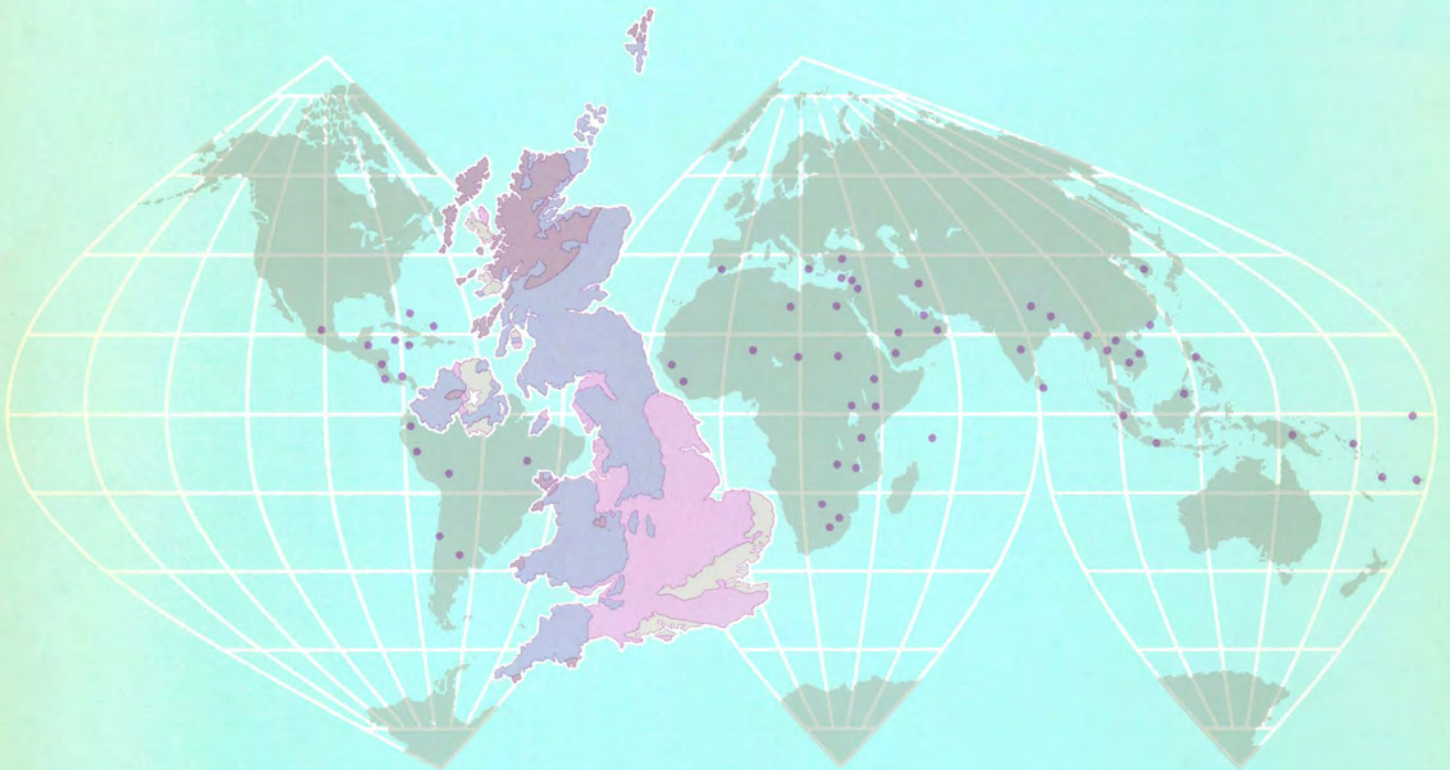




Sand and gravel resources of the Dumfries and Galloway Region of Scotland



NATURAL ENVIRONMENT RESEARCH COUNCIL

INSTITUTE OF GEOLOGICAL SCIENCES

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I. B. Cameron

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Preface

This report is based upon published information, unpublished records in the Institute's files and a limited amount of recent observation in the field. It relates to resources and not to reserves. In the quantitative calculations no account has been taken of even the most obvious restraints on working the deposits such as the presence of built-up areas, although these have been mentioned in the text where relevant. Conservation and amenity considerations have been given only passing mention in the knowledge that detailed advice on these aspects can be had from the Nature Conservancy Council, Hope Terrace, Edinburgh.

The report has been assembled on the basis of information available at 30 April 1976. It is inevitably incomplete because of the uneven data cover and for some deposits no quantitative estimation has been attempted because of the dearth of relevant fact. All quantities are approximate and, without doubt, silt, clay and other unsuitable materials have been included in places. Deposits for which the overburden ratio is more than 1:1 have not been included and no account has been taken of deposits less than 2 m thick. Detailed locations will not be found on the included maps and the reader is advised to refer to the relevant Ordnance Survey map. For each District the resources have been divided wherever possible into those above and those below the water table, but a lack of adequate borehole information has hindered estimation of resources below the water table. A list of working sand and gravel pits and their localities in each District is given in the Appendix. It includes only pits visited between February and April 1976 but omits most of those worked intermittently or on a small scale.

For many areas detailed records are available for consultation at the Institute of Geological Sciences, Murchison House, West Mains Road, Edinburgh EH9 3LA.

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Sand and gravel resources of the Dumfries and Galloway Region of Scotland

I. B. CAMERON

Introduction

The Dumfries and Galloway Region lies wholly within the physiographic division of Scotland known as the Southern Uplands and comprises approximately that part of the Southern Uplands which drains into the Solway Firth. The Regional boundary follows for much of its length the major watershed that separates the drainage which flows into the Firth of Clyde and the Tweed from the south-flowing drainage to the Solway. This definition of the Region is modified by the exclusion of part of the upper Nith drainage area and part of Liddesdale which belong to Strathclyde and Borders Regions respectively.

A very large part of the Region is underlain by rocks of the Ordovician and Silurian systems. They are the oldest rocks that crop out in the Region and consist of interbedded greywackes and shales usually folded and steeply inclined. The greywackes are hard muddy sandstones, usually dark-grey in colour but occasionally dark-red or purple. The shales tend to be hard and splintery and are less durable than the greywackes. Three large granite masses have been intruded into the Ordovician and Silurian rocks in the Criffel-Dalbeattie area, south-west of New Galloway and north-east of Glen Trool.

Rocks of the Carboniferous and Permian systems overlie the older rocks around Stranraer, in three areas of Nithsdale, in Annandale around Moffat and Lochmaben and in a narrow coastal strip south-west of Dumfries which extends eastwards into a broad area around Annan and Langholm. The Carboniferous rocks consist of interbedded pale-brown or grey sandstones, conglomerates and dark mudstones with small amounts of limestone and coal. Basalt lavas crop out in an area south of Lockerbie. The Permian rocks are red sandstones, mudstones and conglomerates.

During the Ice Age that ended less than 10 000 years ago an ice sheet covered the Region and flowed generally southwards. The resultant glacial debris was deposited over the lower ground as boulder clay. When the ice sheet melted large quantities of melt water flowed southwards and transported, sorted and redeposited the detritus in the form of kames, eskers, kame terraces and flat spreads of sand and gravel and, more rarely, laminated silt and clay. These deposits are usually well stratified and sorted and there is a general tendency for gravel to constitute a greater proportion of the deposit in the upper part of the valleys while the finer material, which was transported further, becomes more common in the lower reaches. The deposits in Nithsdale illustrate this point with the gravels occurring around Auldgirth and the finer material in the Lochar Moss area south-east of Dumfries.

The sand and gravel resources of the Region are mainly to be found in the fluvio-glacial deposits, but there are also useful resources in the raised-beach deposits. The latter, however, in many cases are

reworked fluvio-glacial deposits. Pre-Glacial valleys infilled with unconsolidated deposits can provide useful sources of sand and gravel in some areas. The only indication in this Region of the presence of such buried channels is in the lower part of Nithsdale and around Lochmaben in Annandale, but the information available is insufficient to allow any description of the infilling deposits.

A large proportion of the pebbles in the gravels consist of greywacke. Only in the vicinity of the large granite intrusions does granite appear as a significant constituent. The greywacke is derived directly from the Ordovician and Silurian outcrop and also indirectly by erosion of Carboniferous and Permian greywacke-conglomerates. Other rock types such as sandstone, basalt and vein quartz are minor constituents and their occurrence is related to the proximity of the corresponding solid outcrop.

The terms 'grit' and 'gritty' in the text are used to describe small angular fragments of rock, usually greywacke and shale, of coarse-sand size.

Annandale and Eskdale District

Rocks of Silurian, Carboniferous and Permian age all crop out within the District. The oldest and most durable rocks are the greywackes (hard grey sandstones) and splintery shales of the Silurian. These are overlain in the south and in Annandale by Carboniferous and Permian rocks, mainly sandstones, conglomerates, shales and basalts with lesser amounts of limestone and coal.

During the Ice Age boulder clay was deposited over large areas of the District. When the ice melted large volumes of melt water drained southwards carrying quantities of glacially eroded material. The deposits of glacial melt waters are normally the main sources of sand and gravel. The largest of such deposits in this District occur at Beattock and Dalton.

The composition of the gravels corresponds to the more durable rock types occurring within the District and to rock types brought in by ice or melt water. A large percentage of pebbles in the gravels of the District are greywacke, derived either directly from the Silurian outcrop or indirectly by erosion of Carboniferous and Permian greywacke-conglomerates.

DEPOSITS ABOVE THE WATER TABLE

1. Hunterheck

Near Hunterheck Farm [NT 101 047] about 2 km east of Moffat (Fig. 2) there are some deposits of sand and gravel. Just north of the farm there are two small patches of dissected terrace consisting of up to 4 m of ill-sorted greywacke-gravel resting on boulder clay and red sandstone.

