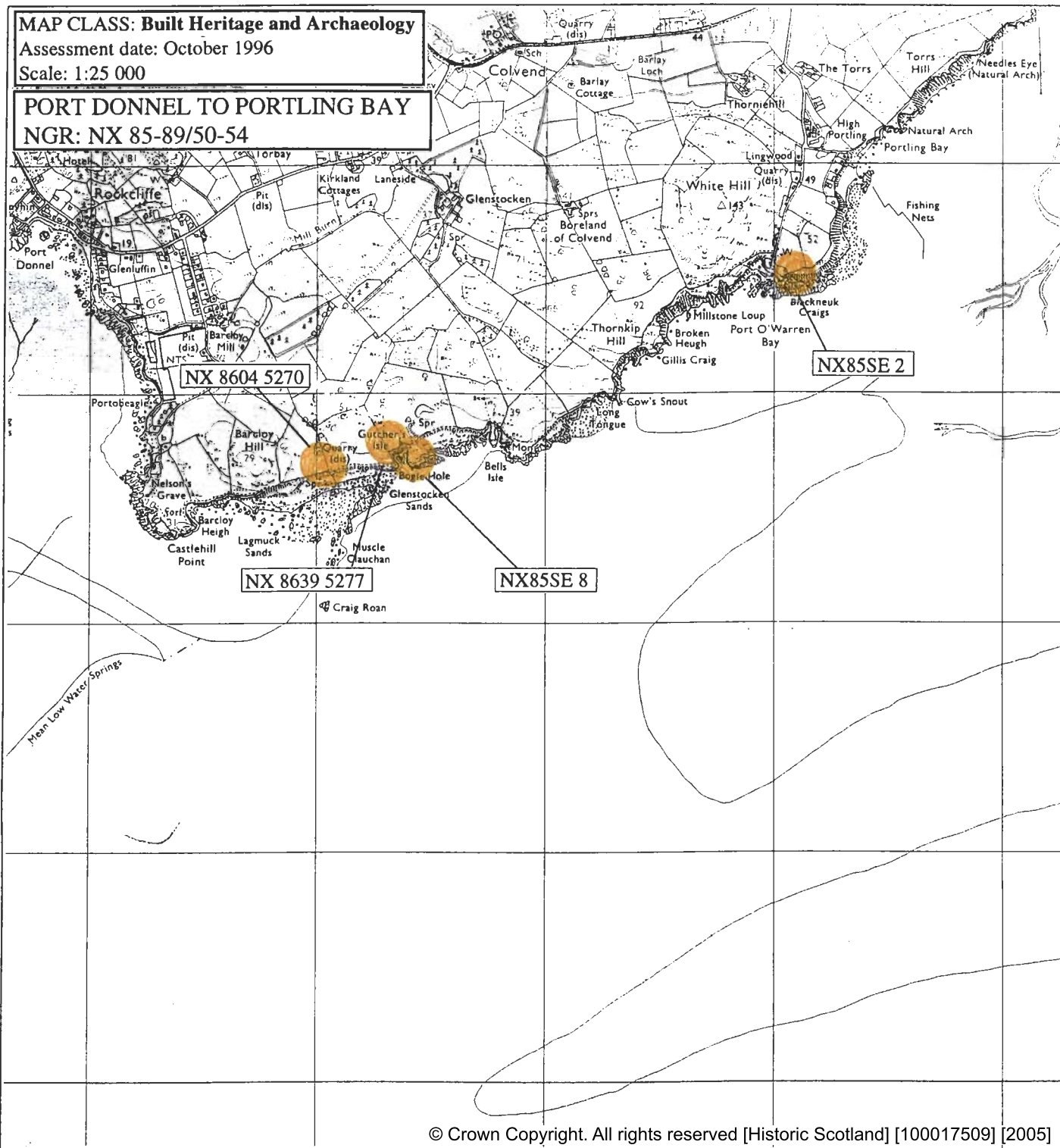
NX85SE 8
NX 8640 5270
GLENSTOCKEN QUARRY
Quarry
Uncertain
Uncertain; not located
Nil

NX 8639 5277
GUTCHER'S ISLE
Ruined Buildings
Uncertain
Good
Nil

NX85SE 2
NX 8804 5352
PORTOWARREN
Promontory Fort
1st Mill.BC/AD
Destroyed
Nil

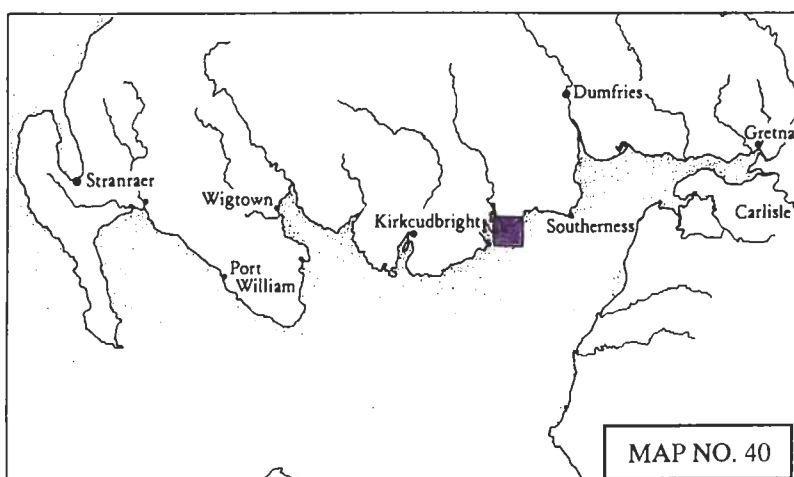
Sites in the Hinterland

NX 8604 5270
BARCLOY HILL
Disused Quarry
Uncertain
Good
Nil



KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 41: PORTLING BAY TO MERSEHEAD

Hinterland Geology and Coastal Geomorphology: The map sheet depicts a coastline that radically alters from one that has a precipitous cliff-edge to low lying land that is dominated by sand dunes. At Sandyhills Bay, low sand dunes have formed at the head of the bay. Till outcrops over steep cliff-edge towards the small burn called the Southwick Water. Salt-marsh dominates the shoreline at the mouth of the Southwick Water.

Erosion Class: The coastline in this region is exposed to south-easterly gales. The dunes at Sandyhills Bay are seriously eroding and have recently been defended by fencing. Dune blow-out has occurred on the dunes facing the sea. This damage has been increased by visitor pressure as the bay has a caravan park and picnic area. Eastwards towards the Southwick water the shoreline is stable with some accretion and erosion occurring up the Southwick Water burn.

Built Heritage & Archaeology: This section contains two archaeological sites; both situated at Sandyhills. The remains of a saltpans, noted in the first edition map (OS, 1854) may survive towards the west flank of the bay. Further inland from the bay, Barnhourie Mill survives and has been renovated into a house. No sites in this stretch of the coastline are threatened by coastal erosion.

Map 41: Hinterland Geology and Coastal Geomorphology

1. PORTOBEAGLE BAY to NEEDLES EYE

ARCH

NX 873 530

4.5km

Cliff (> 10m)

Till and fluvioglacial drift over visible rock

This is an exposed stretch of irregular coastline with a highly incised cliff-edge. Till occurs over visible rock platform with fluvioglacial deposits and marine sands and gravels evident towards to the east of the unit. The shoreline consists of precipitous cliffs with steeply folding Wenlock series greywackee with natural arches.

2. NEEDLES EYE ARCH to BLACKBURN

BRIDGE

NX 895 554

2.5km

Cliff (<10)

Till

This unit contains till over outcropping rock platform. At the head of Sandyhills Bay, blown sand has formed a low system of dunes. To the east of Sandyhills Bay, till overlies rock cliffs. The foreshore east and west of the bay is predominantly sand and poorly sorted boulders. The beach in the bay is mainly clean sand and marine shells. The distance between the MHWMS and the MLWMS is estimated to be c.3km.

3. BLACKBURN BRIDGE to west of

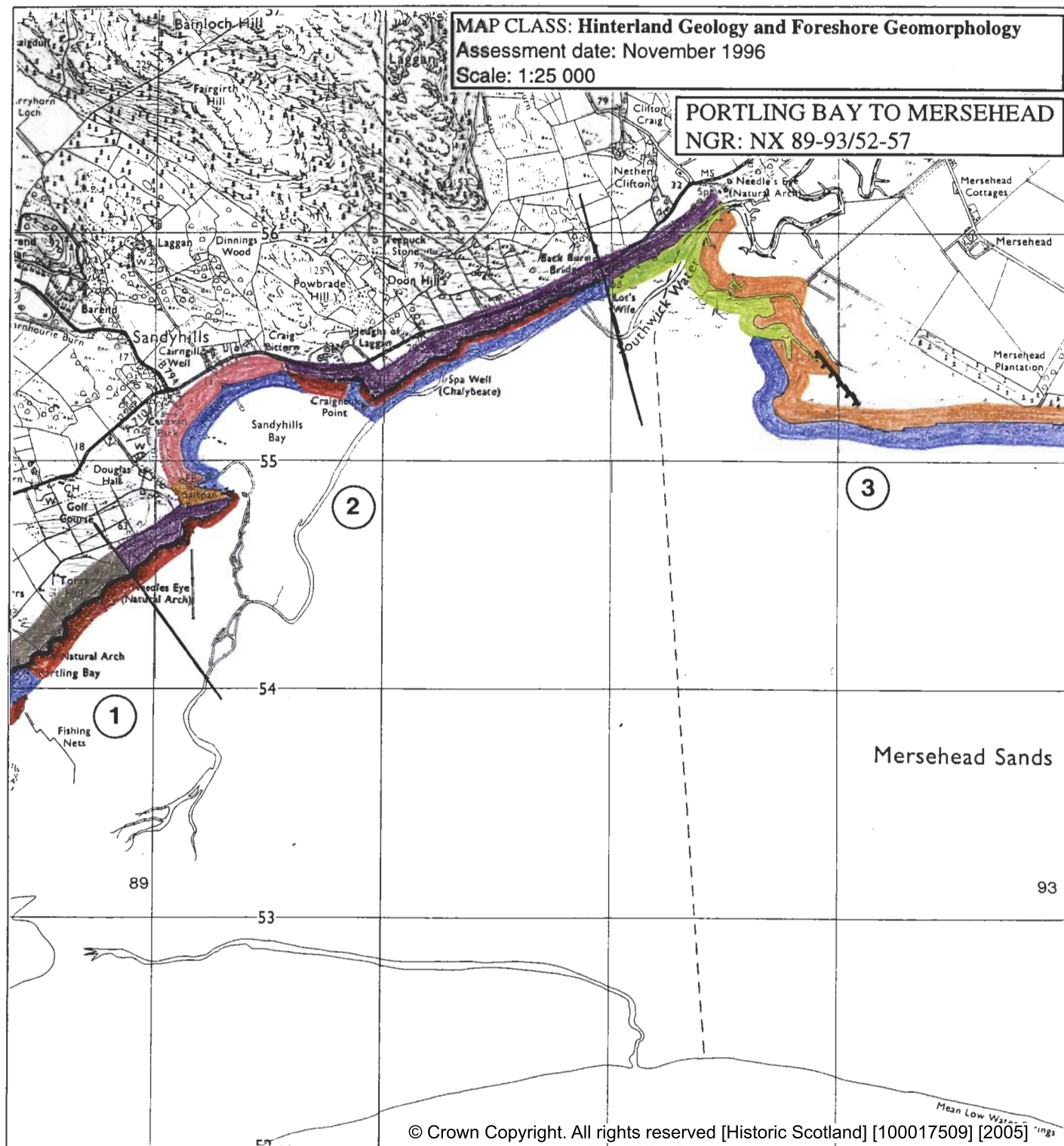
SOUTERNESS POINT

NX 950 550

8.3km

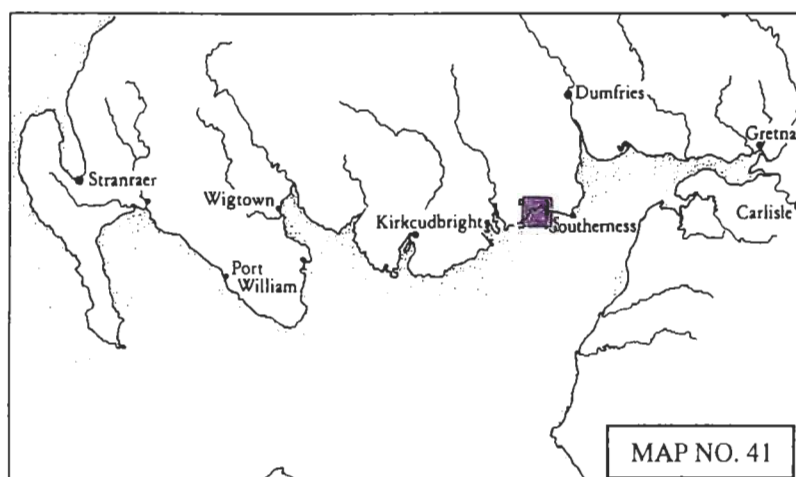
Sand dunes

This unit has a uniform hinterland of Holocene raised sand and gravel coastal deposits that form a series of elongate terraces and ridges. These overlook wide sand flats with an estimated tidal reach (springs) of 4km towards Southerness Point.



KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermilion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 41: EROSION

1. SALTPAN ROCKS to BLACK BURN BRIDGE

NX 894 554

2.1km

Eroding/eroding or stable

This unit includes Sandy Hills Bay (NX 884554) which contains a dune system that has evidence of severe erosion both at the MHW and also intensified by tourist pressure. The surrounding shore has a wide intertidal area that is mainly shingle and sand bars that appears to be stable at the present.

2. Mouth of SOUTHWICK WATER to CAULKER BUSH

NX 924 566

5km

Both accreting and eroding

Tidal stretch of the Southwick Water which is a meandering river with large loops. Erosion is occurring on the inside curves and mud is accreting on the calmer stretches.

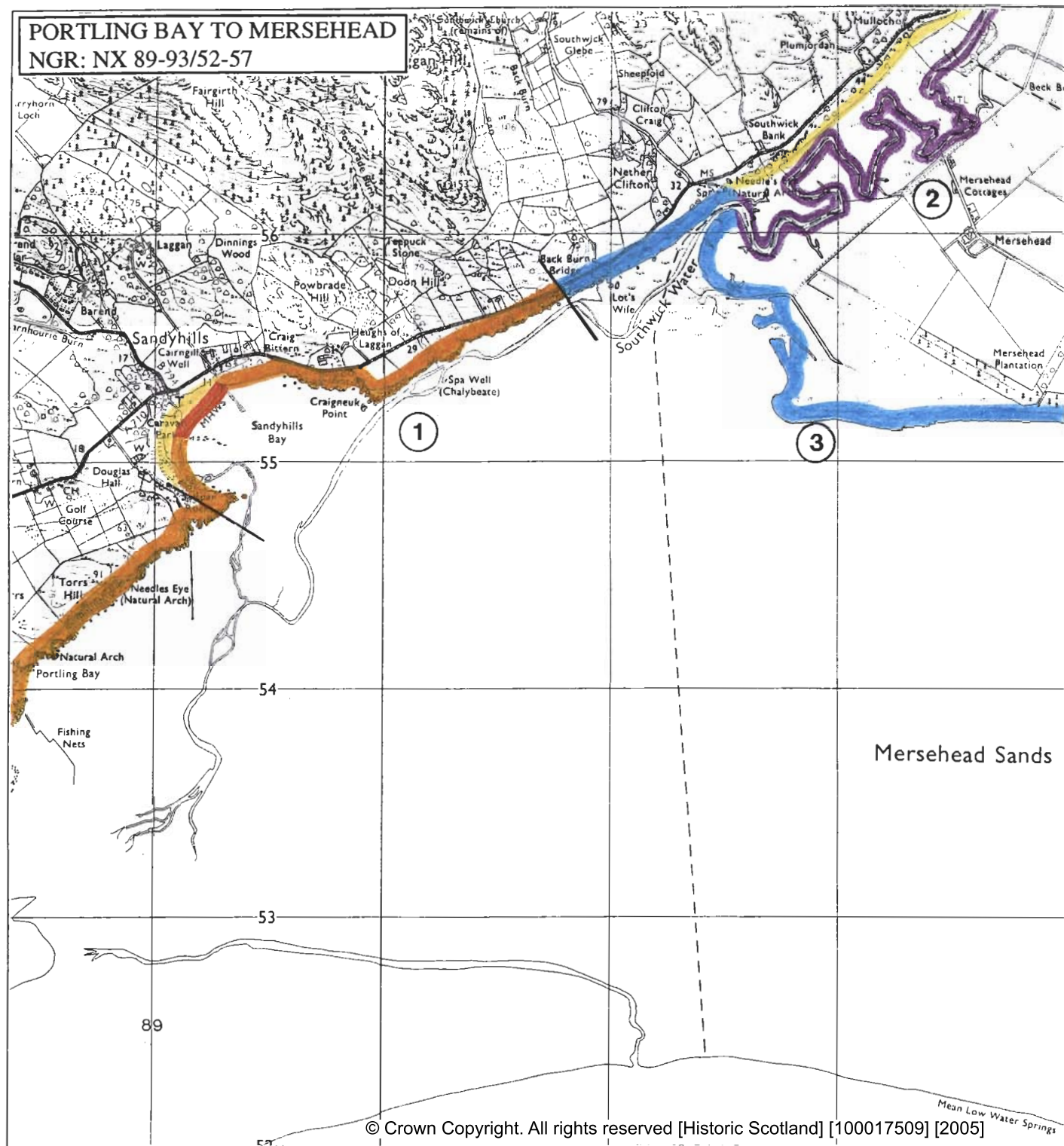
3. BLACKBURN BRIDGE to south of PRESTON MERSE

NX 926 552

4.3

Accreting or stable

Very straight sandy beach backed by stable dune systems. No erosion is occurring at the present.



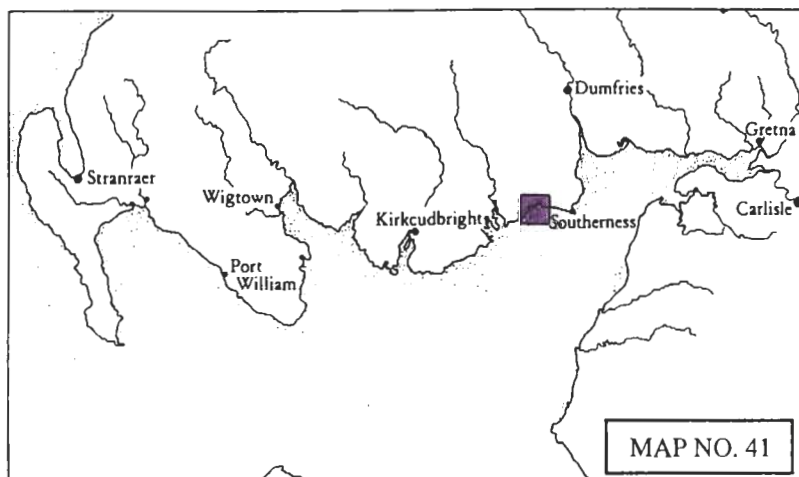
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 10.10.96

Scale 1:25 000



MAP 41: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

None

Sites in the Hinterland

NX 8918 5488

SANDYHILLS BAY

Salt pans

18/19th century

Good

Nil

NX 8904 5530

BARNHOURIE MILL, SANDYHILLS

Old Mill

Uncertain

Good

Nil

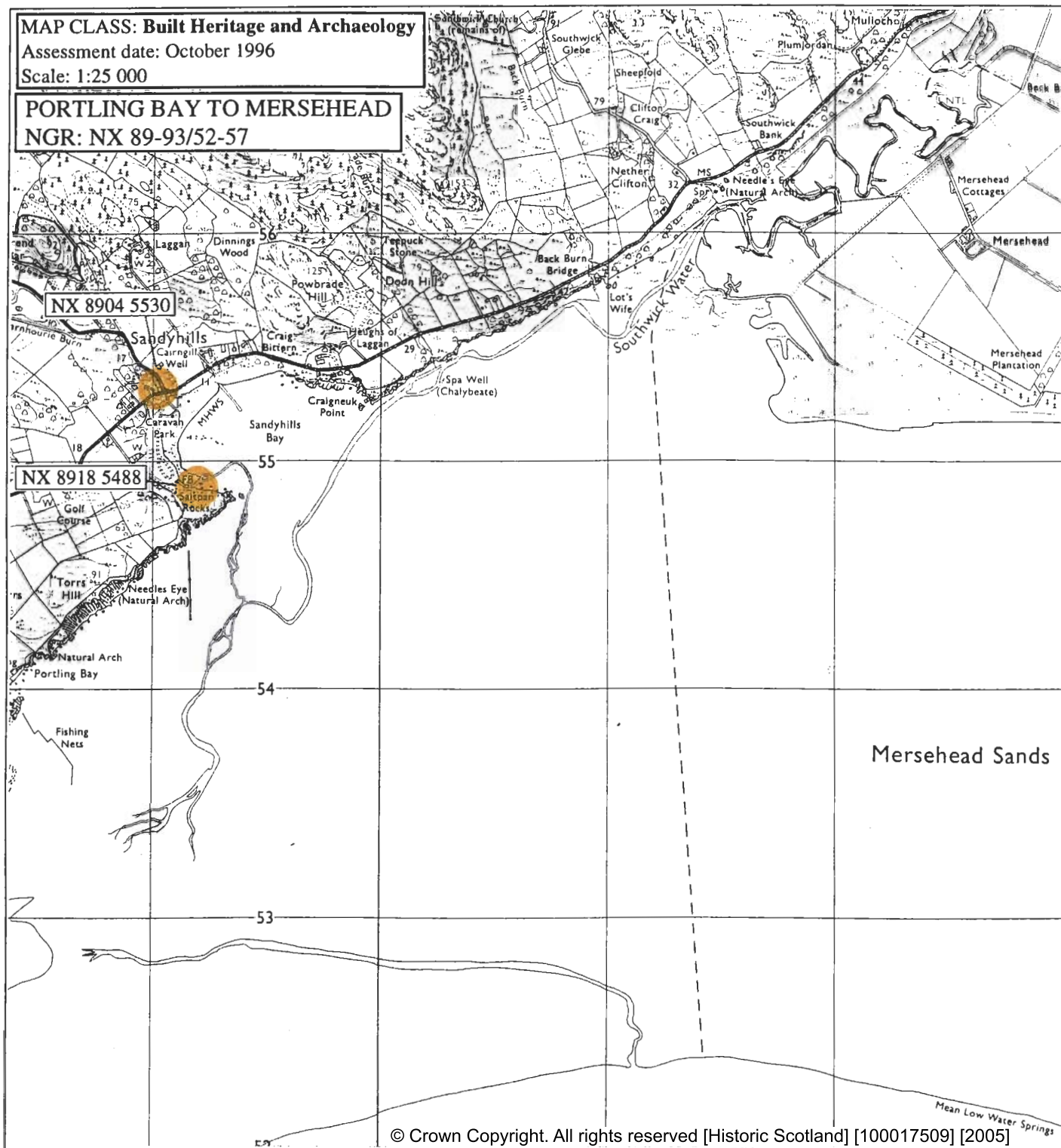
MAP CLASS: Built Heritage and Archaeology

Assessment date: October 1996

Scale: 1:25 000

PORTLING BAY TO MERSEHEAD

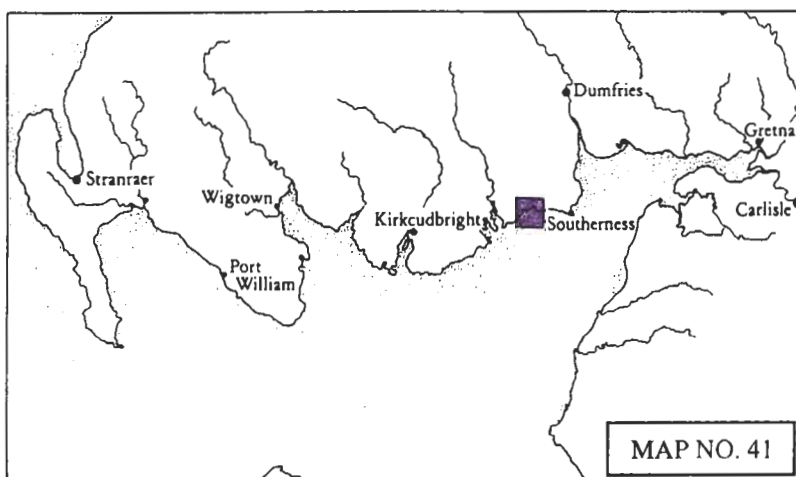
NGR: NX 89-93/52-57



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KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 42: MERSEHEAD TO SOUTHERNESS

Hinterland Geology and Coastal Geomorphology: This particular stretch of the coastline is dominated by blown sand on coastal carse deposits. The dunes are extensive and run sub-parallel to the foreshore. The dunes protect merseland and on their seaward side and overlook sand-flats that have a wide intertidal area towards Southernness Point.

Erosion Class: No erosion is occurring along the dune system at the present.

Built Heritage & Archaeology: The remains of a quarry kiln near Southernness Point survives in this section of the coastline. Situated at the edge of the merseland behind the coastal edge, it is not susceptible to coastal erosion.

Map 42: Hinterland Geology and Coastal Geomorphology

1. BLACKBURN BRIDGE to west of SOUTERNESS POINT

NX 950 550

8.3km

Sand dunes

This unit has a uniform hinterland of Holocene raised sand and gravel coastal deposits that form a series of elongate terraces and ridges. These overlook wide sand flats with an estimated tidal reach (springs) of 4km towards Southerness Point.

2. SOUTERNESS POINT

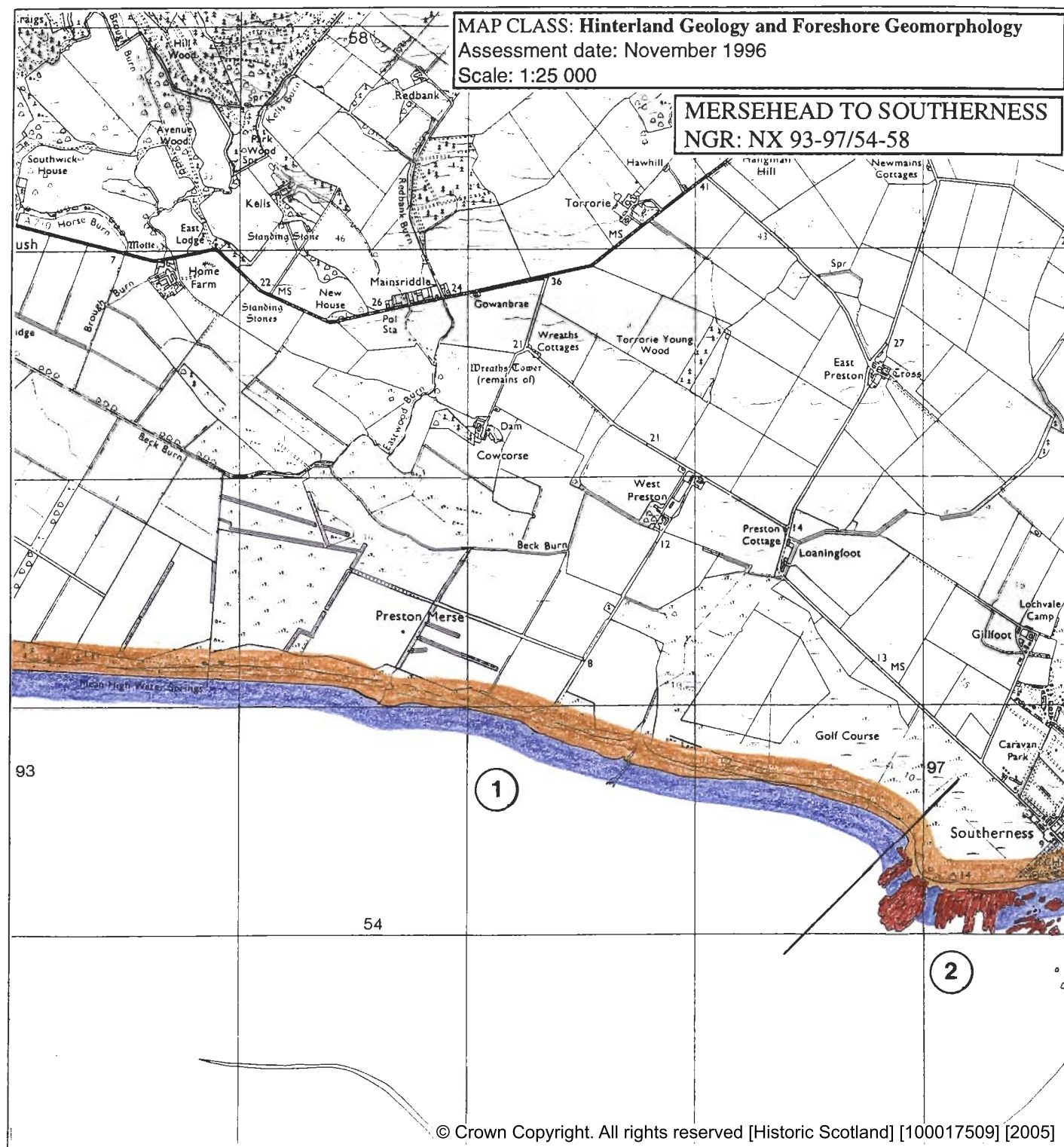
NX 975 545

2km

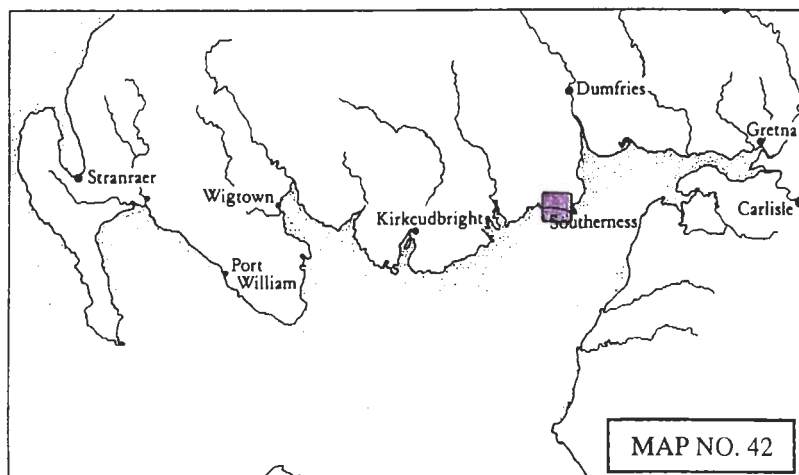
Low edge (< 5m)

Marine deposits over visible rock

Southerness Point is a promontory headland with outcropping folded limestone platforms. The hinterland consists of marine sands and gravels.



KEY		
Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermilion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 42: EROSION

1. South of PRESTON MERSE to west of
SOUTHERNESS POINT

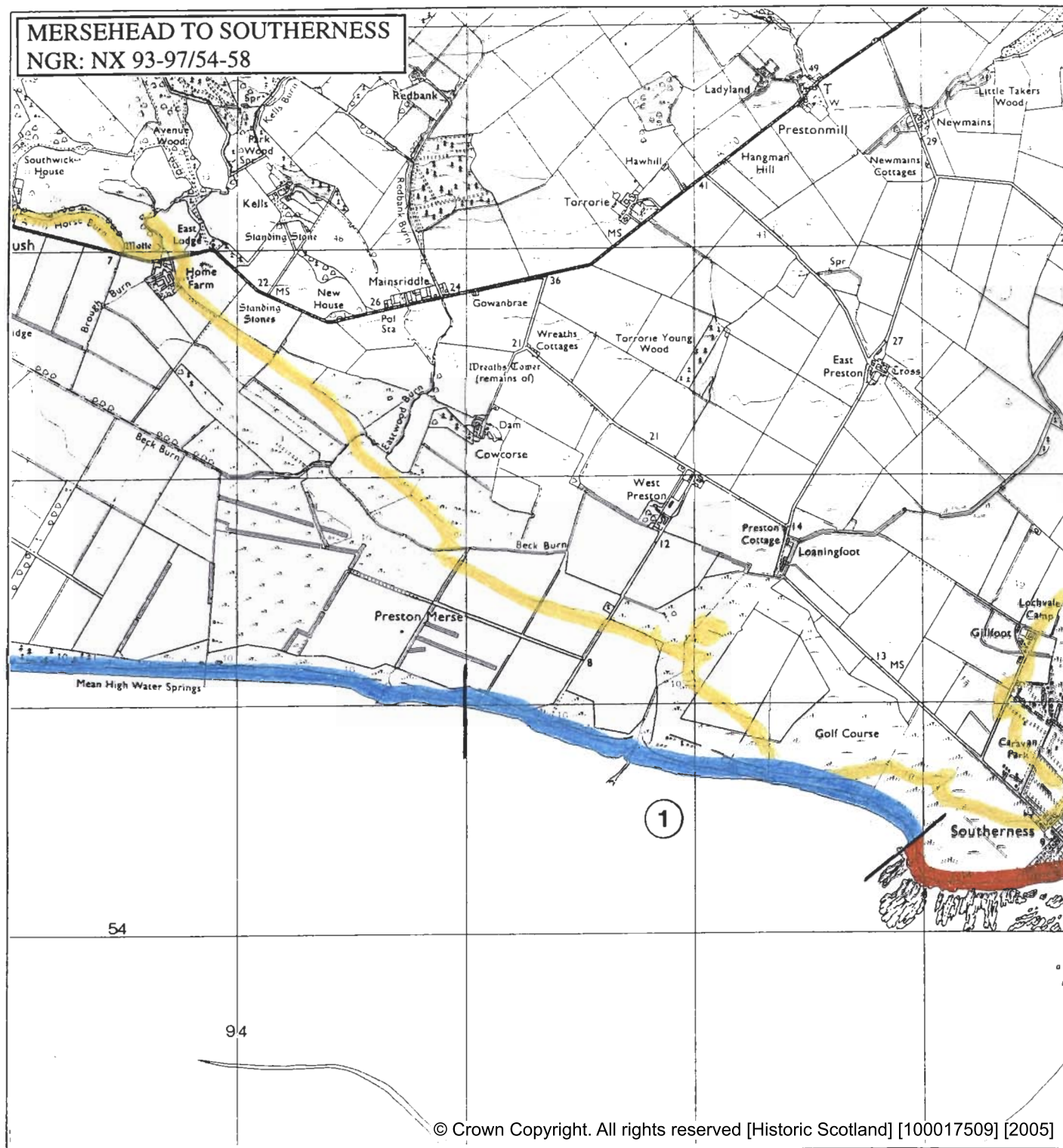
NX 957 547

2km

Accreting or stable

Continuation of the dune system with sandy
beach. No erosion is occurring at the present.

MERSEHEAD TO SOUTHERNESS NGR: NX 93-97/54-58



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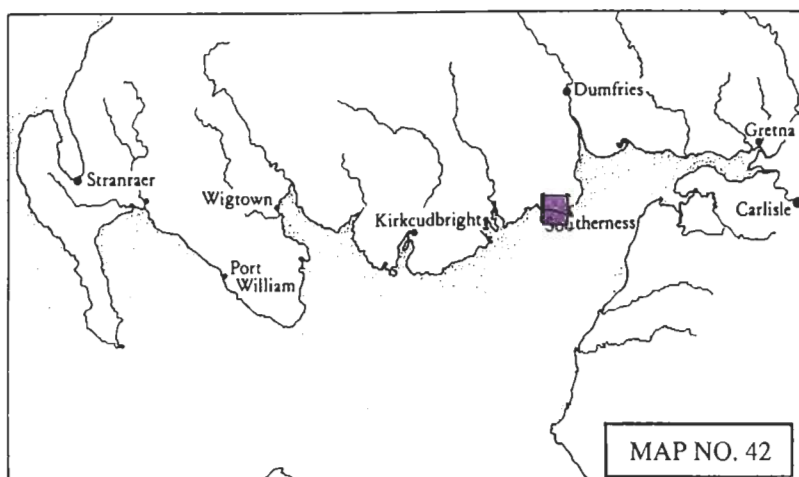
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 10.10.96

Scale 1:25 000



MAP NO. 42

MAP 42: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

None

Sites in the Hinterland

NX 9705 5425
SOUTHERNESS
Quarry Kiln
Uncertain
Good
Nil

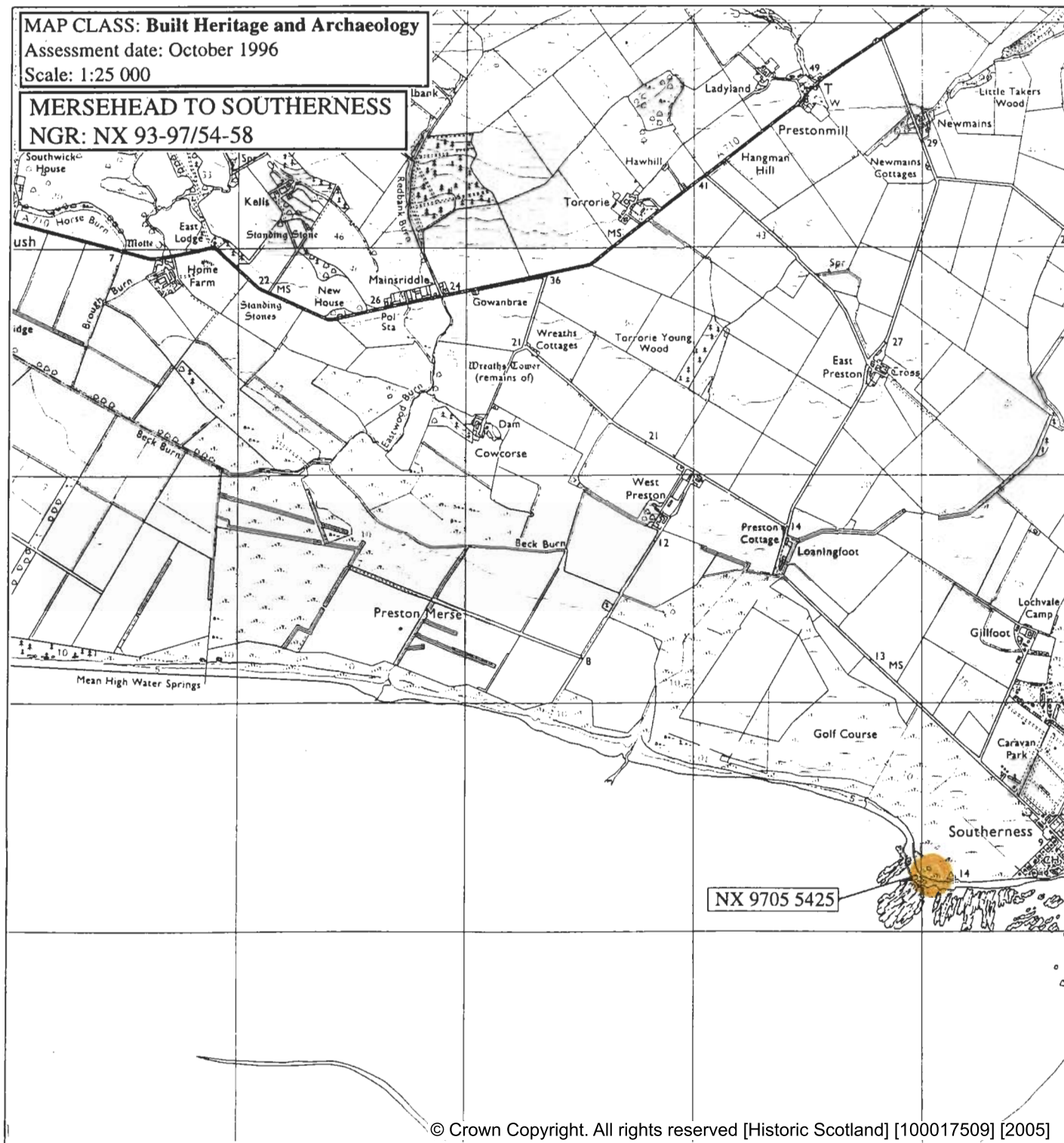
MAP CLASS: Built Heritage and Archaeology

Assessment date: October 1996

Scale: 1:25 000

MERSEHEAD TO SOUTHERNESS

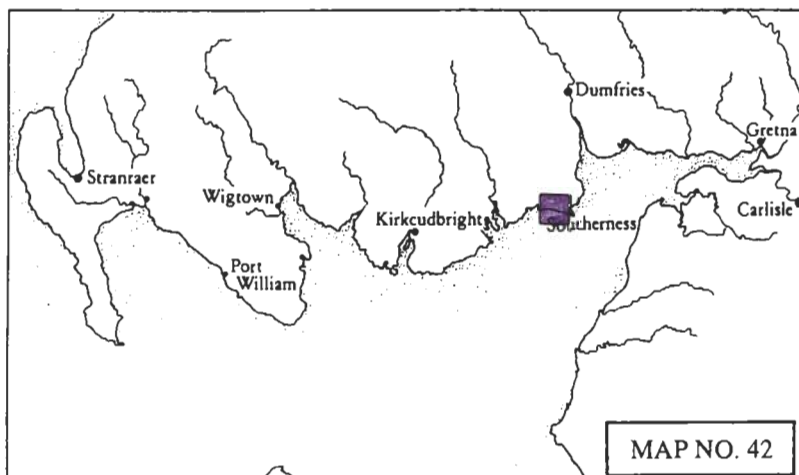
NGR: NX 93-97/54-58



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KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg. NX 143 368	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg. NX13 SW17	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 43 WEST PRESTON (SOUTHERNESS POINT) TO ARBIGLAND

Hinterland Geology and Coastal Geomorphology: Dunes and marine sands and gravel cover exposed rock platform at Southernness Point which forms an exposed promontory headland.. Northwards to Powillimount farm, glacial sands and gravels, and till covers a low cliff-edge. Here greywackee rock is visible down to the HWM. The beaches are gradual with an admixture of sand and shingle. The foreshore at Southernness contains wave cut platforms.

Erosion Class: At Southernness Point attempts to consolidate the foreshore are failing. The shore in front of the caravan park is seriously eroding. A local resident commented on the severity and impact of recent autumnal gales. These have had an adverse effect on the earlier repairs undertaken at this particular section of the cliff section. To the north east the beach appears to be stable but liable to erosion. Towards Thirl Stone this region of coastline is attacked from easterly gales and is considered to be definitely eroding.

Built Heritage & Archaeology: This section contains two sites, both situated at Southernness Point. Southernness Lighthouse, built circa 1748 (Stell, 1984, 64), survives in a slightly dilapidated state. Wave erosion, probably on an infrequent basis at exceptionally high tides, may be inflicting limited damage on the base of the tower and monitoring is recommended. Located in the immediate hinterland behind the lighthouse are a collection of cottages, representing the old village of Southernness, which are inhabited and under no threat from coastal erosion.

Map 43: Hinterland Geology and Coastal Geomorphology

1. BLACKBURN BRIDGE to west of SOUTERNESS POINT

NX 950 550

8.3km

Sand dunes

This unit has a uniform hinterland of Holocene raised sand and gravel coastal deposits that form a series of elongate terraces and ridges. These overlook wide sand flats with an estimated tidal reach (springs) of 4km towards Southerness Point.

2. SOUTERNESS POINT

NX 975 545

2km

Low edge (< 5m)

Marine deposits over visible rock

Southerness Point is a promontory headland with outcropping folded limestone platforms. The hinterland consists of marine sands and gravels.

3. GILLFOOT BAY to HOGUS POINT

NX 998 580

3.8km

Low edge (< 5m)

Glacial sands and gravel/till over visible rock

This unit contains a fairly regular coastal edge with a headland formed at Boron Point. Here till overlies outcropping argillaceous and sandy limestones. Glacial sands and gravels occur at Powillimount. The intertidal zone is wide consisting of sand and boulders.