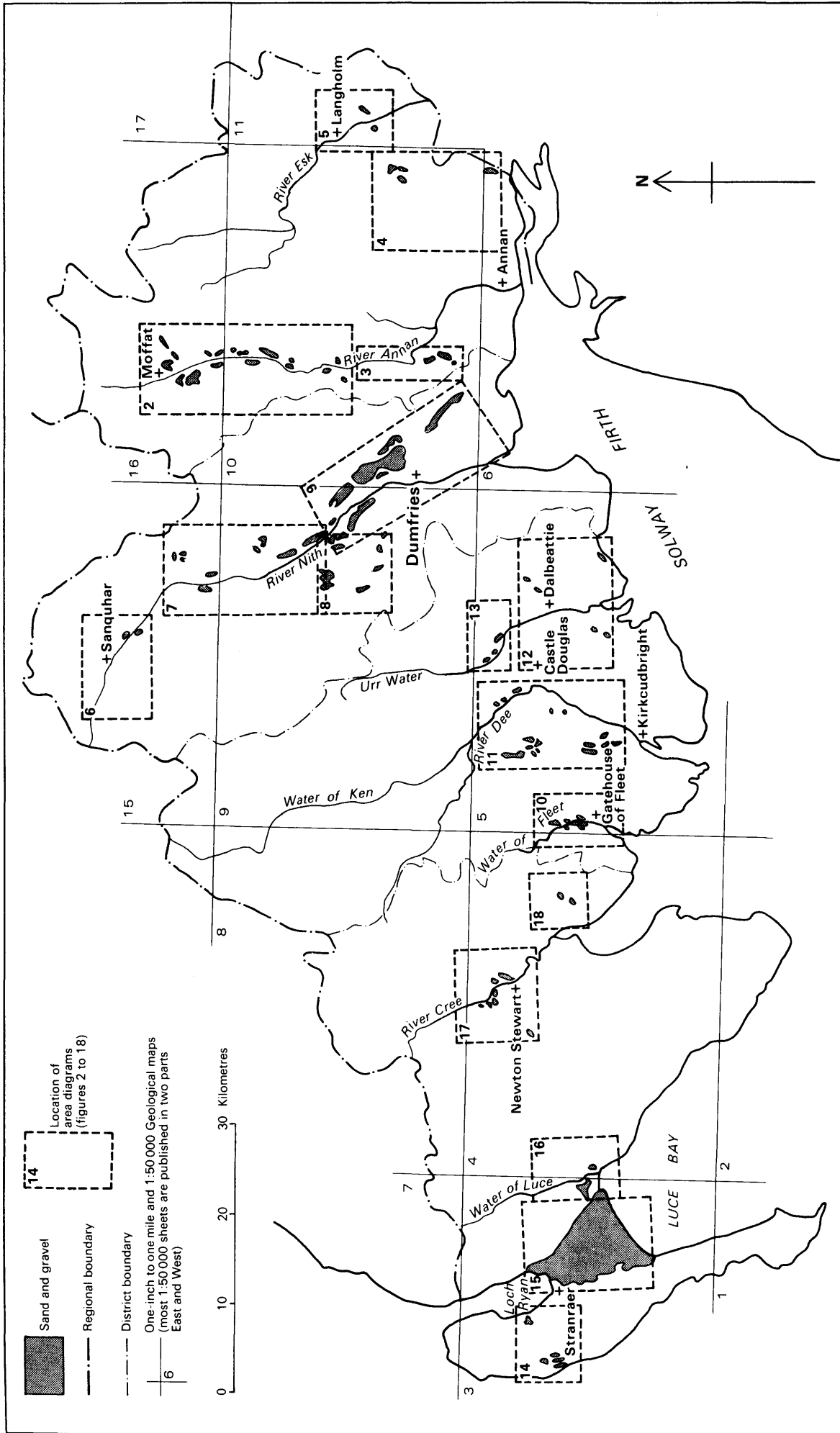


Figure 1. The distribution of the sand and gravel deposits of the Dumfries and Galloway Region

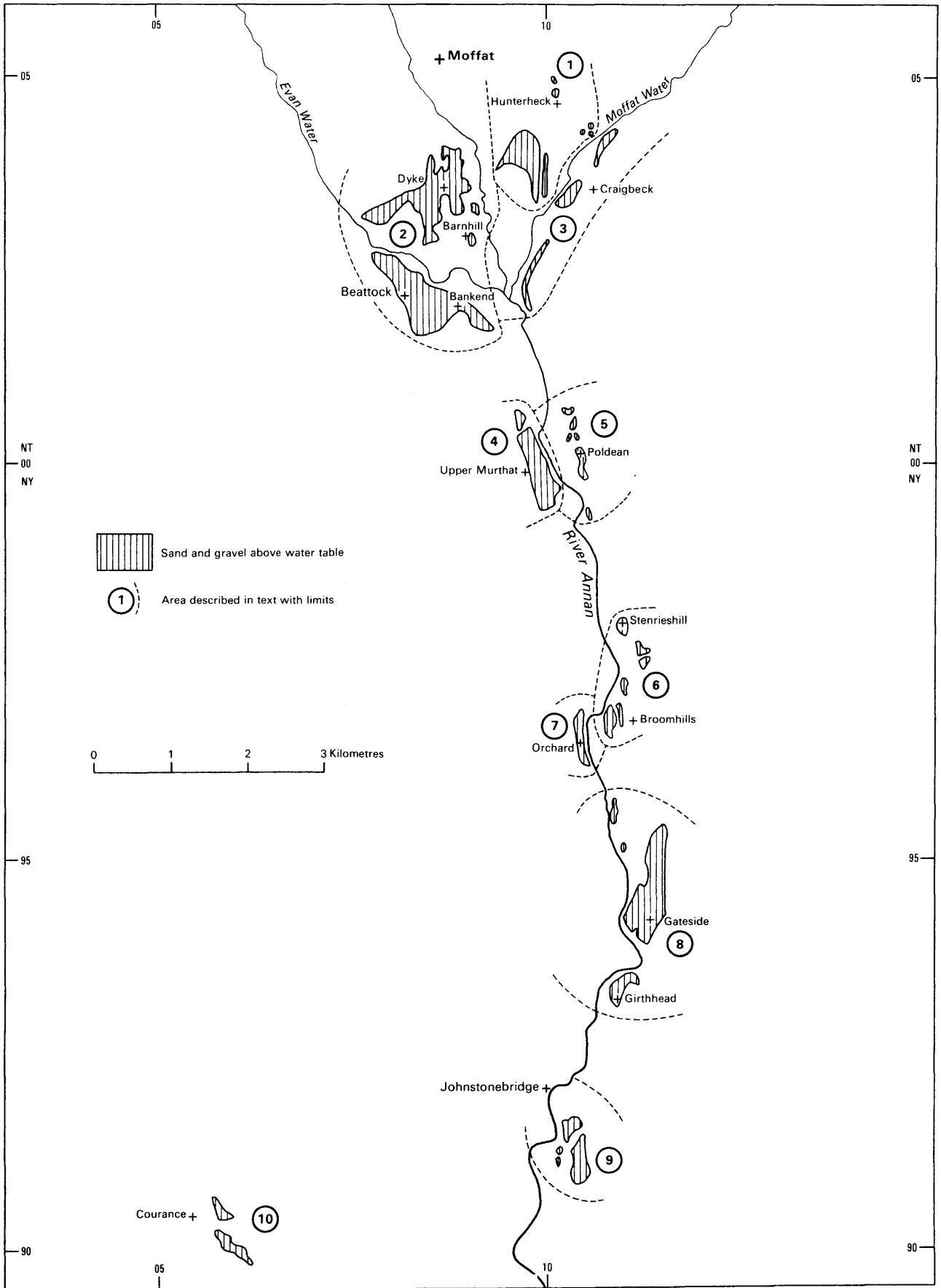


Figure 2. Annandale and Eskdale District: north Annandale

About 1 km south of Hunterheck there is a larger area of sand and gravel in the form of a mounded spread up to 4 m thick. On the east side of this deposit a north-south esker ridge reaches up to 6 m high. The gravel is made up almost exclusively of greywacke pebbles.

To the south-east of Hunterheck there is a group of small greywacke-gravel mounds up to 3 m high.

The total area is 26 hectares and there is estimated to be about 1.0 million tonnes of material present.

The land is mainly farmland with some woodland.

2. *Beattock*

A large deposit in the Beattock area (Fig. 2) forms a terrace to the north and south of the Evan Water. The terrace extends north of the Evan Water to Dyke Farm [NT 086 036] and south-eastwards to Bankend Farm [NT 088 019]. The greatest thickness occurs on the eastern edge of the terrace and it thins out westwards and north-westwards.

The material is exposed in a pit in a small outlier of the terrace at Barnhill [NT 090 030]. The gravel consists of cobbles and pebbles of greywacke slightly bound with clay, with some thin clayey sand layers. No other exposures were seen.

The total area of deposit is 93 hectares and it is reckoned that there is 6.5 million tonnes of sand and gravel present.

The land is farmland but much of the deposit is sterilised by the A74 trunk road which bisects the southern part of the terrace and crosses one end of the northern part.

3. *Craigbeck*

On the east side of the Moffat Water to the north-east and south-south-west of Craigbeck [NT 106 037] there are several small deposits of sand and gravel (Fig. 2). They are remnants of a dissected terrace. The two northern patches are rather mounded and are up to 6 m thick on the west side thinning out against a boulder-clay slope to the east. The deposits to the south are up to 8 m thick in the form of a narrow strip of terrace.

The material of these deposits consists of stratified sand and gravel with patches of laminated silt and clay. The gravel is composed mainly of greywacke pebbles with some of red sandstone. Beds of reddish-brown sand occur and they are silty and clayey in parts.

There is reckoned to be about 0.76 million tonnes of material present in a total area of 19 hectares.

The ground is farmland.

4. *Upper Murthat*

About 5 km south of Moffat around Upper Murthat Farm [NY 097 999] on the west side of the River Annan a patch of sand and gravel forms a broad ridge (Fig. 2). The ridge is thought to be the degraded remnant of a fluvio-glacial terrace.

There are no pits in the area and the natural exposure is very poor. The eastern margin of the deposit is a steep bank down to the River Annan and there are indications there that the sand and gravel rests on a mounded surface of boulder clay and reaches up to 6 m in thickness.

The deposit consists of gravel and beds of reddish sand. The exposure is insufficient to enable estimates of proportions to be made, but the gravel is composed of pebbles of greywacke.

There is estimated to be about 1.8 million tonnes of sand and gravel in an area of 30 hectares.

The area is bounded on the west side by the main railway line and on the east by the River Annan. The land is farmland.

5. *Poldean*

On the east side of the River Annan, around Poldean [NT 105 001], about 5 km south-south-east of Moffat, a group of small mounds and terrace remnants consists of sand and gravel (Fig. 2).

The gravel occurs up to 6 m thick and it is seen to be resting on a mounded surface of boulder clay at Catherine's Hill almost 1 km south of Poldean. The gravel is composed of pebbles of greywacke in a gritty matrix.

The six individual patches of this group total 6 hectares in area and contain about 0.36 million tonnes of sand and gravel.

6. *Stenrieshill*

Small deposits of sand and gravel occur between Stenrieshill House [NY 110 979] and Broomhills [NY 112 966] on the east side of the River Annan about 8 km south-south-east of Moffat (Fig. 2). They consist of mounds and ridges up to 8 m high.

There are a few natural exposures but no pits or excavations. The gravel consists of pebbles and some cobbles of greywacke and beds of red medium sand. The gravel is slightly bound with clay in places and beds of clay were seen in a large mound near Broomhills.

In a total area of 11 hectares there is estimated to be about 0.66 million tonnes of sand and gravel.

7. *Orchard*

At Orchard [NY 104 963] on the west side of the River Annan opposite Broomhills a small area of sand and gravel is part of a degraded terrace and reaches up to 6 m in thickness on the east edge (Fig. 2). It thins out against a boulder-clay slope to the west.

The material consists of pebbles and rare cobbles in a grit and red sand matrix. Most of the gravel is composed of pebbles of red-stained or grey greywacke, with a few pebbles of red sandstone.

There is reckoned to be about 0.28 million tonnes of sand and gravel in an area of 7 hectares.

The area is limited to the east by the River Annan and the A75 trunk road is close to the western margin.

8. *Gateside and Girthhead*

There are patches of terraced sand and gravel around Gateside [NY 113 942] and Girthhead farms [NY 110 931] (Fig. 2).

The most extensive area is around Gateside where the terrace is flat and the deposit probably thin on the east side, but it becomes mounded and up to 6 m thick along the western limit, adjacent to the alluvial flat of the River Annan.

A smaller area around Girthhead Farm is up to 8 m thick along the western edge, thinning out against boulder clay to the east.

The material making up these deposits consists mainly of greywacke gravel and red sand. Riverside exposures near Girthhead showed pebbles of greywacke, some of which are red-stained, and blocks of Permian breccia in a medium-grained red sand matrix. There are also thin beds of red sand. In these exposures the sand to gravel proportions were estimated to be about 30 per cent sand to 70 per cent gravel.

The total area is 60 hectares and the estimated quantity of sand and gravel present is about 3.0 million

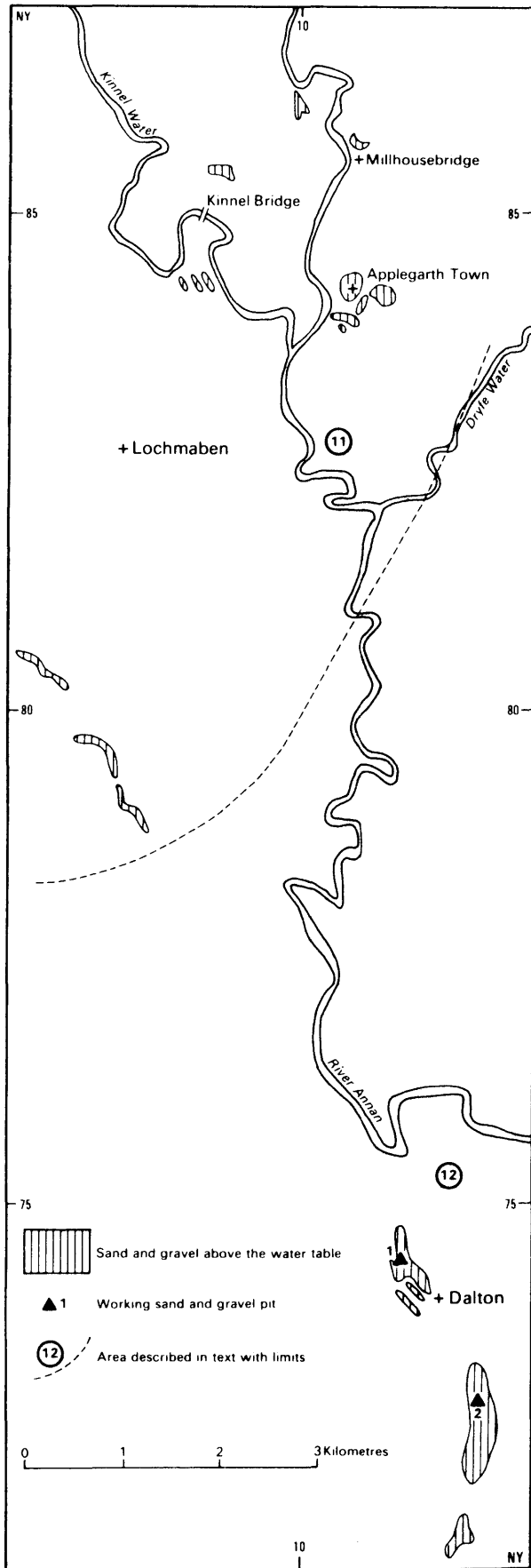


Figure 3. Annandale and Eskdale District: south Annandale

tonnes.

The deposit at Gateside is crossed by a minor road and a railway line. The land is partly farmland and partly forest.

9. Johnstonebridge

Small mounds of sand and gravel form a group about 1 km south of Johnstonebridge [NY 101 918] on either side of the A74 trunk road (Fig. 2).

The mounds are up to 8 m high and consist of gravel with mainly greywacke pebbles and rarely red sandstone pebbles in a matrix of grit and medium sand.

In a total area of 13 hectares the gravel content is estimated to be about 0.78 million tonnes.

10. Courance

Two mounded areas of sand and gravel are located near Courance [NY 054 902], about 5 km south-west of Johnstonebridge (Fig. 2).

The main part of the deposits is a ridge about 10 m high trending north-west. It consists of clay-bound gravel containing boulders, up to 0.7 m in diameter, cobbles and pebbles of greywacke with subordinate amounts of red sandstone and igneous rocks. The gravel is poorly sorted and has little apparent stratification. The matrix is a reddish-brown gritty clay.

The other parts of the deposit consist of low mounds and no exposures of the material have been seen.

In an area of 10 hectares some 0.5 million tonnes of sand and gravel are thought to be present.

11. Lochmaben

There are a number of small scattered deposits of sand and gravel in the vicinity of Lochmaben (Fig. 3). They occur at Millhousebridge [NY 106 856], Kinnel Bridge [NY 089 850], and Applegarth Town [NY 105 843]; there is also a small esker deposit to the south of Lochmaben.

The deposits reach up to 8 m thick, but are usually less than 4 m. They consist of greywacke-gravel with a small proportion of red sandstone, and medium-grained red sand.

Together these deposits total about 30 hectares in area with an estimated 1.2 million tonnes of sand and gravel disposed in at least seven separate mounds or groups of mounds.

12. Dalton

Near Dalton there are mounded sand and gravel deposits which were being worked in 1976 (Fig. 3). To the north of Dalton the deposits are mounds and ridges up to 8 m high and elongated north to south.

One gravel pit in the main part of the deposit shows stratified sand and gravel with flat beds of rather fine sand interbedded with layers of gravel in a sand matrix. The gravel consists principally of greywacke pebbles and a small percentage of red sandstone and basalt. The sand to gravel proportions were estimated to be about 70 per cent sand to 30 per cent gravel. The deposit also contains silt and clay bands and some thin layers of till.

The deposits to the south of Dalton are degraded terraces up to 10 m thick on the west edge and thinning out to the east. A working pit in the north end of this area shows stratified pebbly sand and gravel with some silt and clay bands. The gravel is composed of greywacke with a very small proportion of red sandstone and basalt. The sand to gravel proportions

were estimated to be about 50 per cent sand to 50 per cent gravel.

The total amount of sand and gravel is thought to be about 3.3 million tonnes in an area of 55 hectares.

The land is used as farmland and is crossed by minor roads.

13. *Springfield*

At Springfield [NY 327 683] a deposit of sand and gravel is partly overlain by boulder clay (Fig. 4). Gravel containing small cobbles and pebbles mainly of greywacke is exposed in a steep bank near the River Sark south-east of Springfield. Small exposures farther west show beds of medium-grained red sand apparently overlain by red sandy boulder clay. The deposit is up to 6 m thick at the eastern limit and apparently thins towards the west. The overburden of boulder clay correspondingly increases in the same direction.

Estimates of quantity in this area are tentative because of the lack of information but there is reckoned to be about 0.84 million tonnes of material in an area of 14 hectares.

A railway line crosses the main part of the deposit.

14. *Dunnabie*

South of Dunnabie [NY 256 812], 9 km north-east of Ecclefechan, there are small mounds of rather clayey greywacke-gravel (Fig. 4). The mounds occur up to 4 m high, occupy an area of 2 hectares and consist of about 0.08 million tonnes of material.

15. *Waterbeck*

In the vicinity of Waterbeck [NY 248 776] several small patches of gravel and sand include short steep-sided ridges up to 7 m high and low mound spreads not more than 3 m thick (Fig. 4). The material consists of greywacke-gravel, mainly small pebbles in a rather clayey matrix. The combined area of the mounds is 4 hectares and the quantity of gravel present is calculated to be about 0.16 million tonnes.

16. *Solway Bank*

Near Solway Bank [NY 318 774] about 9 km south-west of Langholm (Fig. 4), a string of small mounds and ridges of gravel show a maximum thickness of about 6 m but more usually 3 to 4 m. They are composed of poorly sorted gravel and rather clayey sand. The gravel content is about 70 per cent greywacke pebbles and 30 per cent sandstone and various igneous rocks. There is estimated to be a total of about 0.4 million tonnes of gravel in an area of 10 hectares.

17. *Barnglieshead*

At Barnglieshead [NY 324 786] 7 km south-west of Langholm there are several areas of sand and gravel (Fig. 4). The largest area is a degraded terrace deposit which is up to 12 m thick at the western edge and thins off eastwards. There are also mounds up to 8 m high.

The deposit consists of gravel and red sand. There are no pits and the natural exposure is poor but the gravel apparently consists of about 70 per cent greywacke pebbles and 30 per cent sandstone pebbles. Red medium-grained sand also occurs in beds up to 4 m thick.

There is estimated to be about 1.7 million tonnes of sand and gravel in a total area of 21 hectares.

The land is farmland and is crossed by a minor road.

18. *Ryehills, Tarcoon and Mossknowe*

Mounds of sand and gravel occur at Ryehills [NY 346 786], Tarcoon [NY 361 778] and Mossknowe [NY 368 771] about 7 km south of Langholm (Fig. 5).

At Ryehills there are two mounds, one of which is about 12 m high. There are no pits and the natural exposure is very poor. The deposits apparently consist of red sand and gravel with pebbles mainly of greywacke and some of brown sandstone and igneous rocks.

Stratified fluvio-glacial sand and gravel is exposed in a sand pit at Tarcoon which is used intermittently. The gravel contains large and small pebbles in a sandy matrix. The pebbles consist of greywacke and sandstone in approximately equal proportions along with a small percentage of vein quartz, granite and other igneous rock types. The sand to gravel proportions were estimated to be about 70 per cent sand to 30 per cent gravel. Layers of red sandy till occur within the sand and gravel.

No exposures were found in the mound at Mossknowe.

The combined area of the mounds is 8 hectares and there is reckoned to be about 0.48 million tonnes of sand and gravel present.

19. *Hagg*

Near Hagg Farm [NY 375 794], 5 km south of Langholm (Fig. 5), a mound of sand and gravel about 5 m high consists of gravel mainly of greywacke with some red sand. The mound covers an area of about 2 hectares and there may be about 0.08 million tonnes of sand and gravel contained in it.

20. *Claygate*

About 1 km north-east of Claygate [NY 395 792] there is a mound of sand and gravel up to 8 m high. The deposit is scarcely exposed but it apparently consists of red sand with greywacke and sandstone pebbles. In an area of 3 hectares it is estimated that there is 0.18 million tonnes of material.

DEPOSITS BELOW THE WATER TABLE

Deposits in buried channels

Buried channels are pre-Glacial valleys which have been infilled with glacial deposits. The deposits can vary widely in composition and are likely to include boulder clay, mud and silt, running sand, gravel and boulders, and in some cases peat near the surface. The location and contents of buried channels in the Region are known only from borehole information; in the Annandale and Eskdale District the borehole information is insufficient to define buried channels. Their presence, nevertheless, is indicated by two bores near Lochmaben where depths to rock-head of 37 m and 17 m were recorded.

Alluvial deposits

Freshwater alluvial deposits are known to occur in the beds of the rivers of the District and in riverside terraces. These deposits have not been investigated for this report and although there are some useful resources of gravel in the river deposits, especially around Moffat, the material from most places is likely to be too fine to constitute resources.