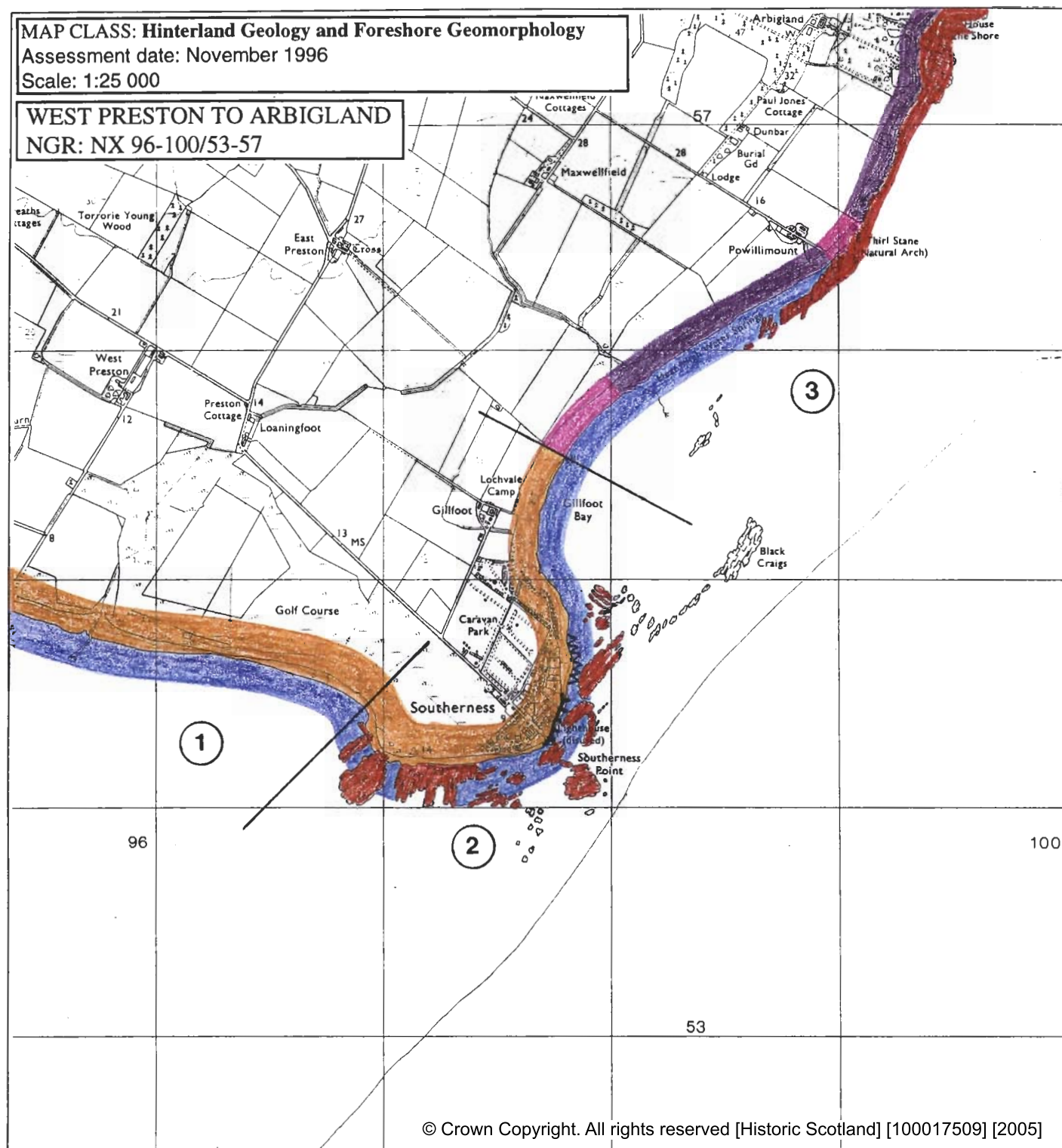
MAP CLASS: Hinterland Geology and Foreshore Geomorphology

Assessment date: November 1996

Scale: 1:25 000

WEST PRESTON TO ARBIGLAND

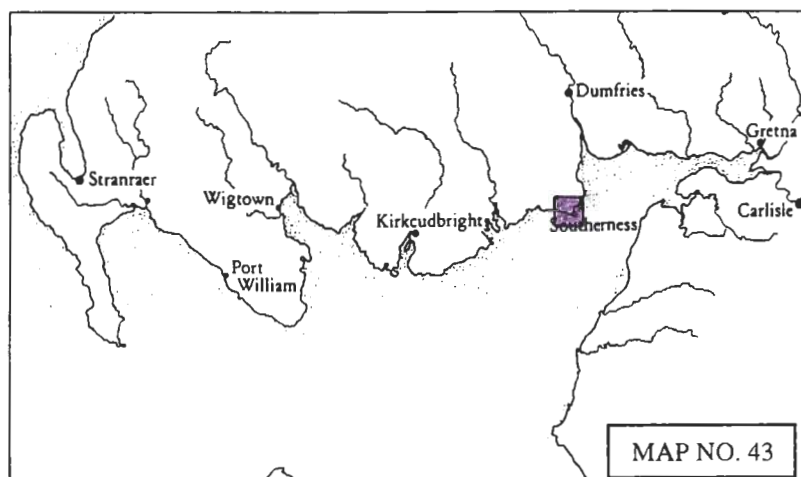
NGR: NX 96-100/53-57



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KEY

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Drift, boulder clay	French Grey	
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Alluvium	Emerald Green	
Coastal Geomorphology		
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Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 43: EROSION

1. West of SOUTHERNESS POINT to south of GILLFOOT BAY

NX 975 542

1.6km

Definitely eroding

This unit contains the exposed promontory headland of Southernness. Rock platform outcrops on the low intertidal area, with sand and shingle bars in between. East of the caravan park, a sea wall has collapsed and has been repaired with concrete caravan anchor blocks. Wave action is now eroding these repairs.

2. GILLFOOT BAY to south of POWILLIMOUNT FARM

NX 980 558

1.5km

Eroding or stable

This unit consists of mainly sand and shingle at the HWM with shingle and poorly sorted boulders across a wide intertidal zone. Some scouring is occurring between the rocky outcrops.

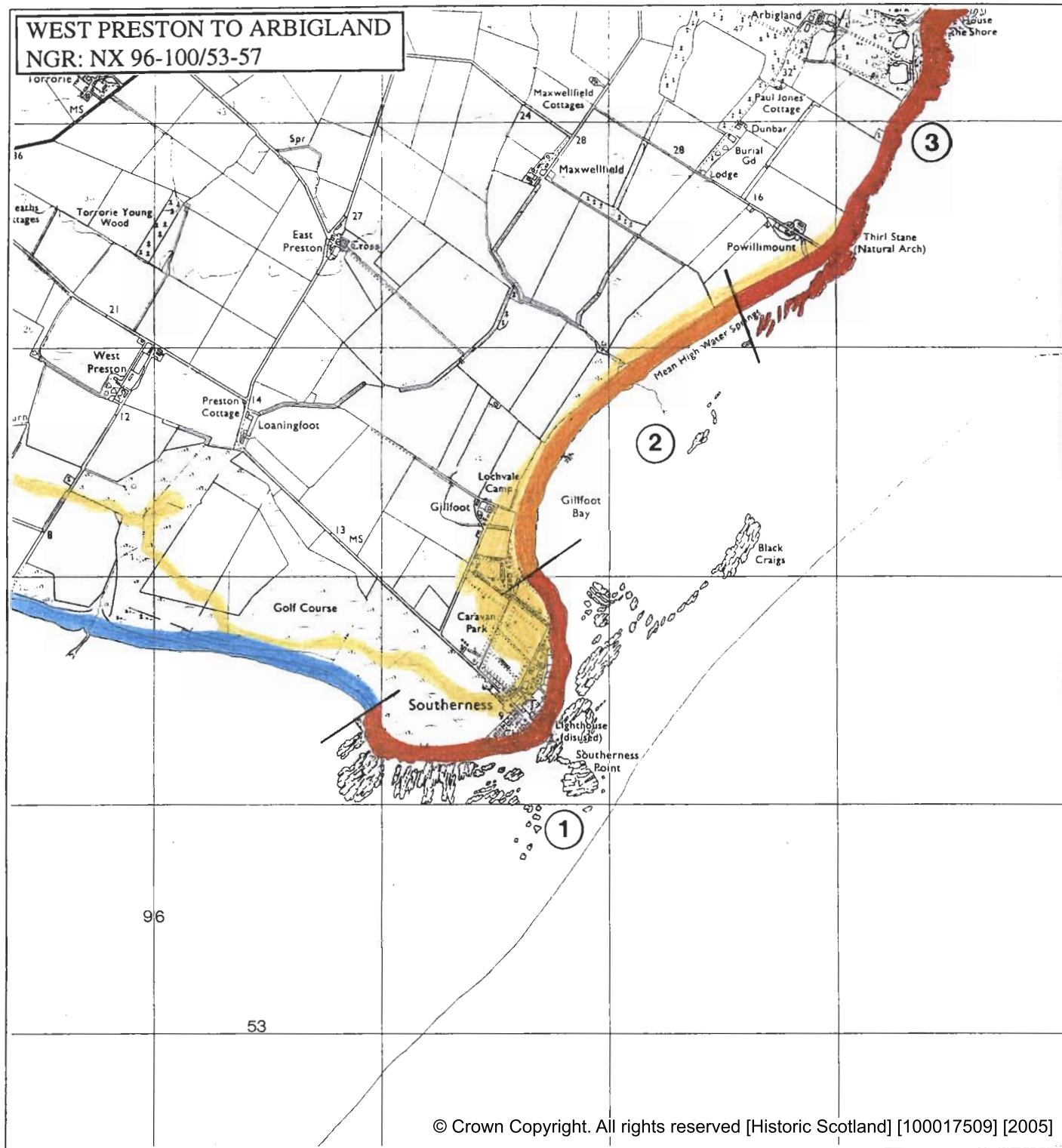
3. South of POWILLIMOUNT FARM to BORRON POINT

NX 993 570

2km

Definitely eroding

Deeply incised rock platforms with basal erosion due to boulder and shingle abrasion. Gullies have been scoured along fault lines within the Carboniferous Limestone. The rate of erosion is estimated to be slow.



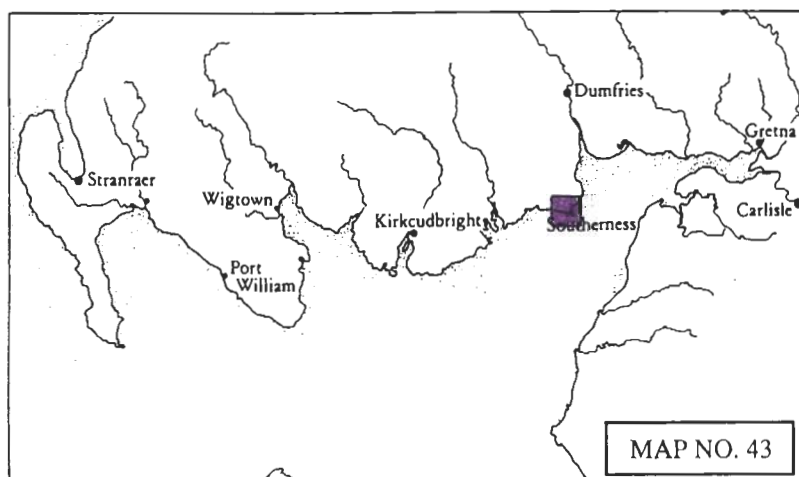
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 09.10.96

Scale 1:25 000



MAP 43: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

NX95SE 1
NX 9774 5428
SOUTHERNESS
Lighthouse
18/19th century
Fair
Monitor

Sites in the Hinterland

NX95SE 2
NX 975 543
SOUTHERNESS
Cottages
Uncertain
Good
Nil

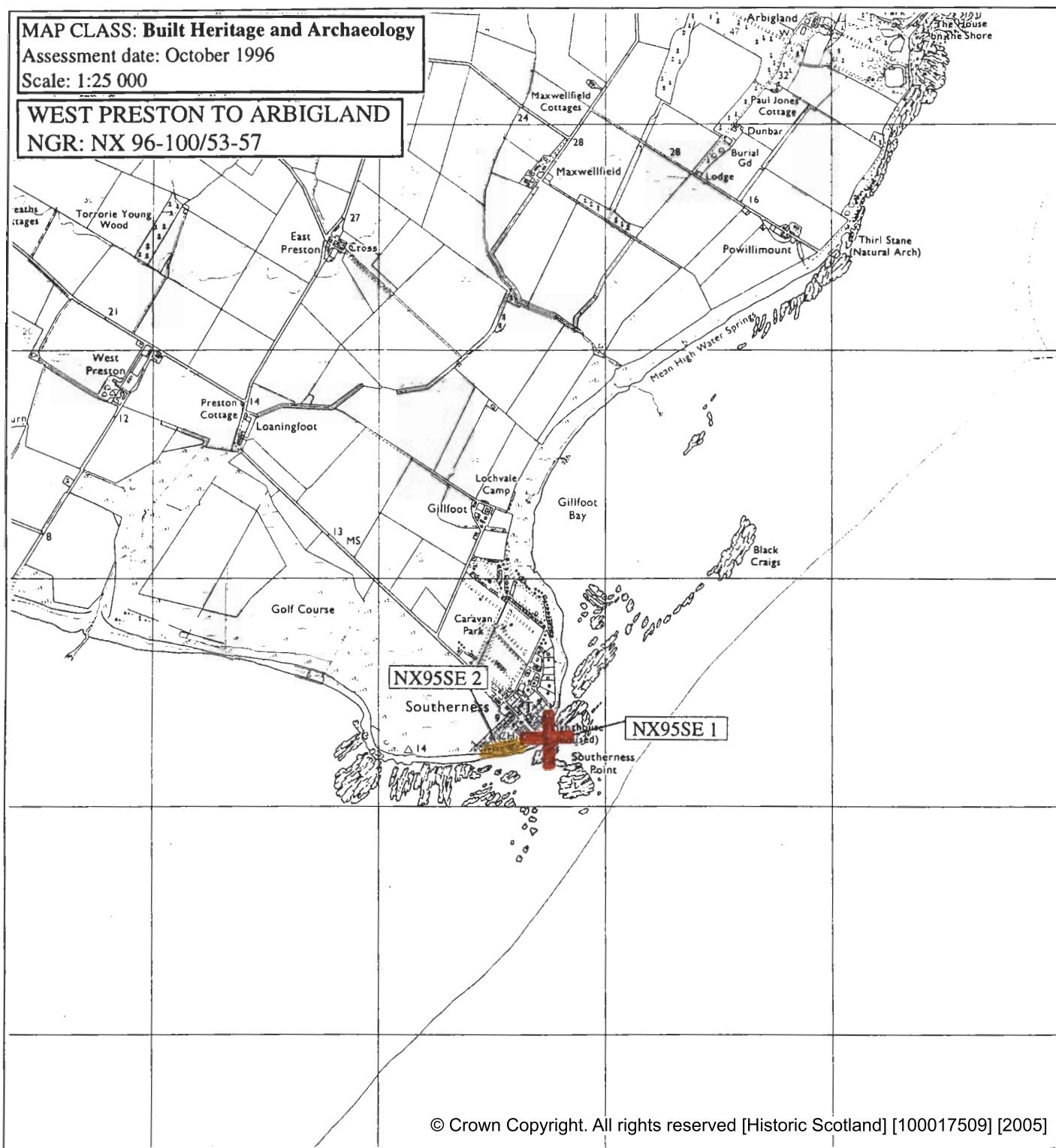
MAP CLASS: Built Heritage and Archaeology

Assessment date: October 1996

Scale: 1:25 000

WEST PRESTON TO ARBIGLAND

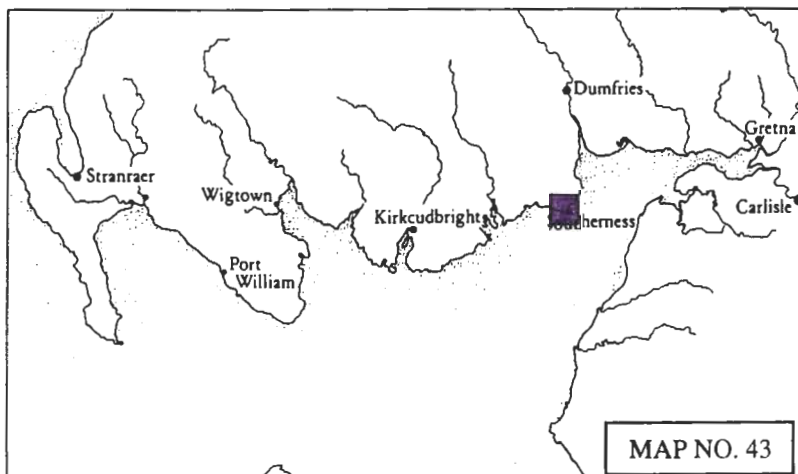
NGR: NX 96-100/53-57



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NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
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NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
	Roundel - Solid, (or area)	Yellow	Undesignated wreck
NX 13 SW 17	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP NO. 43

MAP 44: GILLFOOT TO CARSETHORN

Hinterland Geology and Coastal Geomorphology: This region of the coast forms the outer estuary of the Solway Firth and is very exposed. Tills and glacial deposits overlie an exposed rocky headland at Borron Point. Here cliff recession has exposed wide rock platforms. Northwards the undulating landscape gives way to low lying carse land that lies below 5m O.D..

Erosion Class: Erosion is occurring along this stretch of coast albeit at a slow rate. Gillfoot Bay is exposed and subjected to easterly gales. Offshore stacks and arching at Thirl Stone attests to continued coastal erosion.

Built Heritage & Archaeology: A relatively dense concentration of sites are located along this stretch of the coast. The sites can be divided roughly into two chronological groups; one belonging to the Mesolithic period and the other belonging to the nineteenth and twentieth centuries. The first group includes four flint scatters clustered around Hogus Point and Carsethorn. Located on raised beaches, and therefore *possibly* indicating a *pre* - main glacial marine transgression date, some may include artefacts of the early Mesolithic period (Cormack, 1965; Jardine, 1980). Due to the inherent nature of the rapid field survey, however, it was not possible to closely investigate or locate the flint scatters. The other group consists of sea defences and gardens. The sea defences are suffering from wave action. It is therefore particularly important, in regard to the other archaeological sites on the coastal edge, that monitoring is undertaken in the future. A further site, McCulloch's Castle, belonging possibly to the later prehistoric and medieval periods (Scott-Elliot, 1964), is situated at the edge of the raised beach, and may be suffering from intermittent land slippage (Truckell, pers comm), although the heavily wooded slope of the coast at that point may have a stabilising effect.

Map 44: Hinterland Geology and Coastal Geomorphology

1. SOUTERNESS POINT

NX 975 545

2km

Low edge (< 5m)

Marine deposits over visible rock

Southernness Point is a promontory headland with outcropping folded limestone platforms. The hinterland consists of marine sands and gravels.

2. GILLFOOT BAY to HOGUS POINT

NX 998 580

3.8km

Low edge (< 5m)

Glacial sands and gravel/till over visible rock

This unit contains a fairly regular coastal edge with a headland formed at Boron Point. Here till overlies outcropping argillaceous and sandy limestones. Glacial sands and gravels occur at Powillimount. The intertidal zone is wide consisting of sand and boulders.

3. HOGUS POINT to BURNFOOT

NX 991 599

6.2km

Low edge (< 5m)

Marine sands and gravels

This unit is part of the lower region of the Solway Firth. The coastal edge is uniform with a hinterland of low lying marine sands and gravels overlying Carse clays. The foreshore consists of low lying tidal flats of sand and gravel.

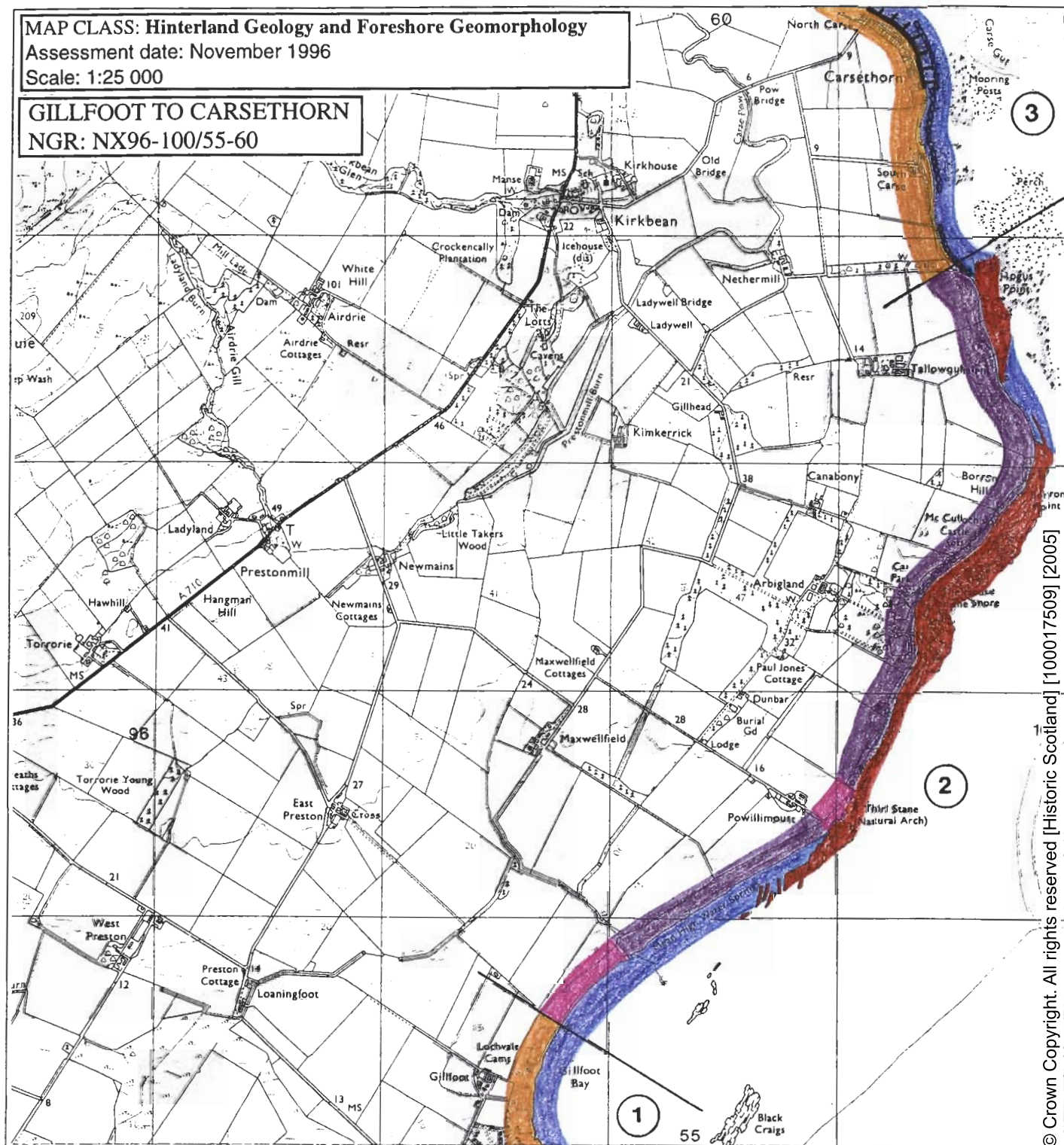
MAP CLASS: Hinterland Geology and Foreshore Geomorphology

Assessment date: November 1996

Scale: 1:25 000

GILLFOOT TO CARSETHORN

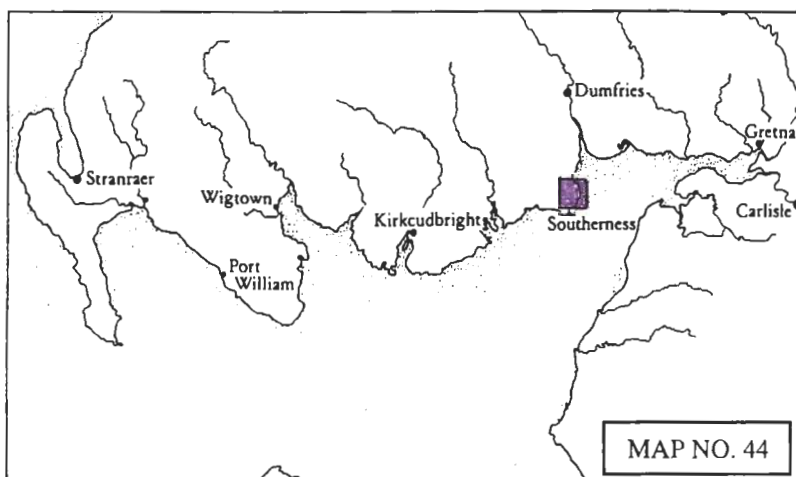
NGR: NX96-100/55-60



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KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 44: EROSION

**1. South of POWILLIMOUNT FARM to
BORRON POINT**

NX 993 570

2km

Definitely eroding

Deeply incised rock platforms with basal erosion due to boulder and shingle abrasion. Gullies have been scoured along fault lines within the Carboniferous Limestone. The rate of erosion is estimated to be slow.

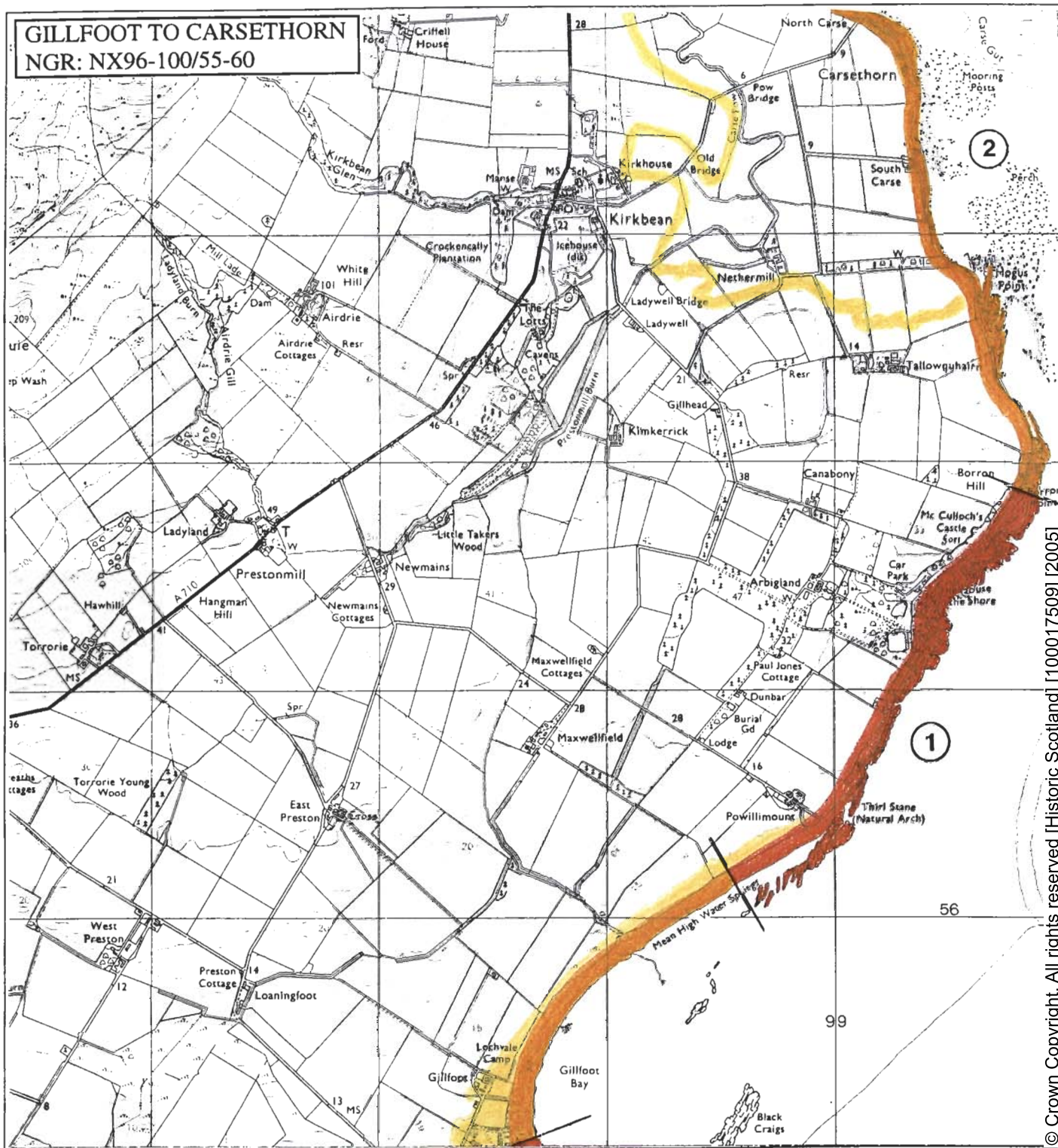
2. BORRON POINT to NORTH CARSE

NY 995 590

2.4km

Eroding or stable

Regular coastal edge broken in parts by outcropping rock platforms. Erosion has been reduced at Carsethorn by concrete sea walls and wooden groins. The greatest impact on this section of the coast occurs in stormy conditions when the sea defences are inundated.



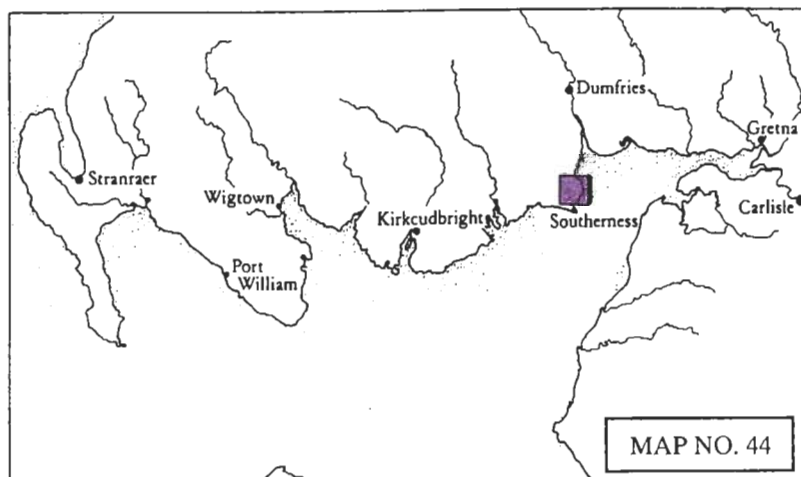
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 09.10.96

Scale 1:25 000



MAP 44: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

NX 99 56

ARBIGLAND HOUSE

Gardens

19/20th century

Good

Nil

NX 9940 5725

ARBIGLAND

Sea Defences & Fishtraps

20th century

Poor

Monitor

NX95NE 4

NX 9962 5769

MCCULLOCH'S CASTLE

Promontory Fort

Scheduled Ancient Monument

1st Mill BC/AD

Fair

Monitor

NX95NE 14

NX 996 587

HOGUS POINT

Flints findspot

6th to 2nd Mill. BC

Uncertain; not visited

Nil

NX 9942 5948

SOUTH CARSE

Former Sea Defence

Uncertain

Poor

Monitor

NX95NE 12

NX 992 599

CARSETHORNE

Flints findspot

6th to 2nd mill BC

Uncertain

Nil

Sites in the Hinterland

NX95NE 13

NX 998 581

BORRON POINT

Flints Findspot

6th to 2nd Mill. BC

Uncertain; not visited

Nil

NX95NE 40

NX 997 583

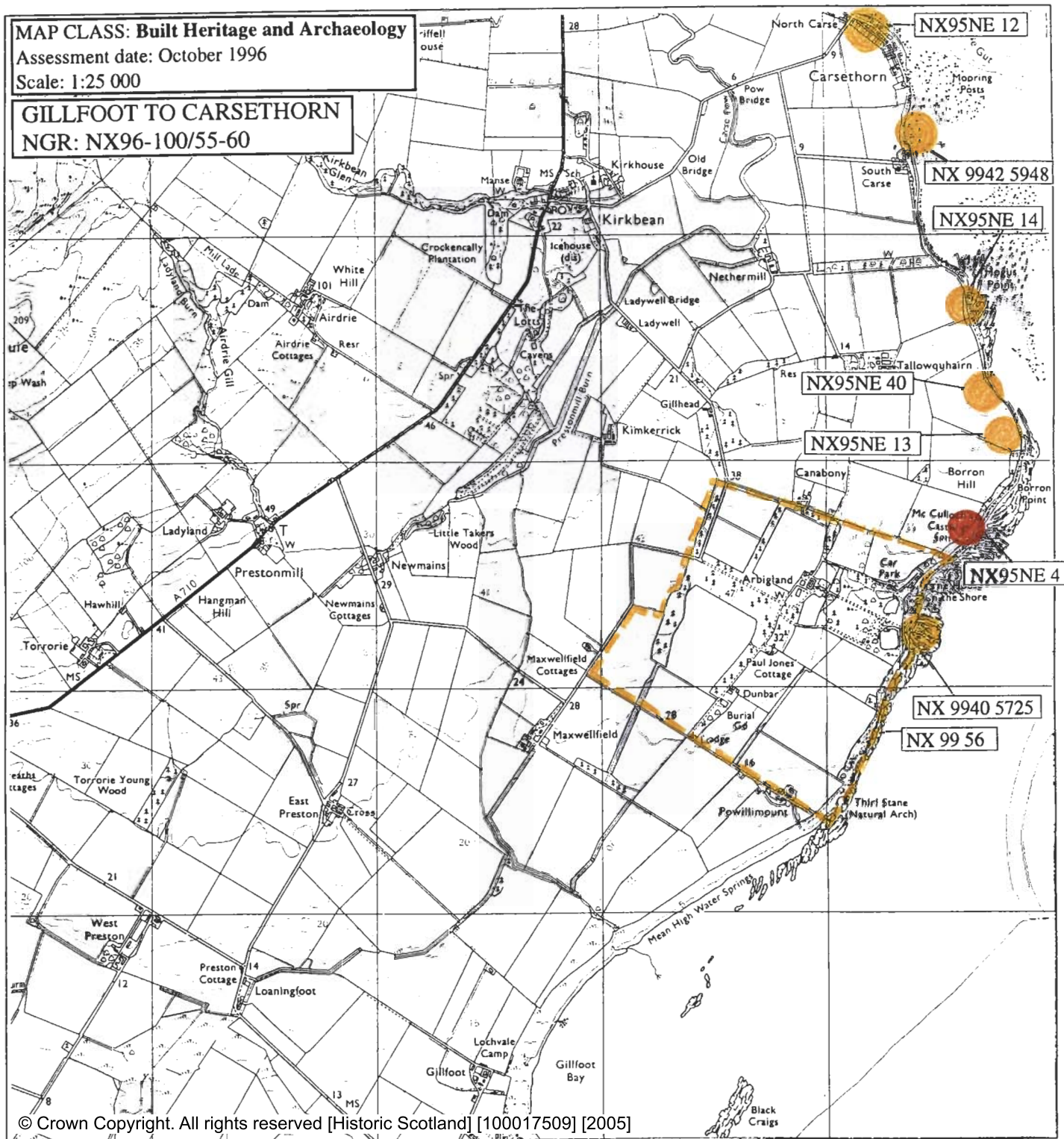
TALLOWQUHAIRN

Flints findspot

6th to 2nd Mill. BC

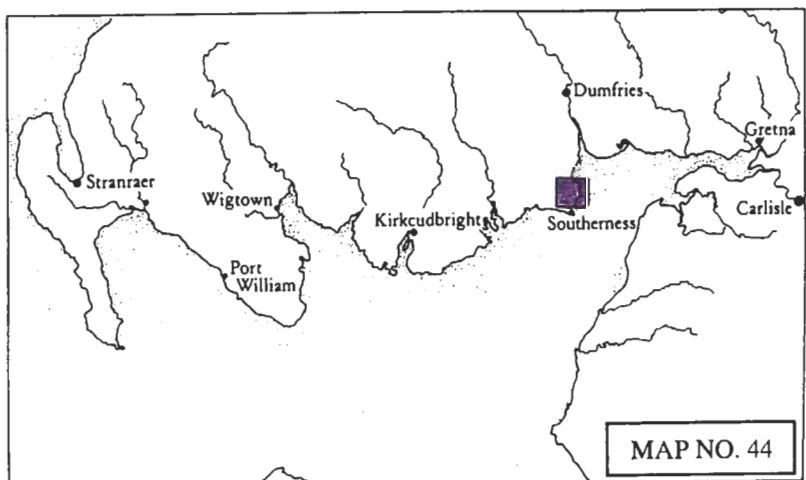
Uncertain; not visited

Nil



KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
NX 143 368	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
	Dashed outline	Yellow	Gardens/Designed landscape
NMRS ref. - eg.	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 45: CARSETHORN TO INGLESTON MERSE

Hinterland Geology and Coastal Geomorphology: This stretch of flat featureless coastline is dominated by merseland with a coastal edge lying below 5m O.D. The hinterland is dominated by estuarine and coastal-bar deposits. These “Carse Clays” (actually an admixture of fine textured silts and clays) indicate deposition in sheltered water conditions. The coastal edge is dominated by salt-marsh from Carse Bay to Burnfoot. Further north the coastline is more sheltered and estuarine.

Erosion Class: Salt-marsh protects the coastal edge from erosion and is generally stable. Local erosion is likely to arise where river channels flow close to the edge of the shoreline.

Accretion of estuarine mud will occur within the narrow drainage channels and these features are prone to erosion when the marsh is inundated on large spring tides.

Built Heritage & Archaeology: This stretch of the coastline again contains two distinct chronological groups; a Mesolithic group and a twentieth century group. The first group consists of two flint findspots; one represents a flint scatter found on the beach in Carse Bay, the other flint scatter was found near the mouth of Kirkbean Burn. Again owing to the inherent nature of these sites and the remit of the survey it was not possible to locate them. Two World War 2 watch towers, a pier and a set of fishing net stakes represent the other chronological group in this section. All the monuments are eroding, to varying degrees, and monitoring is recommended.

Map 45: Hinterland Geology and Coastal Geomorphology

1. HOGUS POINT to BURNFOOT

NX 991 599

6.2km

Low edge (< 5m)

Marine sands and gravels

This unit is part of the lower region of the Solway Firth. The coastal edge is uniform with a hinterland of low lying marine sands and gravels overlying Carse clays. The foreshore consists of low lying tidal flats of sand and gravel.

2. BURNFOOT to AIRNS POINT

NX 986 653

4km

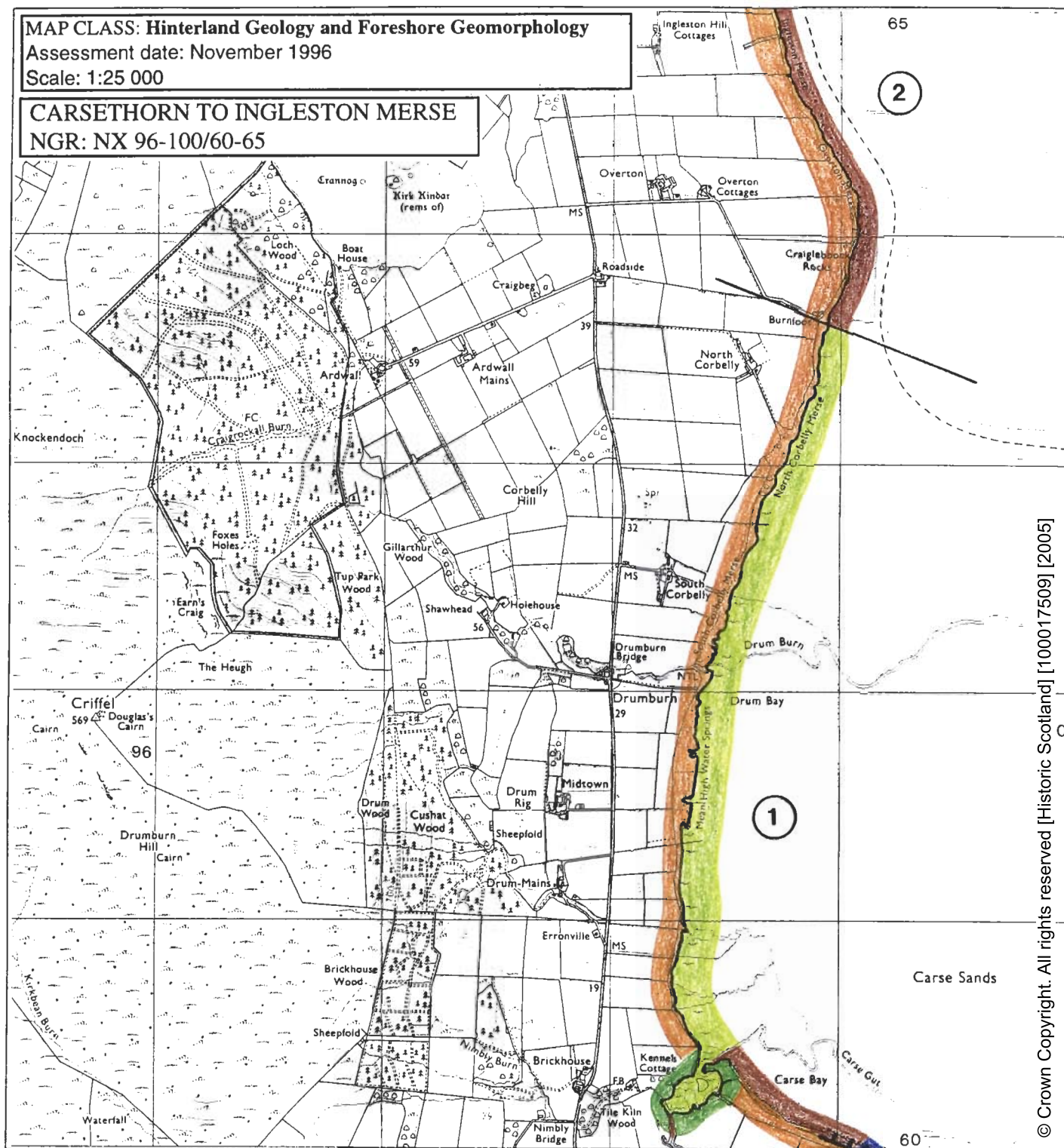
Low edge (< 5m)

Marine sands and gravels

Marine sands and gravels overlie Carse clays. A cleft has been formed at Airds Merse possibly as a result of marine inundation. The foreshore consists of low lying tidal sand and mud flats.