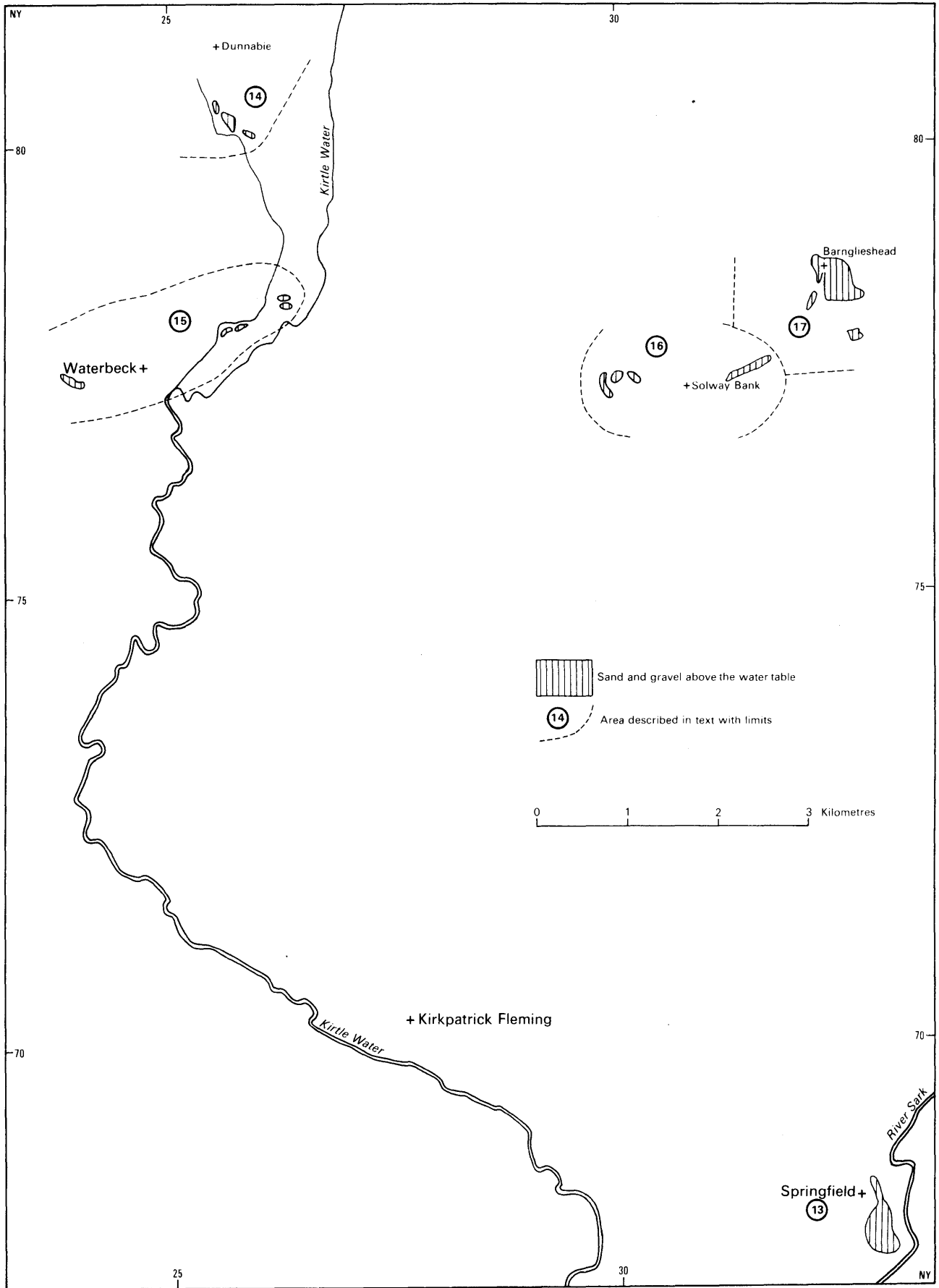


Figure 4. Annandale and Eskdale District: south-eastern part

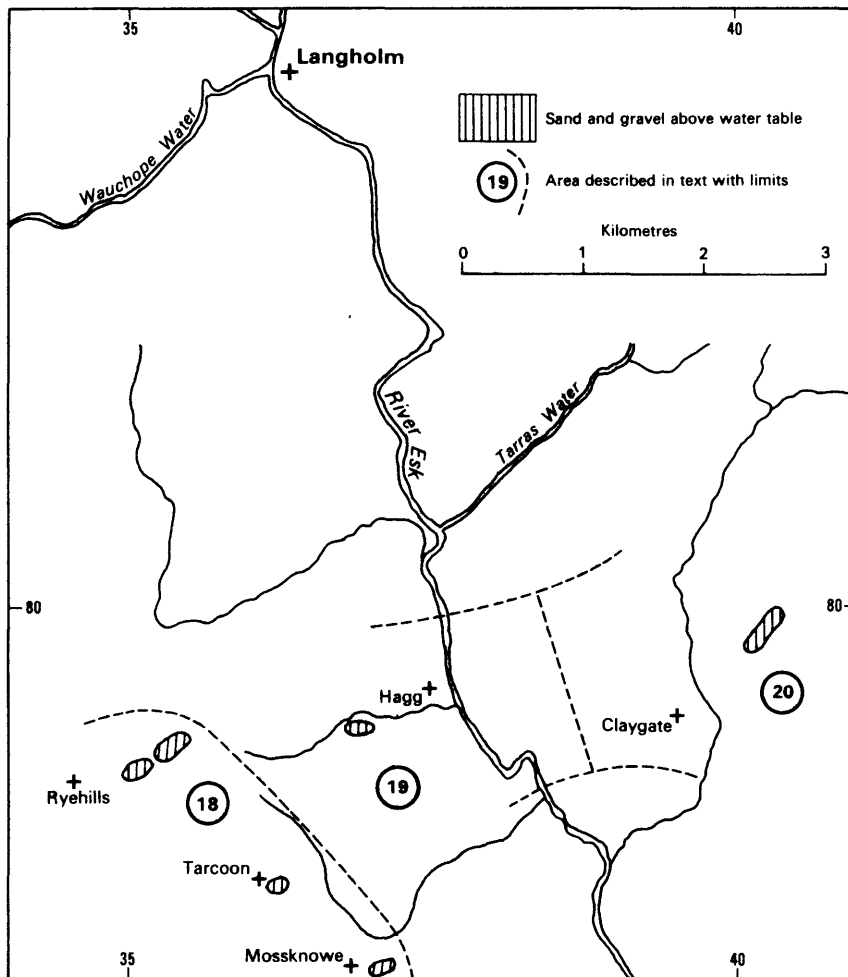


Figure 5. Annandale and Eskdale District: Eskdale

Nithsdale District

The oldest rocks of the District are of Ordovician and Silurian age and are overlain in the Sanquhar and Kirkconnel, Thornhill, and Dumfries areas by rocks of Carboniferous and Permian age.

The Silurian rocks consist of grey indurated muddy sandstones and hard splintery shales. These rocks have been intruded by a granite mass in the Criffel area south of Dumfries and by numerous minor intrusions of other types of igneous rock throughout the District.

Rocks of Carboniferous age outcrop in the Sanquhar, Kirkconnel, and Thornhill areas in the Nith valley and also around Kirkbean and Ruthwell in the south. The rocks consist of red and grey sandstones and conglomerates, mudstones, rare limestones and coals; in the south-east there are basaltic lavas.

Permian rocks consisting of red sandstone, siltstone, conglomerate, breccia and basalt lava overlie Carboniferous rocks in the Thornhill and Dumfries areas.

During the Ice Age boulder clay was deposited over large areas of the District. When the ice melted large volumes of melt water drained southwards carrying quantities of glacially eroded material. The deposits of glacial melt waters are normally the main sources of sand and gravel in an area and in the Nithsdale District the bulk of these deposits occur in the valley of the River

Nith south of Auldgirth.

The composition of the gravels corresponds to the more durable of the rock types occurring within the District and to rock types brought in by ice or melt water from elsewhere. In the Nithsdale District a very high proportion of the gravels is composed of greywacke pebbles, derived either directly from the Silurian outcrop or indirectly by erosion of Permian conglomerates made up mostly of greywacke pebbles. Minor constituents of the gravel are Permian (red) and Carboniferous sandstones and various igneous rocks including granite.

DEPOSITS ABOVE THE WATER TABLE

1. Kirkconnel and Sanquhar

The valley of the River Nith from the District boundary downstream to Mennock has a thin patchy spread of sand and gravel on either side of the river (Fig. 6). Most of this deposit is too thin to be workable.

Small mounds at the Knowe Farm [NS 718 127], Eliock Grange [NS 804 080] and Overtown [NS 813 077] are 3 to 4 m high and of marginal potential. North-west of Eliock Grange, between the A76 and the river a small terrace deposit of sand and gravel is 2 to 3 m thick at its southern edge and thins out northwards. Between Eliock Grange and the river to the east there is a 2-m thick spread of gravel.

These deposits cover a total area of about 13.5

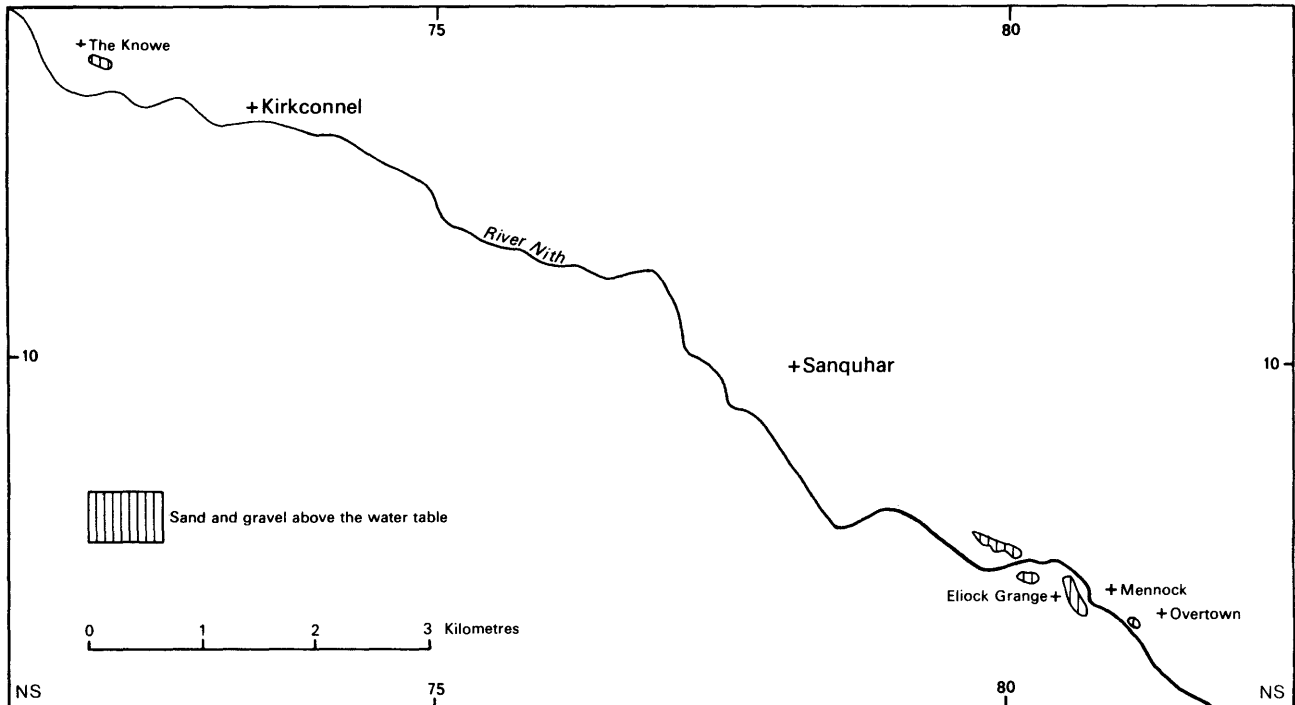


Figure 6. Nithsdale District: Kirkconnel and Sanquhar

hectares and contain some 0.54 million tonnes.