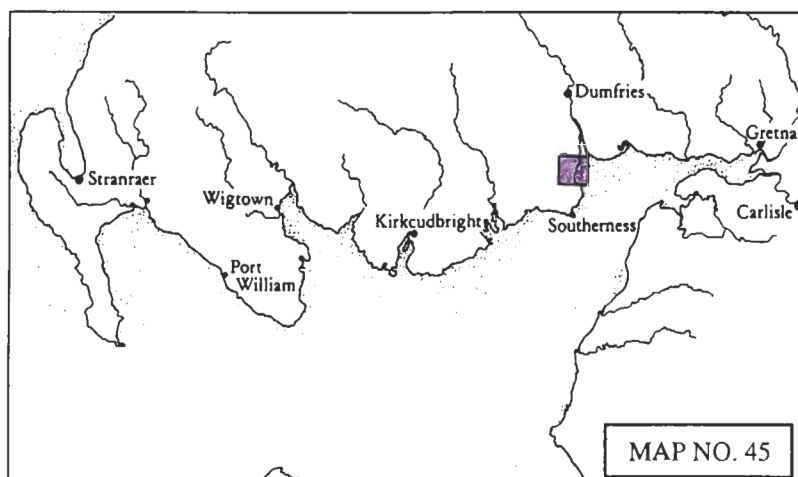
Scale: 1:25 000

NGR: NX 96-100/60-65



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Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermilion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 45: EROSION

1. CARSE BAY north to INGLESTON MERSE

NY 985 626

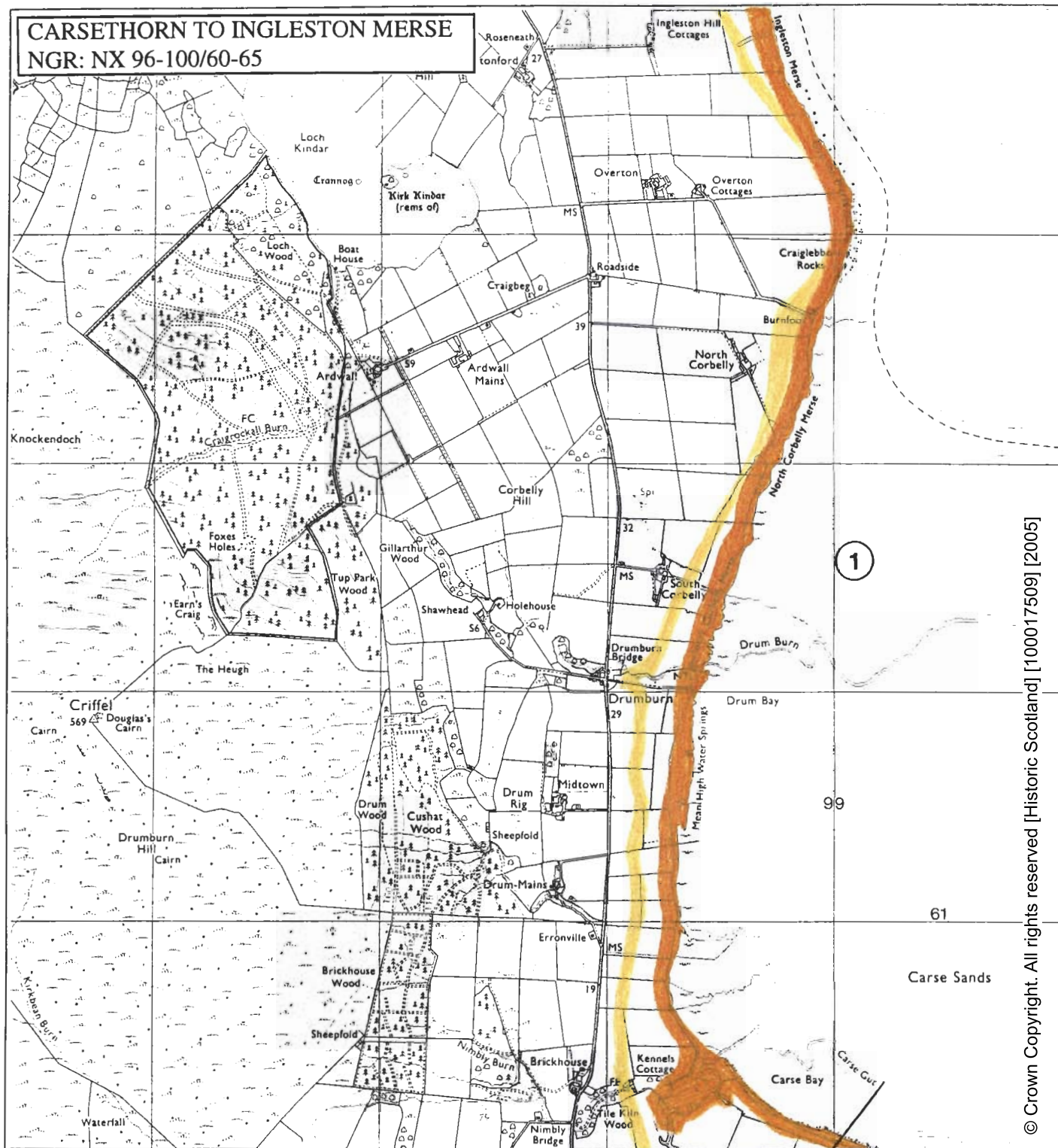
5.9km

Eroding or stable

This unit forms the estuary of the River Nith. The HWM is consolidated by marsh vegetation backing onto mud flats. Erosion by slope failure is occurring in parts but in general this region is stable.

CARSETHORN TO INGLESTON MERSE

NGR: NX 96-100/60-65



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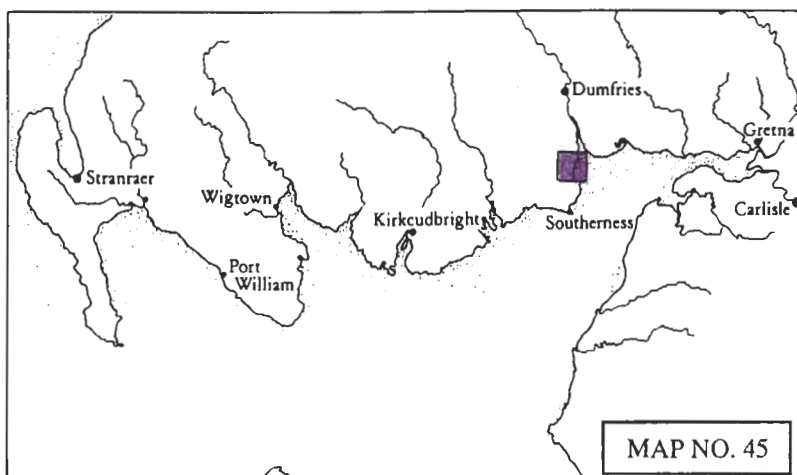
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 09.10.96

Scale 1:25 000



MAP 45: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

NX96SE 14
NX 9910 6004
CARSETHORN
Pier
Uncertain
Poor
Survey & Monitor

NX96SE 11
NX 9888 6011
CARSE BAY
Flints findspot
6th to 2nd Mill BC
Uncertain; not visited
Nil

NX 9872 6078
CARSE SANDS
Fishing Stakes
Uncertain
Poor
Monitor

NX 9854 6246
SOUTH CORBELLY
WW2 Watch Tower
Mid 20th century
Fair
Monitor

NX 9899 6341
BURNFOOT
Fishing Stakes
Uncertain
Poor
Monitor

Sites in the Hinterland

NX 9836 6018
CARSETHORN
WW2 Watch Tower
Mid 20th century
Good
Nil

NX96SE 12
NX 9850 6026
KIRKBEAN BURN
Flints findspot
6th to 2nd Mill. BC
Uncertain; not visited
Nil

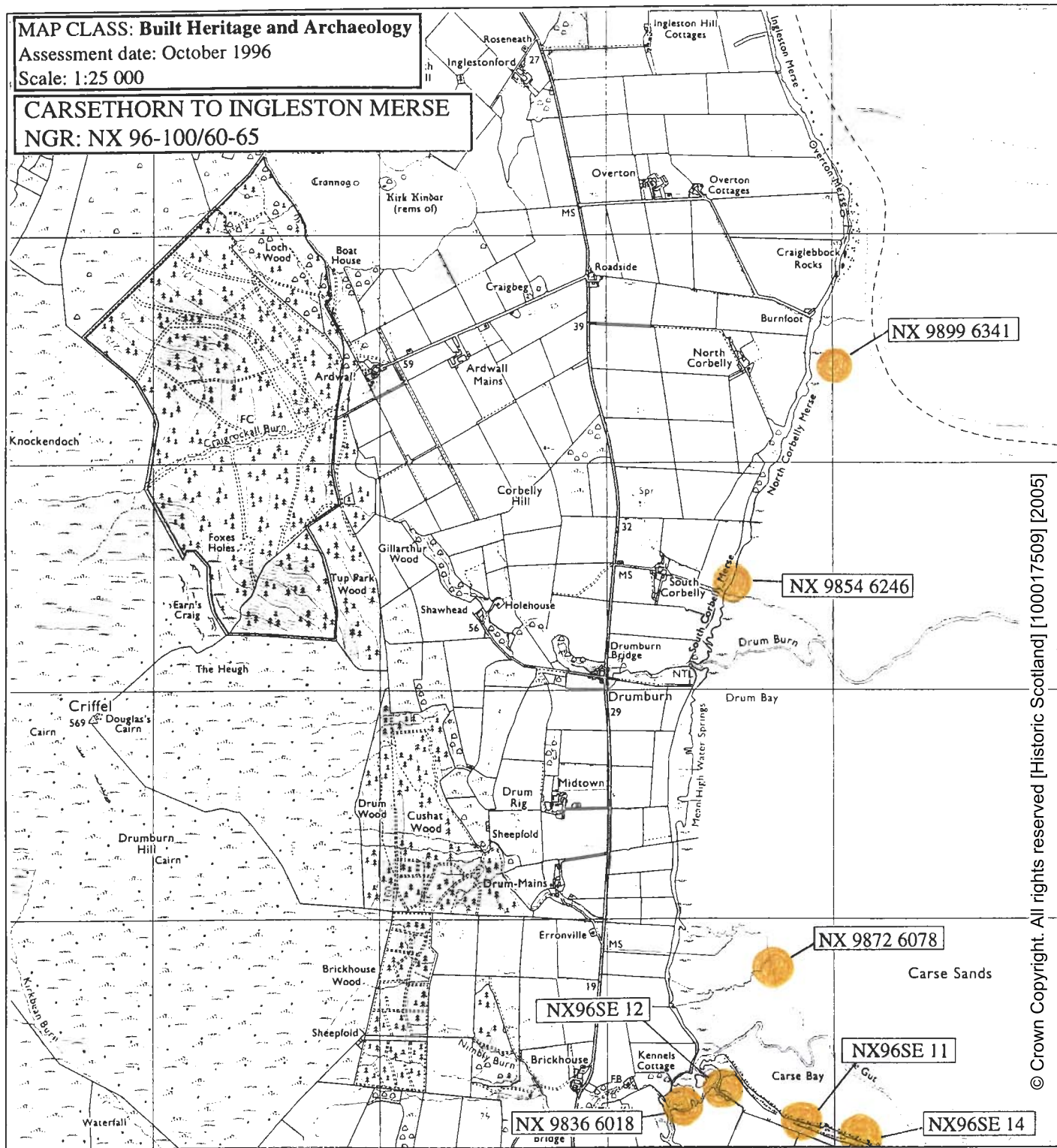
MAP CLASS: Built Heritage and Archaeology

Assessment date: October 1996

Scale: 1:25 000

CARSETHORN TO INGLESTON MERSE

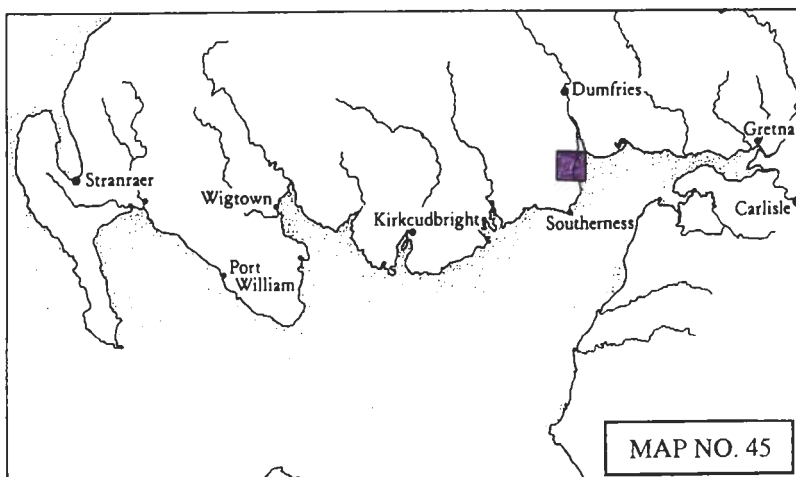
NGR: NX 96-100/60-65



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KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 46: INGLESTON MERSE TO KIRKONNELL MERSE

Hinterland Geology and Coastal Geomorphology: This region forms the lower estuary and mid-tidal reach of the River Nith. The hinterland is flat and lies below 5m O.D. Estuarine and coastal bar deposits are common at Igleston Merse. Till is present between Airds Point and Kirconnel Merse. Salt-marsh is a common feature at this location. Fluvioglacial sand and gravels are common near Glencaple.

Erosion Class: New Abbey Pow enters the Nith estuary at Pow Foot, The banks of this river are accreting and eroding. These conditions apply along the landward edge of Kirconnal Merse and either side of Glencaple village. The riverbank at Glencaple was seen to be stable.

Built Heritage & Archaeology: All archaeological monuments in this section are located on the coastal edge or river bank and most exhibit varying degrees of erosion. The dominant group of monuments in this section belong to the nineteenth and twentieth centuries and includes quays, shipwrecks, cottages and a coastal defence. The original quay at Glencaple was built in 1746 to accommodate ships too large to reach the major local port of Dumfries, further upstream (Graham & Truckell, 1977, 127). The present quay, which dates from the early nineteenth century, fulfilled a similar purpose but is now suffering from limited tidal erosion in places. Also included in this section are a newly discovered enigmatic enclosure at Ingleston, and St Columba's Well which, despite an extensive search, could not be located.

Map 46: Hinterland Geology and Coastal Geomorphology

1. BURNFOOT to AIRNS POINT

NX 986 653

4km

Low edge (< 5m)

Marine sands and gravels

Marine sands and gravels overlie Carse clays. A cleft has been formed at Airns Merse possibly as a result of marine inundation. The foreshore consists of low lying tidal sand and mud flats.

2. AIRNS POINT to KIRKCONNELL MERSE

NX 989 670

4km

Low edge (< 5m)

Till

Till overlies a low coastal edge Saltmarsh has formed at the HWM, beyond which lies wide tidal flats of intermixed alluvial mud and sand.

3. KIRKCONNELL MERSE to GREENMERSE

NX 984 690

2.7km

Low edge (< 5m)

Marine sands and gravels

This unit includes part of the lower tidal stretch of the River Nith. The hinterland is low lying with a cover of marine sands and gravels. The foreshore consists of saltmarsh and alluvial estuarine mud.

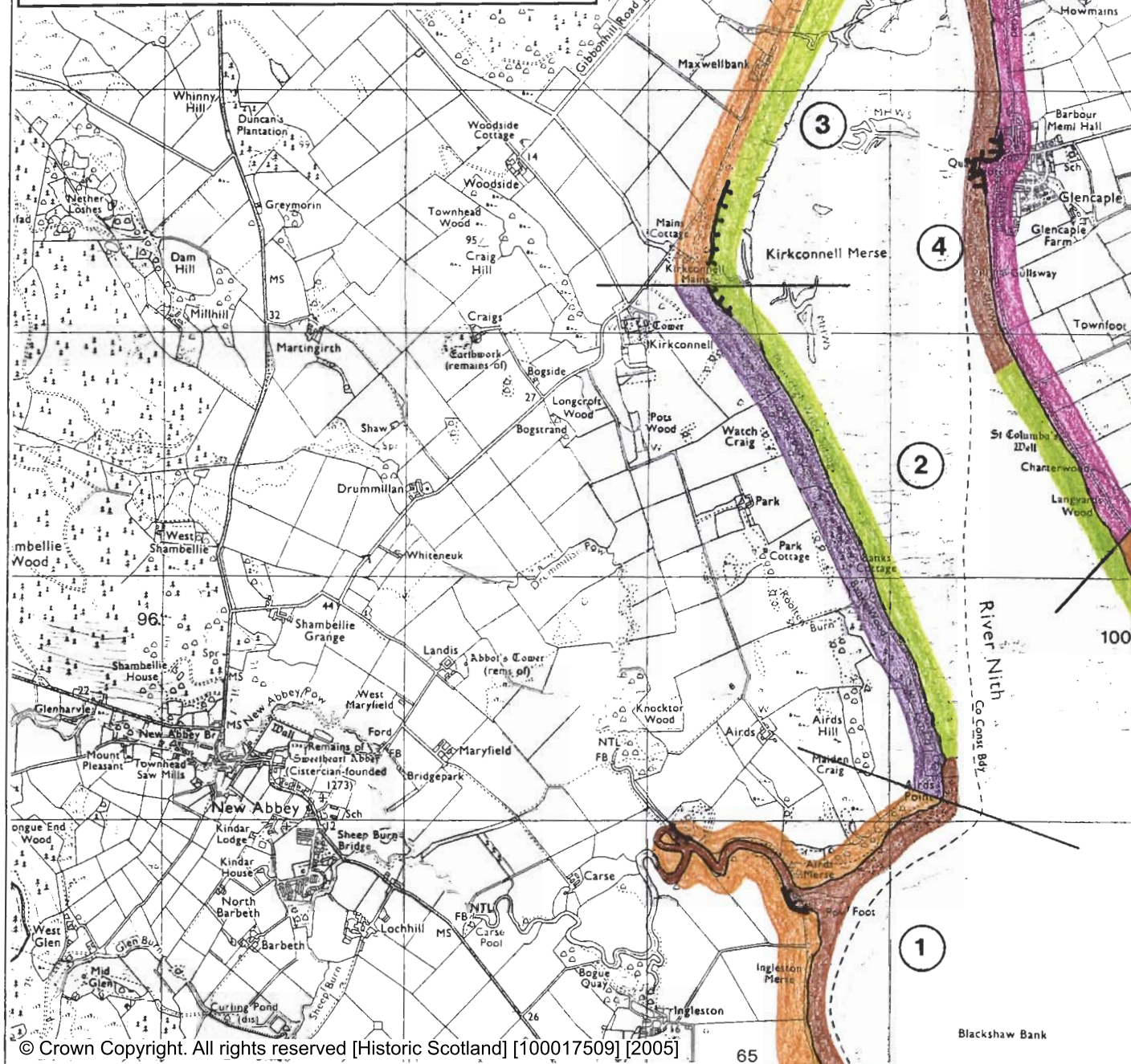
MAP CLASS: Hinterland Geology and Foreshore Geomorphology

Assessment date: November 1996

Scale: 1:25 000

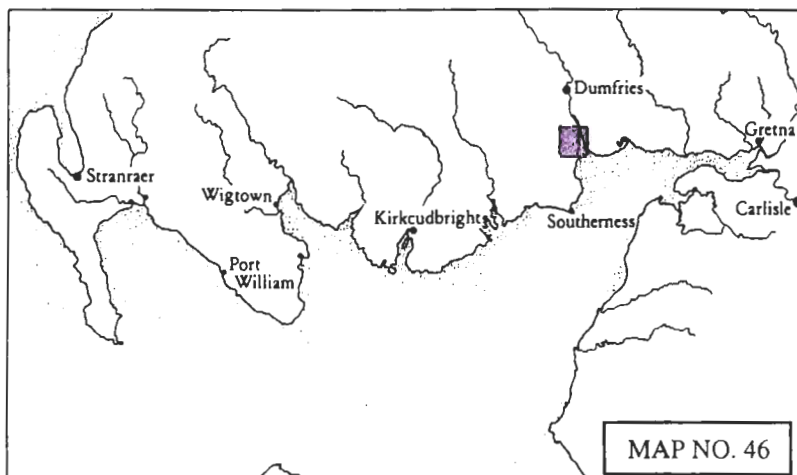
INGLESTON MERSE TO KIRKCONNELL MERSE

NGR: NX 96-100/65-70



KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venician Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 46: EROSION

1. INGLESTON MERSE to AIRDS MERSE via Sheepburn Bridge.

NY 980 655

4km

Both accreting and eroding

Meandering tidal reach of New Abbey Pow.

There is erosion on the inner curves with mud accretion on the slower stretches of the river.

2. AIRDS MERSE to east of GIBBONHILL FARM

NY 993 680

4km

Both accreting and eroding

Eastern side of the Kirkconnell Merse which consists of a large tract of marshland. Mud accretion is occurring being mainly trapped by reed beds. Slope failure is occurring on the softer parts of the river bank.

3. South of BORELAND to GLENCAPLE QUAY

NY 994 687

1.3km

Both accreting and eroding

This straight stretch of river is flanked by alluvial mud. This is accreting up to the current HWM.

This material is prone to erosion owing to the position of the main river channel at this particular stretch.

4. GLENCAPLE QUAY to north of KENNETH BANK

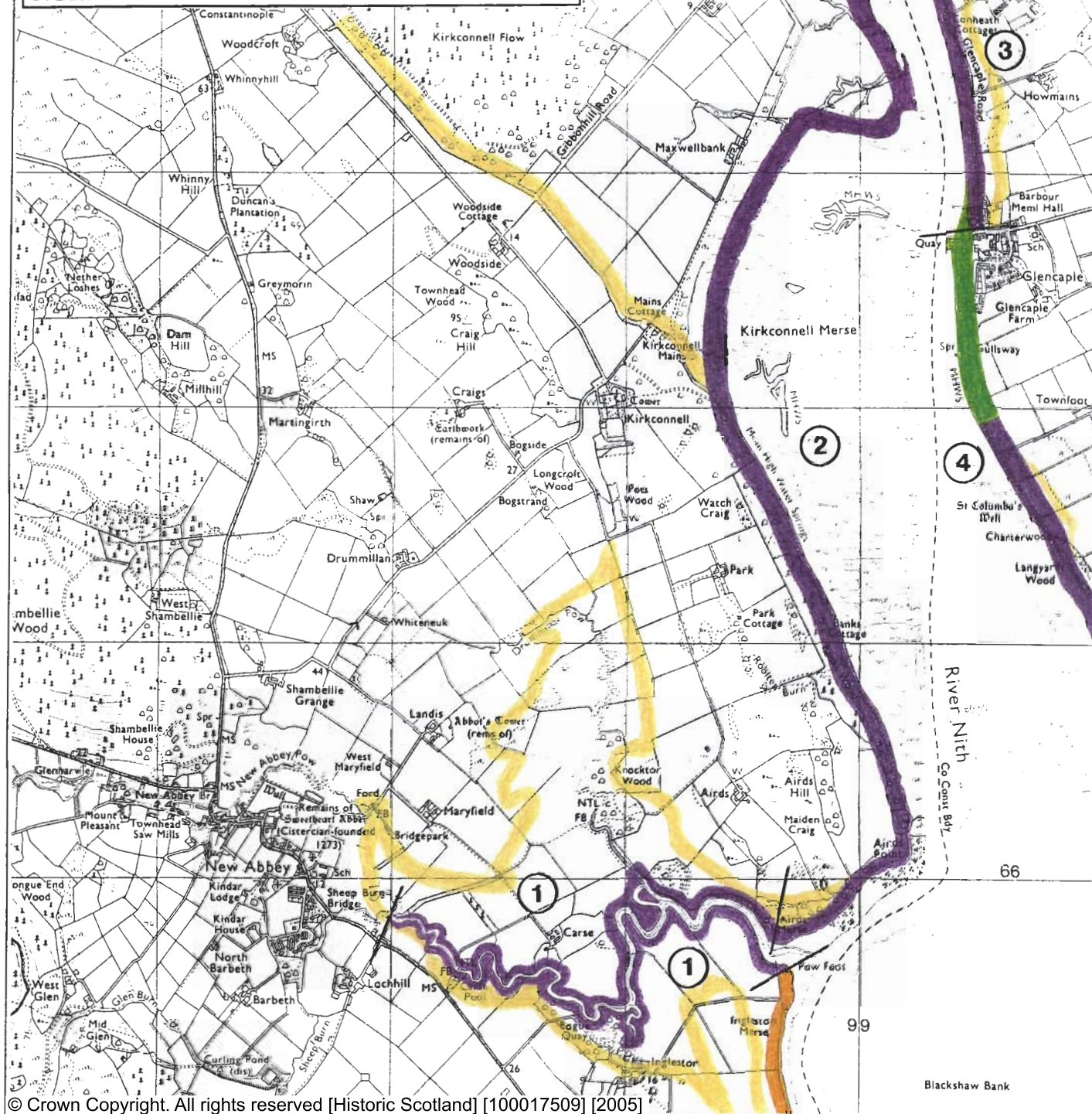
NX 969 678

1km

Both accreting and eroding/stable

At Glencaple concrete sea defences protect a small mooring and this region is considered stable. Further south no defences exist and leave this stretch of the Nith exposed to the effects of erosion and accretion.

INGLESTON MERSE TO KIRKCONNELL MERSE NGR: NX 96-100/65-70



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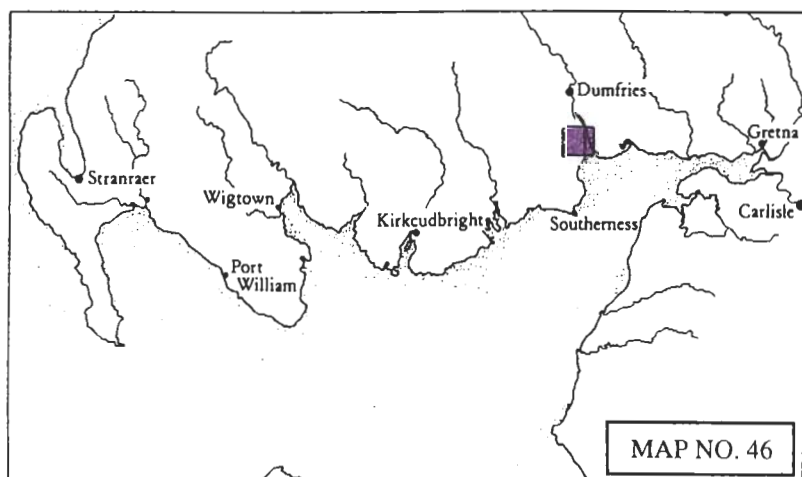
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 09.10.96

Scale 1:25 000



MAP NO. 46

MAP 46: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

NX 9868 6547
INGLESTON MERSE
Coastal Defence
Uncertain
Poor
Monitor

NX 9810 6540
INGLESTON
Enclosure / Fort / Motte
?
Uncertain
Good
Nil

NX 9780 6539
BOGUE
Quay
Uncertain
Fair
Monitor

NX 9938 6967
CONHEATH COTTAGES
Cottages & Shipwreck
20th century
Good
Nil

NX 9944 6904
GLENCAPLE
Shipwreck
Uncertain
Good
Nil

NX 9940 6872
GLENCAPLE
Quay
Statutory Listed Building
Early 19th century
Fair
Monitor
Nil

Sites in the Hinterland

None

NX96NE 15
NX 9969 6759
ST COLUMBA'S WELL
Well
Uncertain; not located

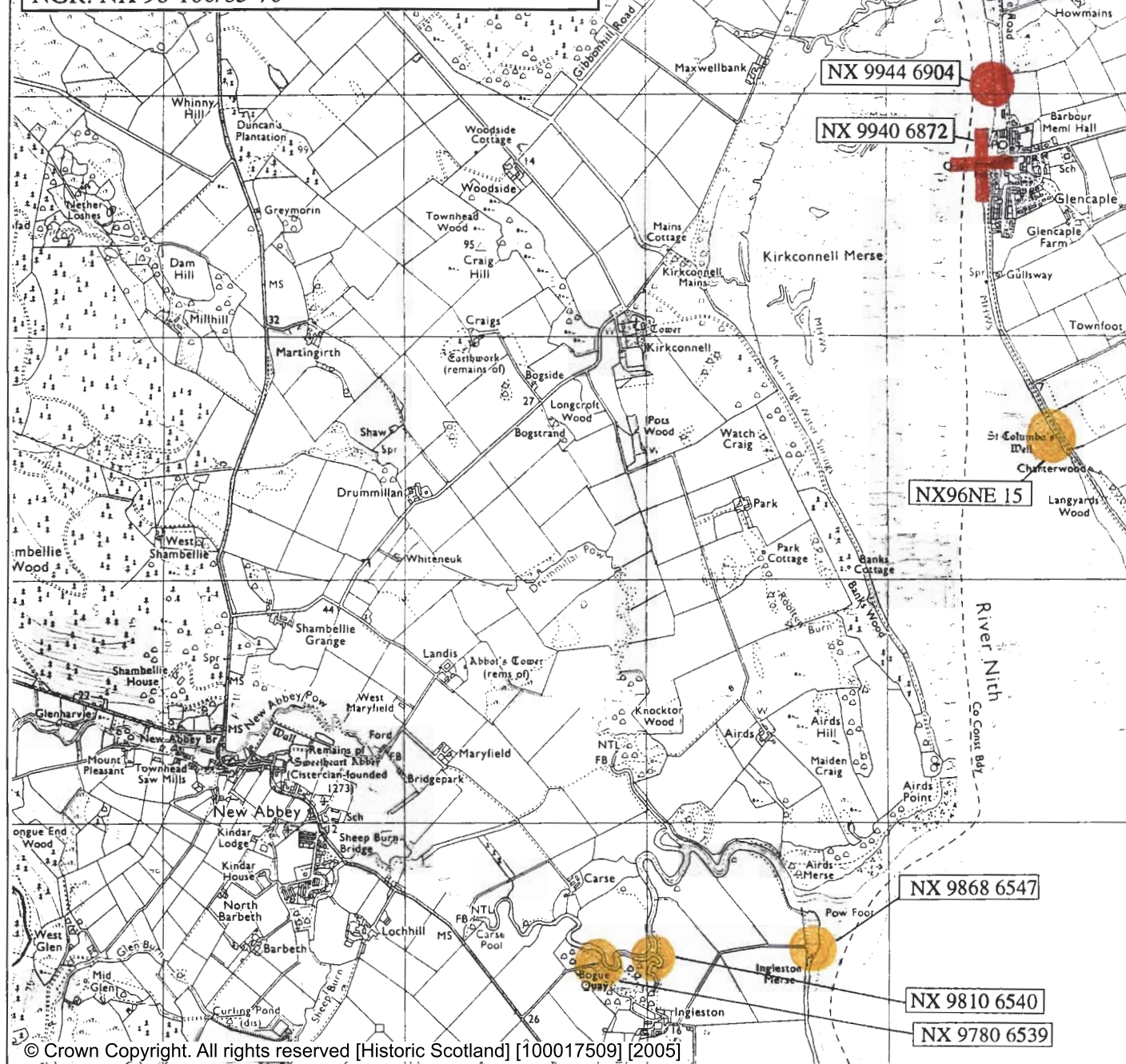
MAP CLASS: Built Heritage and Archaeology

Assessment date: October 1996

Scale: 1:25 000

INGLESTON MERSE TO KIRKCONNELL MERSE

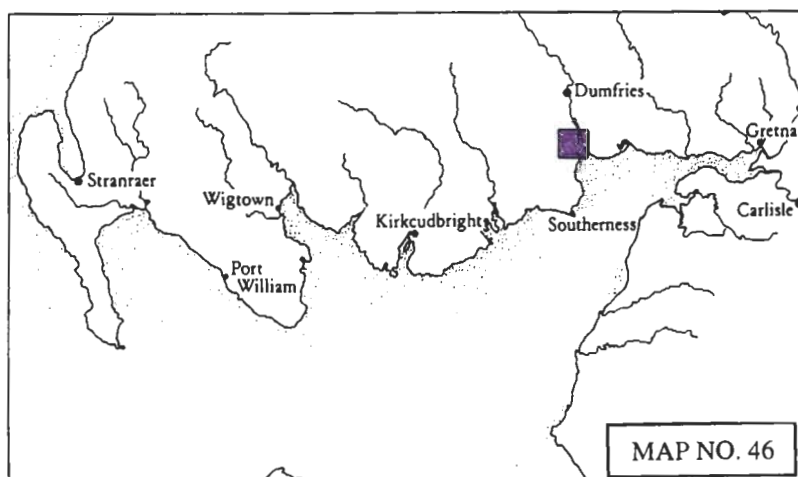
NGR: NX 96-100/65-70



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KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 47: KIRCONNEL MERSE TO DUMFRIES

Hinterland Geology and Coastal Geomorphology: Marine deposits occur along the course of the River Dee which flows through flat land below 5m O.D. This is protected by flood defence works.. Fluvioglacial outwash deposits occur near Kelton and immediately south of Dumfries. Salt-marsh is a common feature along the tidal stretch of this river.

Erosion Class: Kirkonnell Merse is incised by drainage channels and prone to erosion. Higher up the river conditions are stable owing to flood defence works.

Built Heritage & Archaeology: Two quays, situated on opposite banks of the river Nith, are contained in this section. Both belong to the nineteenth century and were originally built in connection to the maritime trade of Dumfries (Graham & Truckell, 1977, 128-134). Laghall quay exhibits signs of tidal damage and monitoring is recommended.

Map 47: Hinterland Geology and Coastal Geomorphology

1. KIRKCONNELL MERSE to GREENMERSE NX 984 690

2.7km

Low edge (< 5m)

Marine sands and gravels

This unit includes part of the lower tidal stretch of the River Nith. The hinterland is low lying with a cover of marine sands and gravels. The foreshore consists of saltmarsh and alluvial estuarine mud.

2. GREENMERSE to DUMFRIES SEWAGE WORKS

NX 975 730

2.2km

Low edge (< 5m)

Marine sands and gravels

West bank of the River Nith. Marine derived sands and gravels overlying Carse clays. The banks of the river consists of alluvial mud and silt.

3. DUMFRIES SEWAGE WORKS to north of KINGHOLM

NX 977 750

3.4km

Low edge (< 5m)

Glacial sands and gravels

Urban stretch of the River Nith. Glacially derived sands and gravels occur on each side of the river. Alluvial mud and silts banks are present alongside the central river channel.

4. North of KINGHOLM to south of KELTONBANK

NX 974 730

3.4km

Low edge (< 5m)

Marine sands and gravels

Lower stretch of the River Nith with a hinterland of marine sands and gravels overlying Carse clays. The riverbanks contain fine alluvial mud and silts. Merse (salt-marsh) is established to the west of Kennethbank.

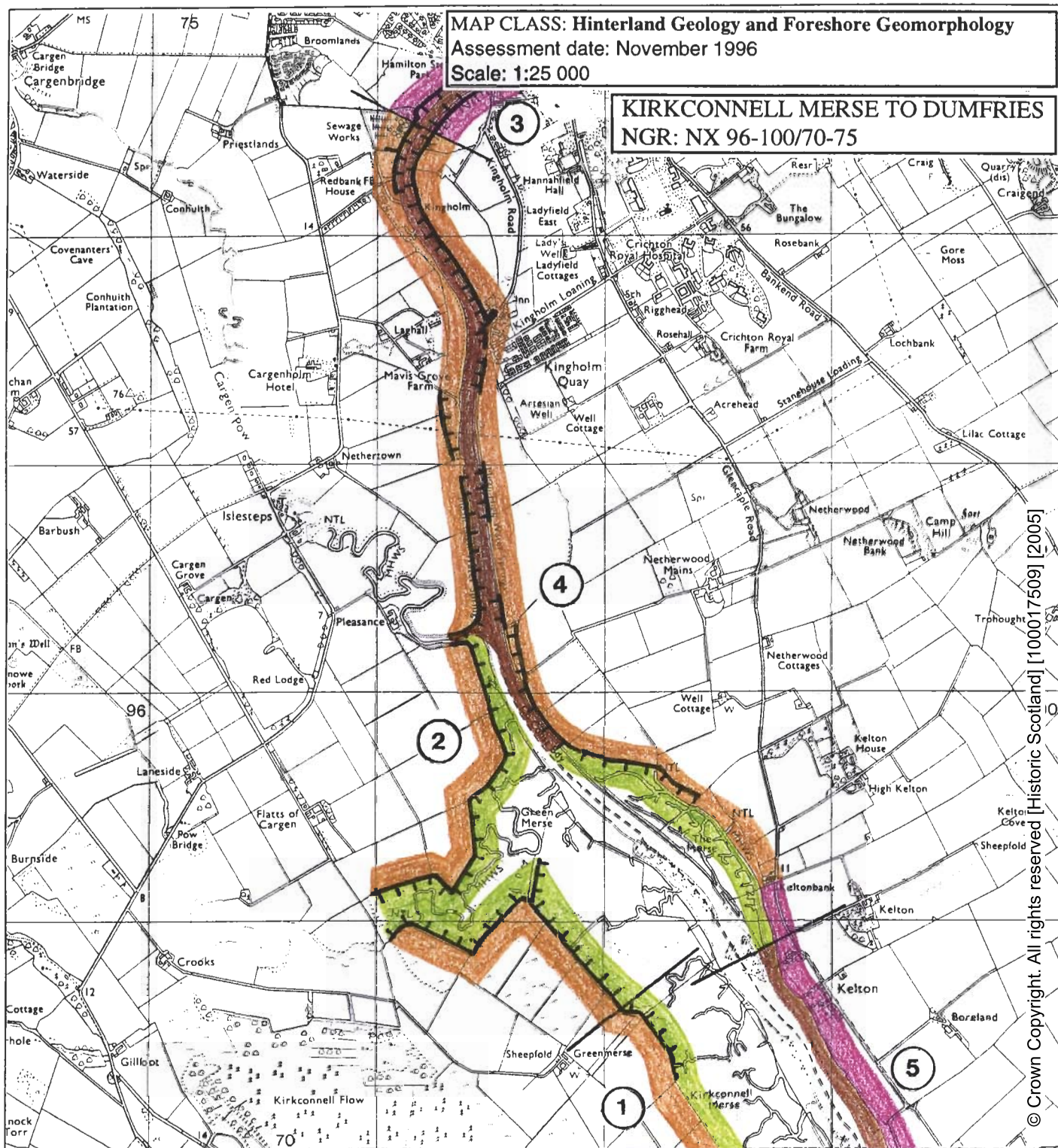
5. South of KELTONBANK to north of KENNETHBANK

NX 995 680

Low edge (< 5m)

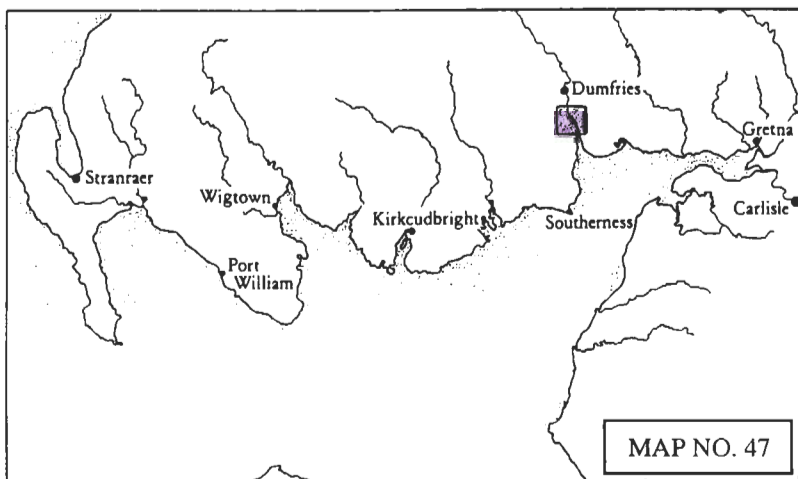
Marine sand and gravel

The lower tidal reach of the River Nith. The hinterland geology consists of marine sands and gravels. The river edge is estuarine mud and silt.



KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	000000
Human disturbance	Black carats	AAAAAA



MAP 47: EROSION

1. East of GIBBON HILL FARM to GREEN MERSE

NY 984 710

2km

Accreting and eroding

Incised channels occur along the edge of marshland. These have accreting mud banks. Slope failure is also occurring. In general the marsh is trapping sediment with loss of sediment in other parts.

2. GREEN MERSE to the COLL WEIR, DUMFRIES

NY 972 740

5km

Stable

The west bank of the River Nith protected by flood banks in parts. Reed beds on the river edge provide further stability to the river edge.

3. The COLL WEIR to west of WELL COTTAGE

NY 975 730

5km

Stable

The east bank of the River Nith protected by flood banks. Reed beds on the river edge are providing additional stability.

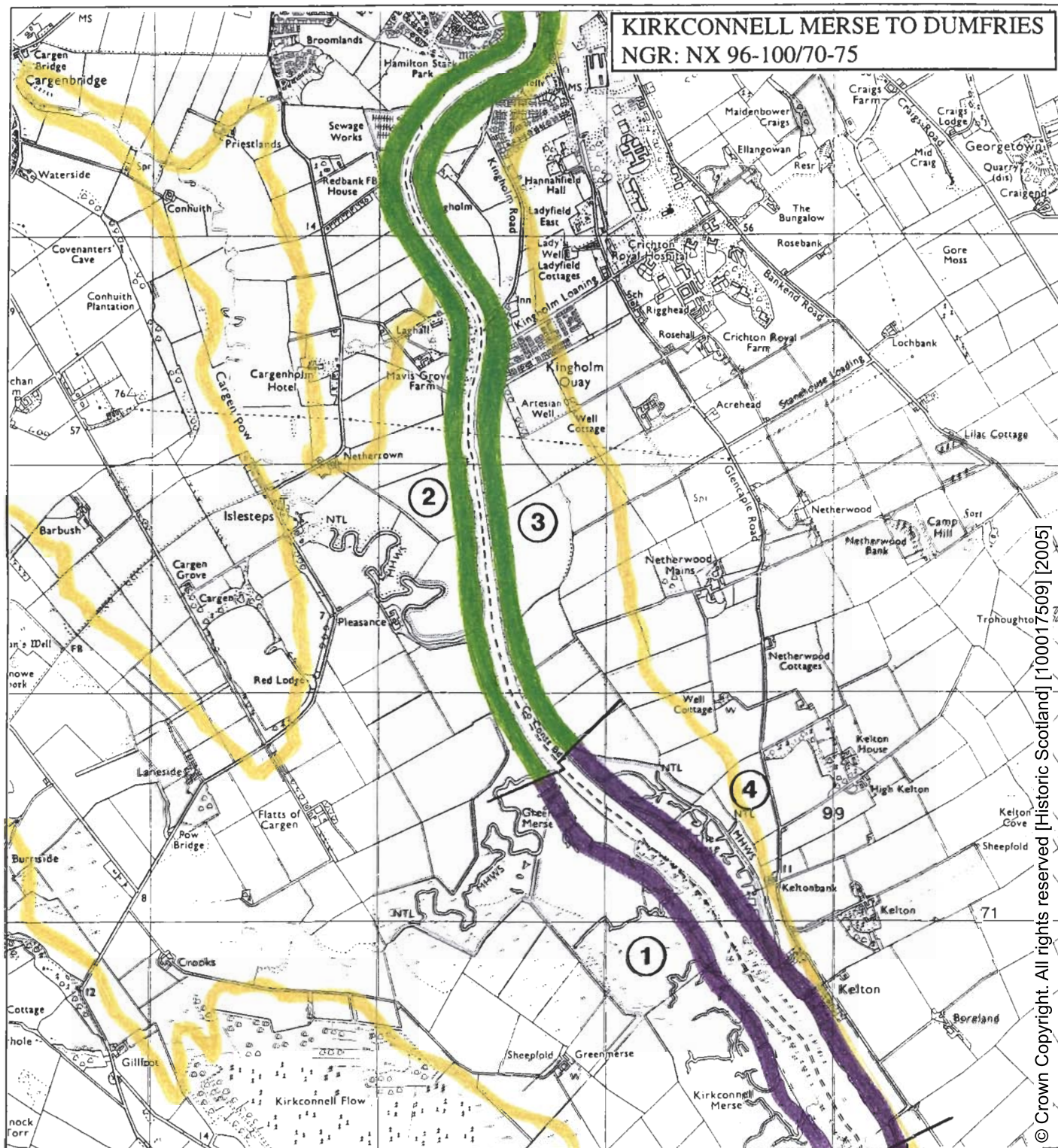
4. West of WELL COTTAGE to south of BORELAND

NY 986 710

2.0km

Both accreting and eroding

This unit includes a tract of marshland that is incised with narrow river channels. Sediment is being trapped by reedbeds in parts.



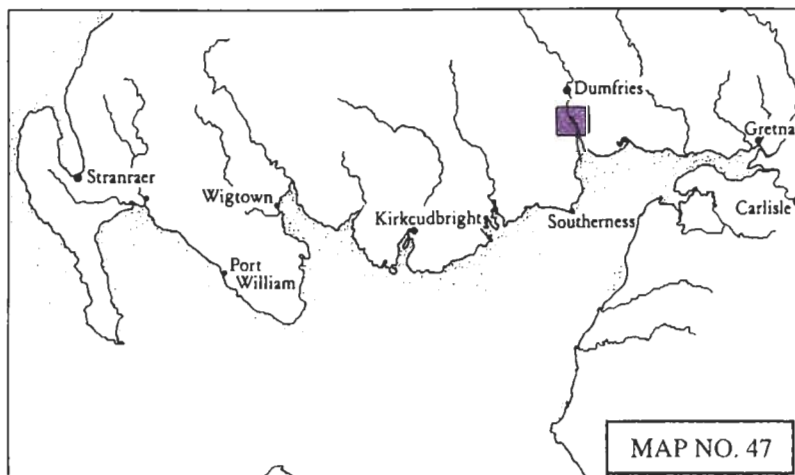
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 09.10.96

Scale 1:25 000



MAP 47: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

NX 9737 7330

LAGHALL

Quay

19th century

Fair

Monitor

NX 9749 7364

KINGHOLM QUAY

Quay & Quayside Buildings

Statutory Listed Building

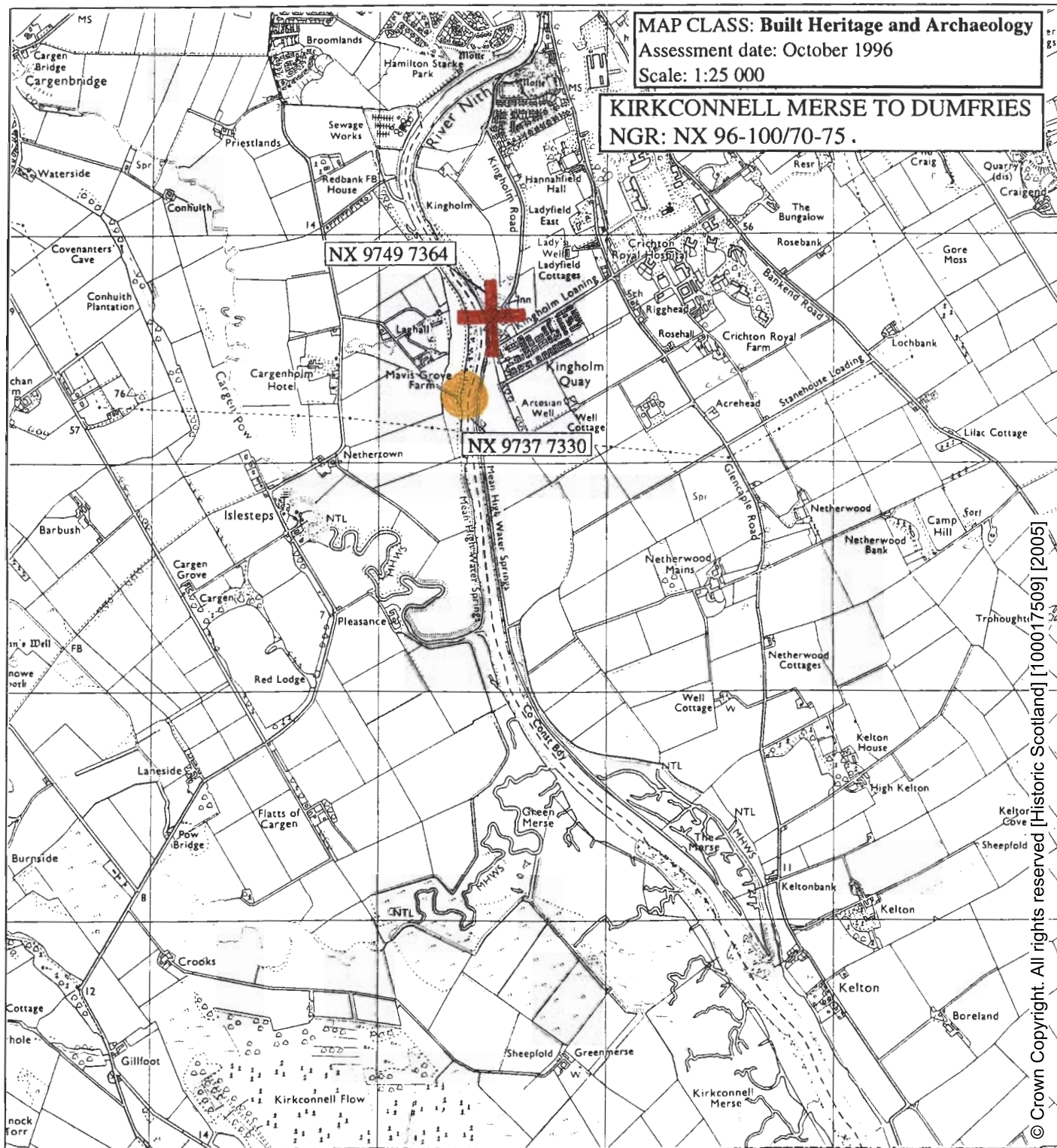
19th century

Good

Nil

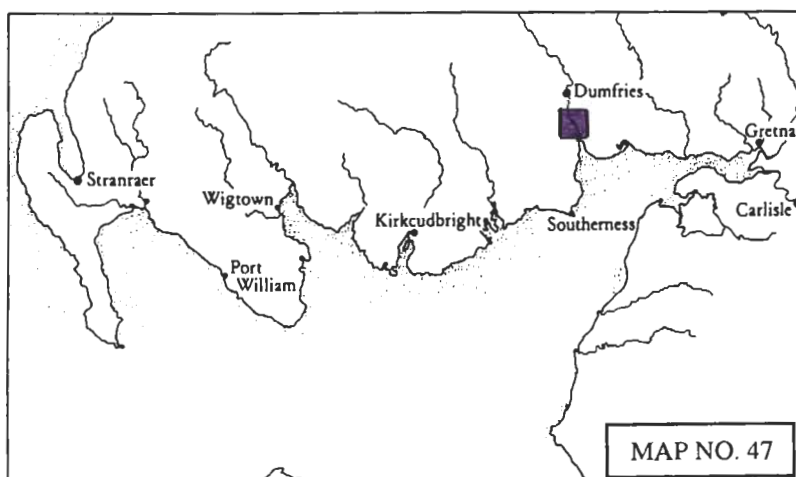
Sites in the Hinterland

None



KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg. NX 143 368	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
NMRS ref. - eg. NX13 SW17	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
	Dashed outline	Yellow	Gardens/Designed landscape
	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 48: DUMFRIES

Hinterland Geology and Coastal Geomorphology: This map shows the upper tidal limit of the River Nith. The hinterland geology consists of marine deposits as far as the sewage works. Beyond this point, fluvioglacial sands and gravels occur.

Erosion Class: The banks of the river have been made stable by flood control measures, namely concrete walling.

Built Heritage & Archaeology: The docks, quays and mills of Dumfries are contained in this section. Built up to the tidal limit of the Nith estuary at 'The Call' the monuments are the remains of the maritime trade of the town and survive in good condition. Burgh records demonstrate the limited extent of foreign trade from the fifteenth century, though trade did not burgeon until the seventeenth century; Dumfries exporting agricultural produce, wool and linen cloth, and importing French wine and Norwegian wood (Smout, 1960, 38; Murray, 1965; Gourlay & Turner, 1977, Graham & Truckell, 1977).

Map 48: Hinterland Geology and Coastal Geomorphology

1. GREENMERSE to DUMFRIES SEWAGE WORKS

NX 975 730

2.2km

Low edge (< 5m)

Marine sands and gravels

West bank of the River Nith. Marine derived sands and gravels overlying Carse clays. The banks of the river consists of alluvial mud and silt.

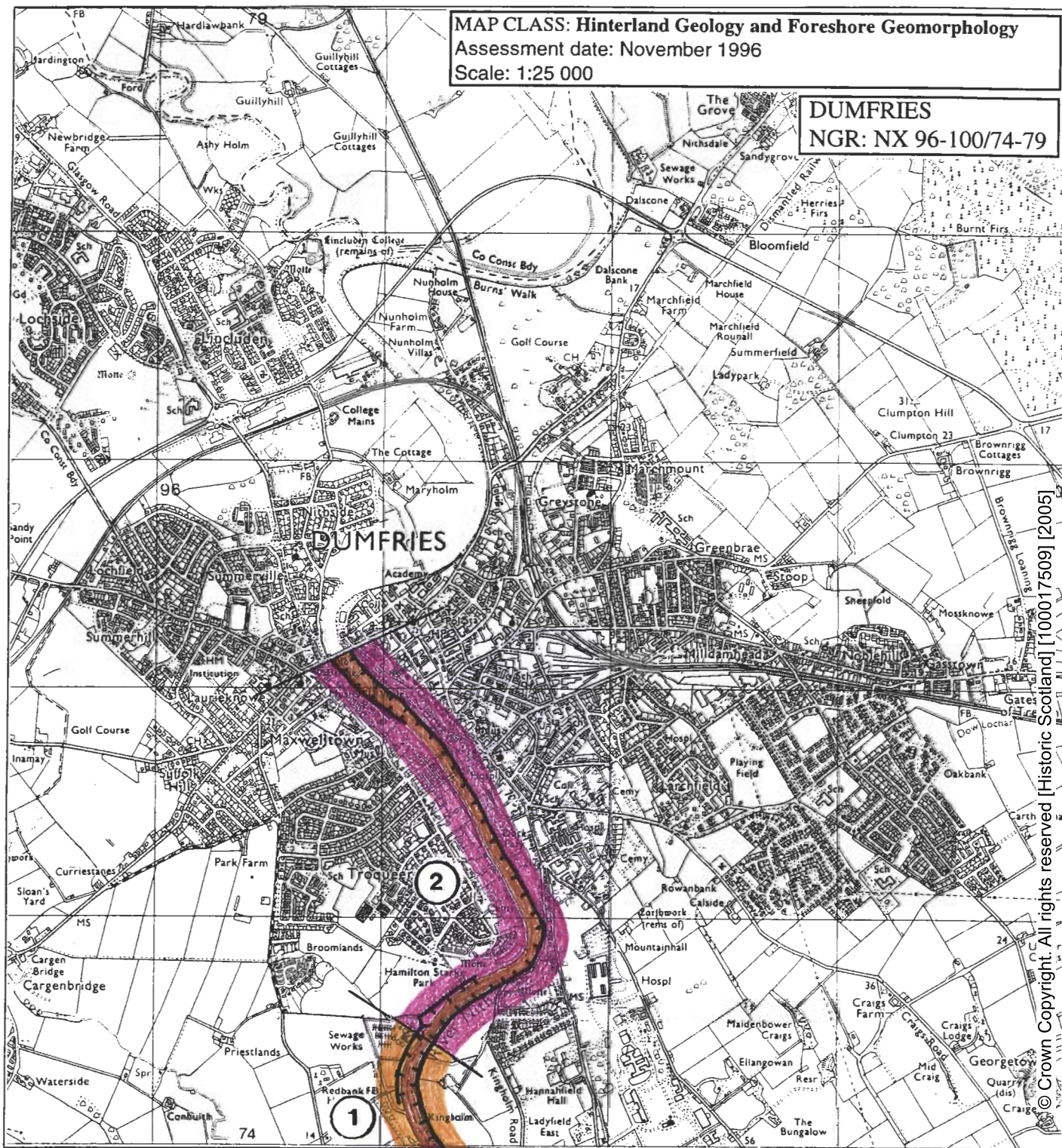
2. DUMFRIES SEWAGE WORKS TO DUMFRIES

NX 970 760

2km

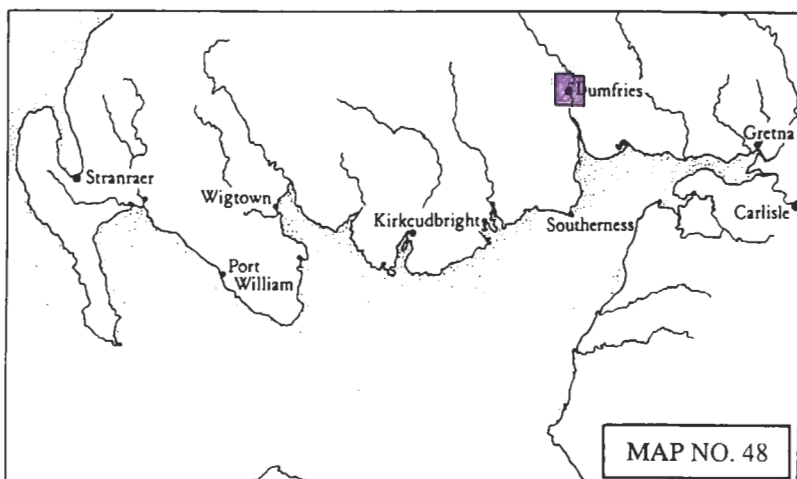
Low edge (< 5m)

This unit forms the urban stretch of the River Nith as far as the Coll Wier. Fluvio-glacial sands and gravel overlie the hinterland of the river. The river banks are covered in alluvial mud and silt. Flood banks traverse the length of this stretch of river.



KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 48: EROSION

1. GREEN MERSE to the COLL WEIR,
DUMFRIES

NY 972 740

5km

Stable

The west bank of the River Nith protected by flood banks in parts. Reed beds on the river edge provide further stability to the river edge.

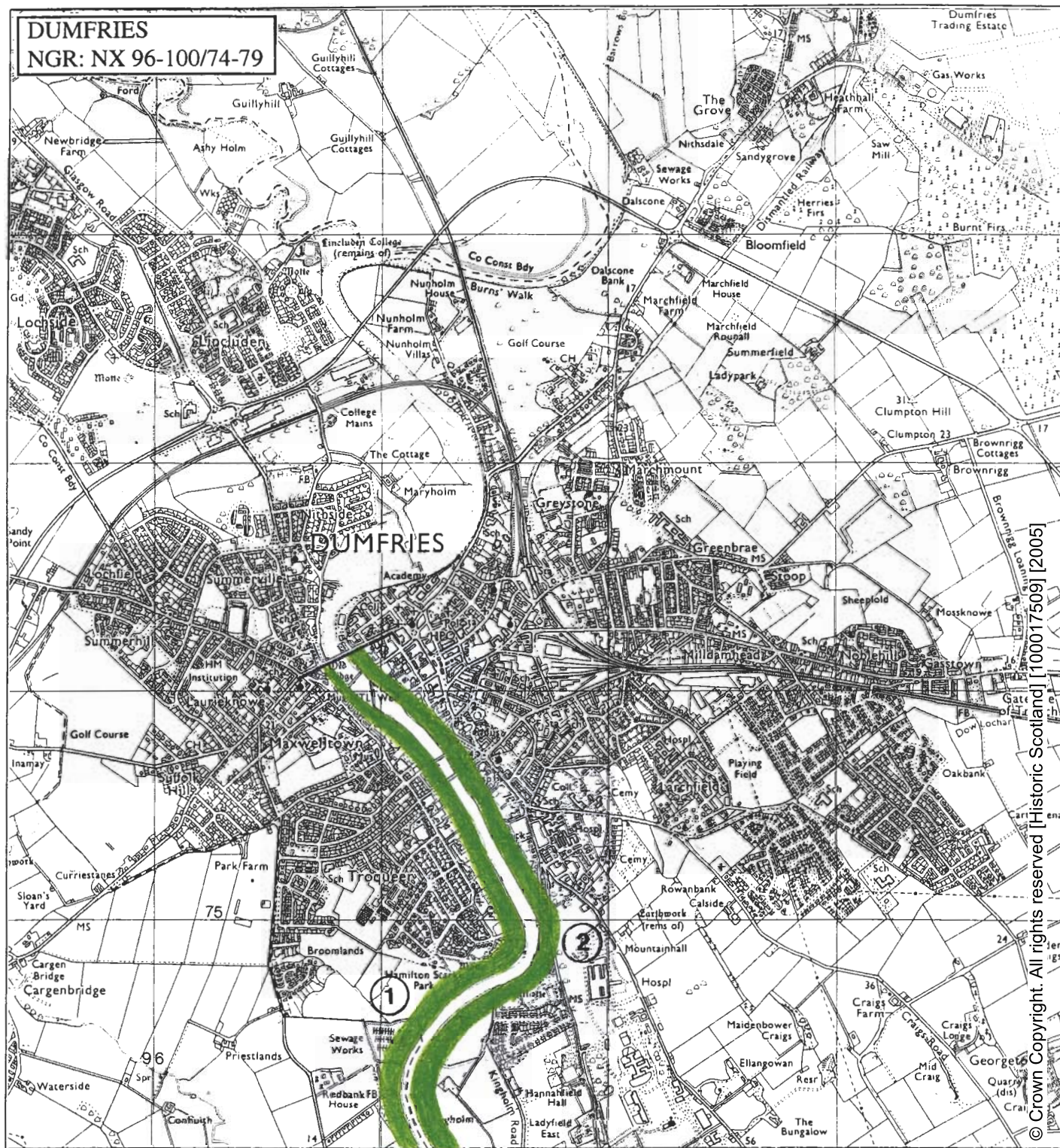
2. The COLL WEIR to west of WELL
COTTAGE

NY 975 730

5km

Stable

The east bank of the River Nith protected by flood banks. Reed beds on the river edge are providing additional stability.



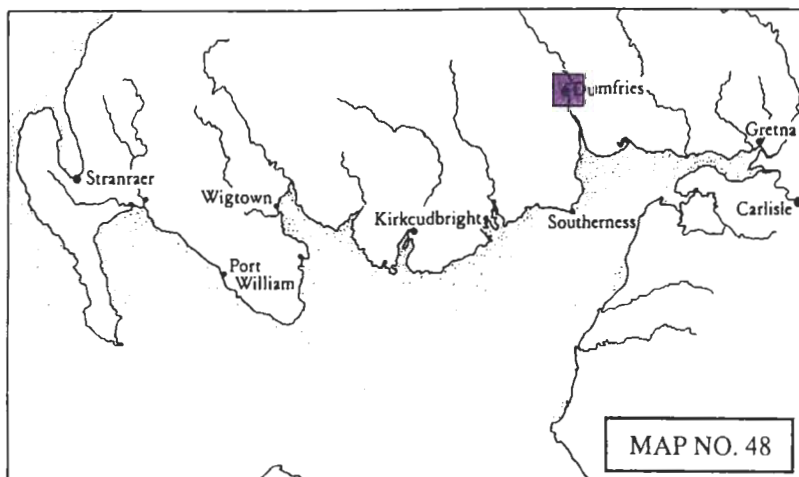
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 09.10.96

Scale 1:25 000



48: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

Sites in the Hinterland

NX 97 75

None

DUMFRIES

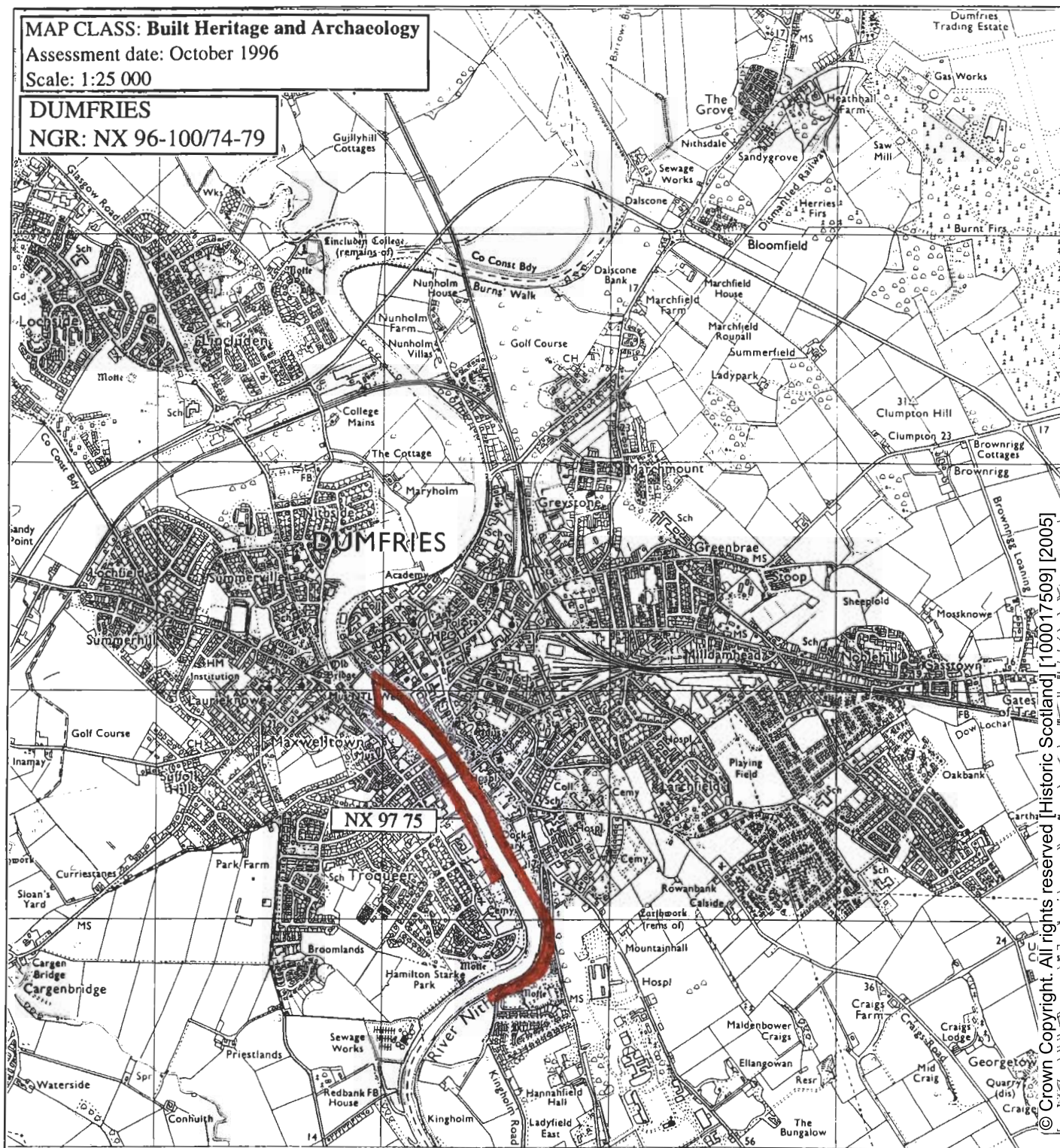
Dock, Quays & Mills

Statutory Listed Buildings

18/19/20th centuries

Good

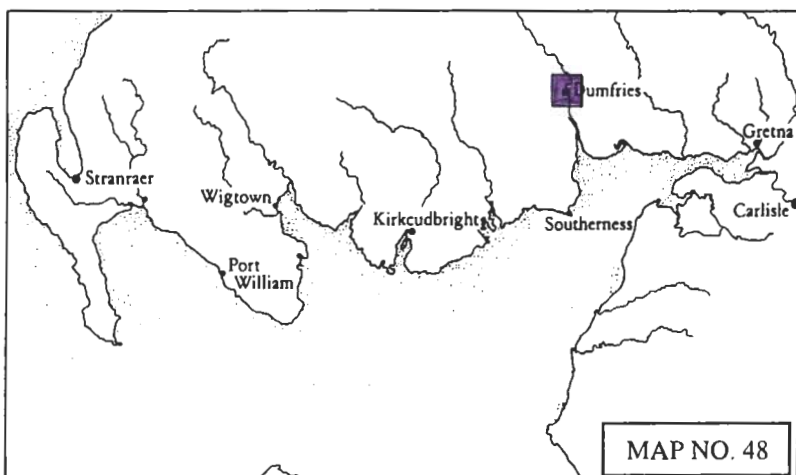
Nil



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KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP NO. 48

MAP 49: KENNETH BANK TO CAERLAVEROCK MERSE

Hinterland Geology and Coastal Geomorphology: This region has a hinterland geology consisting of estuarine sands and coastal-bar deposits. The land to the north lies below 10m O.D. Caerlaverock Merse is a SSSI under the care of SNH and also a nature reserve. It is a large area of deeply incised salt-marsh that is periodically inundated by exceptionally high tides. Landwards, floodbanks offer protection to grazing land.

Erosion Class: At Kenneth Bank (Unit 1 on the Erosion Map) a short stretch of the river edge is eroding. Mr W Wright, the SNH warden at Caerlaverlock showed this writer a monochrome photograph of the Keneth Bank area taken in 1961. The photograph shows 25 fence-posts (c.2m apart) running down to the river edge. Today 12 fence-posts survive and this enables us to estimate that c.26m of coast has been lost since 1961. The merse is incised with channels that show evidence for erosion, other parts are accreting with mud. Aspects of salt-marsh development and erosion at Caerlaverock Merse are dealt with in much greater detail in Section 4.

Built Heritage & Archaeology: This section contained two sites; the remains of the medieval complex surrounding Caerlaverock Castle and the old harbour. Limited erosion of the harbour is taking place and monitoring is recommended.

Map 49: Hinterland Geology and Coastal Geomorphology

1. South of KENNETH BANK east of
BLACKSHAW FARM

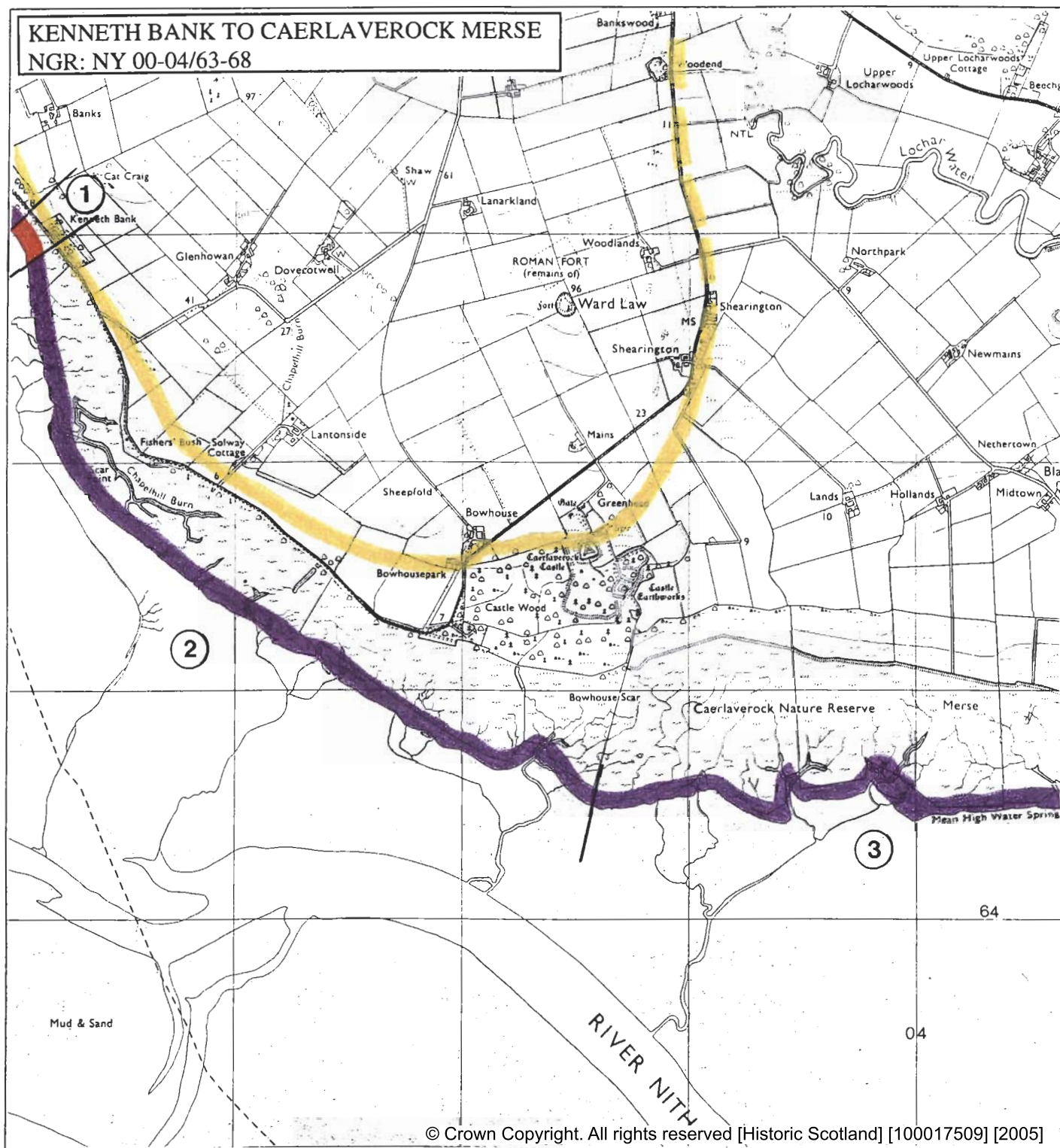
NY 035 652

10km

Low edge (< 5m)

Marine sands and gravel over carse clays

Large tract of estuarine salt-marsh of
Caerlaverock Nature Reserve. The hinterland
consists of marine sands and gravels overlying
Carse clays.



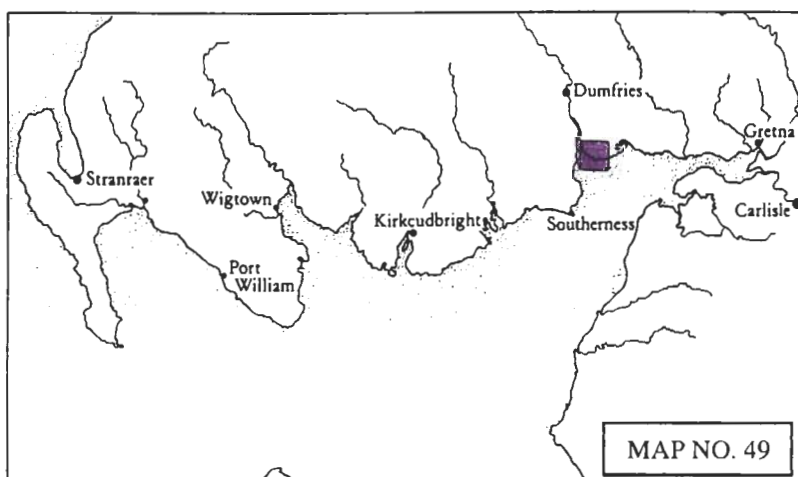
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 08.10.96

Scale 1:25 000



MAP 49: EROSION

1. KENNETH BANK

NY 300 670

0.2km

Definitely eroding

There is evidence of coastal retreat at Kenneth Bank. A photograph taken in 1961 shows a line of 25 fence posts (c.2m apart) of which only 12 remain. As a rough estimate 26m of coast has been lost since 1961 (W Right pers comm).

2. KENNETH BANK to south of BOWHOUSE SCAR

NY 020 646

Both accreting and eroding

Deeply incised drainage channels through a saltmarsh with evidence of erosion of the banks. Mud is accreting in parts.

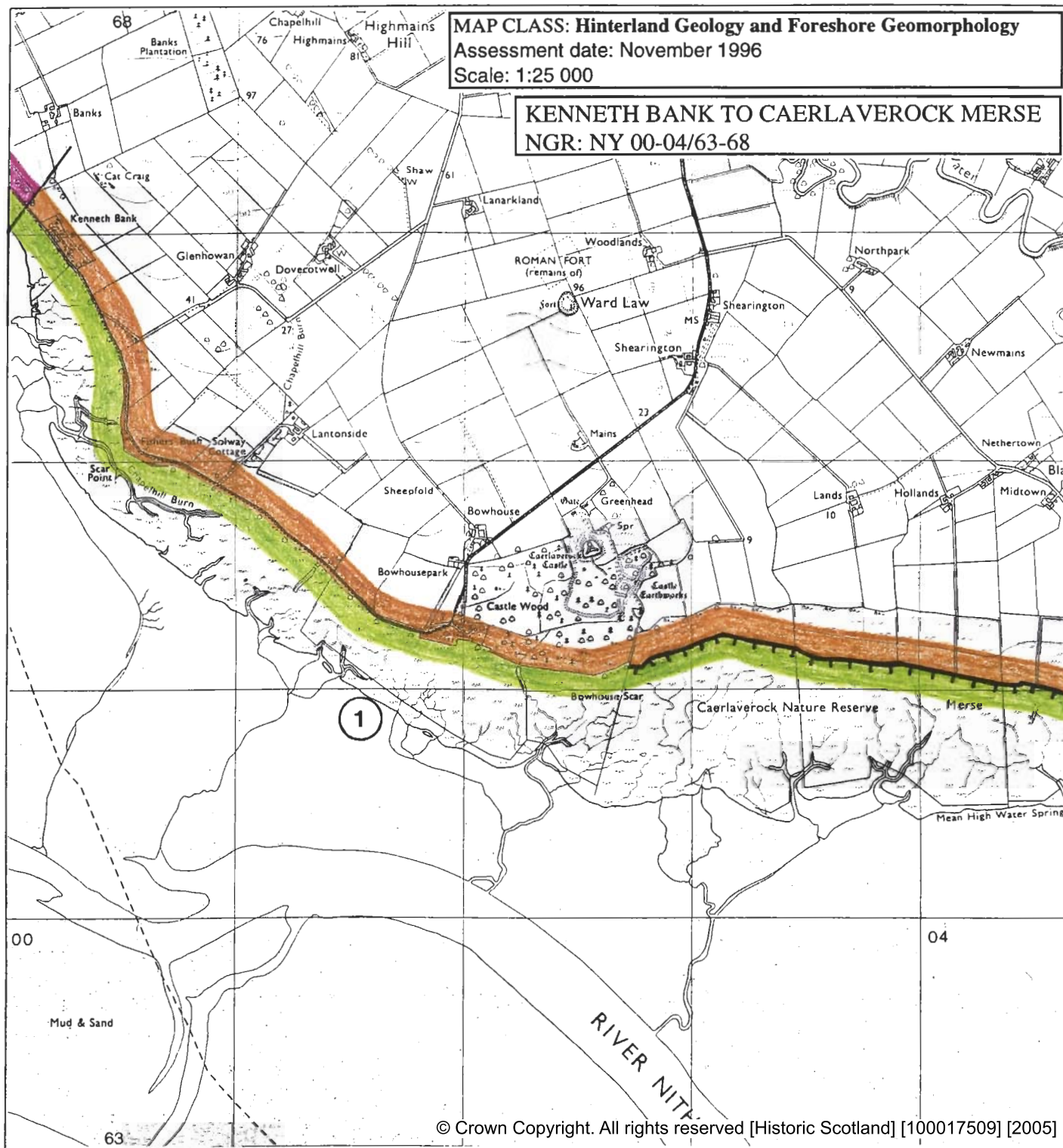
3. South of BOWHOUSE SCAR to south of SHORE COTTAGE (mouth of Lochar Water)

NY 054 646

5.5km

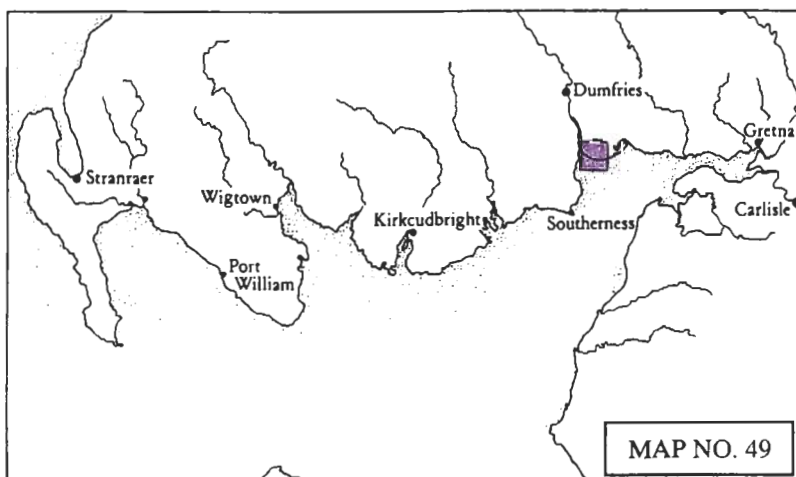
Both accreting and eroding

Marshland deeply incised with drainage channels. Mud is accreting on the banks and arcuate slope failure is occurring on some sections of the channels.



KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 49: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

None

Sites in the Hinterland

NY 02 65
CAERLAVEROCK
Castle Grounds
Scheduled Ancient Monument
12th - 17th centuries
Good
Nil

NY 0274 6510
CAERLAVEROCK RESERVE
Harbour
Scheduled Ancient Monument
Uncertain
Good
Nil

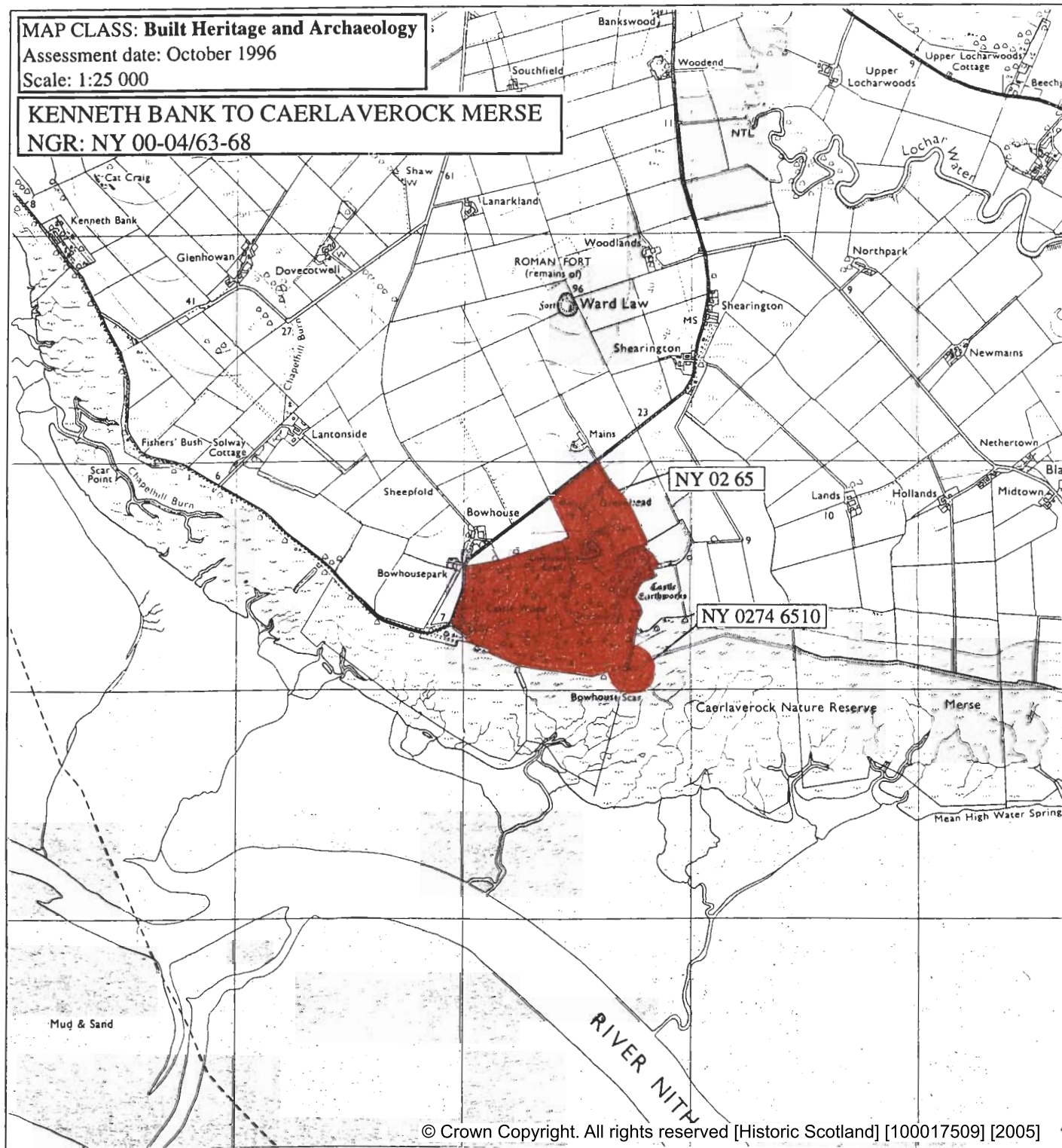
MAP CLASS: Built Heritage and Archaeology

Assessment date: October 1996

Scale: 1:25 000

KENNETH BANK TO CAERLAVEROCK MERSE

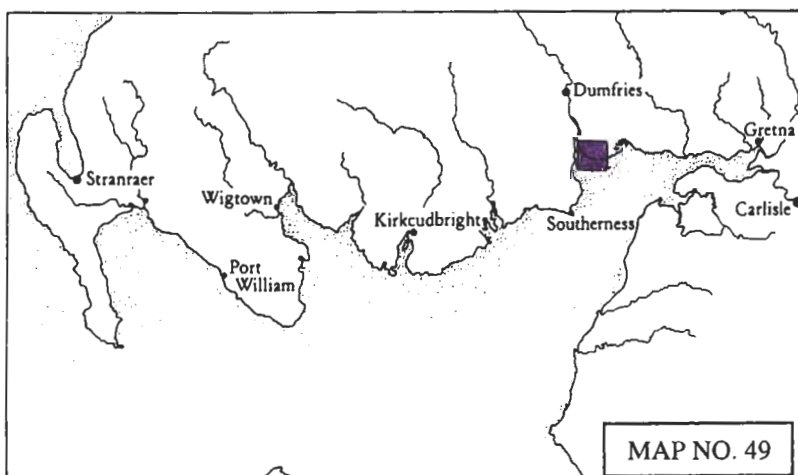
NGR: NY 00-04/63-68



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KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX 13 SW 17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP NO. 49

MAP 50: CAERLAVEROCK MERSE TO STANHOPE

Hinterland Geology and Coastal Geomorphology: This map shows a continuation of Caerlaverock Merse as far as the lower tidal reach of the Lochar Water. Coastal-bar and marine deposits overlie alluvium silts and muds (carse). Salt-marsh is a common feature. Carse deposits continue along the tidal reach of the Lochar Water. Flood banks protect this low lying area.

Erosion Class: The marsh is both accreting and eroding in parts, especially in the oxbow at the mouth of the Lochar Water. Further up the river, conditions are more stable.

Built Heritage & Archaeology: This stretch of coastline contains monuments of the twentieth century, comprising a shipwreck in the foreshore, and a WW2 pillbox and two groynes in the merse of Caerlaverock Nature Reserve. Intermittent high tides may be adversely affecting all monuments in this section.

Map 50: Hinterland Geology and Coastal Geomorphology

**1. South of KENNETH BANK east of
BLACKSHAW FARM**

NY 035 652

10km

Low edge (< 5m)

Marine sands and gravel over carse clays

Large tract of estuarine salt-marsh of
Caerlaverock Nature Reserve. The hinterland
consists of marine sands and gravels overlying
Carse clays.

**2. East of BLACKSHORE FARM to NETHER
LOCHARWOODS HOLDINGS**

NY 050 664

2.5km

Low edge (< 5m)

Marine sands and gravels and carse clay

Lower tidal reach of the Lochar Water. The
hinterland at the mouth of the Lochar Water
consists of marine sands and gravels which give
way further west to Carse clays. Alluvial mud
and silt flanks the meandering river channel.