The gravel consists mainly of pebbles of greywacke with a small percentage of pale sandstone and basalt. The matrix tends to be clayey.

There are no pits or good natural exposures in these deposits.

2. Durisdeer

There is a group of small deposits of sand and gravel near Durisdeer (Fig. 7). North of Carronglen Farm [NS 885 035] a low mounded deposit averages about 2 m in thickness. To the east of the farm a small alluvial fan on either side of the Kirk Burn is up to 3 m thick. The gravel of these deposits consists mainly of pebbles of greywacke with a very small proportion of sandstone and basalt pebbles set in a clayey sand matrix.

On either side of the Carron Water north-east of Drumcruilton Farm [NS 882 021] there are several small areas of terrace up to 4 m thick. The deposits consist of gravel in a clayey matrix with pebbles mainly of greywacke.

The quantity of gravel in all these deposits amounts to about 0.34 million tonnes in a total area of 8.5 hectares.

3. Drumlanrig

On the east side of the Nith north-east of Drumlanrig Castle [NX 852 993] there is an area of fluvio-glacial sand and gravel mounds (Fig. 7). The mounds are up to 10 m high and the few exposures show them to consist mainly of gravel. Most of the gravel is composed of greywacke pebbles and some cobbles with a small percentage of pebbles of Carboniferous sandstone and various igneous rock types.

Within an area of 10 hectares there is calculated to be 0.6 million tonnes of sand and gravel.

4. Carronbridge

On the north side of the Carron Water at Carronbridge (Fig. 7) a terraced area is composed apparently of gravel. The deposit is thickest at the south end and thins

out northwards. The maximum thickness is about 5 m. The main road (A76) occupies a cutting at the south end of the deposit where greywacke-gravel is exposed.

It is reckoned that about 0.21 million tonnes of gravel occur in an area of 3.5 hectares.

The land is woodland and pasture and is bisected by the A76.

5. Burnhead

South and east of Burnhead [NX 862 954] five small deposits of sand and gravel are the dissected remnants of a terrace which was originally thicker at the south-east side and thinned out to the north-west. The maximum thickness is about 4 m.

The deposit consists of gravel in a sandy clayey matrix. Most of the pebbles are greywacke with subordinate amounts of sandstone and igneous rocks.

South-west of Burnhead a small esker 3 to 4 m high is composed of sand and gravel.

The total area of the deposits near Burnhead is about 4.5 hectares and it is estimated that there is about 0.18 million tonnes of sand and gravel.

There are no pits in these deposits and the land is farmland.

6. Templand Mains

On the north side of the Cample Water (Fig. 7) opposite Templand Mains [NX 882 942] there is a narrow ridge of sand and gravel 1 to 2 m high. There are no exposures in the deposit which is estimated to contain 0.03 million tonnes of sand and gravel in an area of about 1 hectare.

7. Closeburn Mains

North-east of Closeburn Mains [NX 908 927] there are two patches of fluvio-glacial sand and gravel (Fig. 7). The deposits consist of ridges and low mounds up to 5 m high composed mainly of pebbles and cobbles of greywacke with subordinate amounts of pale-brown and red sandstone and basalt. An estimated 0.52 million

tonnes of sand and gravel is included in a total area of 13 hectares.

One of the areas is bisected by a main railway line.

8. *Shawsholm*

East of the alluvial flat at Shawsholm Farm [NX 885 915] there is a group of fluvioglacial mounds and ridges of sand and gravel (Fig. 7). The area is about 1.5 km long from NNW to SSE and 0.5 km wide with three small outliers to the south. Mounds occur up to about 15 m high. There are very few natural exposures but a small pit at the north end of the deposit showed an unsorted poorly stratified section of gravel composed of pebbles, cobbles and rarely boulders of greywacke with a small percentage of red sandstone, pale-buff sandstone and igneous rock. The matrix of the deposit is rather clayey.

Within a total area of 34 hectares there is calculated to be about 2.0 million tonnes of sand and gravel.

The land is mainly farmland with a little woodland.

9. *Auldgirth*

On the east side of the River Nith between Auldgirth Bridge [NX 912 864] and Barburgh Mill [NX 900 884] a mounded ridge of sand and gravel about 2 km long is divided into two parts by the Clauchrie Burn (Fig. 7). The deposit is up to 15 m thick at the north end and 6 to 8 m thick at the south end. There are very few natural exposures but a working pit at the north end shows a good section in stratified fluvioglacial sand and gravel. Beds of red sand, mainly medium-grained but with bands of fine silty sand and lenses of gravel, occur interbedded with layers of gravel. The content of the gravel is mainly pebbles with some cobbles and rare boulders of greywacke with a very small percentage of red sandstones, pale-buff sandstones and basalt. The sand to gravel proportions were estimated to be 60 per cent sand to 40 per cent gravel.

In an area of 27 hectares there is reckoned to be about 2.7 million tonnes of sand and gravel.

The deposit is bounded to the west by the main road (A76) and there is a main railway line close to the eastern boundary. The land is farmland and woodland.

10. *Cairn Water*

Several small mounds and ridges of sand and gravel occur beside the Cairn Water (Fig. 8) between Maxwellton [NX 822 897] and Birkshaw [NX 858 857]. They consist of small kames and eskers up to 5 m high of pebbles, cobbles and boulders of greywacke mainly but with a small proportion of igneous rocks. The total area is 8 hectares and there is reckoned to be a total of 0.32 million tonnes of sand and gravel, but the largest individual deposit contains less than a quarter of that total.

11. *Huntfield*

North of Dunscore, around the farm of Huntfield [NX 867 863] there is a large patch of mounded sand and gravel about 70 hectares in extent (Fig. 8). It consists of kames and eskers up to 7 m high. The largest mounds occur in the south part of the deposit. There are very few natural exposures, but a small pit showed flat-bedded silty sand mantled with gravel in a clayey matrix. The gravel consists mostly of pebbles, cobbles and boulders of greywacke with a very small percentage of igneous rocks.

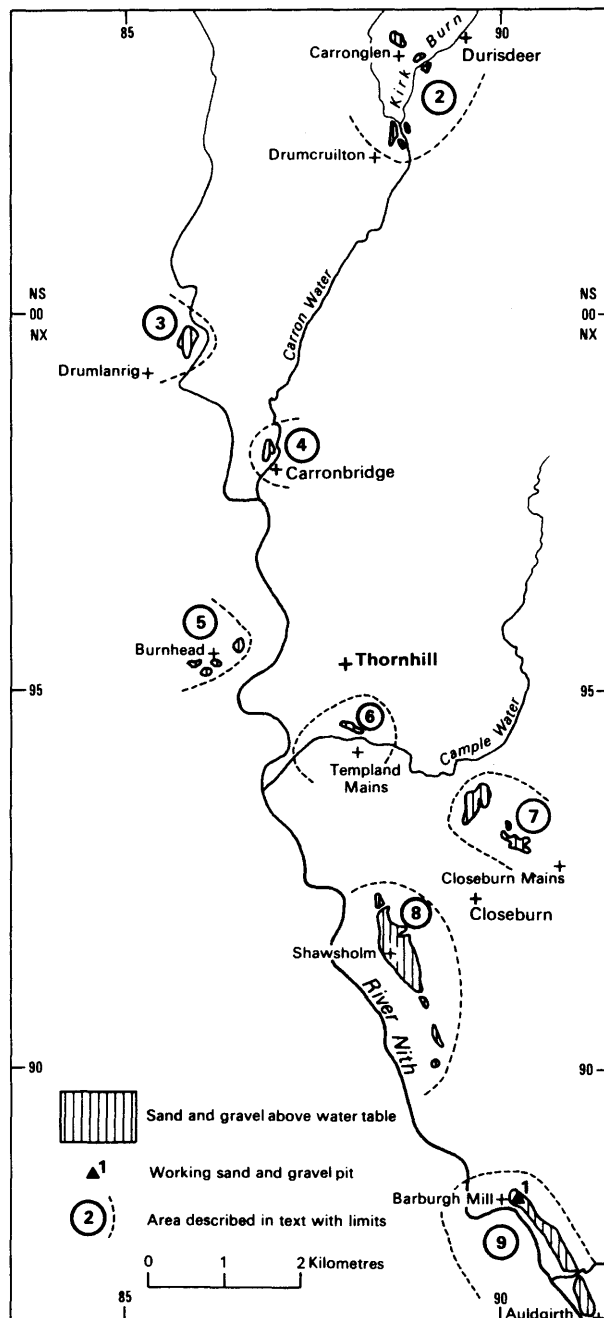


Figure 7. Nithsdale District: northern part

There is estimated to be about 2.8 million tonnes of sand and gravel in an area of 70 hectares.

The land is farmed at the present time.

12. *Speddoch*

Isolated ridges and mounds up to 6 m high occupy an area between Speddoch Farm [NX 852 823] and the Cairn Water (Fig. 8). There are no natural exposures but the deposit appears to consist of greywacke gravel.

In an area of 8 hectares there is thought to be about 0.32 million tonnes of sand and gravel.

13. *Allanton*

To the east of the River Nith about 10 km north-west of Dumfries (Fig. 9) several deposits of sand and gravel are located in the vicinity of Allanton [NX 912 850].