**3. NETHER LOCHARWOODS HOLDINGS to
south of MID UPPER PRIESTSIDE**

NY 094 660

7.5km

Low edge (< 5m)

Marine sands and gravels

marine sands and gravels overlay Carse clays on
the hinterland. On the coast a salt-marsh flanks
wide mud-flats.

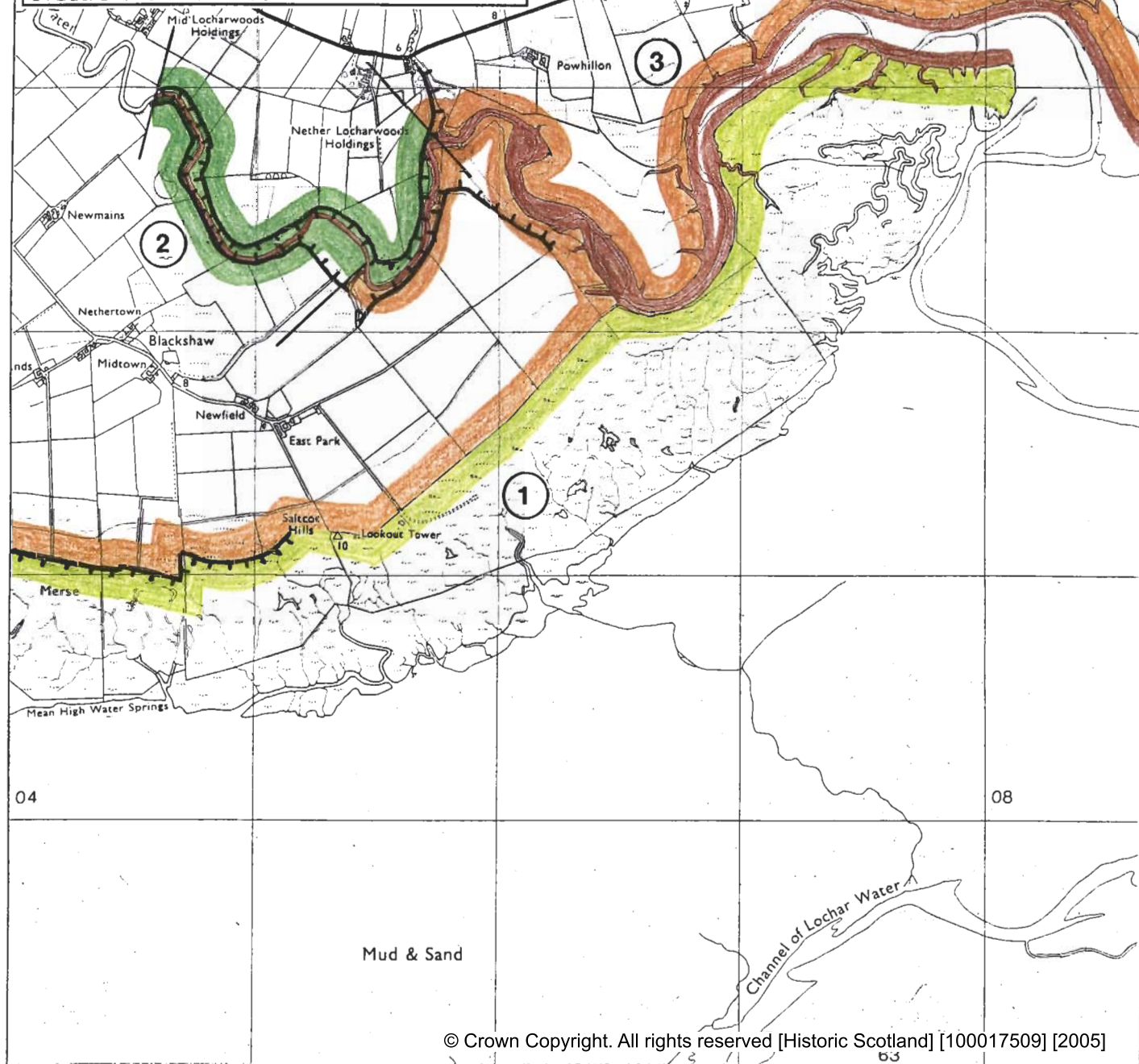
MAP CLASS: Hinterland Geology and Foreshore Geomorphology

Assessment date: November 1996

Scale: 1:25 000

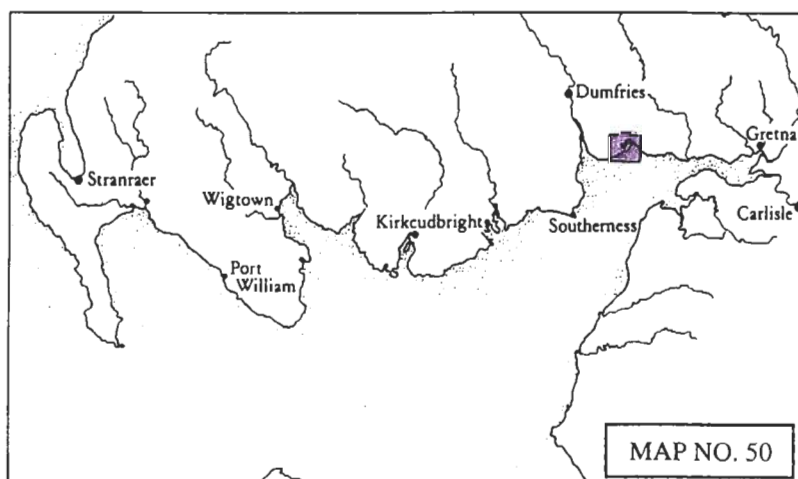
CAERLAVEROCK MERSE TO STANHOPE

NGR: NY 04-08/63-68



KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Maddar Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 50: EROSION

1. South of BOWHOUSE SCAR to south of
SHORE COTTAGE (mouth of Lochar Water)
NY 054 646

5.5km

Both accreting and eroding

Marshland deeply incised with drainage channels.
Mud is accreting on the banks and arcuate slope
failure is occurring on some sections of the
channels.

2. Mouth of the LOCHAR WATER to south of
POWHILLON
NY 072 670

3km

Both accreting and eroding

This unit consists of the lower tidal reach off the
Lochar Water. Mud accretion is occurring along
the banks of a persistent bend.

3. Upper tidal reach of the LOCHAR WATER
NY 050 663

4km

Stable

Earthwork banks are defending this stretch of the
river which appears at the present to be stable.

4. South of POWHILLON to BROW WELL
NY 074 670

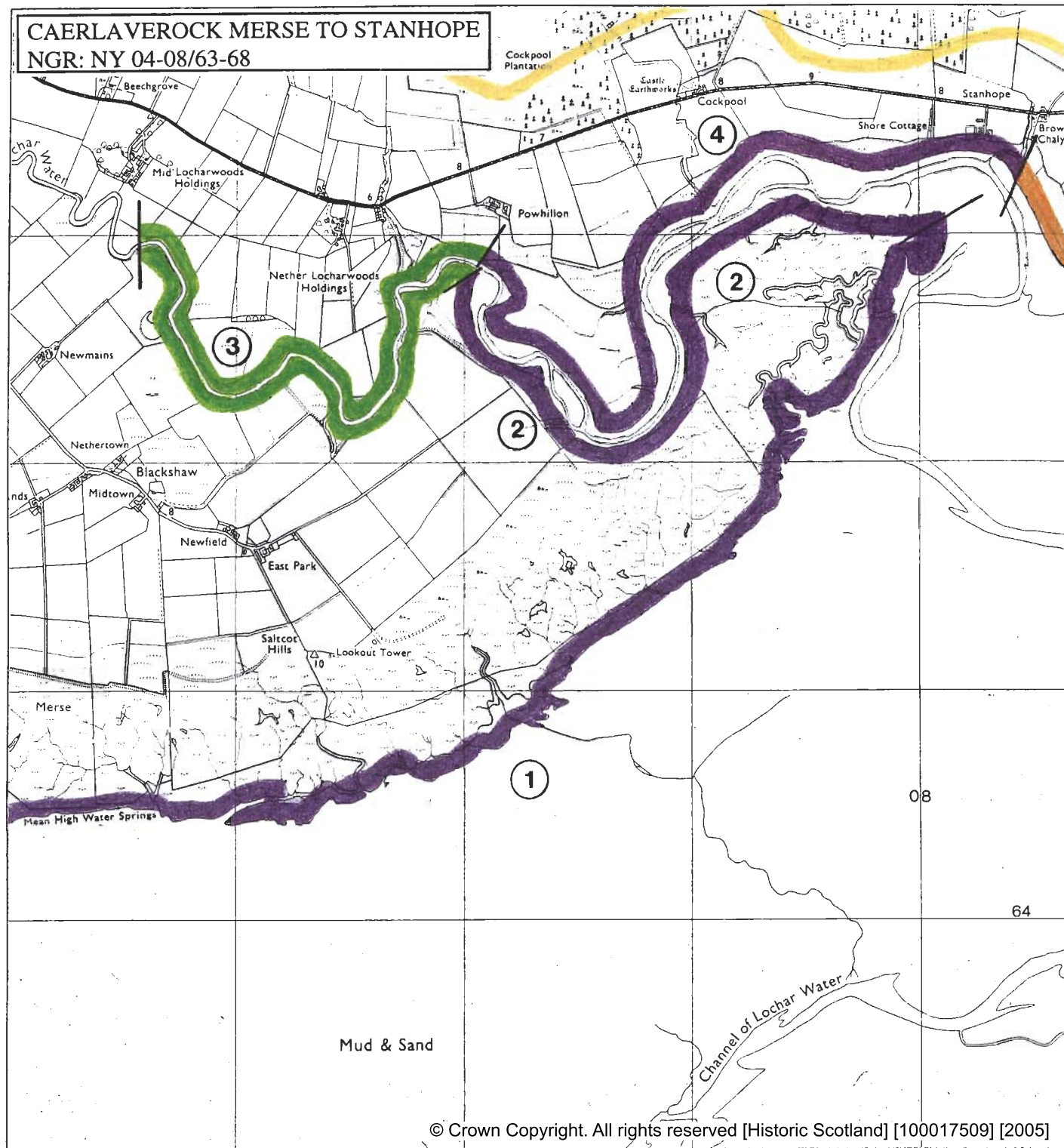
2.7km

Both accreting and eroding

Northern bank of the lower tidal reach of the
Lochar Water. There is some instability due to
river scour at the river edge whilst in parts mud is
accreting.

CAERLAVEROCK MERSE TO STANHOPE

NGR: NY 04-08/63-68



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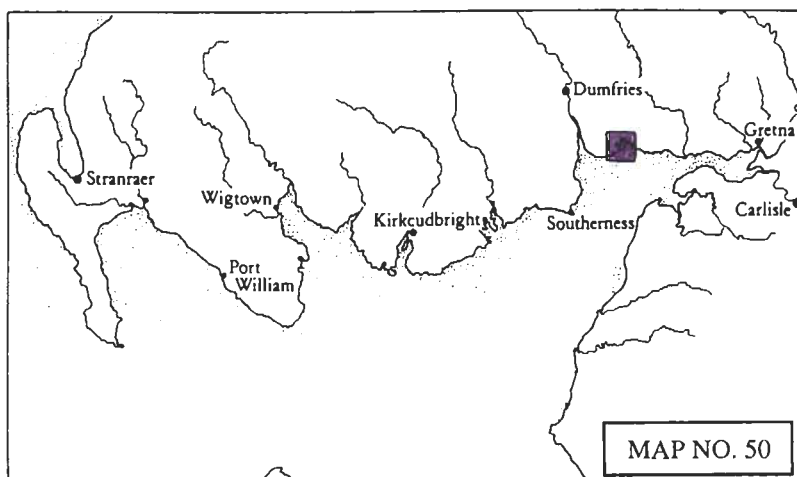
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 08.10.96

Scale 1:25 000



MAP 50: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

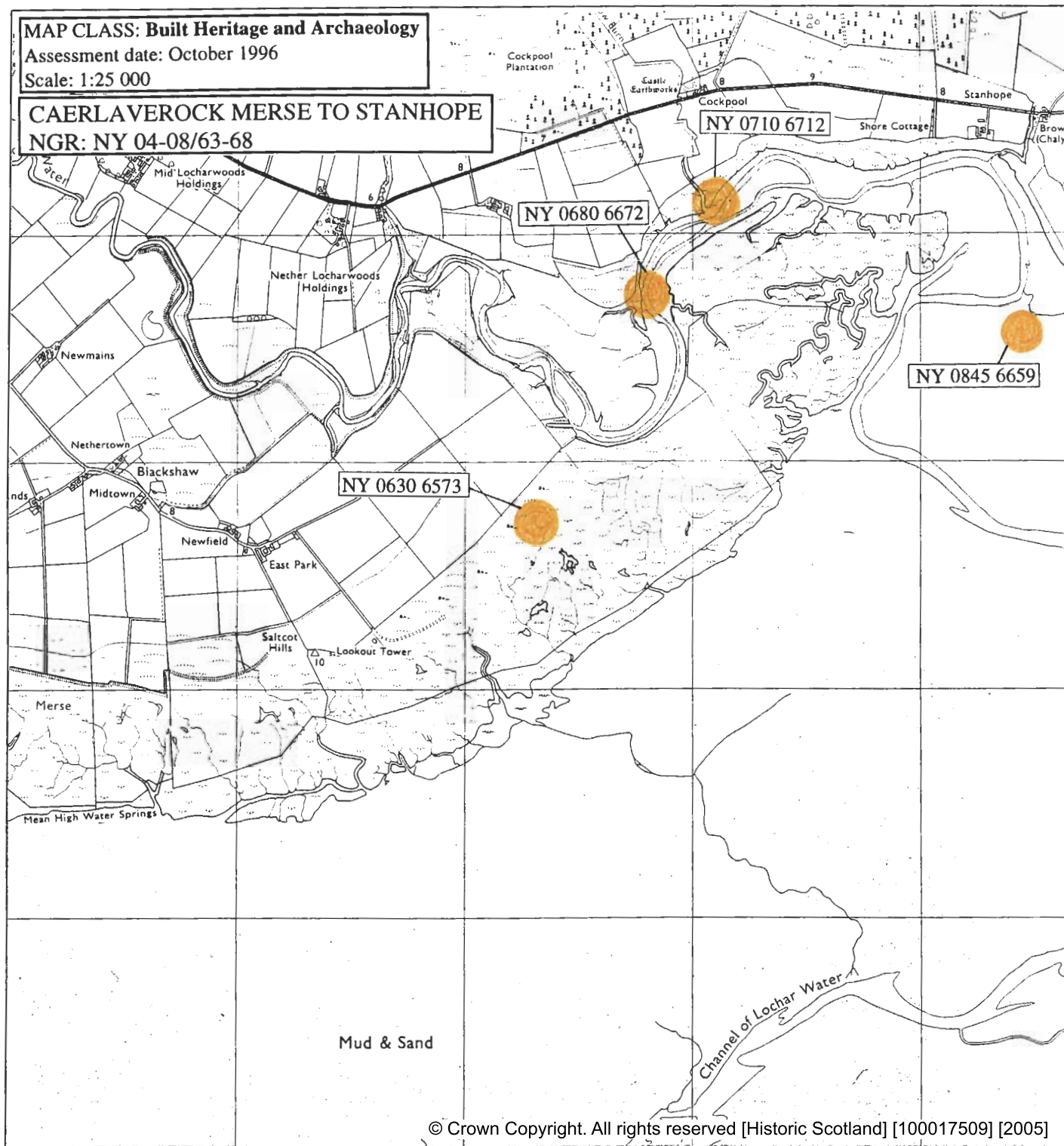
NY 0845 6659
CAERLAVEROCK RESERVE
Shipwreck
Uncertain
Poor
Survey & Monitor

Sites in the Hinterland

NY 0630 6573
CAERLAVEROCK RESERVE
WW2 Pillbox
Mid 20th century
Good
Nil

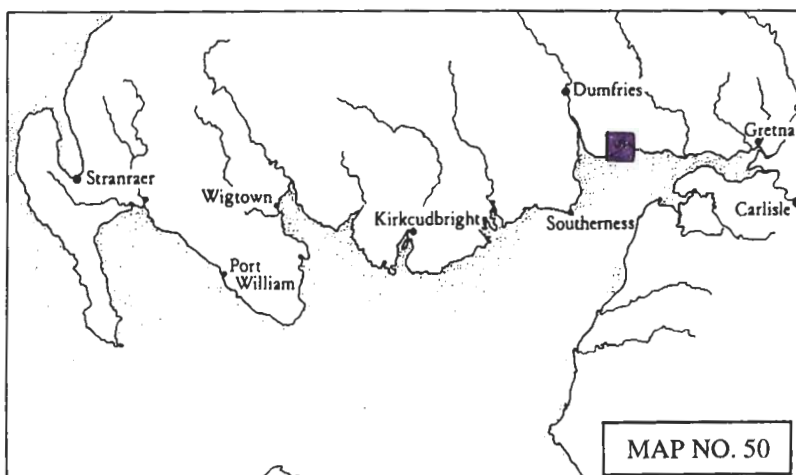
NY 0680 6672
CAERLAVEROCK RESERVE
Groyne/Pier
Uncertain
Good
Nil

NY 0710 6712
CAERLAVEROCK RESERVE
Groyne/Pier
Uncertain
Good
Nil



KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 51: STANHOPE TO EAST HOWCREEK

Hinterland Geology and Coastal Geomorphology: This map shows a fairly irregular coastal edge with a hinterland that lies below 10m O.D. marine deposits overlie coarse clays. The foreshore is colonised by salt-marsh which overlooks the estuarine flats of the Solway Firth. Alluvium mud and silt occurs alongside river channels at the mouth of the Lochar Water.

Erosion Class: The river mouth of the Lochar Water is both accreting and stable. Eastwards towards East Howcreek the coastline is classified as stable and eroding.

Built Heritage & Archaeology: This section contains the remains of the former edge of a field which is now threatened by high tides. This demonstrates the occurrence of local marine transgression which must be accepted as a long established pattern (Jardine, 1980). The formation of peat bogs in the past may hide surviving archaeological remains, the discovery of a dug-out canoe being one example (Jardine & Morrison, 1976, 190-1). Despite the paucity of the present archaeological record, monitoring of the coastline in this section is highly recommended.

Map 51: Hinterland Geology and Coastal Geomorphology

1. South of MID UPPER PRIESTSIDE to
POWFOOT

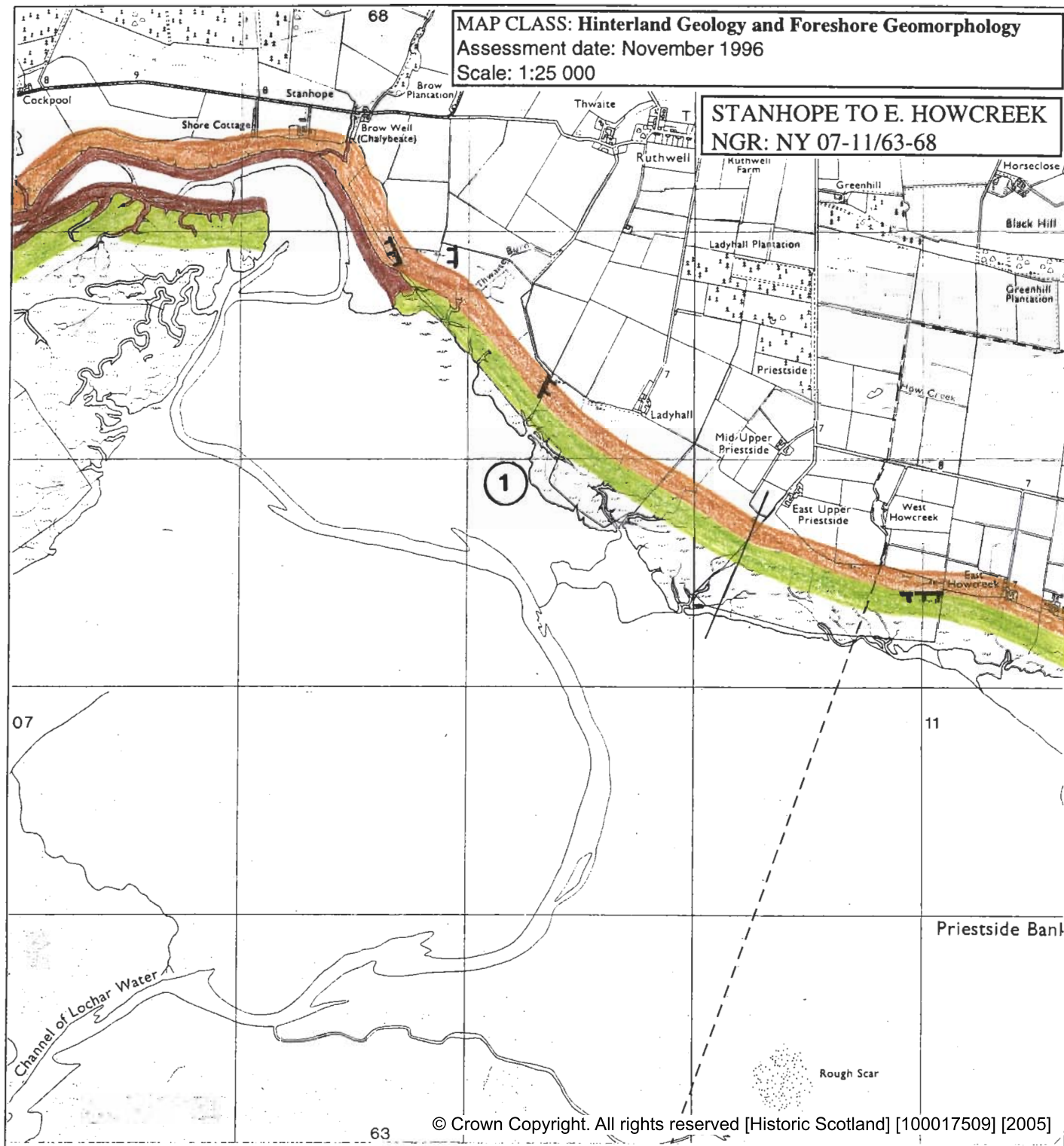
NY 125 650

5km

Low edge (< 5m)

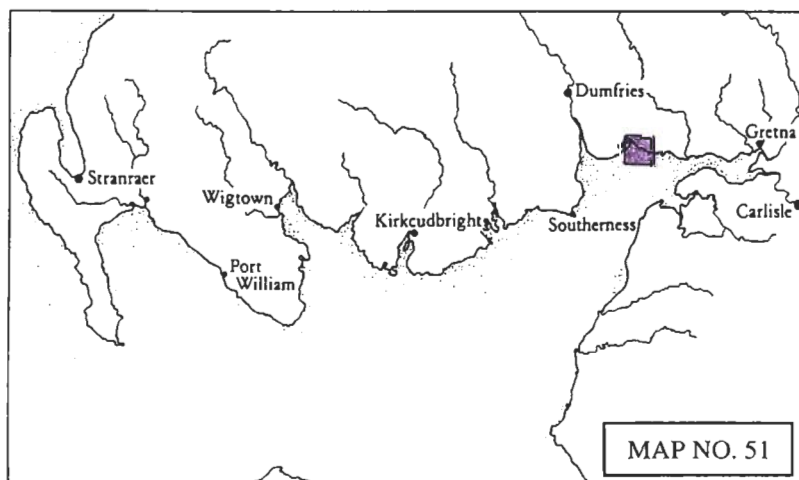
Marine sands and gravels over carse clays

Lower estuary of the River Eden. The hinterland consists of low lying marine sands and gravels over Carse clays. The shoreline is mainly salt-marsh which skirts boulder beds and tidal mud flats.



KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 51: EROSION

**1. BROW WELL to south of EAST UPPER
PRIESTSIDE**

NY 094 660

2.7km

Eroding or stable

This unit is dominated by saltmarsh incised with narrow drainage channels. The banks are prone to arcuate failure but in general this region of coast appears to at present stable.

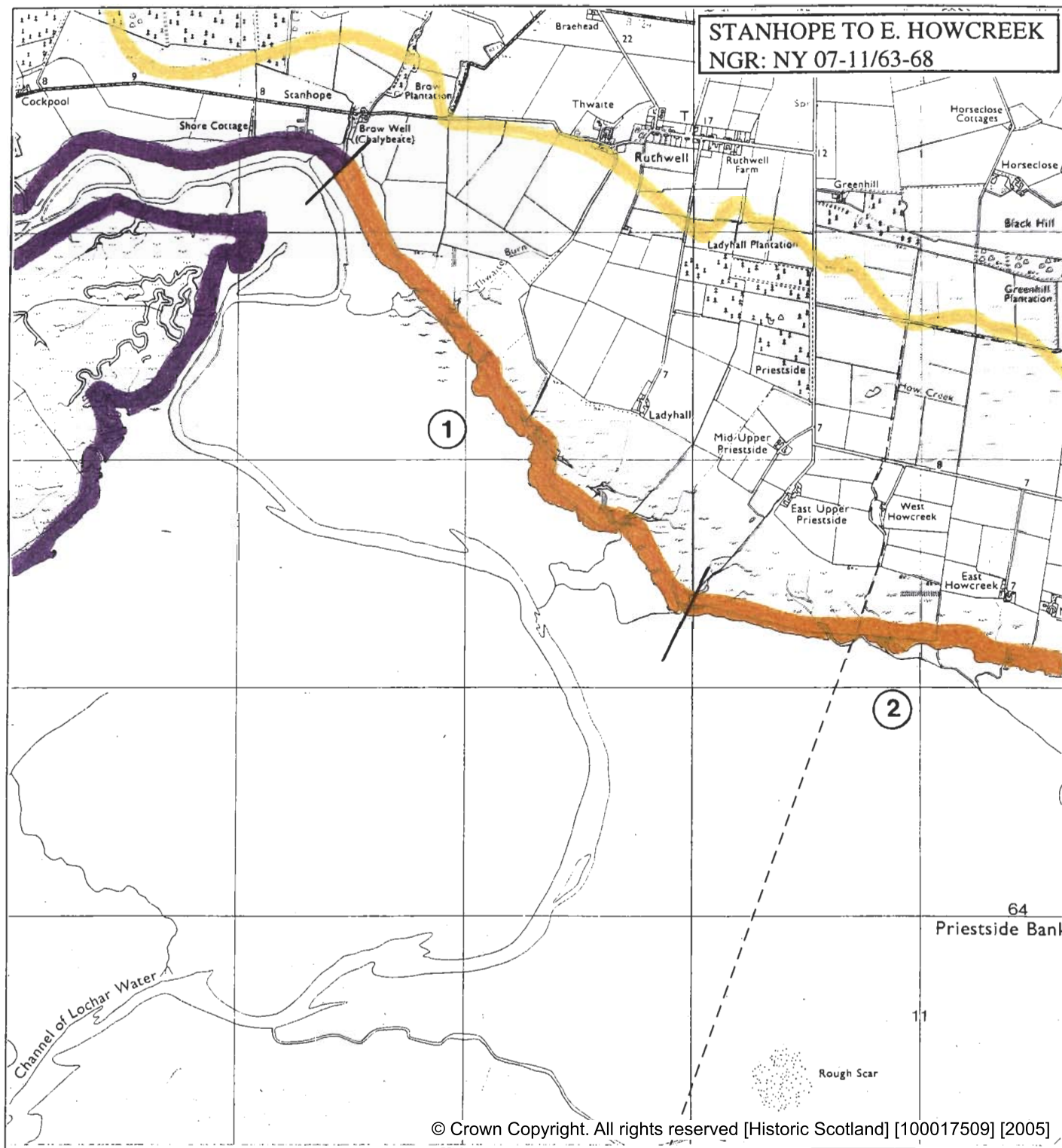
**2. South of EAST UPPERPRIEST SIDE to
POWFOOT**

NY 125 650

5.4k

Eroding or stable

Flat low intertidal area with mud flats and shingle beds that are eroding at the MHW. The coastal edge is broken in parts by drainage channels that are stabilised by saltmarsh vegetation.



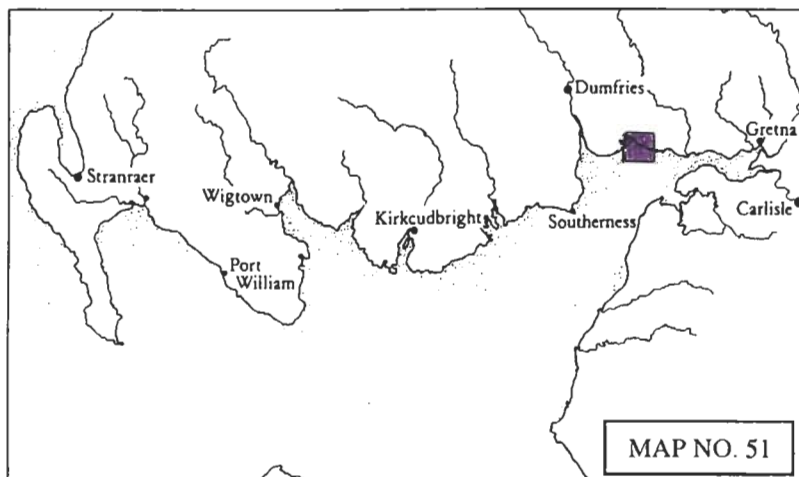
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 08.10.96

Scale 1:25 000



MAP 51: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

Sites in the Hinterland

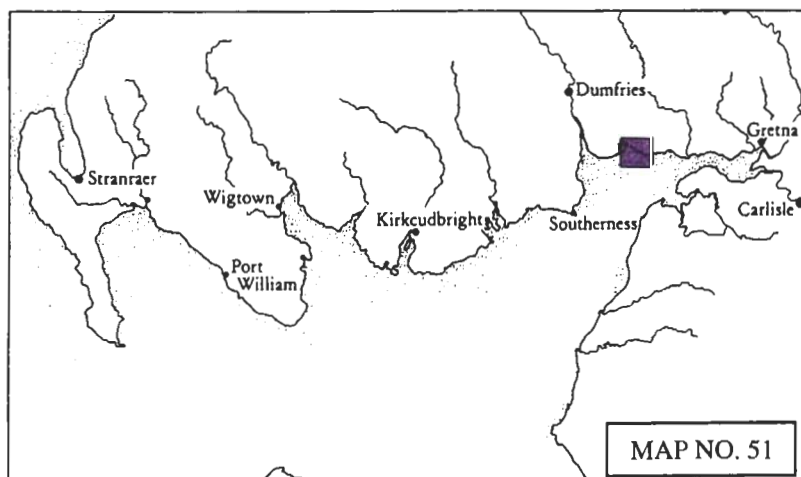
NY 0948 6575
CAERLAVEROCK RESERVE
Fence - Former Edge of Field
Uncertain
Poor
Monitor

None



KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg. NX13 SW17	Dashed outline	Yellow	Gardens/Designed landscape
	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 52: EASTHOW CREEK TO POWFOOT

Hinterland Geology and Coastal Geomorphology: This section of coastline overlooks Priests Bank which is a wide expanse of mud flats. Eastwards towards Powfoot, marine deposits overlie coarse clay deposits. The featureless hinterland is below 10m O.D. A margin of salt-marsh overlooks the low mud-flats.

Erosion Class: The coastal-edge eastwards to Powfoot is stable owing to the presence of salt-marsh vegetation. Sediment loss is likely to be high when flooding is extreme. The coastal edge in front of Powfoot is suffering intense erosion. The cliff section is soft sand and gravels and attempts to consolidate it with concrete sea walls has failed. Boulders and concrete are strewn along the foreshore which is leading to further abrasion at the base of the low cliff-edge.

Built Heritage & Archaeology: Powfoot harbour is recorded in the NMRS in this section. However, no remains of a harbour could be found in the field survey.

Map 52: Hinterland Geology and Coastal Geomorphology

1. South of MID UPPER PRIESTSIDE to
POWFOOT

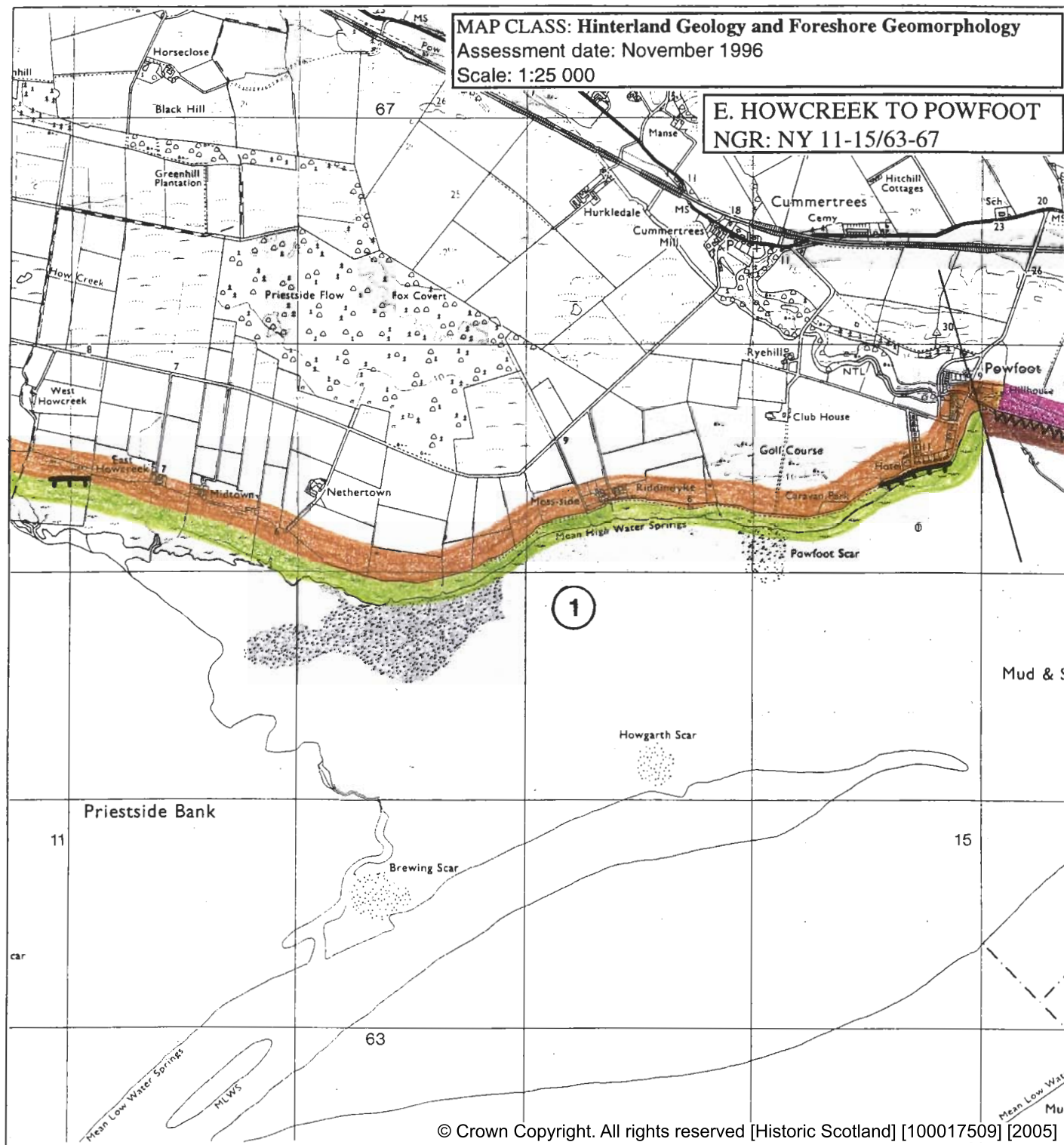
NY 125 650

5km

Low edge (< 5m)

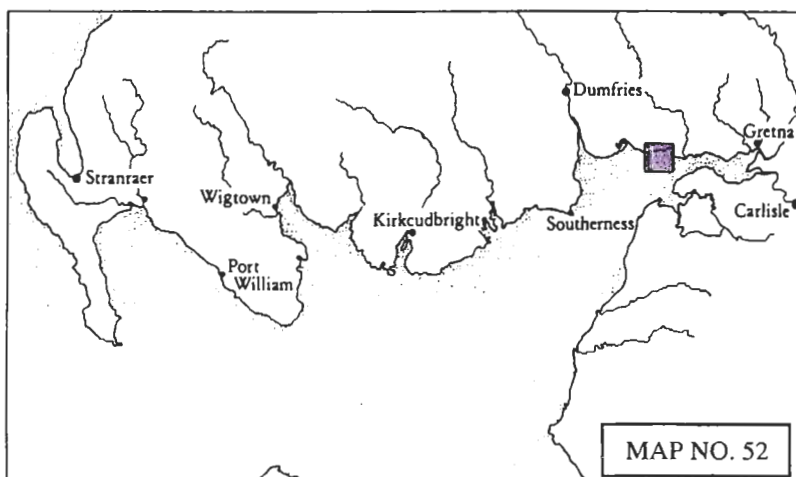
Marine sands and gravels over carse clays

Lower estuary of the River Eden. The hinterland consists of low lying marine sands and gravels over Carse clays. The shoreline is mainly salt-marsh which skirts boulder beds and tidal mud flats.



KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermilion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 52: EROSION

**1. South of EAST UPPERPRIEST SIDE to
POWFOOT**

NY 125 650

5.4k

Eroding or stable

Flat low intertidal area with mud flats and shingle beds that are eroding at the MHW. The coastal edge is broken in parts by drainage channels that are stabilised by saltmarsh vegetation.

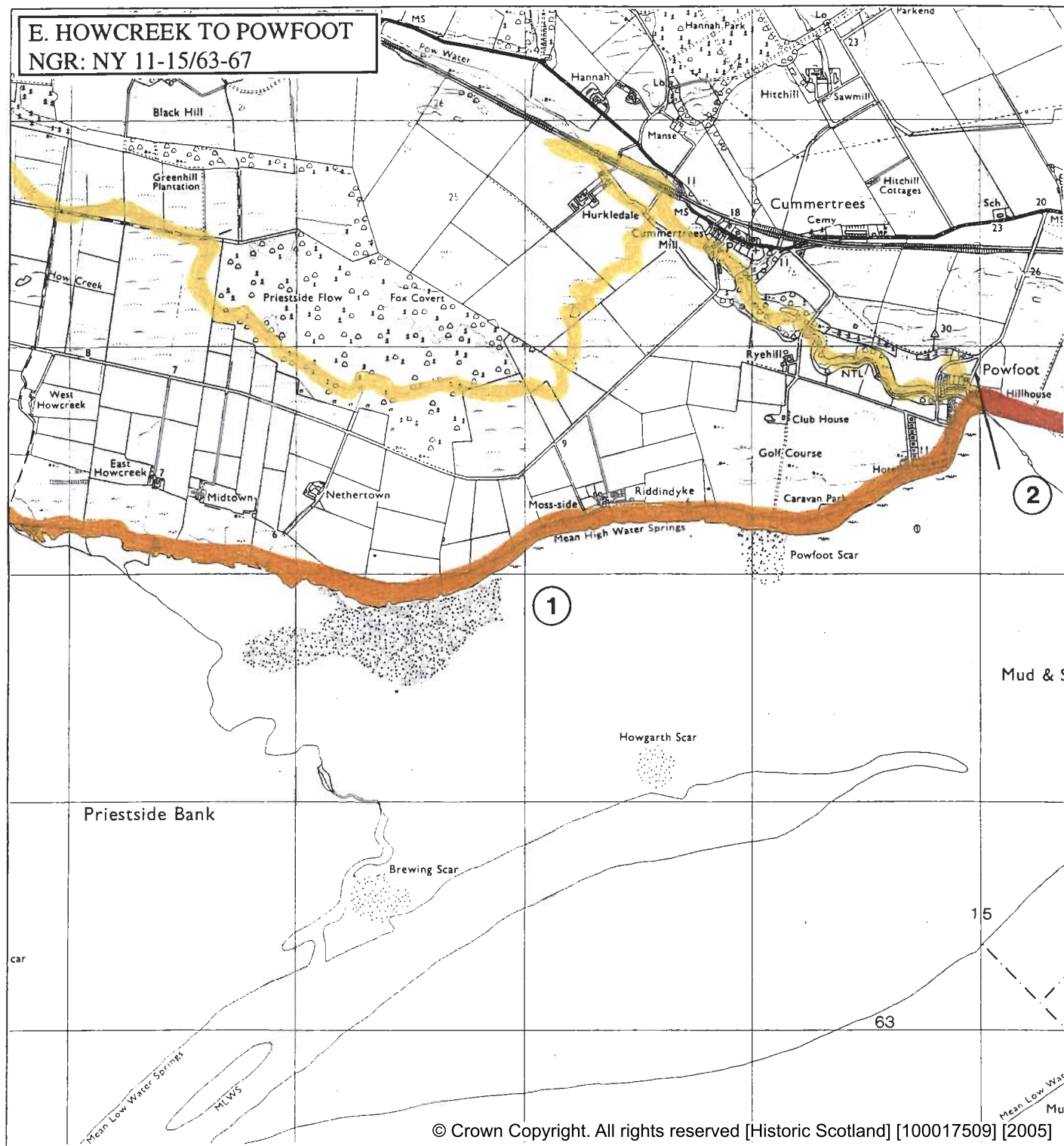
2. POWFOOT to BARNKIRK POINT

NY 183 464

4.5km

Definitely eroding

This unit has a very unstable coastline effected by storm damage. The cliff section c. 200 east of Hillhouse (NY 162658) shows evidence for severe erosion and slope failure. Concrete and builders rubble have been used to consolidate the cliff but this is failing badly. Concrete and brick debris is scattered along wide stretches of this soft coastline.



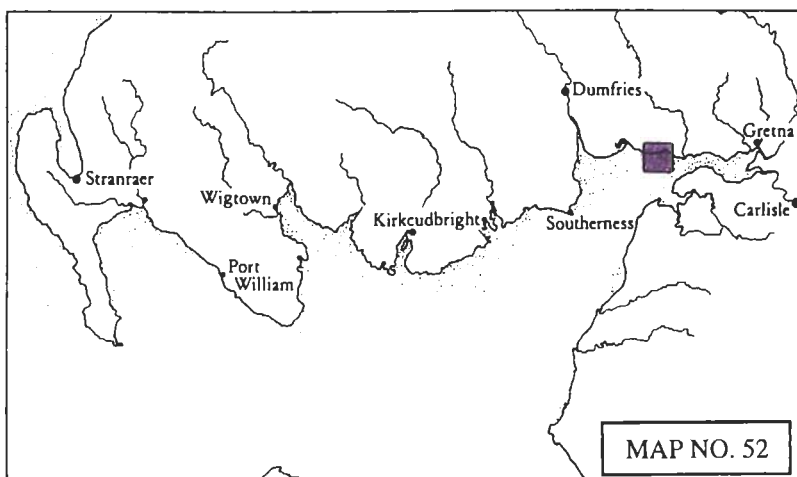
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 08.10.96

Scale 1:25 000



MAP 52: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore	Sites in the Hinterland
NY16NE 27	None
NY 1500 6570	
POWFOOT HARBOUR	
Harbour	
Uncertain	
Uncertain; not located	
Nil	

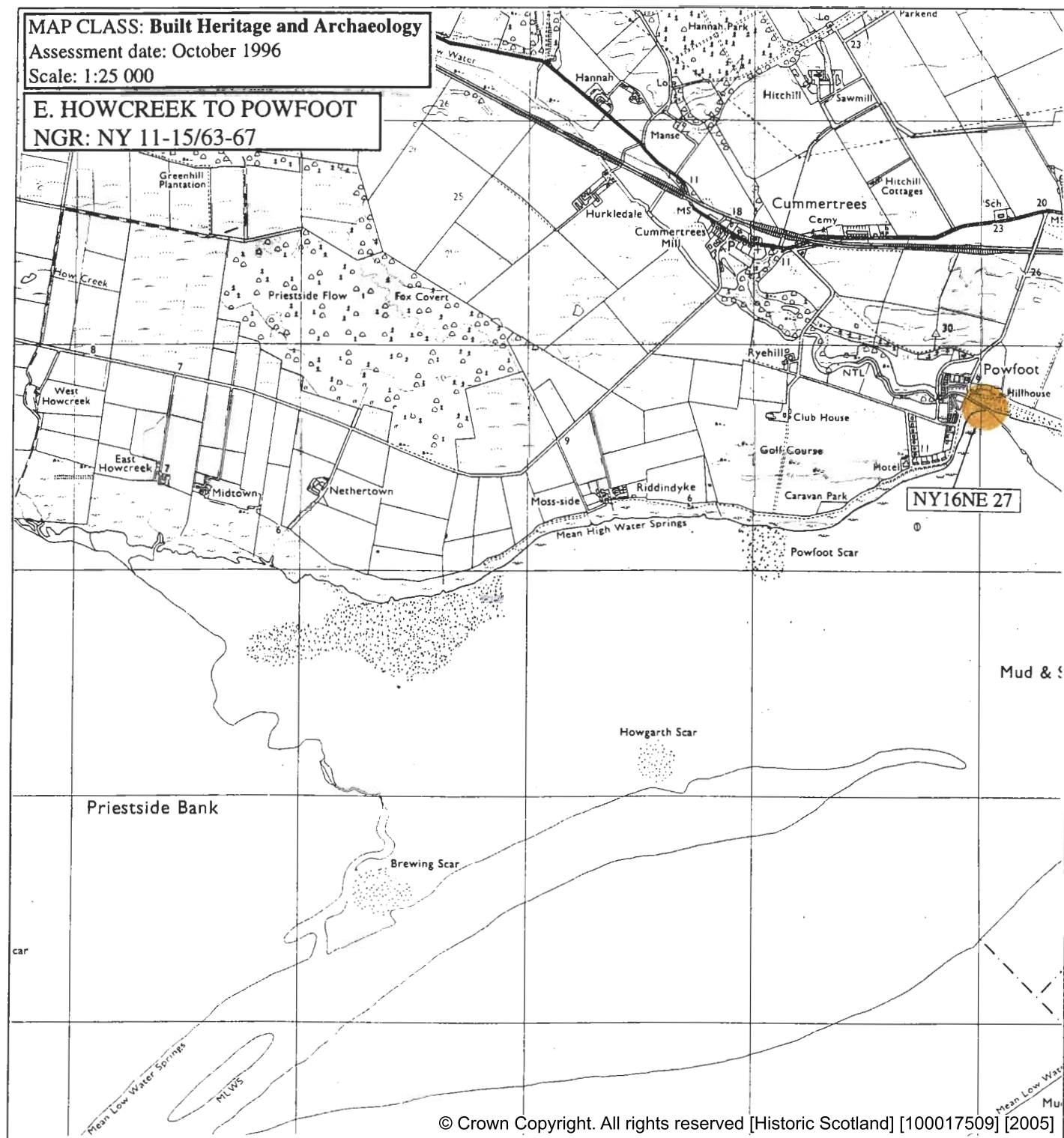
MAP CLASS: Built Heritage and Archaeology

Assessment date: October 1996

Scale: 1:25 000

E. HOWCREEK TO POWFOOT

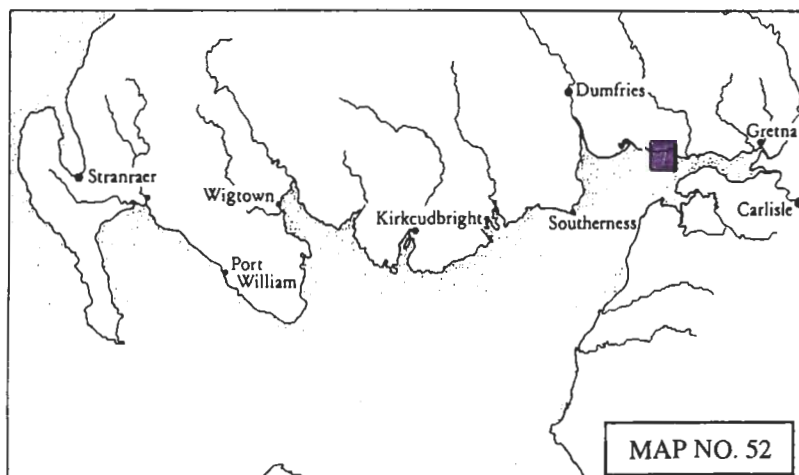
NGR: NY 11-15/63-67



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KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 53: POWFOOT TO ANNAN

Hinterland Geology and Coastal Geomorphology: The coastal geology from Powfoot to Annan is dominated by fluvioglacial outwash, blown sands and marine deposits. The land beyond Newbie Cottages is flat and lies below 10m O.D. marine sands and gravels flank the River Annan. The coastal edge as far as Barnkirk Point consists of mud and boulders and has a fairly steep gradient down to the channel of the River Eden. Salt-marsh is common along the River Annan and eastwards towards Eastriggs.

Erosion Class: This region marks the start of the longest stretch of ('softer') eroding coastline throughout this entire coastal survey. The soft glacial-outwash and blown sand deposits are constantly eroded at the HWM as the channel of the River Eden encroaches landwards.

Built Heritage & Archaeology: This section contains a relatively dense distribution of sites dominated by monuments dating to the seventeenth to nineteenth centuries. Included in this group, which clusters around the river Annan, are mills, warehouses, quays, piers and buildings, reflecting the maritime trade of the town of Annan particularly in the eighteenth and nineteenth centuries (Graham & Truckell, 1977, 115-117). The remains of disused fish traps is situated near the mouth of the river and represents a common monument along the foreshore east of the river Annan. Much of the older remains, particularly at Barnkirk Point and Newbie, have at some stage in the past been destroyed by industrial development.

Map 53: Hinterland Geology and Coastal Geomorphology

1. POWFOOT to BARNKIRK POINT

NY 167 650

5.3km

Low edge (< 5m)

Glacial sands and gravels, blown sand, marine sands and gravels

Lower tidal reach of the River Eden

This straight stretch of coast has a complex geomorphology, consisting of different types of marine deposits. From Powfoot to south of Broom (NY 162 657), laminated glacial sands and gravels occur. From here to Newbie Mains (NY 173 647) blown sand laminated with beach deposits can be seen in shore sections. From this location to Barnkirk Point, marine sands and gravels occur cover carse clay. The shoreline is a mixture of mud and poorly sorted boulders.

2. BARNKIRK POINT to WATER FOOT via ANNAN BRIDGE

NY 185 650

4km

Low edge (< 5m)

Marine sands and gravels

Lower tidal reach of the River Annan. The hinterland of this unit is mostly marine sands and gravels. The riverbank on either side of the river channel contains alluvial mud and silt.

3. WATERFOOT to GOWKESK RIG

NY 205 649

2km

Low edge (< 5m)

Marine sands and gravels

The hinterland of this unit consist of marine sands and gravels overlying Carse clays. The foreshore at the HWM is mainly saltmarsh and mud that borders tidal mud-flats.

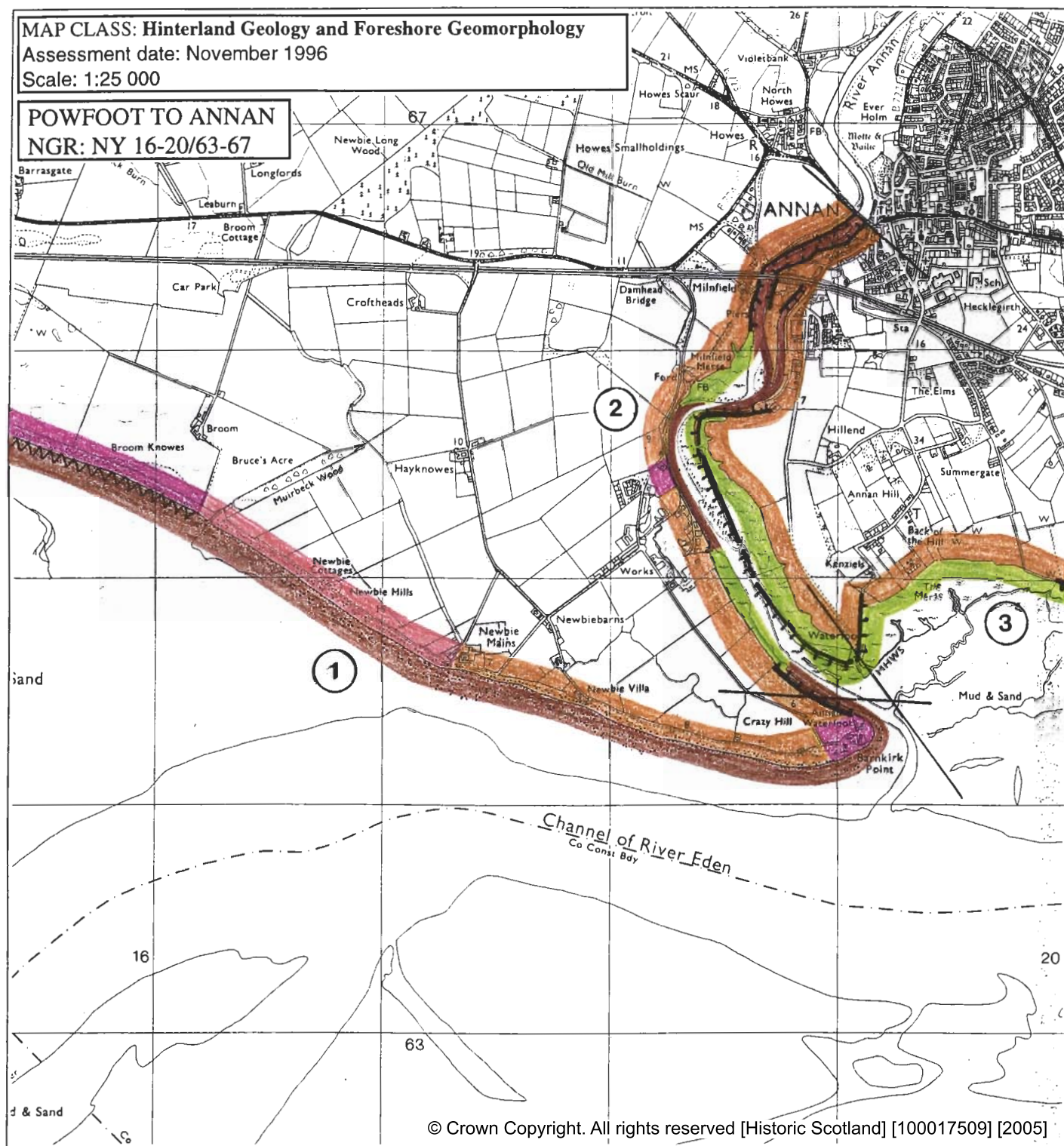
MAP CLASS: Hinterland Geology and Foreshore Geomorphology

Assessment date: November 1996

Scale: 1:25 000

POWFOOT TO ANNAN

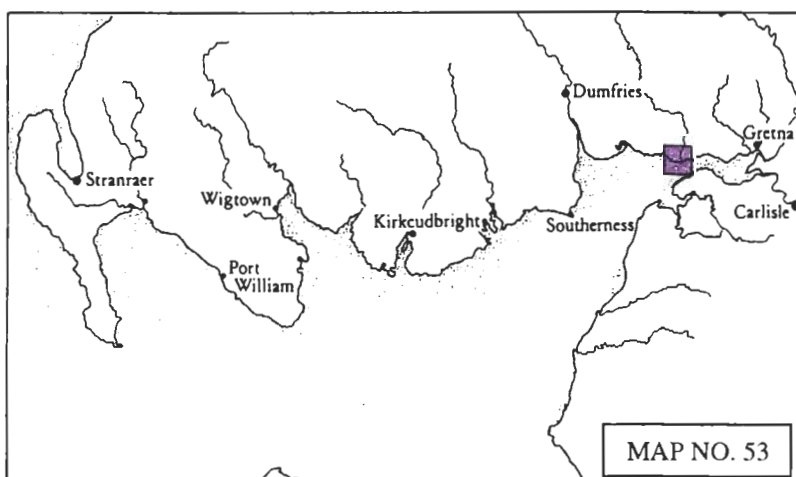
NGR: NY 16-20/63-67



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KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 53: EROSION

1. POWFOOT to BARNKIRK POINT

NY 183 464

4.5km

Definitely eroding

This unit has a very unstable coastline effected by storm damage. The cliff section c. 200 east of Hillhouse (NY 162658) shows evidence for severe erosion and slope failure. Concrete and builders rubble have been used to consolidate the cliff but this is failing badly. Concrete and brick debris is scattered along wide stretches of this soft coastline.

2. BARNKIRK POINT to MILNFIELD

NY 192 642

6.6km

Accreting or stable

Lower tidal stretch of the River Annan with mud accreting on the western banks of the river due to high sediment loads brought down the river. Floodbanks protect low lying farmland behind.

3. MILNFIELD south to WATERFOOT

NY 192 647

2km

Accreting or stable

East bank of the lower tidal stretch of the River Annan. Mud is accreting on the river bank. Flood banks protect low lying marsh behind.

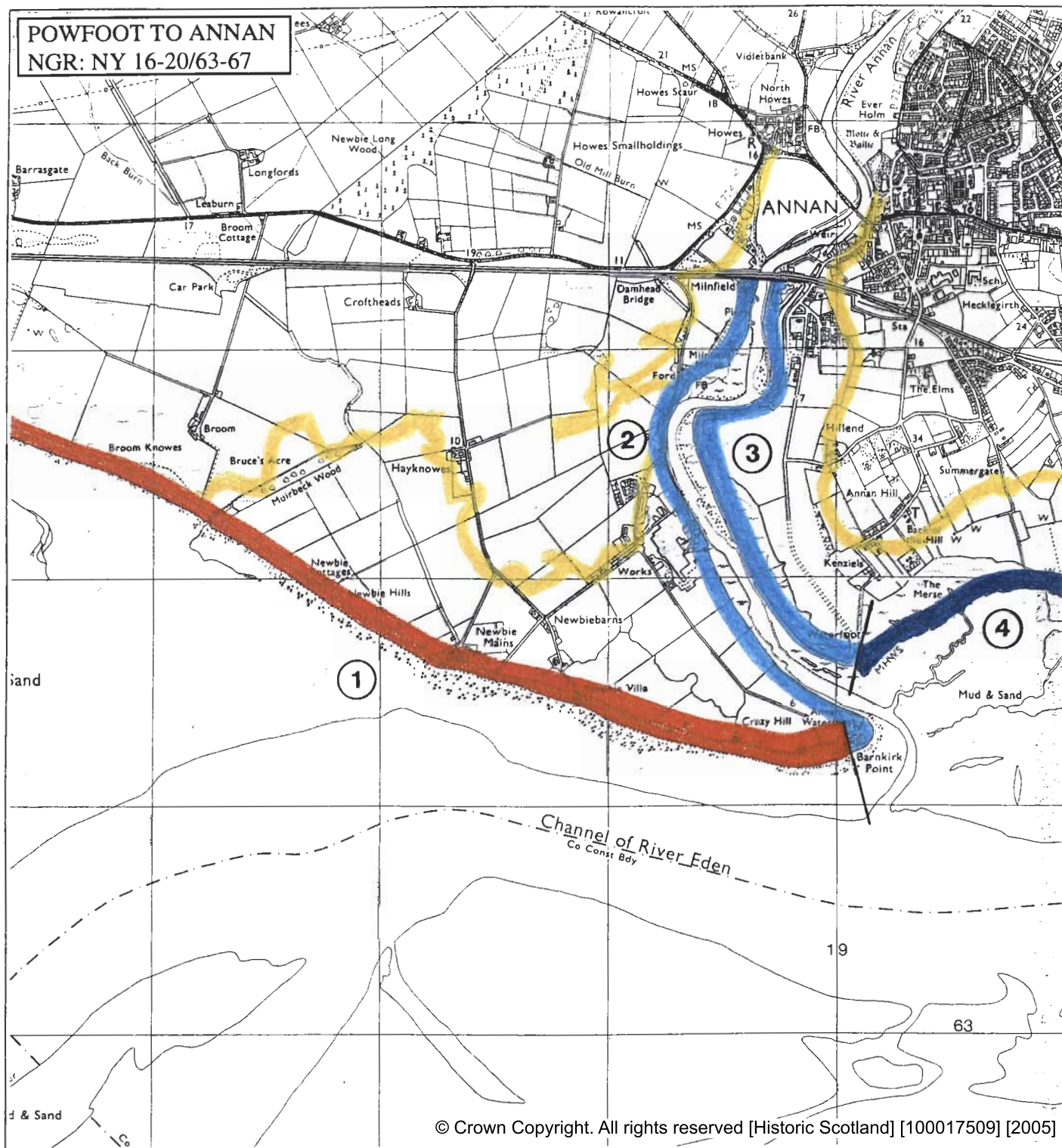
4. WATERFOOT east to SEAFIELD

NY 200 650

1.9km

Definitely accreting

This unit consists of accreting mud banks at the HWM caused in part by high sediment loading down the River Annan and in part to the influence of the old railway jetty at Seafeld (NY 206645).



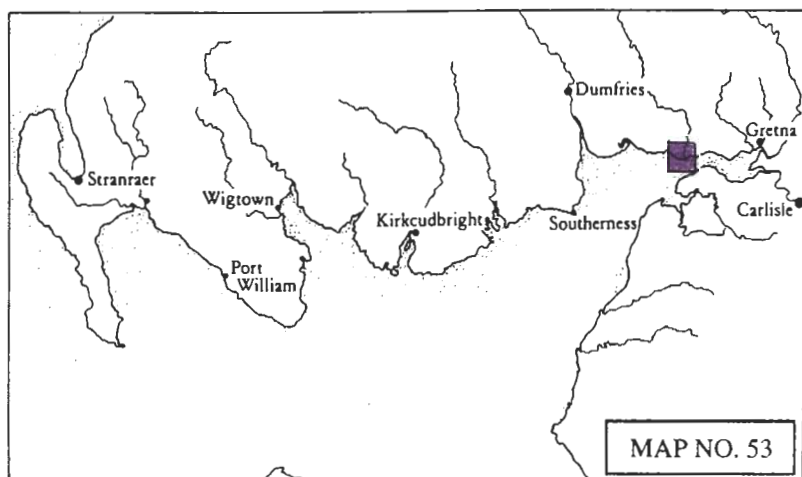
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 08.10.96

Scale 1:25 000



MAP 53: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

NY 1678 6497
NEWBIE COTTAGE
 Cottage
 Statutory Listed Building
 17th century
 Good
 Nil

NY16SE 8
 NY 1717 6469
NEWBIE MAINS
 Cists
 2nd/3rd Mill BC
 Uncertain; not located
 Nil

NY 1738 6466
NEWBIE MAINS FARM
 Farmhouse
 Statutory Listed Building
 19th century
 Good
 Nil

NY16SE 11
 NY 1903 6425
WATERFOOT
 Spears & Skeleton Findspot
 Destroyed
 Nil

NY16SE 18
 NY 1903 6425
BARNKIRK POINT
 Lighthouse
 19th century
 Destroyed
 Nil

NY 1864 6621
MILNFIELD PIERS
 Stone Piers
 Uncertain
 Good
 Nil

NY 18 66
ANNAN
 Mills, Stores, Viaduct &
 Quay
 Statutory Listed Buildings
 19th century
 Good
 Nil

NY 191 647
WATERFOOT
 Flood Banks
 Uncertain
 Fair
 Monitor N

Y 1900 6460
WATERFOOT
 Shipwreck
 Uncertain
 Poor
 Survey & Monitor

NY16SE 16
 NY 1910 6460
WATERFOOT
 Harbour
 Uncertain
 Fair
 Monitor

NY 1980 6466
WATERFOOT
 Disused Fish Traps
 Uncertain
 Good
 Nil

Sites in the Hinterland

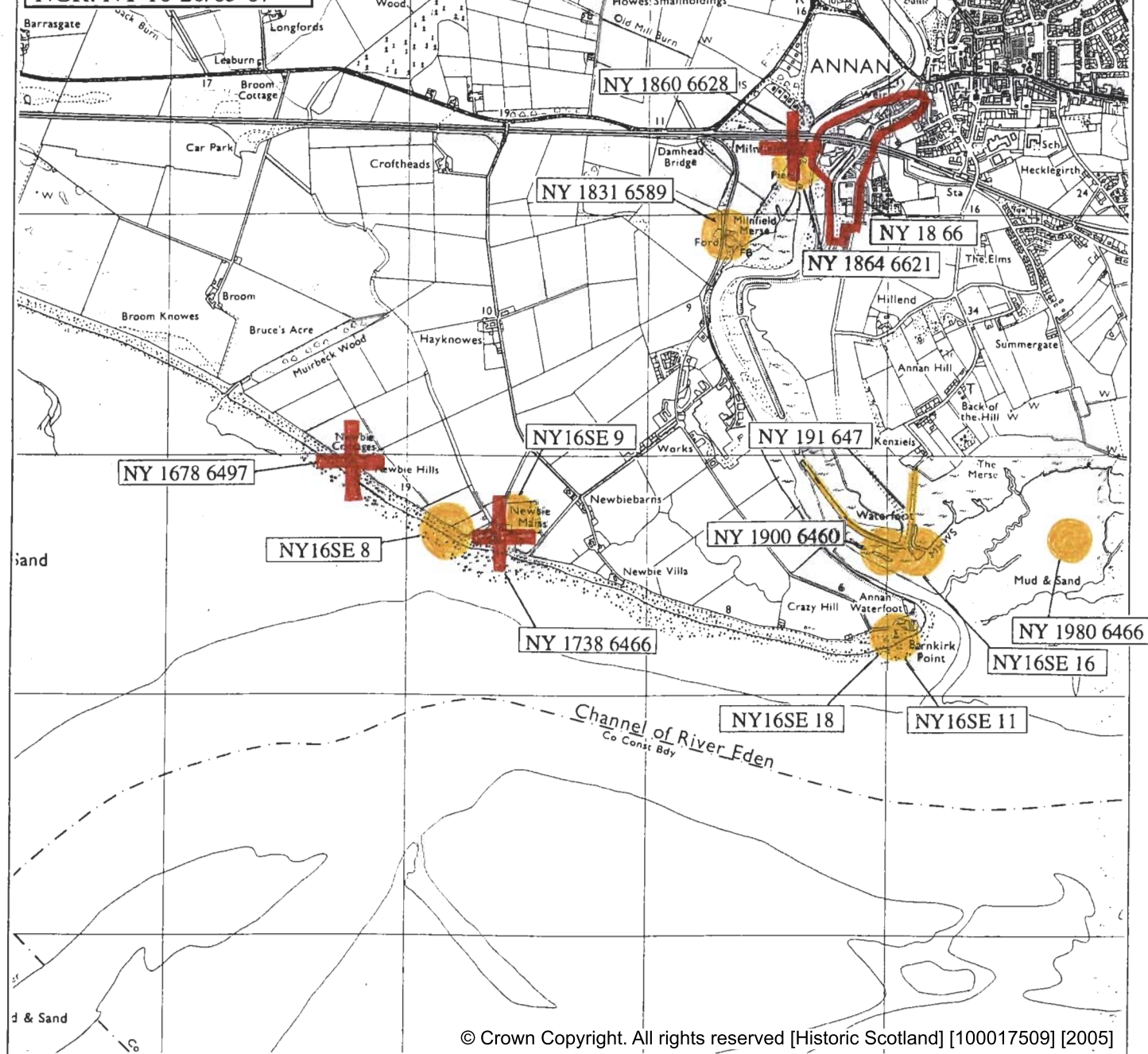
NY16SE 9
 NY 1742 6469
NEWBIE MAINS
 Site of Castle
 Uncertain
 Good
 Nil

NY 1831 6589
MILNFIELD BRIDGE
 Foot Bridge
 Uncertain
 Good
 Nil

NY 1860 6628
MILNFIELD FARM
 Farmhouses
 Statutory Listed Buildings
 Early 19th century
 Good
 Nil

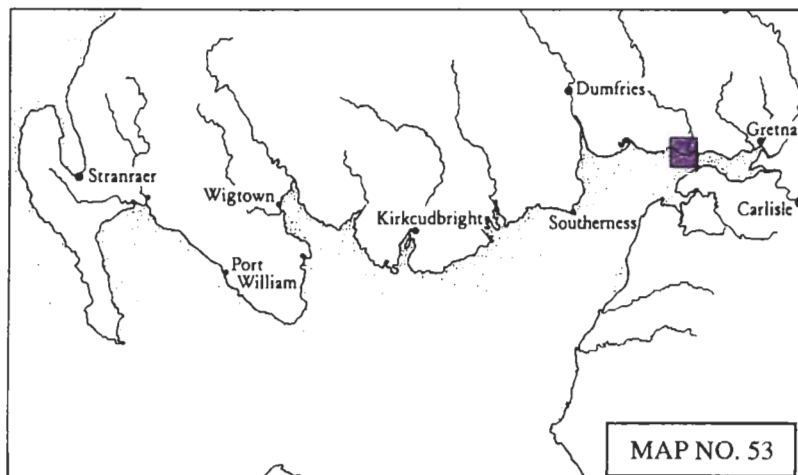
Scale: 1:25 000

NGR: NY 16-20/63-67



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Site location	Symbol	Colour	Significance
NGR ref. - eg. NX 143 368	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg. NX13 SW17	Dashed outline	Yellow	Gardens/Designed landscape
	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 54: ANNAN TO EASRIGGS

Hinterland Geology and Coastal Geomorphology: This map depicts the lower tidal reach of the River Eden. The coastal geology is soft and consists of stretches of marine sands, glacial drift and coarse clay deposits. Riverine mud and salt-marsh are a common feature at Gowkesk Rig and further eastwards along the river.

Erosion Class: The foreshore is being eroding by wave attack along the length of this section. However the rate of shoreline recession is not as great as that observed at Powfoot.

Built Heritage & Archaeology: The dominant form of archaeological monuments in this section of the coastline are fishing net stakes and fish traps, distributed in a scattered fashion. Originally many more net stakes existed on the expansive sands revealed at low tide in this area (Solway Salmon Fisheries Commission, 1878-79), the last century witnessing the depletion of fisheries in the area. Although some of the surviving systems may still be used, others are adversely affected by tidal abrasion and monitoring is recommended in regard to these sites. Situated at the coastal edge of this section are two farm buildings and the remains of the Solway Railway Viaduct, a failed business venture of the late nineteenth and early twentieth century (RCAHMS, NY26SW 32).

Map 54: Hinterland Geology and Coastal Geomorphology

1. WATERFOOT to GOWKESK RIG

NY 205 649

2km

Low edge (< 5m)

Marine sands and gravels

The hinterland of this unit consist of marine sands and gravels overlying Carse clays. The foreshore at the HWM is mainly saltmarsh and mud that borders tidal mud-flats.

2. GOWKESK RIG to DORNOCK COTTAGE

NY 214 650

1.5km

Low edge (< 5m)

Marine sands and gravels over carse clay

The hinterland consists of marine sands and gravels overlooking a boulder and mud foreshore. Wide tidal-flats occur out to the main channel of the River Eden.

3. DORNOCK COTTAGE to DORNOCK BROW FARM

NY 224 653

1.5km

Low edge (< 5m)

Glacial sands and gravels

The hinterland is glacial sands and gravels with a parcel of salt-marsh between a break in the topography

4. DORNOCK BROW FARM to south of BAURCH HOLDINGS

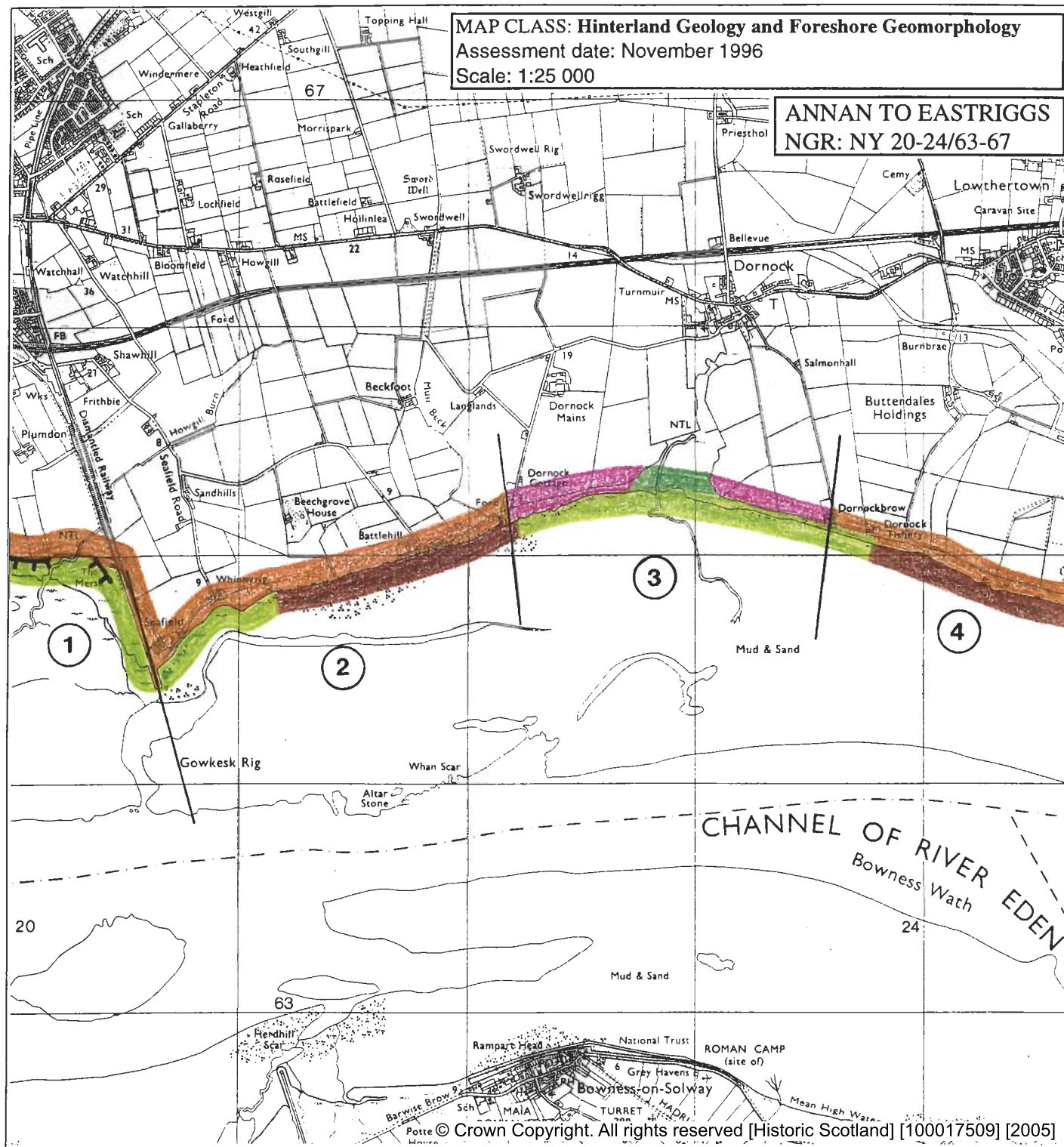
NY 260 640

6km

Low edge (< 5m)

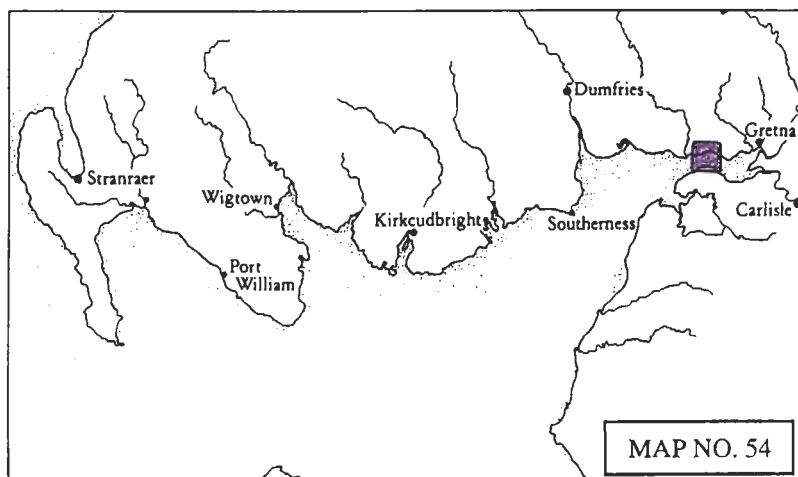
Marine sand and gravels

Marine sands and gravels overlie carse clays. The shoreline is bounded by salt-marsh which overlooks the wide tidal mud-flats of the River Eden.



KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP 54: EROSION

1. SEAFIELD to TORDUFF POINT

NY 240 650

6km

Definitely eroding

This unit shows evidence of erosion at the HWM owing to the soft nature of the drift material (clays). The saltmarsh is failing to protect this region of coastline owing to accelerated mass movement caused by the large spring tides.



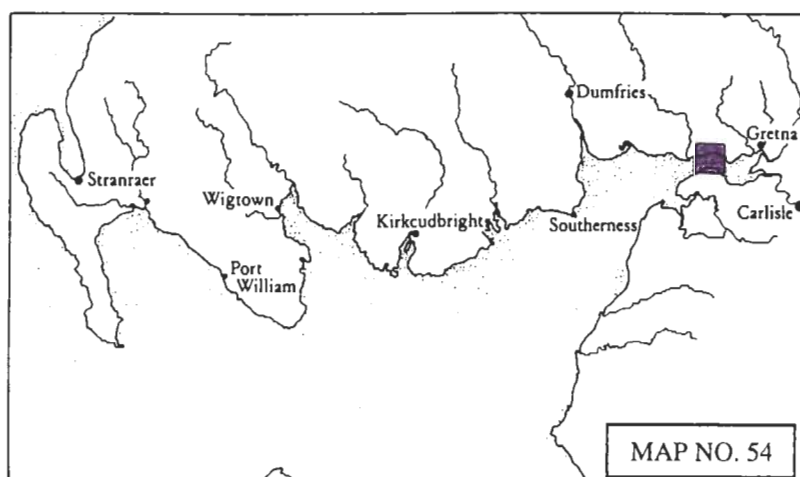
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 07.10.96

Scale 1:25 000



MAP 54: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

NY 2050 6444

SEAFIELD

Fishtrap

Uncertain

Fair

Monitor

NY26SW 33

NY 2062 6242

SOLWAY VIADUCT

Railway Viaduct

19th century

Good

Nil

NY26SW 32

NY 2087 6481

WHINNYRIGG

Barn

Uncertain

Good

Nil

NY26NW 14

NY 2178 6503

BATTLEHILL

Cottage & Outbuildings

Uncertain

Good

Nil

NY 2190 6506

BATTLEHILL

Fishtrap - Step Plan Trap

Uncertain

Good

Nil

NY 2272 6520

DORNOCK

Fish Traps

Uncertain

Poor

Monitor

Sites in the Hinterland

None

NY 23 65

DORNOCK FISHERY

Fish Trap

Uncertain

Fair

Monitor

NY 2392 6501

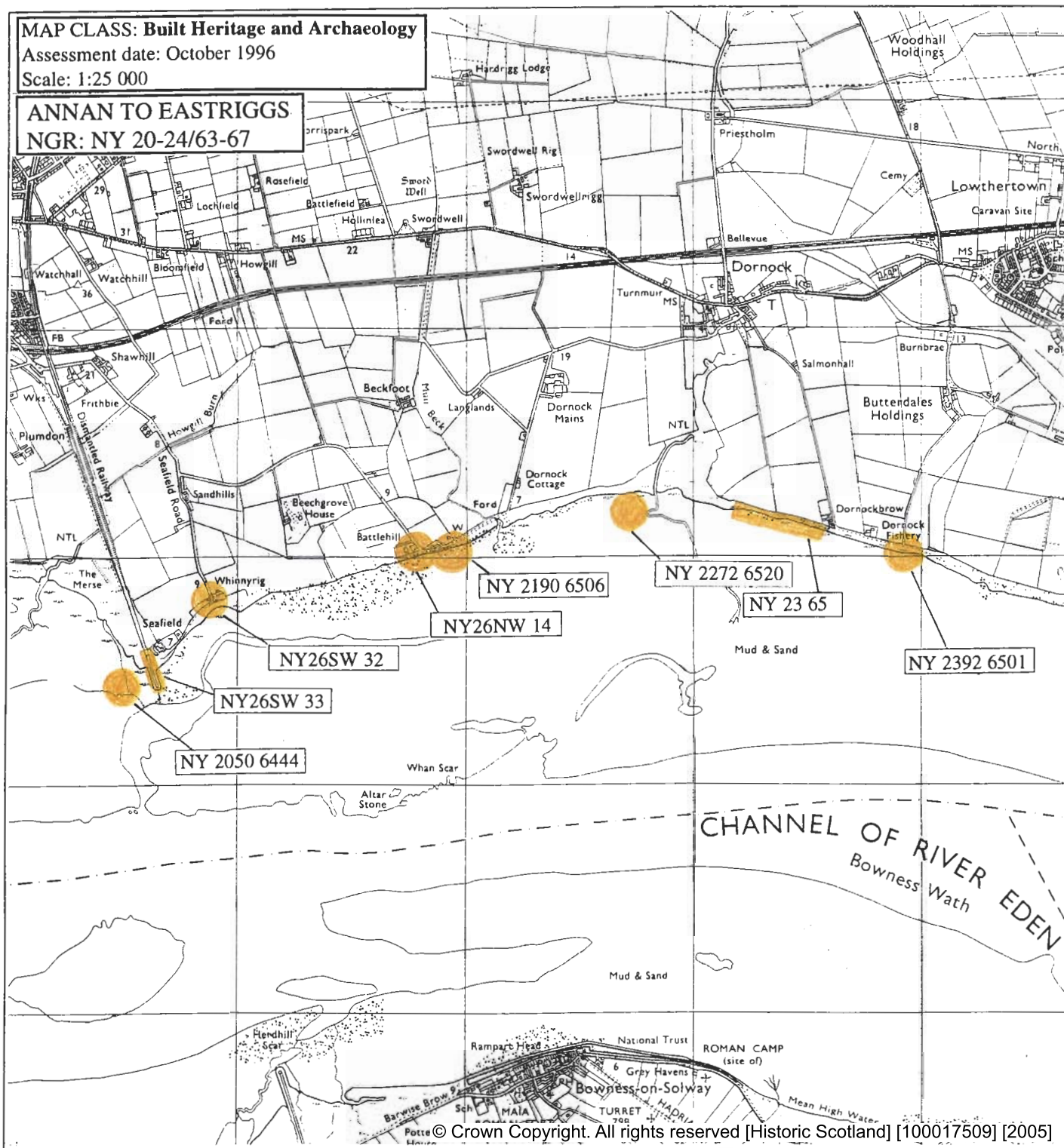
DORNOCK FISHERY

Fish Traps

Uncertain

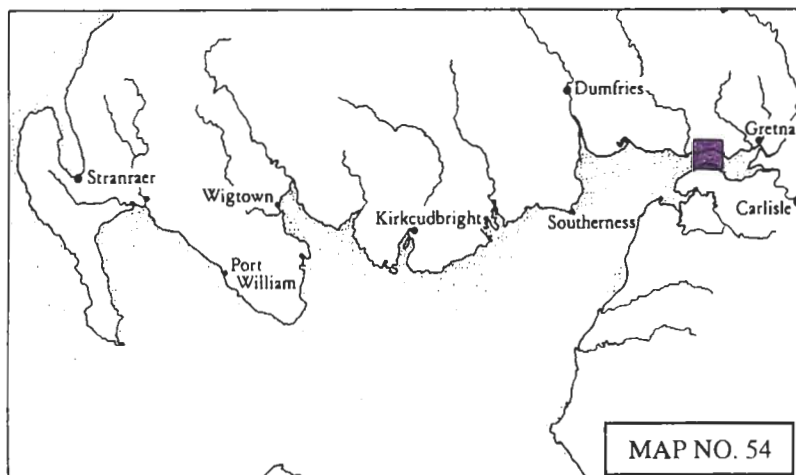
Poor

Monitor



KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
	Roundel - Solid, (or area)	Yellow	Undesignated wreck
NX 13 SW 17	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 55: EASTRIGGS TO RIG

Hinterland Geology and Coastal Geomorphology: This section of the coast is dominated by marine sands and gravels over carse clays. The shoreline has been shaped by the channel of the River Esk. Estuary mud and salt-marsh are common along the steep river-edge. The hinterland is extremely flat and lies below 10m O.D.

Erosion Class: The river-edge is eroding at the current HWMS owing to the nature of the geology, and by the abrasive action of the River Eden channel.

Built Heritage & Archaeology: This stretch of the coastline again contains a scattered distribution of fisheries, generally surviving in poor condition. A monitoring programme is strongly recommended for the surviving fisheries of the Solway coast east of the river Annan. A World War 2 pillbox surviving in poor condition on the coastal edge at Torduff Point relates to the munitions factories established around Eastriggs and Gretna in the middle of the Twentieth century. Surveying and monitoring is recommended in regard to this monument.

Map 55: Hinterland Geology and Coastal Geomorphology

DORNOCK BROW FARM to south of BAURCH
HOLDINGS

NY 260 640

6km

Low edge (< 5m)

Marine sand and gravels

Marine sands and gravels overlie carse clays. The shoreline is bounded by salt-marsh which overlooks the wide tidal mud-flats of the River Eden.

MAP 55: EROSION

1. TORDUFF POINT east to BROWHOUSES

NY 270 641

2km

Definitely eroding

Retreating coastal edge due to slope failure caused by accelerated mass movement at large spring tides.

2. BROWHOUSES to REDKIRK POINT

NY 290 654

2km

Definitely eroding

Channel of the River Esk with erosion noted towards Redkirk Point. Boulder dump sea defences are offering some protection to the hinterland but the immediate foreshore is severely scoured due to extreme tidal conditions.