Between Cairnhall [NX 904 859] and Merkland [NX 902 851] a thin terrace passes into a mounded deposit

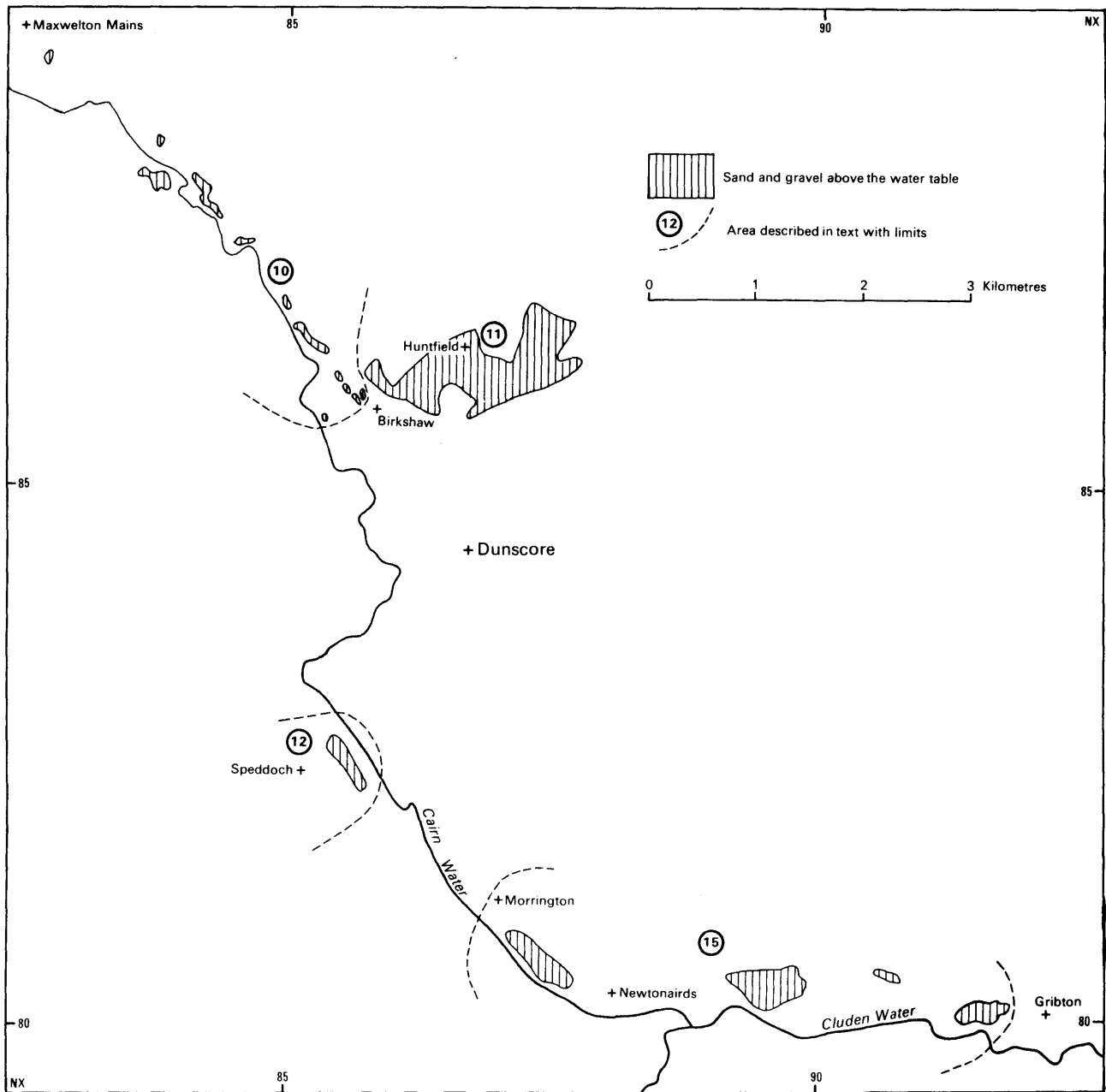


Figure 8. Nithsdale District: Dunscore area

towards the south-east. The terrace is 3 to 4 m thick at the eastern edge and thins out westwards. The mounds in the south-east are 3 to 4 m high. The deposit consists of gravel made up of pebbles of greywacke with a small proportion of acid and intermediate igneous rocks.

In an area of 42 hectares there is reckoned to be about 1.68 million tonnes of sand and gravel.

The ground is farmland and is crossed by minor roads.

In an area immediately south of Auldgirith Bridge [NX 912 864] there are mounds up to 8 m high. There are no natural exposures but the deposit appears to consist of pebbles and cobbles of greywacke. There is estimated to be about 1.62 million tonnes of sand and gravel in an area of 27 hectares. The area is partly farmland partly forest and is bounded to the east by the main road (A76).

Between Allanton and the Nith an area of mounded gravel extends northwards in a strip. The mounds are up to 10 m high and the material is exposed in road cuttings. The deposit consists mainly of gravel made up of pebbles, cobbles and rare boulders of greywacke with a small percentage of red sandstone, pale sandstone and granite. Pebbles and large pebbles predominate. There are several small lenses of red sand and the gravel has a red sandy gritty matrix. This deposit occupies an area of about 22 hectares and the resources of sand and gravel are estimated to be 2.2 million tonnes.

The main road (A76) traverses the deposit north to south and the ground is farmland and woodland.

About 1 km east-south-east of Allanton, east of the A76, a small area of sand and gravel includes mounds up to 5 m high. No exposures have been located. In an area of 5 hectares there is reckoned to be about 0.2 million tonnes of material.

14. *Killylung*

An area of sand and gravel extends from Farthingwell [NX 925 830] in a narrow arc south-eastwards to Killylung [NX 954 815] (Fig. 9). The deposit is partly a terrace but it passes into mounds and ridges north of Killylung where the bulk of the resources in this deposit occur. The terrace is a maximum of 6 m thick and thins out rapidly southwards. North of Killylung the mounds and ridges are up to 8 m high. The exposure is very poor although the deposit was formerly worked beside the railway south of Summerhill [NX 949 817]. It consists mainly of greywacke-gravel.

The total area of the deposit is 76 hectares and there is estimated to be 4.6 million tonnes of material present.

The deposit is bounded to the east by the alluvial flat of the River Nith and it is bisected north to south by the main railway line. The land is mainly farmland with some woodland.

15. *Newtonairds*

On the north side of the Cluden Water between Morrington [NX 870 811] and Gribton [NX 922 800] there are several small deposits of sand and gravel (Fig. 8). The most easterly of this group of deposits occurs about 1 km west of Newtonairds [NX 882 803] and consists of a group of gravel mounds up to 4 m high on a boulder-clay slope. The gravel consists of large pebbles, cobbles and boulders of greywacke.

A mounded area of sand and gravel about 1 km east of Newtonairds is a dissected remnant of a terrace. The mounds are up to 6 m high and evidence from very poor exposure indicates that they consist mainly of greywacke-gravel.

About 0.5 km west of Gribton a flat terrace area apparently consists of fine greywacke-gravel in a clayey matrix. The deposit is about 4 m thick.

The total area of these deposits is 32 hectares and there is estimated to be about 1.3 million tonnes of sand and gravel.

The land is farmland and the deposits are crossed by minor roads.

16. *Terregles*

At Terregles Banks [NX 935 771] a sharp crested ridge about 0.8 km long and up to 4 m high consists of coarse greywacke gravel in a clayey matrix (Fig. 9). There are other deposits in the vicinity but they are thought to be thin patches overlying boulder clay.

There is reckoned to be 0.08 million tonnes of gravel in an area of about 2 hectares.

17. *Forrest*

On the east side of the River Nith about 1 km south-east of Auldgirith, near Forrest Farm [NX 921 854] (Fig. 9), a deposit of sand and gravel in the form of a long narrow strip of terrace is up to 5 m thick on the south-western edge and thins off to the north-east. There are no exposures but it is most likely to be composed mainly of greywacke-gravel.

In an area of 6 hectares there is thought to be about 0.24 million tonnes of gravel.

The deposit is crossed by a minor road and is otherwise farmland.

18. *Quarrelwood*

In the vicinity of Quarrelwood [NX 961 842] there is an extensive area of terraced and mounded sand and gravel (Fig. 9). The area stretches from Dalswinton [NX 943

841] and Boghall [NX 948 854] at the north-west end to the Duncow Burn in the south-east.

At the north-west end of the area the deposit is in the form of rather degraded terraces at two levels. The higher level is approximately 75 to 80 m OD and the lower level about 45 to 50 m OD. The remnants of the upper terrace form mounds 4 to 6 m high. The lower level is less mounded and has an estimated average thickness of about 3 m. Between Quarrelwood and the Duncow Burn there are mounds up to 8 m high.

There are no working pits in the deposit and very few natural exposures. The gravel content is mainly pebbles with cobbles and rarely boulders of greywacke with very small proportions of sandstone and various igneous rocks. The proportion of sand to gravel cannot be estimated.

The total area is 196 hectares and there is estimated to be about 12 million tonnes of material present.

Most of the ground is farmland with some woodland. The area is bounded to the south-west by the alluvial flat of the river Nith and a minor road.

19. *Kirkton*

A large area of mounded sand and gravel in the vicinity of Kirkton [NX 976 814] extends from the Duncow Burn in the north-west to the Park Burn in the east (Fig. 9). For ease of description the area is bounded to the south by an arbitrary line from Kirkton eastward along a minor road to Kilblane Farm [NX 988 818].

Much of the ground in the northern part of the area is mounded but it is probably part of a degraded terrace at a height of 45 to 50 m OD. The deposit thins out against a back feature at the north and north-east margins and thickens to the south when it passes into an area of steep mounds up to 10 m high. The southern part of the area has kame-and-kettle topography.

There are no working pits in this area and the natural exposure is very poor. Two small exposures in the south of the area showed gravel composed of pebbles and cobbles mainly of greywacke with a small proportion of red sandstone and various igneous rocks. The matrix of the gravel is a red gritty sand. Red sand was seen in small thin lenses in the gravel.

The total area of the deposit is 387 hectares and there is estimated to be about 19 million tonnes of sand and gravel present. The land is farmland with some woodland and is crossed by minor roads.

20. *Locharbriggs*

This area (Fig. 9) is defined in the east by the Amisfield Burn and the Lochar Water, in the west by the Park Burn and the arbitrary boundary with the Kirkton area (19). The southern limit is taken arbitrarily at a line from The Grove [NX 987 786] south to Clumpton [NX 992 771] and from there eastwards along the A709 to the Lochar Water. Resources to the south of this line have not been assessed because of lack of information. Much of the material is probably too fine and most of it is below the water table.

The area north and north-west of Locharbriggs consists of mounds and ridges of sand and gravel up to 10 m high. Many of the mounds tend to be flat-topped suggesting that the deposit is a dissected terrace that previously formed a level at 25 to 30 m. The sand and gravel has been deposited around a ridge of red sandstone which outcrops in a broad ridge running north-westwards from Locharbriggs.