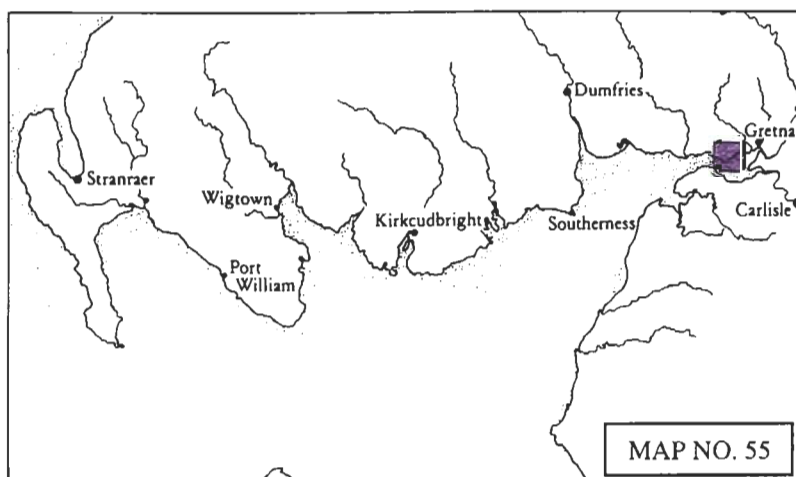
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 07.10.96

Scale 1:25 000



MAP 55: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

NY 255 644
TORDUFF
FISH TRAPS
Uncertain
Poor
Monitor

NY 257 640
TORDUFF
Fish Traps
Uncertain
Poor
Monitor

NY 2616 6397
TORDUFF POINT
WW2 Pillbox
Mid 20th century
Poor
Survey & Monitor

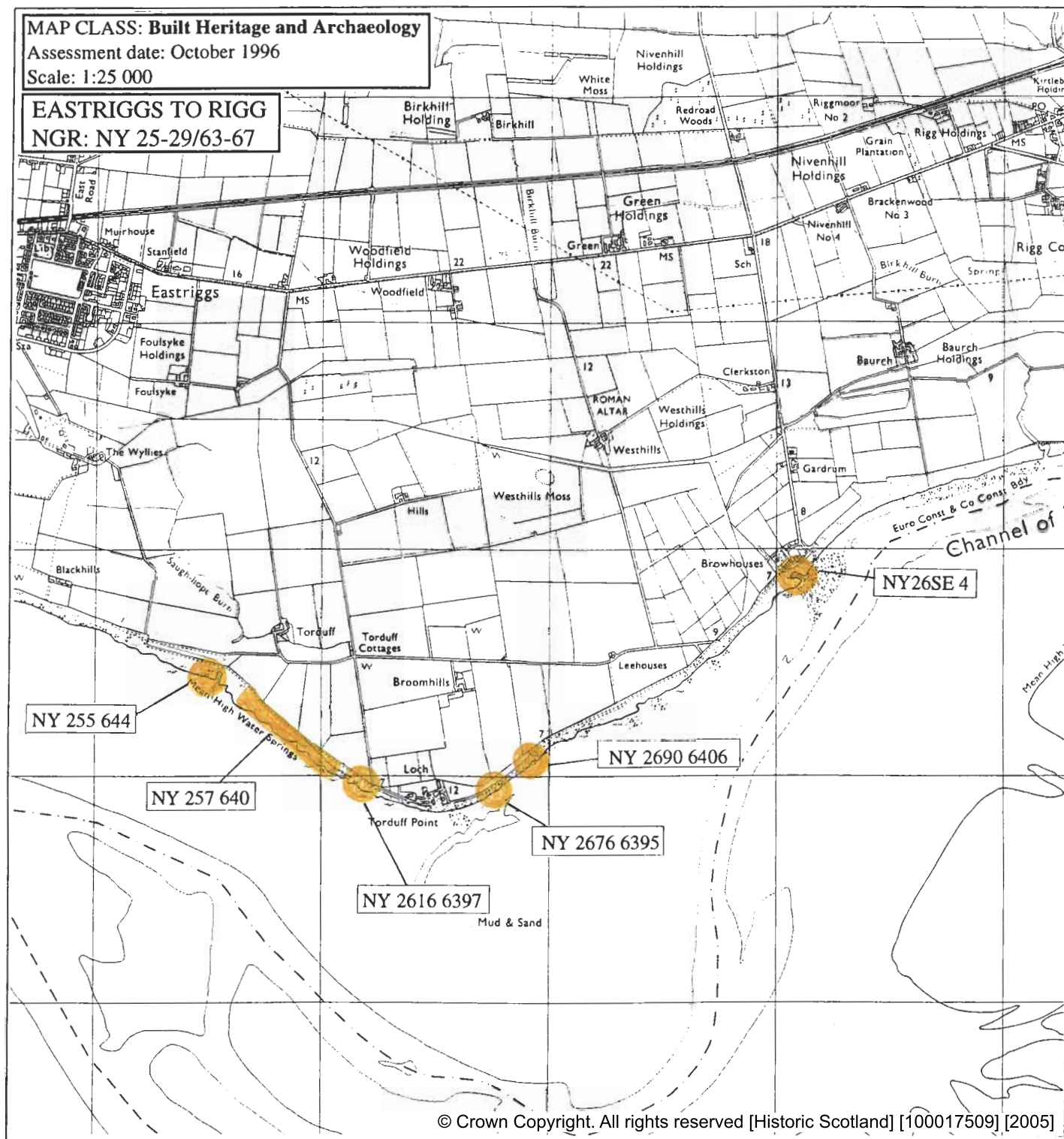
NY 2676 6395
TORDUFF POINT
Fish Trap
Uncertain
Poor
Monitor

NY 2690 6406
TORDUFF POINT
Fish Trap
Uncertain
Poor
Monitor

NY26SE 4
NY 2810 6486
BROWHOUSES
Landing Place
Uncertain
Poor
Monitor

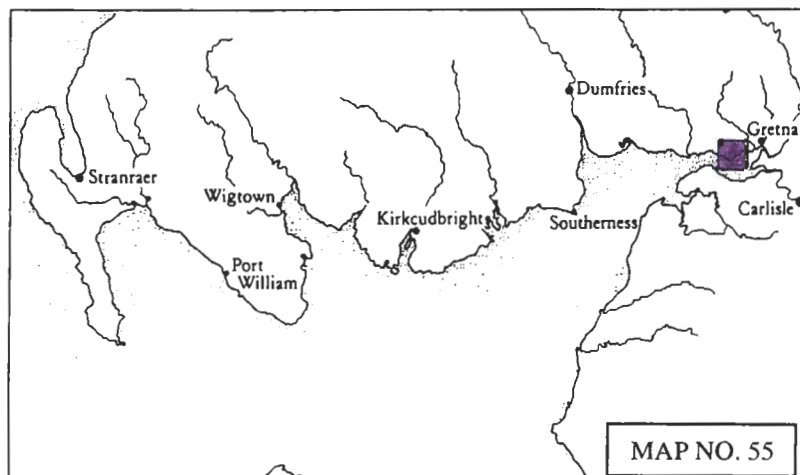
Sites in the Hinterland

None



KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



MAP 56: RIGG TO GREтна

Hinterland Geology and Coastal Geomorphology: This is the final section of the study and details the hinterland geology from Rigg to the River Sark at Gretna. The hinterland geology is marine deposits over carse clays and silts. The lower tidal reach of Kirtle Water is surrounded by alluvium deposits which continue up to Gretna. Redkirk point has been the focus of palaeoenvironmental study and is discussed in greater detail below.

Erosion Class: Coastal barriers have been constructed along this stretch of the River Esk but it is still being seriously eroded, particularly at Redkirk Point. Farmland is being lost immediately east of Redkirk Point. Here fence posts were seen to overhang exposed sections. The current rate of cliff-edge retreat is difficult to determine without more precise data from a programme of monitoring. An attempt to reconstruct what has been lost over the last 250 years, and its implications for archaeology and palaeoenvironmental history in this area has been undertaken using cartographic sources. This work is shown in section 4.

Built Heritage & Archaeology: A cluster of archaeological remains at Redkirk Point dominates the distribution of archaeological monuments in this section. These comprise early Mesolithic remains (Masters, 1981), the remains of a medieval church, cemetery, pottery kiln and pottery finds (Truckell, 1967), WW2 defences, and nineteenth century fishing stakes. Although a coastal defence barrier at the moment protects the coastal edge, the foreshore, where all the known monuments are situated, is being severely eroded and a monitoring programme is urgently required. The erosion of the shingle beach has revealed a small (5 x 5m) patch of an underlying dark organic layer, which may be of archaeological significance given previous work (Masters, 1981, 113). Further east, landing places on the coastal edge and the remains of a stone circle, Lochmabenstone, in the hinterland, are situated. The landing place at Stormont is badly eroding and requires monitoring. Across the river Sark, at the eastern terminal of the Coastal Survey are the Sark bridges and the disused Sark Viaduct. Both monuments survive in good condition.

Map 56: Hinterland Geology and Coastal Geomorphology

1. SOUTH of BAURCH HOLDINGS to east of REDKIRK HOLDINGS

NY 304 655

4.5km

Low edge (< 5m)

Marine sands and gravels over carse clays

Channel of the River Esk. Marine sands and gravels overly bands of Carse clay which overlies fluvioglacial gravels. The foreshore is steep down to the main channel of the River Eden and consists of salt-marsh alluvial mud and silt.

2. East of REDKIRK HOLDINGS to SARK BRIDGE

NY 324 664

4km

Low edge (< 5m)

Alluvial clay

The hinterland of this unit consists of alluvial clays are bounded by salt-marsh. The foreshore along the channel of the River Esk up to Sark Bridge (NY 327 670).

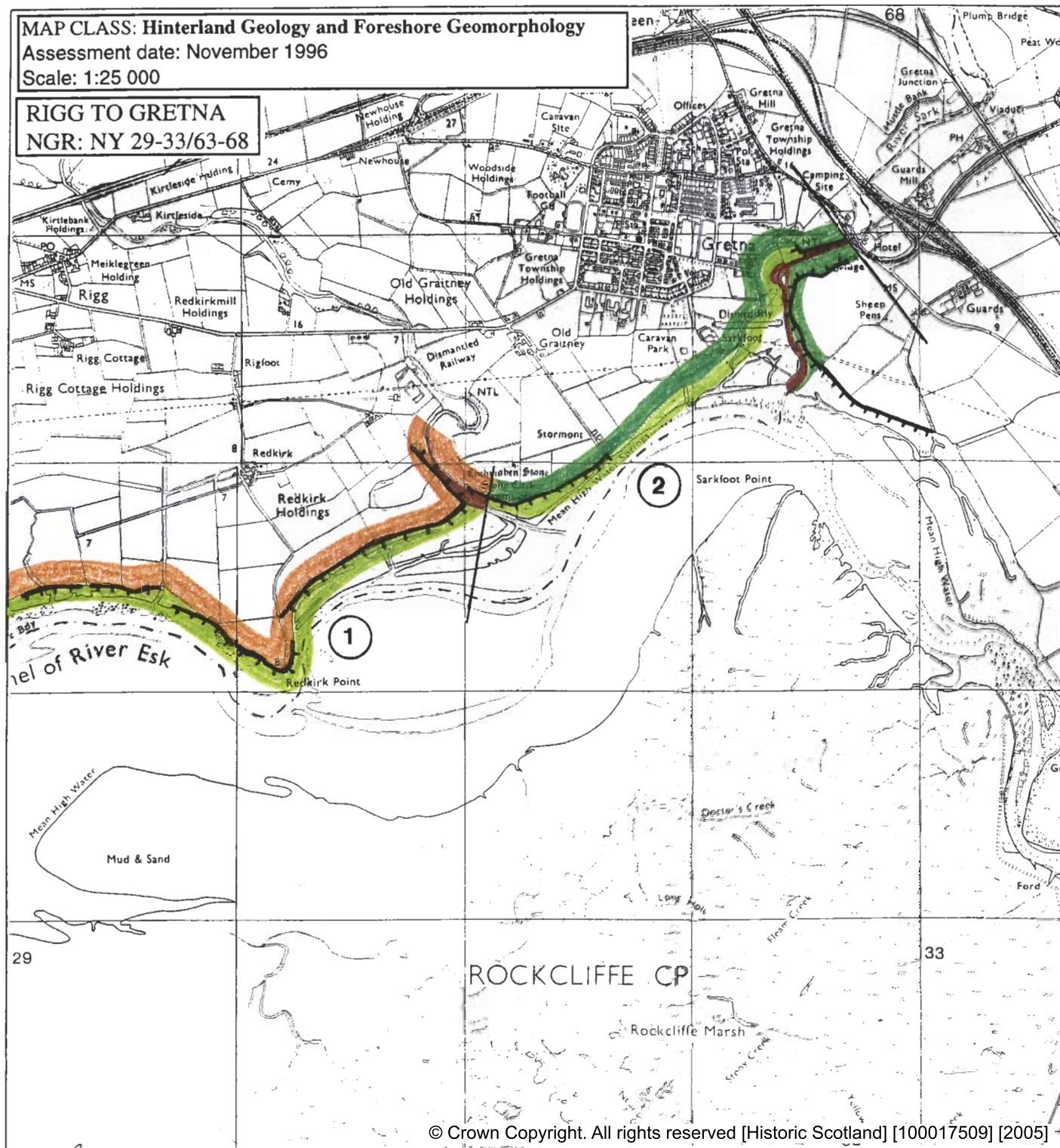
MAP CLASS: Hinterland Geology and Foreshore Geomorphology

Assessment date: November 1996

Scale: 1:25 000

RIGG TO GRETNA

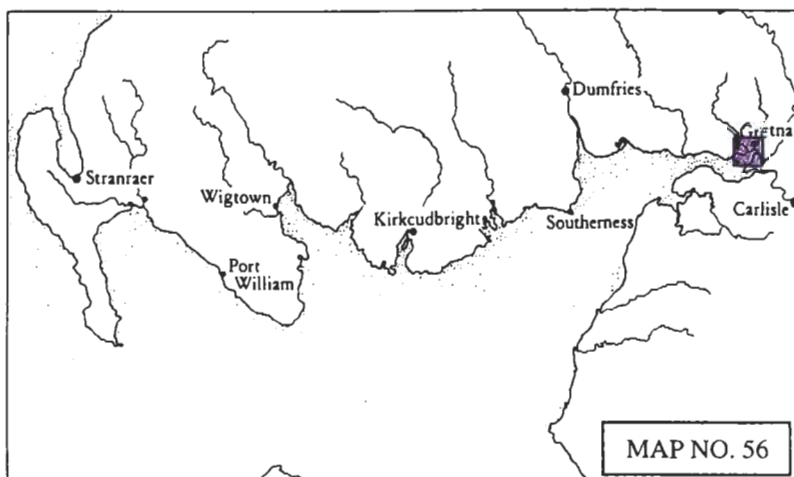
NGR: NY 29-33/63-68



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KEY

Hinterland Geology	Derwent Code	Colour
Drift, boulder clay	French Grey	
Drift, boulder clay over visible rock	Dark Violet	
Raised beach and marine deposits	Golden Brown	
Blown sand	Pink Madder Lake	
Glacial sand and gravel	Magenta	
Alluvium	Emerald Green	
Coastal Geomorphology		
Mainly rock platform	Deep vermillion	
Mainly sand	Ultramarine	
Mainly alluvial/marine mud	Venetian Red	
Marsh	May Green	
Coast Edge		
Low edge (<5m)	Thin black line	
Cliff (>5m)	Solid black line	
Man made barrier	Black line with spines	
Shingle beach	Small circles	
Human disturbance	Black carats	



MAP NO. 56

MAP 56: EROSION

1. REDKIRK POINT to south of GRETNA

NY 310 656

2.5km

Definitely eroding

This section of the River Annan is severely eroding. Soft clay banks are slipping and attempts to consolidate the banks have failed with the loss of grazing land.

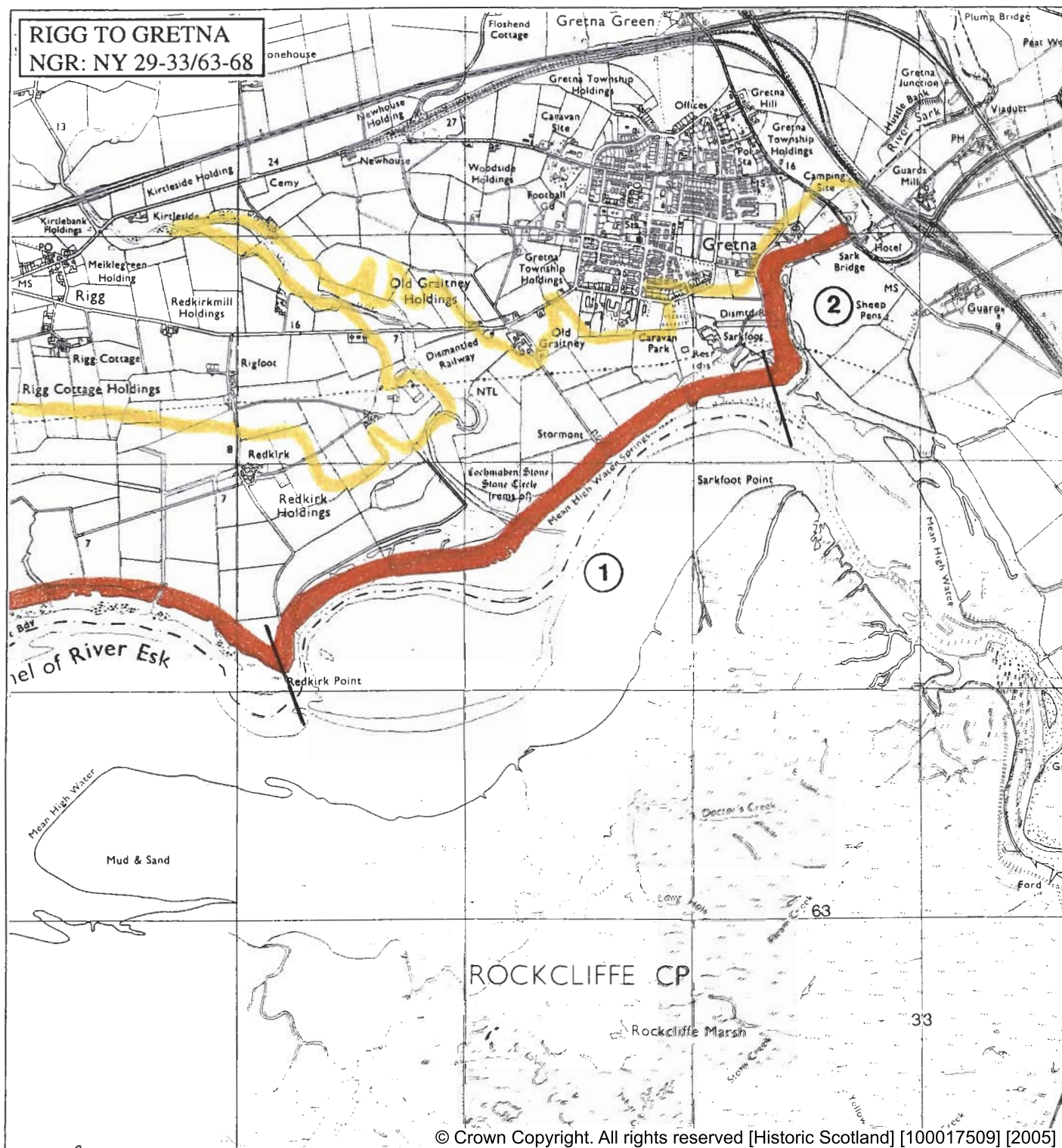
2. South of GRETNA to SARK BRIDGE

NY 325 667

0.8km

Definitely eroding

Part of the tidal reach of the River Sark. The banks of the river are scoured and eroding at the HWM.



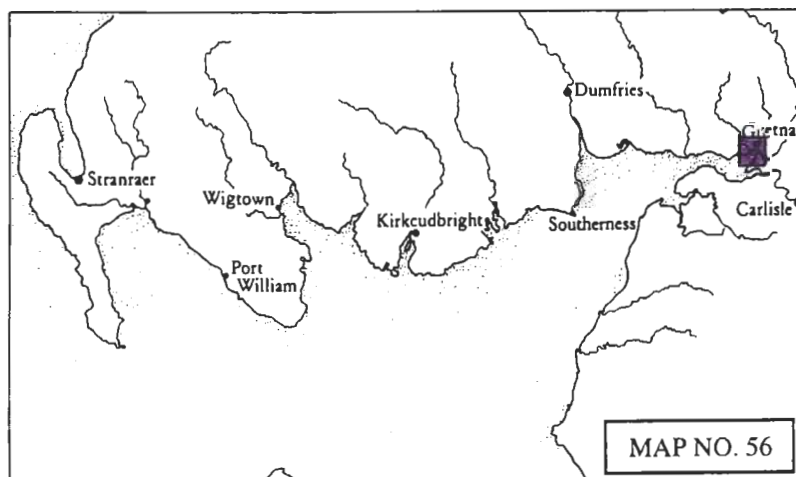
KEY

Erosion class	Derwent Code	Colour
Definitely accreting	Prussian Blue	
Accreting/stable	Light Blue	
Stable	Grass Green	
Stable/eroding	Deep Chrome	
Definitely eroding	Deep Vermilion	
Both accreting and eroding	Imperial Purple	
No access	Blank	
Land below 10m	Straw Yellow	

MAP CLASS: EROSION

Assessment date: 07.10.96

Scale 1:25 000



MAP 56: BUILT HERITAGE AND ARCHAEOLOGY

Sites on the Coast Edge & Foreshore

NY 2990 6530
REDKIRK POINT
WW2 Defences
Mid 20th century
Poor
Survey & Monitor

NY 2982 6520
REDKIRK POINT
Fishing Stakes
Uncertain
Poor
Monitor

NY 304 651
REDKIRK POINT
Buried Land Surface
Uncertain
Poor
Survey & Monitor

NX36NW 5
NX 3010 6503
REDKIRK POINT
Church & Burial Ground
12th century
Poor
Nil

N36NW 13
NY 302 650
REDKIRK POINT
Flints Findspot
7th Mill BC
Poor
Monitor

NY36NW 22
NY 302 651
REDKIRK POINT
Pottery & Pottery Kiln
Findspot
13-15th centuries
Poor
Monitor

NY36NW 34
NY 3005 6514
REDKIRK POINT
Mesolithic Hearth
7th Mill BC
Poor
Monitor

NY36NW 44
NY 302 650
REDKIRK POINT
Flint Blade Findspot
7th Mill BC
Poor
Monitor

NY36NW 48
NY 302 650
REDKIRK POINT
Landing Place
Uncertain
Poor
Monitor

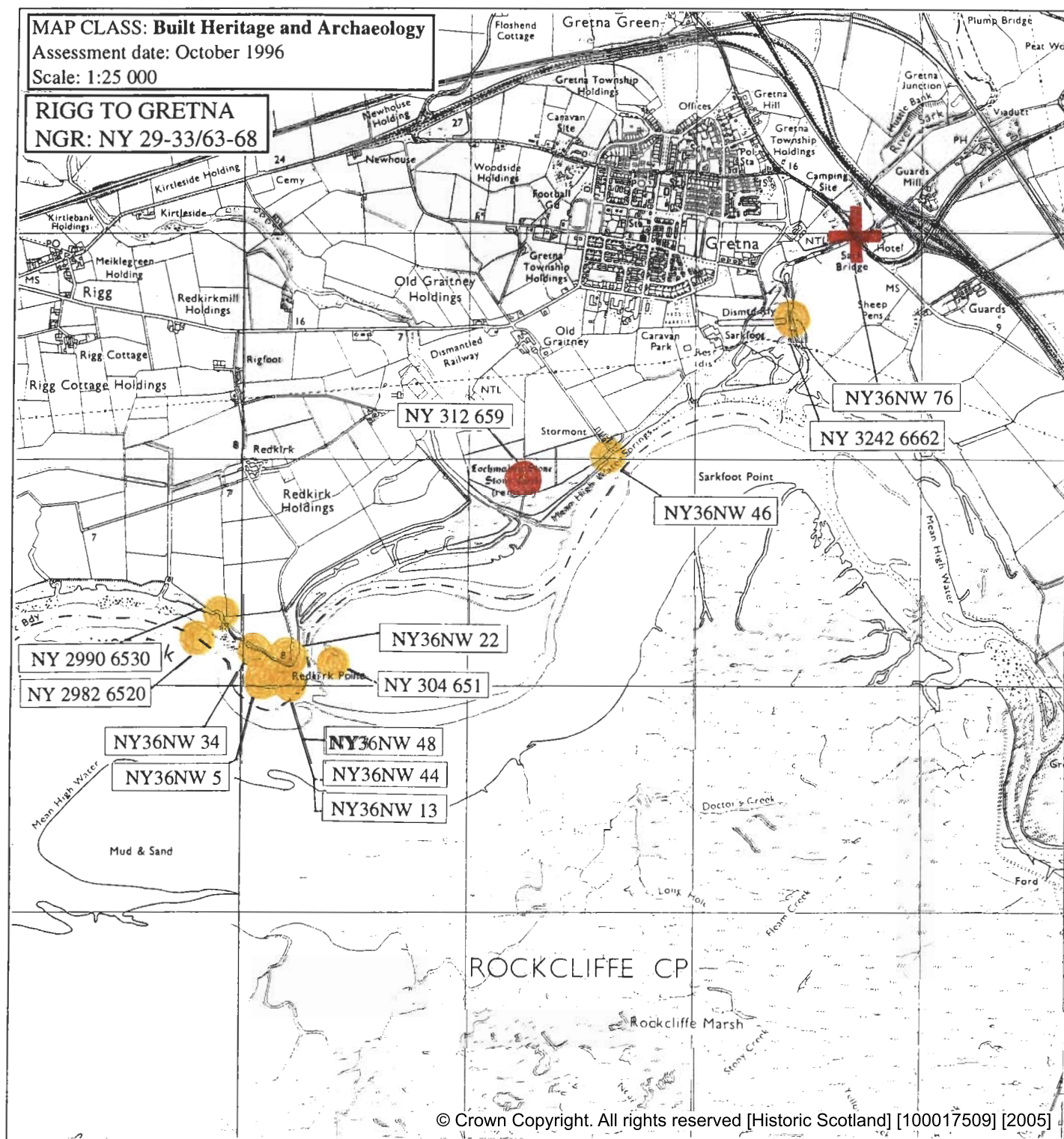
NY36NW 46
NY 316 660
STORMONT
Landing Place
Uncertain
Poor
Monitor

NY 3242 6662
SARK VIADUCT,
GRETNA
Disused Railway Bridge
19th century
Good
Nil

NY36NW 76
NY 3269 6698
SARK BRIDGES, GRETN
Road Bridges & Weir
Statutory Listed Buildings
Early 19th century
Good
Nil

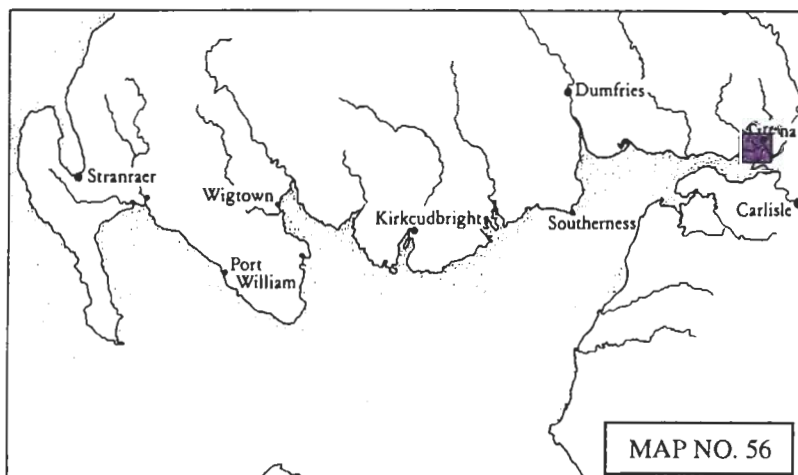
Sites in the Hinterland

NY 312 659
LOCHMABEN STONE CIRCLE
Remains of Stone Circle
Scheduled Ancient Monument
3rd-2nd Mill BC
Good
Nil



KEY

Site location	Symbol	Colour	Significance
NGR ref. - eg.	Roundel - Solid, (or area)	Red	Protected Ancient Monument
	Cross	Red	Listed Historic Building
NX 143 368	Roundel - Open, (or area)	Red	Monument formally proposed by Historic Scotland for designation
	Roundel - Solid, (or area)	Yellow	Other known Ancient Monument
NMRS ref. - eg.	Dashed outline	Yellow	Gardens/Designed landscape
NX13 SW17	Roundel - Solid, (or area)	Yellow	Undesignated wreck
	Area	Green	Insufficient information; more work needed
	Area	Blue	Probably archaeologically sterile



4 CASE STUDIES

Introduction

Four case studies are provided to illustrate in further detail the range of coastal erosion affecting a variety of archaeological remains on the Solway Coast. The three principal ones consider archaeological sites, described below, that vary greatly in form and period. These studies focus on the upstanding nineteenth century remains of Stairhaven harbour, the, Later Prehistoric promontory fort at Back Bay, and the Mesolithic and Medieval remains at Redkirk Point. Their archaeological importance is presented and the effects of violent wave-action, localised coastal erosion and more massive coastal erosion are brought into focus. It should be stressed at this point that, although all three sites exhibit the most severe erosion evident in the survey, their inclusion in this section, as examples, is designed only to illustrate the varying erosion processes affecting physically, culturally and chronologically dissimilar sites. The fourth short case study provides an example of accretion and erosion from Caerlaverock Merse.

Stairhaven Bay (Map 8) - **NX25SW 52** (NX 2094 5370)
NX25SW 53 (NX 2083 5365)
NX 2084 5358
NX 2087 5361

Brief history

Numerous small harbours and landing places are situated on the Solway Coast. Many have no associated landward structures and were used simply for the transport, and often smuggling, of goods in and out of Galloway (Graham, 1979, 40). The remains of a small harbour survive at Stairhaven Bay. Long before the construction of the harbour, Stairhaven Bay was a well-known landing place for boats, much used by smugglers (Graham citing Wood, 1979, 64). The harbour, built in 1845 and enlarged in 1852 (Graham, 1979, 64), was originally designed as a port for the transport of agricultural produce to market. In 1848, soon after its original construction, a steamship service was proposed (Graham, 1979, 64). With the advent of the railways in the 1870s Stairhaven harbour lost its import/export business, after which it was used only by the occasional fishing vessel (Graham, 1979, 64).

Environmental Setting of Stairhaven Bay

Stairhaven is a small bay that lies between a headland to the north, known as the Crow's Nest and steep cliffs to the south. A small burn enters the bay from a north-easterly direction. The hinterland geology consists mainly of fluvioglacial sand and gravel which overlie greywacke sandstone that are assigned to Llandoverly Series. The foreshore is very wide with an assortment of beach cover that includes sand, gravel and boulders between bare patches of sand.

Structural Evidence

The original pier, built in 1845, was straight, on an east-west axis and measured approximately 83m along its north side (Graham, 1979, 64; O.S., 1846). In 1852 the pier

was lengthened to 100m, giving it an outer end deflected north-westwards, and thus providing shelter to a tidal pocket in the south east part of the bay (Graham, 1979, 64; O.S., 1896). Wave action has now reduced the pier to a small surviving remnant 16.50m long, extending from the land. Immediately to the southeast, behind the pier, are the remains of small building, possibly associated with the harbour. Another associated building is the grain store, located approximately 150m inland from the harbour. Immediately south of the remains of the pier, on the foreshore, are two parallel lines of wooden posts, extending approximately 13m out to sea. These may relate to fishing activities in the bay. The pier itself was stone built and many of the stones of which it was constructed are now strewn around the area.

Historical changes to the coastal edge.

Examination of the 1846 First Edition, 1896, Second Edition, 1909 and 1986 Ordnance Survey maps show that there have been significant alterations to the coastline here over a period of 140 years. Figure 2 is a colour coded plan that illustrates these relative changes. In broad terms the most significant change is apparent in the shape of the present shoreline which is more curved than the shorelines represented on the map coverage dated to 1846, 1896 and 1909 respectively. The nearby headland at Crow's Nest has altered in shape considerably, due to erosion occurring on its northern side. As well as alterations to the general course of the burn above the high water mark, a considerable amount of alluvium, to judge from the evidence produced by the sequential maps, has accreted at its outfall to the sea. The shore is presently receding immediately south of the ruined pier (PLATE 1). Coastal retreat has also occurred to the west of the broch. The changes summarised here have in all probability arisen owing in part to the relative instability of fluvio-glacial deposits that contrast with the hard greywacke surrounding the bay. The pier may have afforded shelter to the bay, by diffusing the impact of wave action, especially when it was extended in the mid-19th century. Its collapse may have produced renewed erosion, as wave action was again able to work on the formerly-protected softer coastal deposits in the vicinity.

Significance and Evaluation

Violent wave action has greatly reduced the pier at Stairhaven. It is not an isolated case: similar processes can be seen at Orroland Bay (NX 7746 4623; Map 35) and Knockbrex (NX 5820 4890; Map 28). The suite of decaying stone structures at Stairhaven Bay is significant as an example of a facility related to a former transport system that illustrates both the past economic and transport history of the area. The archaeological importance of the now badly ruined Stairhaven Bay harbour pier, one of many similar sites along the Solway Coast, is reinforced by the survival of contemporary, associated structures in close proximity to it. The function of these buildings was entirely bound up with the existence of the docking facility, and loss of the pier leaves them devoid of a key element that elucidates the choices made in where to site them and in their architectural characteristics. Consideration of these associated structures should be included in future work.

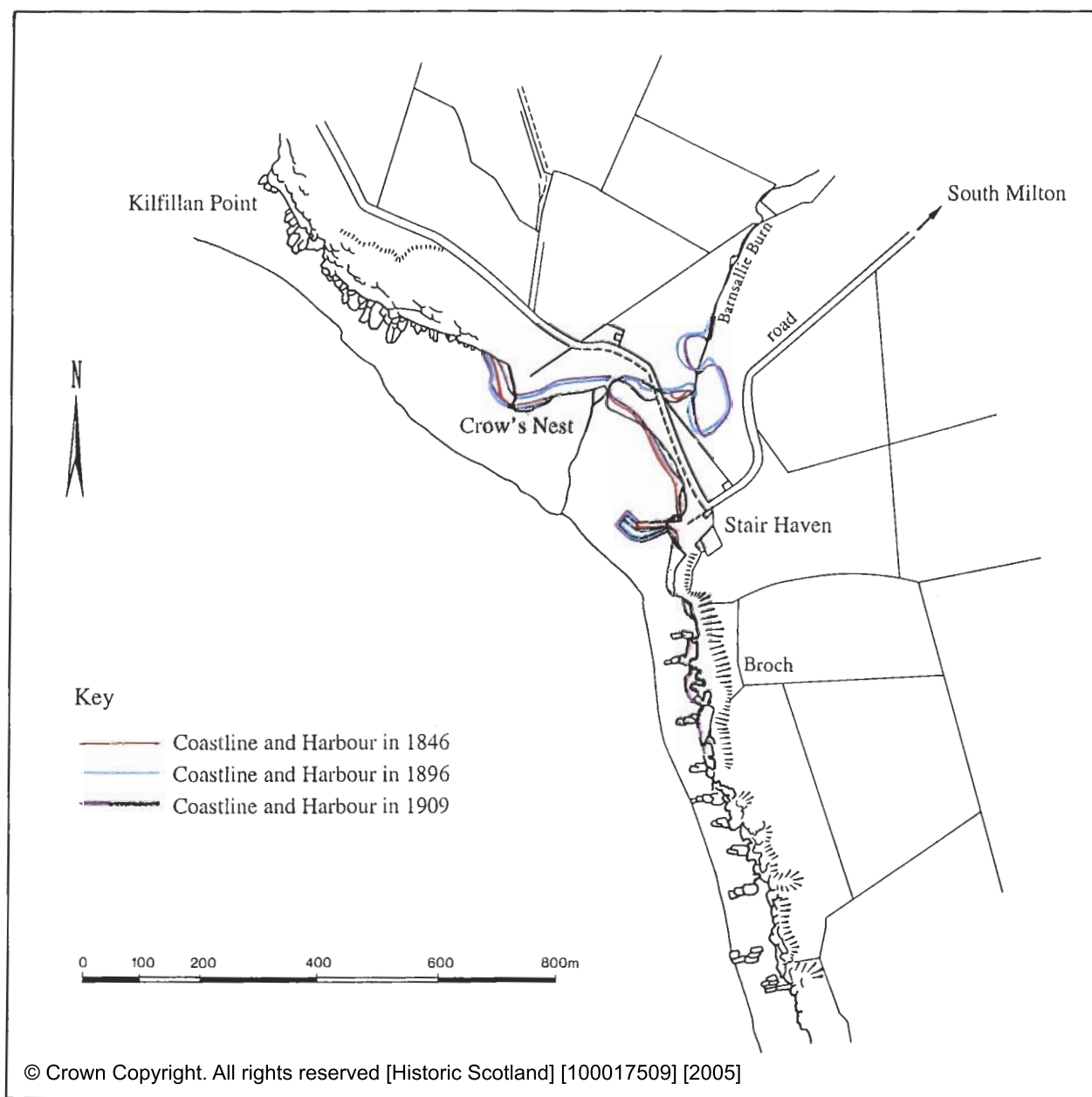


Figure 2 Stair Haven Bay

Back Bay (Map 13) - **NX33NE 2** (NX 3696 3932)

Promontory forts of the Solway coast

The promontory fort of Back Bay is one of twenty-two promontory or cliff forts situated on the Solway coast (See Map No 8). All the forts comprise sites situated on either a coastal promontory or cliff edge and thus necessitating their clear demarcation by *landward* obstacles only: these linear ramparts and ditches or semi-circular ramparts and ditches respectively may have been complemented by lesser works on their sea-girt or cliff-top sections, but, if so, no indisputable evidence of such works now survives. The enclosure at Back Bay itself is a small seaward sloping promontory defined by a curvilinear counterscarp bank, rock-cut ditch and rampart topped by the foundations and lower courses of a drystone wall, approximately 2.5m thick. A causeway leads across the line of the ditch through a clearly defined entrance in the rampart. Slight surface features, perhaps indicative of settlement remains, are evident immediately behind the rampart.

The generally scattered distribution of isolated promontory forts along the north Solway coastline forms a marked contrast to a cluster of sites around the southern tip of the Machars peninsula. Back Bay is located near the north western periphery of this cluster. Only one of these cliff forts, McCulloch's Castle, has been excavated but this yielded minimal information (Scott-Elliot, 1964). A sherd of Samian pottery, lying near the bottom of a hearth close to the eastern end of the rampart, was dated to the second century A.D. (Scott-Elliot, 1964, 123). Another possible promontory fort, Cruggleton Castle, yielded an uncalibrated radiocarbon date of 50 +/- 70 A.D. (GU 1638), from the partial remains of a hut circle (Ewart, 1985, 14) and a bronze brooch from the same site is estimated to date to between the mid-first and mid-second century A.D. (Caldwell in Ewart, 1985, 64).

The excavation at Cruggleton Castle, traditionally and historically identified as the seat of the early Lords of Galloway, was initiated in response to coastal erosion at the site (Ewart, 1985, 4-6) and, in addition to the Iron Age occupation, also provided evidence for occupation from the mid-eighth century A.D. to the mid-seventeenth century. Like similar sites elsewhere on the Atlantic seaboard (Gilmour, 1996, 6-9) and indeed elsewhere in Scotland, promontory forts in the Solway region may hold evidence for multi-phase occupation.

Geomorphological setting

The promontory fort at Back Bay is situated on red-brown clayey glacial drift deposits probably of Devensian age (Figure 3). The underlying bedrock is the more resilient greywacke sandstone. The fort is exposed to the full force of south-westerly gales. During the course of fieldwork, CFA noted that there is serious erosion taking place on the seaward margins of the bank and ditches. The clay-rich earthworks are being lost due to slope failure and constant weathering by the elements.

Erosion at Back Bay

The impact of coastal erosion affecting Back Bay promontory fort is localised within certain specific areas, particularly at the neck of the promontory where the defensive

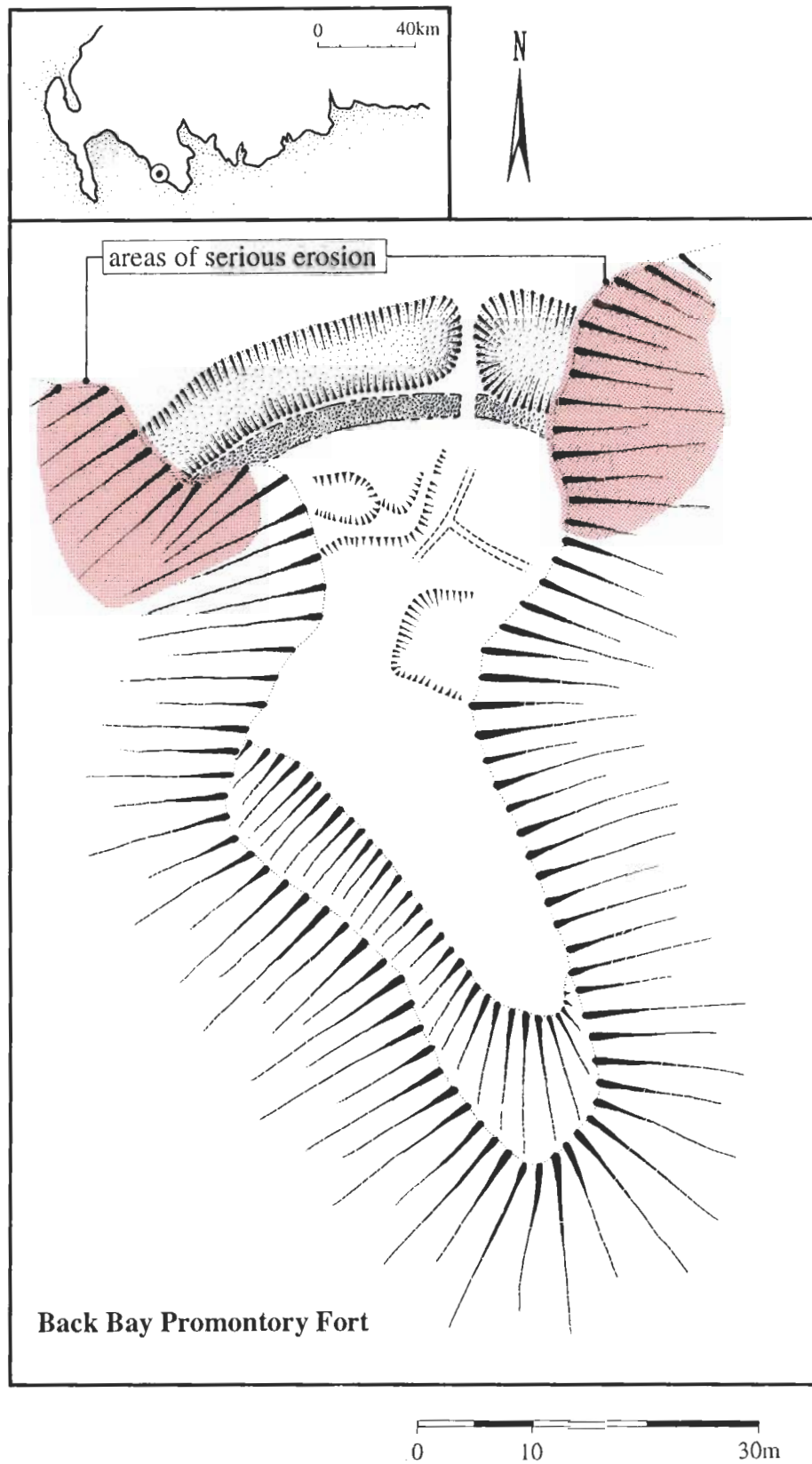


Figure 3 Back Bay Fort

structures are located. Animal impact at the site, including cattle and sheep tracks, and rabbit burrowing, is adding to the piecemeal destruction of the rampart, ditch, causeway and counterscarp. Indications of adverse impacts attributable to animals are common on many of the promontory forts on the Solway coast. Human impact, in the form of farming activities, notably dumping and visitor trails, also adversely affects the condition of many sites, despite the scheduled status of the vast majority of these promontory forts, although this does not appear to such a serious problem at Back Bay.

Significance and Evaluation

A recurring feature of many promontory forts on the Atlantic seaboard is the location of structures immediately behind the main rampart, even when the actual area enclosed is large (Gilmour, 1996, 4). An important factor, therefore, in gauging the impact of erosion is the consideration of the surviving condition of internal structures within the sites. The presence of internal structures immediately behind the main rampart at Back Bay is evident and should be taken into consideration in future work.

Redkirk Point (Map 56) - NY36NW 5 (NY 3010 6503)
NY36NW 13 (NY 302 650)
NY36NW 22 (NY 302 651)
NY36NW 34 (NY 3005 6514)
NY36NW 44 (NY 302 650)
NY36NW 48 (NY 302 650)

Coastal erosion of Redkirk Point has been an ongoing process since at least the seventeenth century A.D., when the Red Kirk itself fell into the sea (Truckell and Williams, 1967, 148). Probably built in the twelfth century, the church and its burial ground may possibly be associated with a large number of pottery sherds (broadly dating to the thirteenth to fifteenth centuries) found as the flood tides have progressively eroded the promontory. A much earlier occupation of Redkirk Point was revealed by the excavation of a hearth, dating from the seventh millennium B.C. (Masters, 1981, 113). A number of Mesolithic flints, also revealed by marine erosion at Redkirk Point (Cormack, 1983), provide additional evidence for Mesolithic occupation.

It has been suggested that the evidence for Mesolithic activity at Redkirk Point is considerably earlier than for other dated coastal Mesolithic sites in Dumfries and Galloway (Masters, 1981, 113). Mesolithic activity on the Solway Coast has in the past been tentatively divided into two phases: Early Mesolithic; that is activity *before* the main post-glacial marine transgression (Jardine, 1980, 10, Masters, 1981, 113); and Late Mesolithic, comprising activity *after* the main post-glacial marine transgression. Proposed Early Mesolithic sites, such as Low Clone and Barsalloch (Cormack and Coles, 1968; Cormack, 1970), are situated *above* the raised beach and are thus possibly indicative of an older coastline, relating to a higher sea level. Late Mesolithic sites, such as Terally (Livens, 1958), are located on the foreshore and are thus indicative of activity after the sea had receded. Through analysis of local geomorphological stratigraphy (Jardine, 1980, 7-10), the Mesolithic hearth at Redkirk Point, eroding from the raised beach deposits, was demonstrated to be older stratigraphically than the main post-glacial marine transgression. Two radiocarbon dates, of 8 000 +/- 65 B.P. (UB-2445) and 7 935 +/- 110 B.P. (UB-2470), obtained from the hearth, may readily be compared with a radiocarbon date of

8,135 +/- 150 BP (Q-637) from nearby geomorphological levels predating the main post-glacial marine transgression (Jardine, 1980, 10). There are two main caveats to this distinction of early and late Mesolithic. The first is that all the dated material from the Solway coast falls within the date ranges generally ascribed to the Late Mesolithic in Britain and is typologically of Late Mesolithic character. The second is that care has to be used in dating Mesolithic occupations by their geomorphological context. The geomorphological context provides a *terminus ante quem*, it does not date the site.

Geomorphological background

Redkirk is one of several sites situated between Redkirk Point and the mouth of the River Esk. This coastline consists of raised coastal sediments which are exposed discontinuously in low cliffs between higher bluffs of red glacial till. The Holocene coastal deposits along this section of coast have been described fully by Bishop and Coope (1977) and Jardine (1964, 6-7 and 1980, 7-10). The highly organic sedimentary sequences stratified between layers of marine sand provide a definite evidence of marine transgression and recession (Table 1). Figure 4 shows a schematic representation of the shore line at Redkirk Point. The principal feature within Section A is the wave cut 'notch' that has been filled with Holocene marine gravels. This is a result of marine transgression that eroded the earlier carse deposits. Twenty metres west of Section A, Section B was recorded as having a wide shelf attributable to marine inundation across the earlier marine carse deposits. This shelf was again overlain by marine gravels which were subsequently overlain by merse deposits attributed to episodes of flooding.

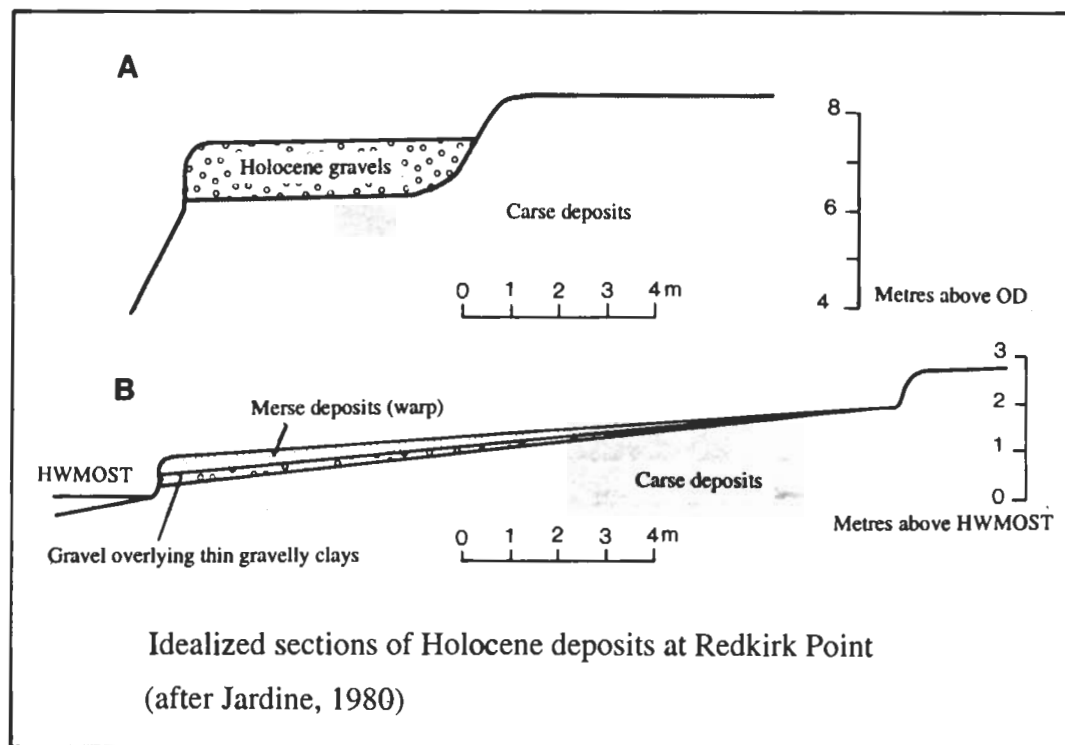


Figure 4 Schematic section of shore at Redkirk Point

Figure 5 shows in detail the historical changes that have occurred at Redkirk Point . their recognition is based on three cartographic sources. The headland has been sculpted by erosion and the banks either side of the point have undergone modifications. The controlling factor here is the impact from the channel of the River Esk that is migrating northwards. This is leading to severe erosion towards the east of Redkirk Point (PLATE 2).

The significance of environmental remains at Redkirk Point

Jardine and Morrison (1976 182) have outlined the likely circumstances that explain the occurrence of stratified biogenic sequences within cores and coastal sections in the eastern Solway Firth. Dateable environmental deposits were found to occur in one or other of four situations:

- as organic material e.g., organic detritus, wood, peat, or mollusc shell debris which either accumulated during temporary interruption in the course of the main Holocene marine transgression,
- or accumulated in the course of the recession from the sea from the maximum of the main Holocene transgression,
- or was deposited in the coastal non-marine environment after the sea had receded from the locality concerned;
- or formed as organic detritus which accumulated on a pre-existing land surface which was inundated in the course of the main Holocene marine transgression.

SITE LOCATION	Radiocarbon years Before Present	Marine Transgression	Marine Recession
Redkirk Point (NY 302651)	8135 ± 150 (Q-637)	√	
Newbie Mains (NY 171651)	7812 ± 131 (GU-375)		√
Newbie Cottages (NY 166650)	7694 ± 99 (Birm-222)	√	
Sandyknowe Bridge (NY 017776)	7426 ± 136 (GU-65)	√	
Maximum Marine Transgression †	c.7200	√	
Nether Locharwoods (NY 056680)	6645 ± 120 (Q-638)		√
66m west of Newbie Cottages*	5630 ± 116 (Birm-200)		√
West Preston shore (NX 951549)‡	1850 ± 95 (I-5069)		√

Table 1: Summary table of radiocarbon dates taken from stratigraphic and bore-hole sequences from the eastern Solway Firth (after Jardine 1980,52). Note: (†) this estimate applies only to the eastern part of the eastern Solway Firth. (*) This date represents the termination of the of the Main Holocene Marine Transgression in this region. (§) Prior to this date, the sea withdraws to approximately its present position.

Table 1 summarises the radiocarbon dates based on palaeoenvironmental research on sea level changes in the eastern Solway Firth area (Jardine 1980, 52). The Holocene sea first flooded the land surface at Redkirk Point, near Gretna, at approximately 8 100 B.P. At Newbie Mains, near Annan, marine transgression was interrupted temporarily at approximately 7 800 B.P., but the main inundation occurred between 7 500-7 200 based on radiocarbon dating of sedimentary material from nearby Newbie Cottages.

The archaeological significance of the exposed Holocene coastal deposits in the region of Redkirk lies is the sheer wealth of palaeoenvironmental data that is stratified within these deposits. These have been demonstrated to contain an environmental record of sea level

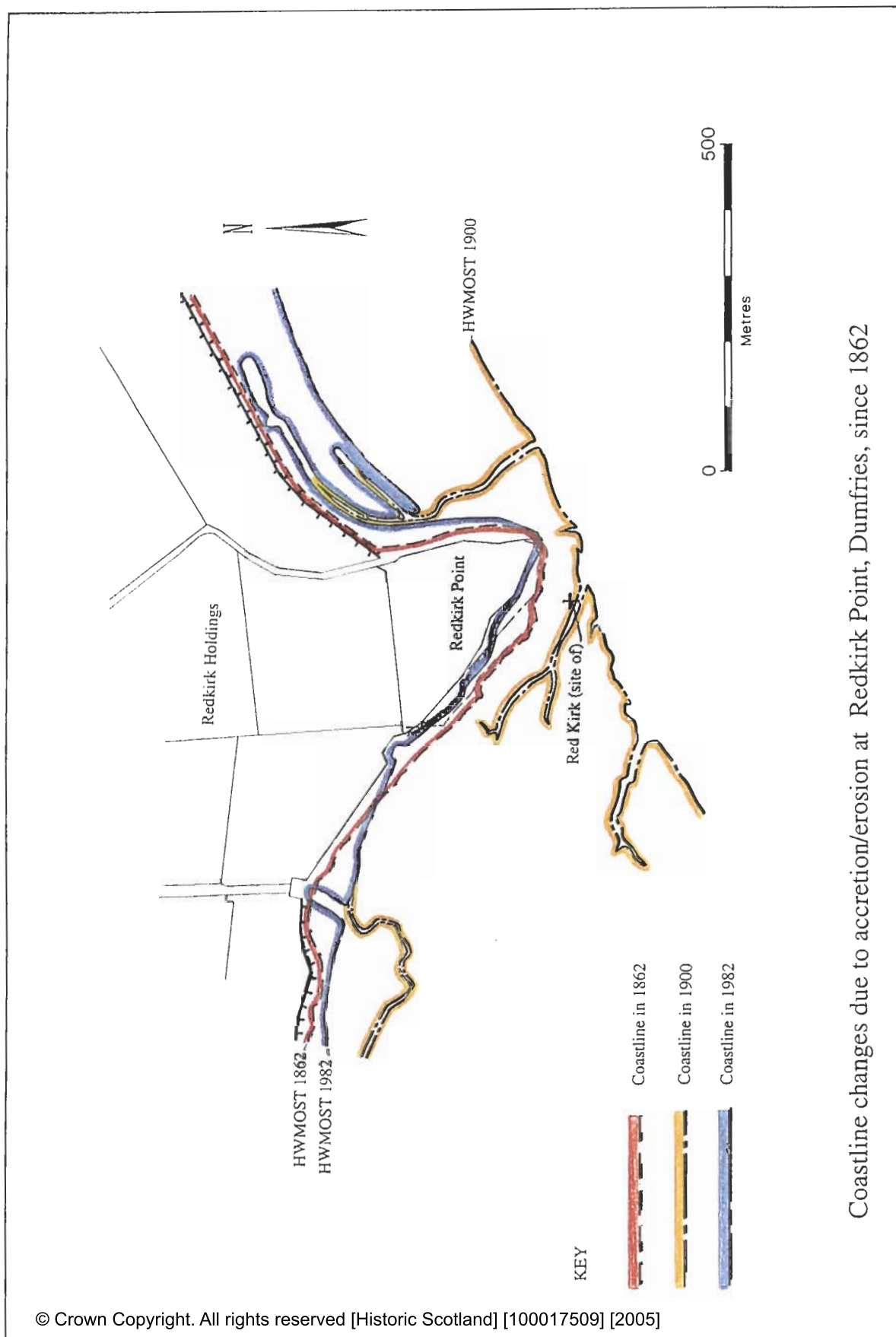


Figure 5 Redkirk Point

advance and retreat over the last eight thousand years. Their removal by erosion from seaward sections is considered to be as important as the loss of other early archaeological remains such as flint, pottery and hearths.

Erosion

The dumping of rocks, by the local authority in 1976 (Masters, 1981, 113), to form a coastal protection barrier has halted further erosion of the coastline here. However, the foreshore in front of the barrier is suffering from continuous and severe erosion owing to the flow down the course of the river Esk. A thin layer of dark organic material, revealed by the erosion of the overlying shingle beach, was discovered during the rapid field survey. Its proximity to known archaeological deposits indicates the potential importance of any archaeological data contained at the site, in relation possibly to the earliest settlement phase represented in Scotland.

Significance and Evaluation

Redkirk Point is a good illustration of the loss of archaeological and environmental data through erosion and how, even where coastal defences have been established, while these may halt the obvious progression of erosion on part of the shore, they may not entirely solve the problem. In some cases they may speed erosion in other areas, while in this case the identification of additional features beyond the protected zone has revealed that the defences may not in fact be protecting some of the more significant archaeological data. Even had the coastal protection barrier been specifically designed to protect the archaeological remains, it is unlikely that layers of organic rich material would have been considered as part of the site in 1976, perhaps illustrating how contemporary measures may not always protect what future archaeologists may regard as some of the more important features. Furthermore, and significantly for any coastal situation, as environmental data related to past coastlines are part of the pattern of evidence for variations in the coastal margins on the shore, they are themselves extremely sensitive to ongoing changes. Ironically, an attempt were to be made to protect the evidence of former coastal change, this would constitute an interruption to that process and would be artificially distorting the sequential evidence for coastal variation that was intended for preservation.

Caerlaverock Merse

Caerlaverock Merse provides a good example of the dynamic changes that can occur to a salt-marsh environment over the last 140 years (Figure 6). The Merse has been the focus of study owing to the physiographic changes that have occurred within this sector (see Maps 49 and 50). The Merse originally formed against the edge of a raised beach and developed seawards as a result of accretion some time prior to 1856. Marshall (1962) writing in on the development of the Merse outlined that at this time coastal change was occurring in two different ways. Firstly, at the east end, the Lochar Water was close in shore causing fluvial deposition and secondly, erosion was occurring at the west end by wave action. Bridson's study of the Merse in 1976 confirmed that the trend of erosion was indeed primarily west to east. This continues to the case to the present. The western end of Caerlaverock Merse is retreating rapidly. As was the case in the 1960s, the shifting

channel at the mouth of the Lochar Water is the main factor in sculpting the shape of the eastern end of the Merse.

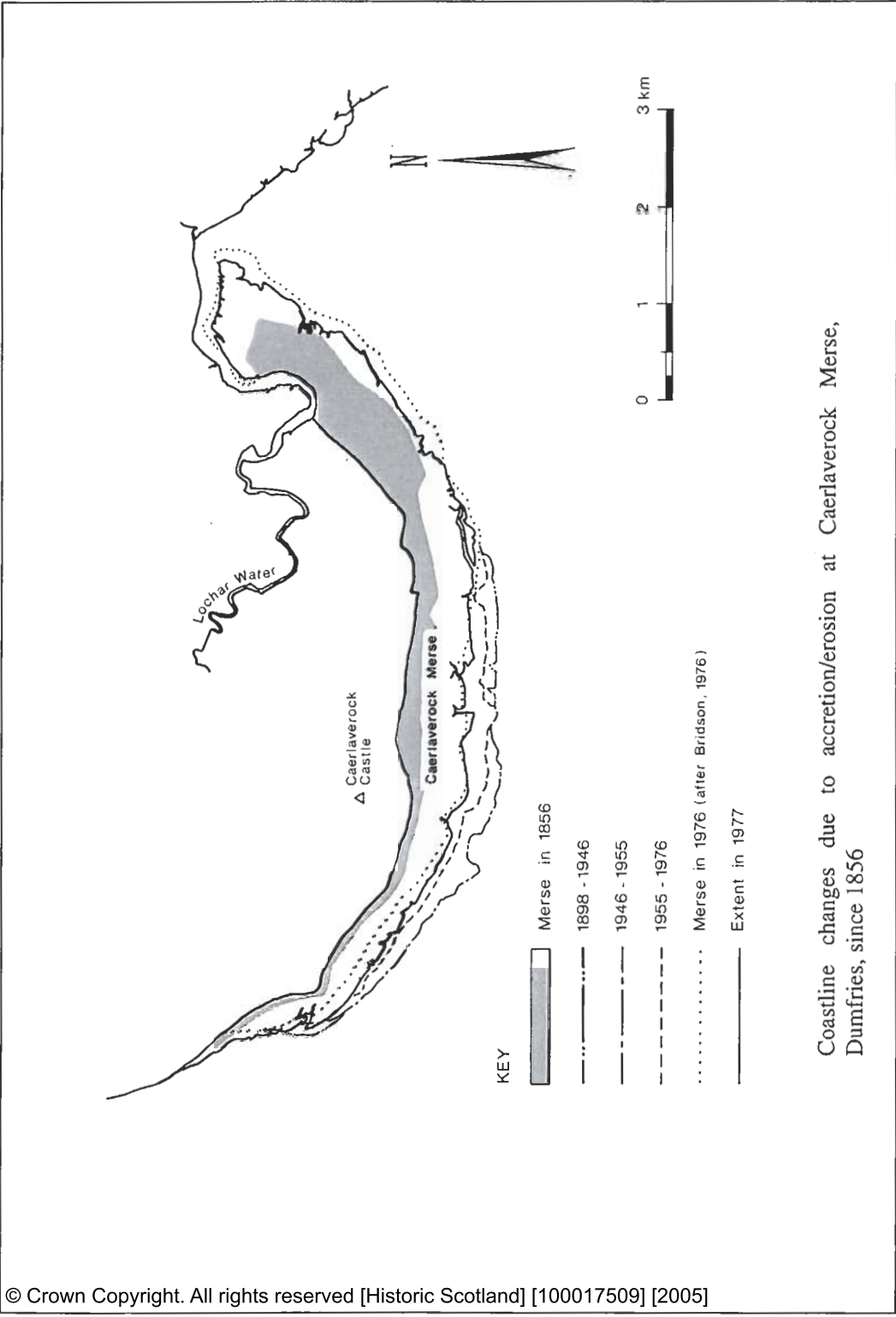


Figure 6 Caerlaverlock Merse

5 SUMMARY & RECOMMENDATIONS

SUMMARY

ANALYSES OF THE EROSION DATA

Introduction

This section examines the findings concerned with the erosional record of the north Solway coastline, based on the results of the field survey. The factors recognised as controlling coastal erosion are summarised in the diagram at the back of this report. The results of the coastal erosion survey data are shown summarised in Table 2 and in Figures 7 and 8. The percentage of the total length of coastline cited is based on the straight line measurement of each unit as mapped on each 1:25,000 map sheet (Maps 1-56). The combined length of all units is 317.1km. This figure was used to establish the percentage frequency of each erosion class. 317 km is obviously an underestimate of the true length of the coastline surveyed, as it does not incorporate the mean length of meandering rivers or deeply incised regions of cliff-edge and indeed other topographical irregularities along this coast, but it gives an indication of the relative significance of the results.

Erosion Survey Results

The *Accreting and Stable* and the *Eroding or Stable* classes share the same percentage frequency of 30% (n = 41 and 40 respectively). The units identified as *Definitely Eroding* were found to comprise 20% of the total length of the survey. The *Stable, Definitely Accreting* and the *Both Accreting and Eroding* erosion classes are much lower in frequency with representation at 10.6%, 0.5% and 8.2% respectively.

Erosion Class	Number of units	Total unit length (km)	Total length (%)
Definitely Accreting	1	1.9	0.5
Accreting or stable	40	96.6	30.1
Stable	13	33.8	10.6
Eroding or stable	41	96	30.2
Definitely eroding	28	63.8	20.1
Both accreting and Eroding	11	26	8.2
Total	134	317.1	

Table 2 Summary statistics of the erosion class units lengths.

The results from the *Definitely Eroding* class confirm that a substantial portion (20%) of the north Solway coast is being affected by serious erosion. This class includes areas where there is a direct failure of existing sea defences such as is the case at Low Curchie (PLATE 3) (Map 2), Stairhaven Bay (Map 8) and south of Garlieston pier (Map 18) (PLATE 4). The greater majority of units in this class occur on the eastern stretch of the north Solway coast towards Annan, where the coastal edge is generally soft (see below).

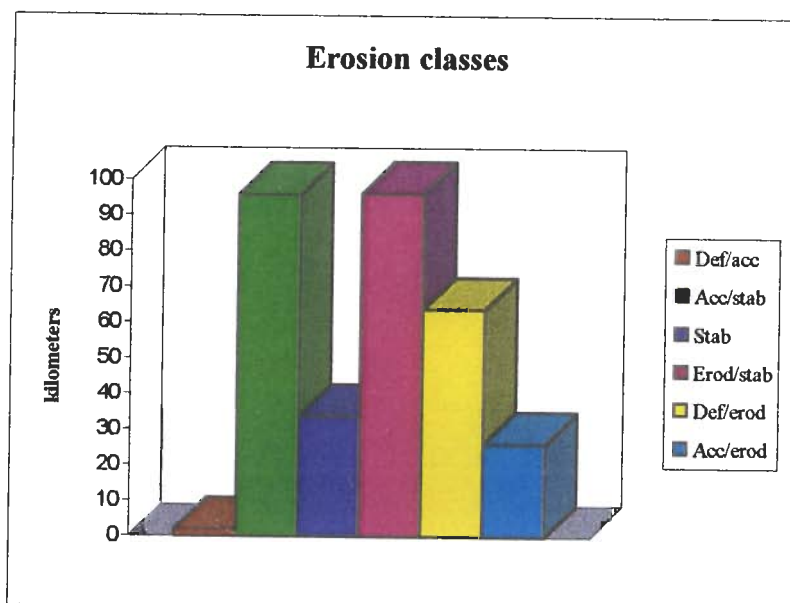


Figure 7 Frequency of erosion classes based on their overall distance of the field survey results.

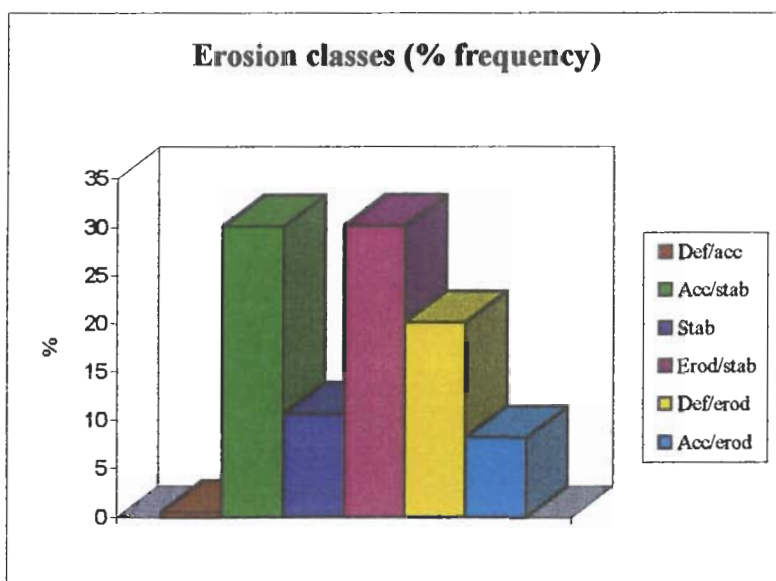


Figure 8 Percentage frequencies of individual erosion classes as a percentage of the total length of field survey (established as 317km based on linear measurement)

Human Impacts

In addition to the coastal erosion processes affecting archaeological sites on the Solway Coast, human and animal impacts, predominantly attributable to livestock, are taking their toll on the condition of many archaeological sites.

The processes considered in this section can be separated into two groups: those related to farming, and those attributable to recreational uses.

Farming Activities

Adverse impacts due to animals, such as cattle and sheep tracks, rabbit and fox burrowing, and cattle scraping, are the cause of much deterioration visible on archaeological sites on the Solway Coast. Sites comprising earthworks, such as the sinuous banks traversing the substantial headland of the Mull of Galloway (NX13SW 17; Map 1), promontory forts (e.g. Old Fort, Dinnans (NX44SE 3; Map 17), mottes (e.g. Green Tower Motte NX5847 5507; Map 27) and castles (e.g. Cruggleton Castle NX44SE 4; map 17) are particularly at risk from animal action. The condition of standing stones and upright cup-and-ring marked stones is also threatened by cattle rubbing. The impact of animals is exacerbated by the location of feeding troughs within archaeological sites, such as is evident at Old Fort, Dinnans, and the lack of, or inadequacy of, fencing to exclude stock from the entirety of certain archaeological sites.

Activities related to farming, such as ploughing, quarrying and dumping also adversely affect various archaeological sites on the coast. The most serious case of dumping, compounding excavation damage, was noted at Castleyards promontory fort (NX75NE 5; Map 34) where a deep pit, immediately behind the rampart, had been recently excavated and filled with the carcasses of sheep and cattle. Slightly further east along the coast, a quarrying pit is evident within Spouty Dennans (NX74NE 9; Map 35). At Burrow Head promontory fort (NX43SE 1; map 15), recent extraction of material from the outer

rampart is evident and is exacerbated by cattle scraping themselves on the exposed surface.

Recreational Impact

The profusion of coastal walks is another factor affecting the condition of archaeological sites on the Solway Coast. Monuments comprising earthworks again form the most vulnerable group. The most serious examples of erosion, where footpaths have gouged gaps through earthworks, occur at the Burrow Head promontory forts (NX43SE 1 and NX43SE 3; Map 15), Isle Head (NX43NE 8; Map 16), Borness Batteries (NX64SW 2; Map 29) and Castlehill Point (NX85SE 1; Map 37). The promotion of a 'pilgrim way' along the coast of the Machars peninsula, around Whithorn (Murray, 1996), may only add to the traffic, and the implementation of measures to safeguard and promote the archaeological sites there are recommended.

Discussion

Whilst the inclusion of human impact within the general summary of erosion processes possibly strays beyond the tight structure of the project design as outlined in Historic Scotland's *Archaeology Procedure Paper 4 - Coastal Zone Survey*, the inspection of sites during the field survey revealed that many survive in a narrow band between farmed land and the high water mark along much of the coastline. This factor contributes to the occurrence of specific erosion processes, as outlined above, which form an integral part of the general erosion of coastal archaeological sites. As such, it is important, when drawing up measures to alleviate erosion of coastal archaeological sites, that the erosion dynamics in their entirety are taken into account.

ARCHAEOLOGICAL SITES

334 archaeological sites (including those not exhibiting structural remains) were recorded in this assessment survey. Coastal erosion, was recognised to be affecting 118 sites, or 35.3 % of the population (Figure 9). The eroding sites could be separated into two groups, defined by the extent and severity of the coastal erosion that is apparently occurring. Following the guidelines expressed in *Archaeology Procedure Paper 4 - Coastal Zone Survey* (H.S., 1996, 14), the coastal erosion state was qualified as good, meaning negligible erosion; fair, meaning moderate erosion; and poor, meaning severe erosion. A distinction was therefore made between moderate and severe coastal erosion (Figure 10). The results show that **moderate** coastal erosion affected 16.2 % and **severe** coastal erosion was recognisable at 19.1 % of the total population of known archaeological sites. The variable nature of archaeological remains, as discussed below, means that generalised recommendations on remedial or other possible actions are, however, difficult to make. The unique combination of structural remains and erosive activities present at each site should take precedence over general prescriptions.

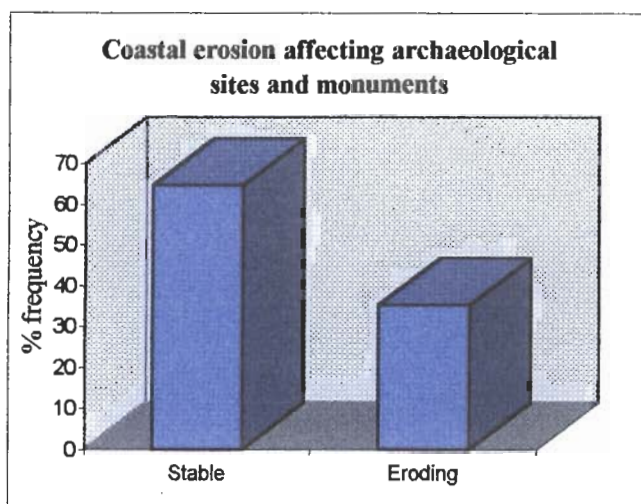


Figure 9

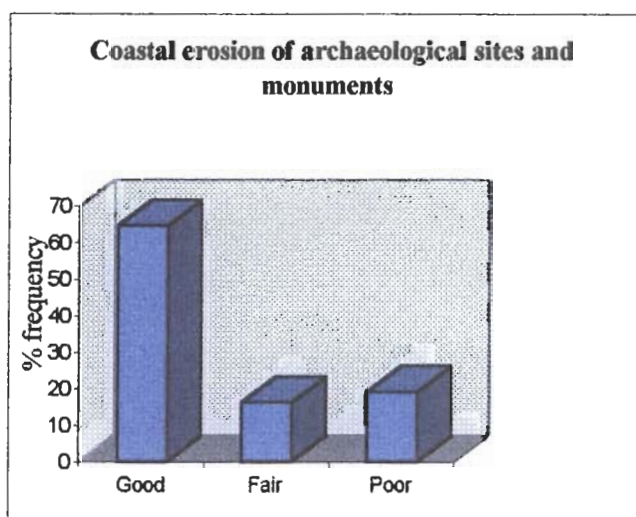


Figure 10

Following the guidelines set down in *Archaeology Procedure Paper 4 ; Coastal Zone Survey* (Historic Scotland, 1996, 14) the archaeological sites were separated into chronological groups:-

Early Prehistory (EP):	8000BC - 1000BC
Later Prehistory/Early Medieval (LP):	1000BC - 1000 AD
Medieval (M):	1000 AD - 1700 AD
Post-Medieval/Industrial (PM):	1700 - 1900
Early 20 th Century/WW 2 (TC):	1900 - 1945

No significant problems were identified with multi-period sites that extend beyond the limits of these groups, areas with significant multi-period occupation, such as Redkirk Point were treated as separate find spots or sites.

The extent of coastal erosion affecting each chronological group can be gauged from Figure 11, where the number of sites in a group is expressed as a percentage of the total population of **eroding** sites:

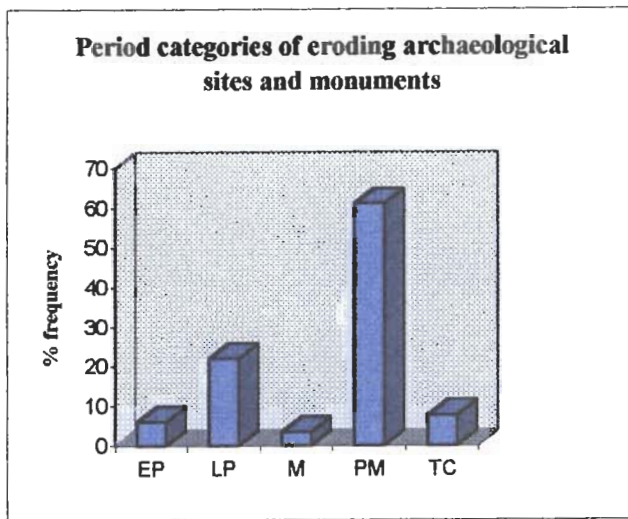


Figure 11

Early Prehistoric Sites

A small, scattered distribution of early prehistoric sites are affected by coastal erosion. They comprise a flint scatter at Terally Bay, in the Rhinns, a hammerstone findspot at Kirkcudbright Bay and the Mesolithic occupation site and associated finds at Redkirk Point. Localised coastal erosion and instability of the foreshore account for the erosion at the first two sites, while massive coastal erosion affects the last-named site. Regular monitoring of these sites must be considered.

Later Prehistoric & Early Medieval Sites

A larger, but equally scattered distribution of Later Prehistoric and Early Medieval sites, dominated by the cluster of promontory forts around the southern tip of the Machars peninsula, are adversely affected by coastal erosion. They consist mainly of promontory and cliff forts, but also include 'homesteads', a possible galleried dun, a broch and less strictly defined classes of settlements. The known sites appear overwhelmingly to indicate places of settlements, located on the seaward limits of the land, and offer a marked contrast with the settlement record from the middle ages onwards, during which this geographical setting seems to have been much less favoured. This broad temporal distinction emphasises the archaeological potential of this group of remains. Localised coastal erosion, in many cases exacerbated by human and animal impact, poses a serious threat to numerous examples within these series and a surveying and monitoring programme is strongly recommended.

Medieval Sites

A small, scattered distribution of medieval sites is suffering from coastal erosion. Localised coastal erosion affects Kirkcough Motte and Cuggleton Castle, while massive

erosion has obliterated the remains of the Church and related medieval remains at Redkirk Point. Monitoring of Redkirk Point, as emphasised in the discussion of this site, should be made on a more frequent basis than the other sites in this group. Although it is very likely that no medieval structural remains now survive at Redkirk Point, isolated finds from this period may continue to be revealed by the erosion of the foreshore.

Post-medieval and Industrial sites

Constituting by far and away the largest group of eroding sites on the Solway Coast, the extensive, but generally scattered distribution of more recent sites is nevertheless dominated by clusters of monuments and remains, particularly within the numerous bays and inlets of the coastline. The group as a whole differs markedly in nature from the preceding groups and includes piers, harbours, shipwrecks and fisheries. Predominantly maritime and industrial in character, the majority of sites are located on the foreshore and are particularly vulnerable to violent wave action. Although monitoring is recommended, detailed survey of a representative sample may be the best response to the erosion affecting this class.

Early Twentieth Century

A small distribution of monuments, mainly comprising World War Two defences, designed landscapes, coastal defences and fish traps, largely clustered at Garlieston Bay, Carse Sands, Arbigland, and Redkirk Point, are affected by a limited range of coastal erosion processes {?? Or of limited severity}. The gardens of Galloway House border on a severely eroding coastline at Cruggleton Bay, south of Garlieston, while in the foreshore of Garlieston Bay itself, the rusting hulk of a Mulberry, used in training exercises during the Second World War, is vulnerable to violent wave action. The sea defences at Carse Bay and Arbigland are also affected by violent wave action, as are the monuments at Redkirk Point. The general dilapidated condition of many of the World War Two defences was recorded during the field survey, but this data is not included in the tables above. A monitoring and surveying programme may represent the best response for this group of sites.

SUMMARY

As stated above, the range of archaeological sites evident on the Solway Coast are affected by a range of coastal erosion processes. These impact of these can be seen generally to correspond to different groups of chronologically distinct archaeological monuments and remains, reflecting the varying topographical locations of the relevant sites. Briefly the results of the survey have revealed the following broad trend affecting vulnerable sites on the Solway Coast:

A small number of early prehistoric settlement sites are vulnerable from localised or more massive coastal erosion. A larger number of later prehistoric and early medieval settlement sites are again affected by localised coastal erosion, often exacerbated by human and animal impact. A small number of medieval settlement sites share the same trend as the early prehistoric sites. The largest group of sites, comprising monuments and remains of an industrial and maritime nature from the post-medieval and industrial periods, are adversely affected primarily by violent wave action. The last group

considered, comprising a range of monuments of the early Twentieth century, exhibit the same general vulnerability; that is from the detrimental effect of violent wave action.

This survey represents a snapshot of the condition of the archaeological remains that were visible in late 1996. It is clear that, in addition to the rapid nature of the survey, there are a number of other biases inherent in the results. Chief amongst these are the characteristics of the vegetation cover that significantly hindered survey above the high tide line, and the nature of many of the coastal deposits. This latter issue is of concern in areas of soft coast, where both on the mudflats and in areas incised by rivers and streams, it is likely that moving sediments and shifting channels within the sediments have in the past buried archaeological features. Where such sediments are still mobile, it is likely that a different array of archaeological remains may become visible from time to time. As this process is relatively constant and fluid, any time-limited survey is going to reflect only the character and range of remains that may globally be present in such environments. Furthermore, as some deposits and features may rapidly degrade once exposed, any periodic survey programme is likely to miss some features. Given these concerns it appears certain that the most appropriate method for locating archaeological (or palaeoenvironmental) sites of interest would be to encourage a system of local monitoring.

Another landscape facet in which our rapid overview is probably insufficient concerns the dune systems. CFA knows that it has proved possible in the past for excavations to be conducted in these areas, for example those conducted by Trevor Cowie in Luce Sands, and that that area is of great archaeological importance (as witnessed, for example, by the site of Torrs Warren, where the only substantial pitchstone knapping site in Scotland has been located, with material examined by Dr Finlayson). CFA survey could identify little in these areas, and this appears to be the result of current management practices employed within them. Substantial areas of the Luce Sands have been levelled and grassed over to facilitate the recovery of munitions, which has had an impact on both the presence of archaeological remains and their visibility. Furthermore, the absence of animal grazing, perhaps especially at Torrs Warren, has allowed the growth of a substantial scrub cover. While this has prevented recent sand deflation leading to blow-outs, it has prevented the detection of any additional sites in this area during the survey programme reported here. The growth of scrub on the dune systems may be detrimental to their SSSI status, and it appears possible that more active management of these sites may be adopted at some point in the future to restore their ecological interest. If that were to happen, it would be important that the potential archaeological interest be considered.

RECOMMENDATIONS

A number of recommendations have been made through this report. These are:

- To establish a local network of fieldworkers to encourage regular monitoring of areas of soft sediments
- To conduct more detailed geomorphological studies to provide a more detailed chronology for the coastal sediments, allowing inferences to be made regarding the likely presence and period of buried archaeological remains
- To conduct more detailed survey of a number of specific, representative sites.

- To ensure that a systematic programme of monitoring of known threatened sites be established.
- To maintain good communications with other agencies interested in the management of the coast.

These recommendations can only be achieved through a combination of approaches. Some of the work may be achieved directly by Historic Scotland through the Monument Wardens, or indirectly by the award of grants for specific pieces of research. Wider (and more frequent) monitoring will require additional efforts and should ideally include the Local Authority Archaeologist and Museum Officers as well as the participation of local groups, since the former have both local knowledge and relevant professional expertise. The Council for Scottish Archaeology may have a role to play in encouraging or co-ordinating local society efforts.

As part of the current exercise we are in the process of producing a summary note describing the work of the project. This will be discussed with Historic Scotland and the Local Authority Archaeologist before release to various organisations and heritage centres along the coast. In addition, we are producing posters, suitable for sending to local museums, libraries and schools. We have proposed a local lecture and will be looking at other opportunities to present the work of the project to the local populace.

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HBM (SDD)	Management and Monuments Directorate. (Scottish Development Department).
OS	Ordnance Survey
PSAS	Proceedings of the Society of Antiquaries of Scotland.
RCAHMS	Royal Commission on the Ancient and Historical Monuments of Scotland.
SFP	Solway Firth Partnership.
TDGNHAS	Transactions of the Dumfries and Galloway Natural History and Antiquarian Society.

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Plate 1. General shot of the ruined Stairhaven pier and eroding section.



Plate 2. Redkirk Point looking eastwards, note the slope failure on the edge of the field.

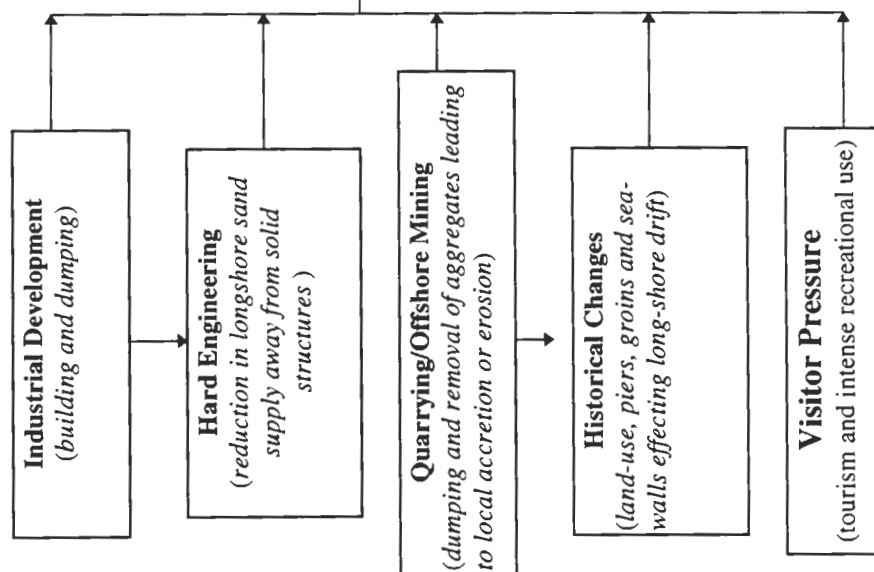


Plate 3. Eroded sea defences at Low Gurchie.

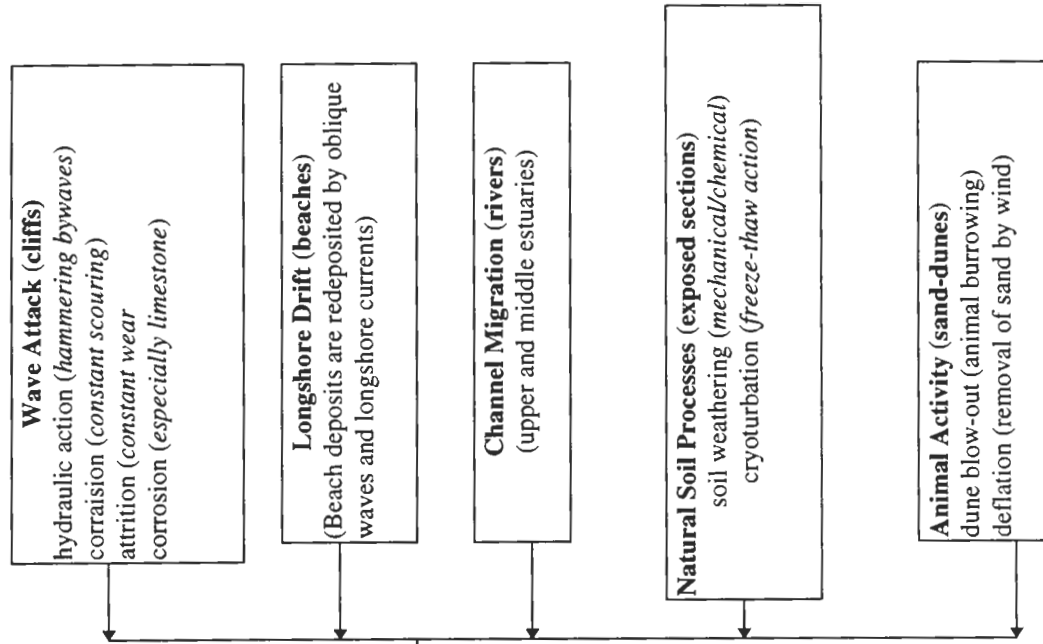


Plate 4. Serious coastal erosion to the west of Garlieston Bay

HUMAN-IMPACT ON COASTLINES



NATURAL IMPACT ON COASTLINES



Source: Based on Holmes 1978, Sunamuru 1981 and Bryant 1991