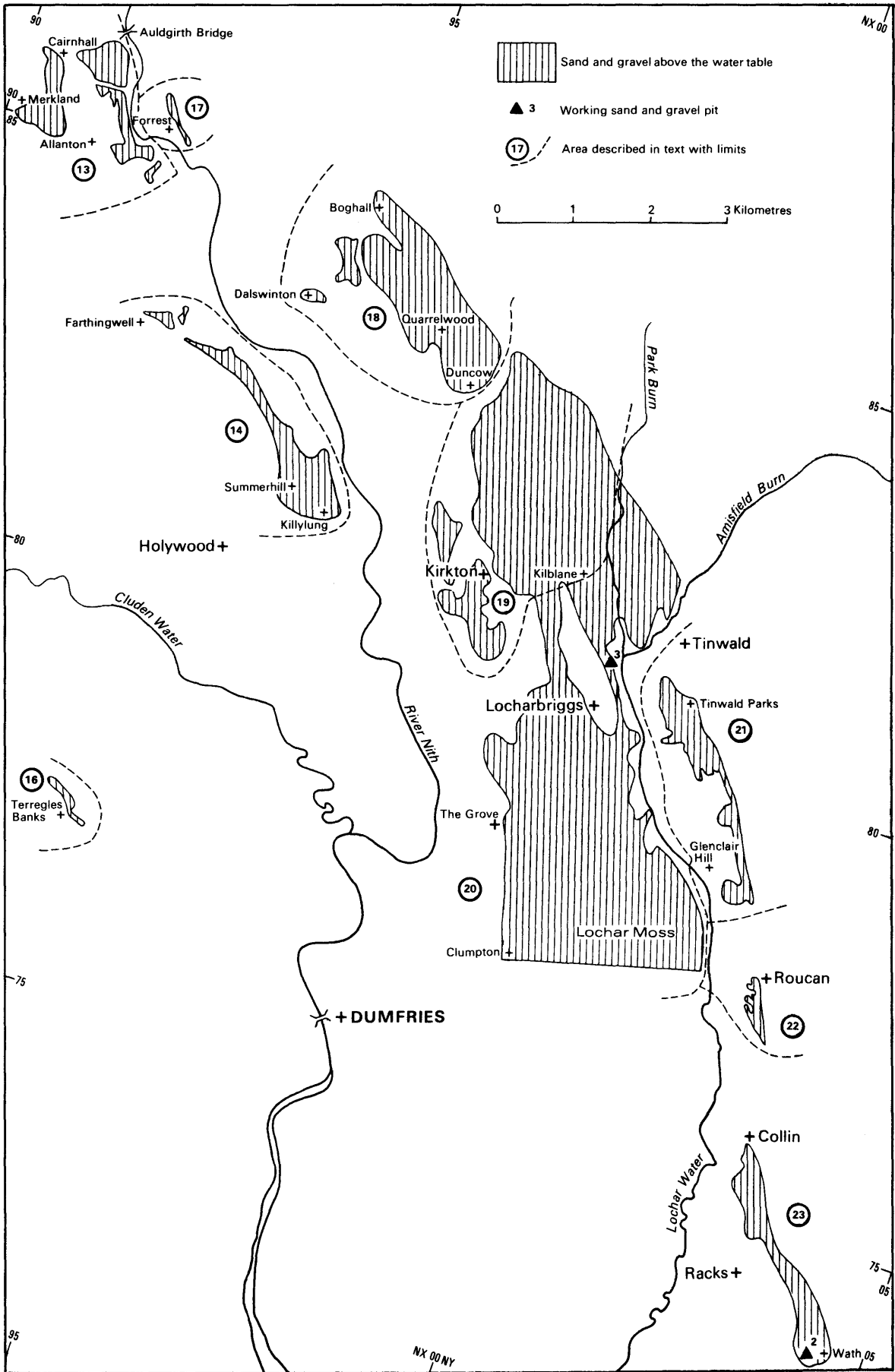


Figure 9. Nithsdale District: southern part

There are very few natural exposures in the area, but there is a working sand and gravel pit just north of Locharbriggs. The deposit consists of pebbles and cobbles of greywacke with a small proportion of red sandstone and various igneous rocks. Beds of fine silty sand occur at lower levels in the pit. The sand to gravel proportions were estimated to be about 30 per cent sand to 70 per cent gravel. The deposit is banked against the north-east side of the ridge of red sandstone and there are numerous angular blocks of red sandstone at lower levels in the pit.

South of Locharbriggs the area is mainly a low flat terrace at about 25 m OD in the north descending to about 15 m in the south where much of the ground is peat-covered.

The few natural exposures suggest that there is a greater proportion of finer material in the deposit than farther north. The exposures show fine, slightly clayey sand, with fine gravel. The pebbles are mainly of greywacke.

In the northern area, totalling 208 hectares, the deposits are estimated to contain about 12 million tonnes of sand and gravel. An area of about 331 hectares south of a line through The Grove is mainly concealed by Lochar Moss and there is insufficient information available to enable an estimate of quantities to be made.

The area as a whole is mainly farmland in the north and peat moss in the south; the Heathhall Industrial Estate occupies a considerable area north of the Moss. The main road (A701) crosses part of the deposit.

21. Tinwald

This area lies on the east side of the Lochar Water (Fig. 9) and extends from Tinwald Parks Farm [NY 005 808] south-eastwards to Glenclair Hill Farm [NY 014 789]. The deposit was formerly a terrace at a height of about 25 m OD and is now dissected into a series of mounds up to 6 m high. The remnants of the terrace are thickest in the south-west and thin out against a boulder clay slope to the north-east.

No exposures were seen in this deposit but it is assumed the material is similar to that described from the west side of the Lochar Water (20).

In an area of 80 hectares there is reckoned to be about 3.2 million tonnes of sand and gravel.

The ground is farmland with a minor road bounding the deposit on the north-east side.

22. Roucan

Between Roucan and Collin (Fig. 9) there are more patches of dissected terrace similar to that described above (21). The mounded remnants of the terrace are up to 5 m high. No exposures have been located. There is estimated to be about 0.48 million tonnes of sand and gravel in an area of 12 hectares.

23. Racks

From Collin south-east to Wath [NY 045 737] there is a flat terrace at a height of about 18 m OD (Fig. 9). The terrace deposit is thickest in the south and west and it thins to the north-east against a boulder clay slope. The maximum thickness seen was 5 m.

No natural exposures were seen but there is a disused sand pit near Collin, now used as a rubbish dump, and an active pit in the south at Wath. The disused pit shows up to 4 m of reddish sand and gravel with some layers of till. The sand to gravel proportions were estimated to be about 50 per cent sand to 50 per cent gravel. The pit at Wath exposes mainly reddish-brown

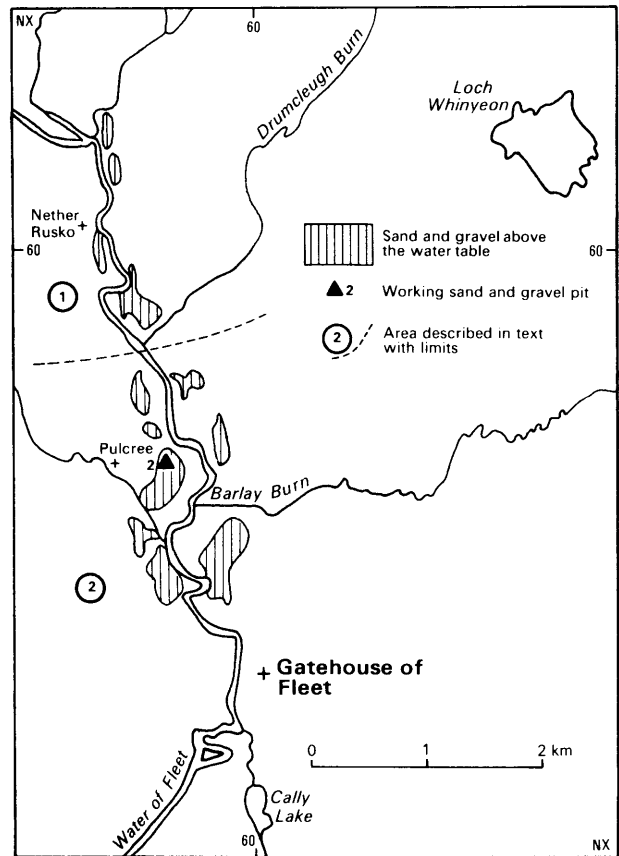


Figure 10. Stewartry District: Gatehouse of Fleet

sand, usually rather fine and silty. The sand is in irregular beds and lenses with some beds of dark reddish-brown silty clay. There are also layers of till and lenses of gravel. The gravel consists mainly of greywacke with about 20 per cent red sandstone and various igneous rocks. The sand to gravel proportions were estimated to be 95 per cent sand to 5 per cent gravel.

The area of the deposit is 64 hectares and there is reckoned to be about 2.6 million tonnes of sand and gravel.

The land is farmland and a minor road runs along the length of the deposit. The railway line limits the area to the south-west.

DEPOSITS BELOW THE WATER TABLE

Deposits in buried channels

Buried channels are pre-Glacial valleys which have been infilled with glacial deposits. The deposits vary widely in composition and are likely to include boulder clay, mud and silt, running sand, gravel and boulders and possibly peat near the surface.

Buried channels are known to occur in the Kirkconnel and Sanquhar area, but they are thought not to contain useful deposits of sand and gravel.

It is probable that there are very large deposits of sand and gravel below the alluvial flats of the River Nith from about Dalswinton [NX 943 841] downstream. There may also be large deposits below the alluvial flats of the Lochar Water from Locharbriggs southwards. Only two bores in the area give any indication of the nature of the deposits in these channels. One bore at Holywood [NX 944 808] north-west of Dumfries penetrated 17 m of superficial deposits, including sand

and gravel, before meeting solid rock, and another bore about 2 km east of Dumfries encountered solid rock at a depth of 44 m after passing through peat, boulder clay, sand and gravel. The information available is quite insufficient to make even the most tentative estimate of quantities.

Alluvial deposits

Freshwater alluvial deposits are known to occur in the beds of the rivers of the District and in riverside terraces. These deposits have not been investigated for this report and although there may be useful resources of gravel, the bulk of the material is likely to be too fine. Gravel has been taken from the River Nith at several places upstream from Dumfries.

Stewartry District

The solid rocks of the District are folded greywackes (hard grey sandstones) and splintery shales of Ordovician and Silurian age; they have been intruded by large granite masses in the Criffel-Dalbeattie area and to the south-west of New Galloway. A narrow outcrop of Carboniferous rocks, mainly sandstones, overlies the Silurian rocks along the coast between Kirkcudbright Bay and Auchencairn Bay.

During the Ice Age boulder clay was deposited over large areas of the District, but in many places rock knobs now stick up through the mantle of drift. When the ice melted large volumes of melt water drained southwards carrying great quantities of glacially eroded material. Most of the resources of sand and gravel in an area are to be found in the deposits of glacial melt waters, but in the case of the Stewartry District there was either very little original deposition or much of the original deposits have since been eroded away. Almost all the deposits occur in the valleys of the Water of Fleet, the River Dee and the Water of Urr.

The composition of the gravels corresponds to the more durable rock types occurring within the District. Greywacke is the predominant constituent, with minor amounts of igneous rocks, granite being especially prominent in the vicinity of the intrusions. The resistance of granite pebbles to weathering varies quite markedly. In most deposits the material is quite sound but in some cases the granite breaks down and becomes friable.

DEPOSITS ABOVE THE WATER TABLE

1. Nether Rusko

There are mounds of sand and gravel up to 8 m high on either side of the Water of Fleet near Nether Rusko [NX 585 601], 4 km north of Gatehouse of Fleet (Fig. 10). No pits have been excavated and natural exposure is poor but a section in a river bank shows medium and fine pale silty sand overlain by gravel. The gravel is composed mainly of greywacke pebbles with a small percentage of granite.

The total area occupied by the various deposits is 14 hectares and there is reckoned to be about 0.84 million tonnes of sand and gravel.

Some of the deposits included in this group are within an area designated as a Site of Special Scientific Interest.

2. Pulcree

A group of deposits near Pulcree [NX 588 582] about 2 km north of Gatehouse of Fleet are parts of a terrace

dissected by the Water of Fleet and its tributaries (Fig. 10). The deposits are up to 6 m thick with the maximum thickness of each deposit nearest the river. They tend to thin out against the sides of the valley.

The material is exposed in a sand pit where a bed of gravel about 2 m thick overlies pale-brown fine silty sand. The sand is well stratified with some small-scale cross-bedding and is up to 4 m thick. The sand to gravel proportions at this locality were estimated to be 90 per cent sand to 10 per cent gravel. The gravel consists of about 80 per cent greywacke pebbles and 20 per cent granite pebbles.

The total area of these deposits is 48 hectares and there is estimated to be about 1.9 million tonnes of sand and gravel.

3. Laurieston

Between Laurieston [NX 682 648] and Woodhall Loch (Fig. 11) there are a number of terrace and kamiform deposits of sand and gravel. They are generally on the west side of the valley which drains north to the loch. The deposits have a maximum thickness of 8 m. The natural exposures are very small but there is one working sand and gravel pit. The material consists of stratified sand and gravel with an estimated 70:30 sand to gravel ratio. There are beds of medium and fine pale-brown sand with layers of pebbly gravel. The pebbles are mainly of greywacke but granite and other igneous rocks make up a small percentage. In size they range from large pebbles down to coarse sand.

An exposure in a small deposit at Laurieston Hall [NX 676 657] showed about equal amounts of sand and gravel and the pebble content was estimated to be about 60 per cent greywacke and 40 per cent granite.

The deposits cover an area of about 19 hectares and total about 1.1 million tonnes of sand and gravel.

4. Bargatton

South of Laurieston (Fig. 11), west and south of Bargatton Farm [NX 689 632], an area with several individual deposits of sand and gravel includes esker-like ridges, groups of mounds and level terraces. The deposits occur up to 6 m thick.

Natural exposure is very poor but there is a small disused sand pit near Bargatton. The gravel consists almost entirely of greywacke pebbles with a very small proportion of granite. The size ranges from cobbles to small pebbles and grit. The sand is pale-brown fine to medium with silty bands.

The resources in this area are thought to amount to about 2.0 million tonnes in an area of 51 hectares.

The area is all farmland and part of the ground south of Bargatton has been designated a Site of Special Scientific Interest.

5. Ringford

On the west side of the Tarff Water (Fig. 11), opposite Ringford [NX 689 577], there is a terrace area with kettle holes, particularly at the north end. The terrace is cut in two by a dry valley which may at one time have been the course of the Tarff Water. The eastern part of the deposit is up to 8 m thick over most of its area but it thins to about 3 m at the southern end. The western part of the deposit is more moundy, generally thinner and reduces to a feather-edge down the west margin.

There are no pits in the deposit, nor are there any natural exposures. Indications in the ploughed land suggest that the deposit consists almost entirely of greywacke-gravel.

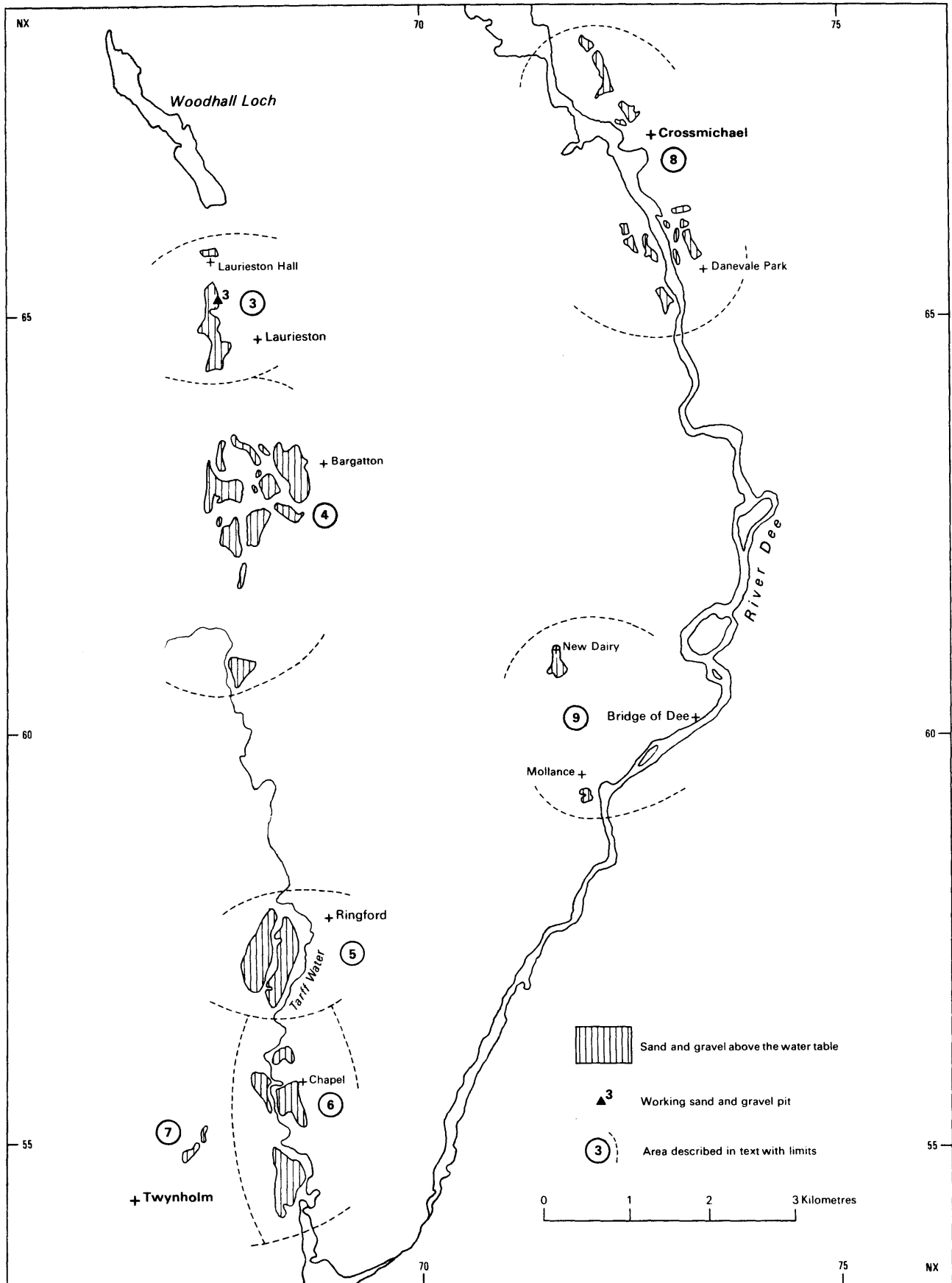


Figure 11. Stewartry District: Laurieston area, River Dee and Tarff Water

The combined area of both deposits is 31 hectares and it is estimated that there are resources of about 2.8 million tonnes of sand and gravel.

The area of the deposit is farmland.

6. *Chapel*

Remnants of high terrace on either side of the Tarff Water (Fig. 11), south of the A75 trunk road around Chapel Farm [NX 685 557], contain deposits up to 6 m thick which tend to thin out towards the sides of the valley. One or two natural exposures in the banks of the Tarff Water show mainly greywacke-gravel. Some shallow boreholes along the route of the re-aligned A75 trunk road recorded up to 6 m of sand and gravel made up of a bed of mixed sand and gravel overlying fine and medium-grained silty sand.

The total area of the deposits is 41 hectares and there is thought to be about 2.5 million tonnes of potential sand and gravel resources.

The area underlain by deposits is mainly farmland, but the re-aligned A75 cuts across the north part.

7. *Twynholm*

Two kames at Twynholm [NX 665 544] up to 8 m high appear to consist of fine greywacke-gravel (Fig. 11).

There is estimated to be about 0.24 million tonnes of sand and gravel in an area of 4 hectares.

The deposits occur between the old line of the A75 and the re-alignment; the ground is farmland.

8. *Crossmichael*

There are several small deposits in the vicinity of Crossmichael [NX 730 668] (Fig. 11). They are mainly on the east side of the River Dee between Danevale Park [NX 734 653] and Crossmichael with some small areas north of Crossmichael and on the west side of the river. The individual deposits are esker-like ridges and low mounded spreads resting on boulder clay and rock.

The only exposures are in two small disused pits, one of which, about 1.5 km north-west of Crossmichael, showed mainly small gravel and gritty sand. The pebble content of the gravel was estimated to be about 99 per cent greywacke with minor fractions of various igneous rocks.

In the other pit, about 0.5 km north-west of Crossmichael, a layer of clayey gravel about 0.5 m thick rests on stratified, cross-bedded sand and gravel. The deposit consists of beds of grey gritty sand with beds of fine greywacke-gravel and also layers of coarser gravel. Greywacke is the dominant constituent; other rock-types make up only a very small proportion of the gravel.

An estimated 0.8 million tonnes of sand and gravel occupy a total area of 20 hectares.

The deposits all occur on farmland. The A713 road crosses some of the mounds and part of the area has been designated as a Site of Special Scientific Interest.

9. *Bridge of Dee*

There are two small deposits of sand and gravel near Bridge of Dee (Fig. 11), at New Dairy [NX 717 609] and south of Mollance [NX 720 594].

The deposit at New Dairy, in which no exposures have been observed, consists of low mounds and ridges up to 3 m high.

South of Mollance a low mounded spread, possibly part of a degraded terrace, is probably not much more than 2 m thick. There are no exposures.

Some 0.2 million tonnes of material occupy a total area of 5 hectares.

10. *Castle Douglas*

About 1 km south of Castle Douglas (Fig. 12), east of Carlingwark Loch, low mounds of sand and gravel occur up to 3 m high. The deposit has been worked in the past and consists of gravel with layers of brown medium sand. The gravel consists almost entirely of greywacke pebbles.

The area of the deposit is 6 hectares and there is an estimated resource of 0.24 million tonnes of sand and gravel.

11. *Gelston*

Near Gelston [NX 770 586] a small low terrace with kettle holes is about 2 m high (Fig. 12). Although there are no exposures indications in the soil suggest that the deposit consists of greywacke-gravel. A tentative estimate indicates a quantity of about 0.12 million tonnes of material in an area of 4 hectares.

12. *Chapel Croft and Screele*

There are small patches of sand and gravel at Chapel Croft [NX 806 548] and Screele [NX 801 538] (Fig. 12).

A small pit in the deposit at Chapel Croft shows about 1.5 m of unsorted gravel overlying cross-bedded gravel. There are also beds of brown sand. The gravel is made up of pebbles of greywacke (about 70 per cent) and various rocks including granite (about 30 per cent). The deposit is mounded but may represent a remnant of an old terrace.

At Screele the deposit has also been worked but the pit is now partly filled and grassed over. Such exposure as can still be seen shows coarse, rather clayey gravel, mainly of greywacke with some granite. The deposit is a remnant of degraded terrace.

There is about 0.28 million tonnes of material in an area of 7 hectares.

13. *Kilquhanity*

On the east side of the Urr Water (Fig. 13) in the vicinity of Kilquhanity [NX 766 705] a group of mounds and ridges of sand and gravel extend from Walton Park [NX 763 709] in the north to Doon of Urr [NX 773 691] in the south. Most of the deposit lies between the Urr Water and the B794 road. The maximum thickness is estimated to be about 5 m. There are no pits and the exposure is poor. A small section north of Kilquhanity showed greywacke-gravel with pebbles, cobbles and boulders in a clayey-sand matrix.

It is thought that there is about 1.7 million tonnes of sand and gravel in an area of 28 hectares.

The area of the deposit is farmland and parkland.

14. *Haugh of Urr*

Between Haugh of Urr [NX 808 663] and Old Bridge of Urr [NX 776 677] there are a number of small sand and gravel deposits which consist of mounds, esker-like ridges and patches of degraded terrace (Fig. 13). None of the deposits is more than 3 m thick and there are no working pits. The contents of the deposits are not adequately exposed but what little evidence there is indicates gravel composed of greywacke pebbles and, rarely, cobbles.

The largest individual deposit lies south-east of King's Grange [NX 787 670].

The total area of sand and gravel is 21 hectares and

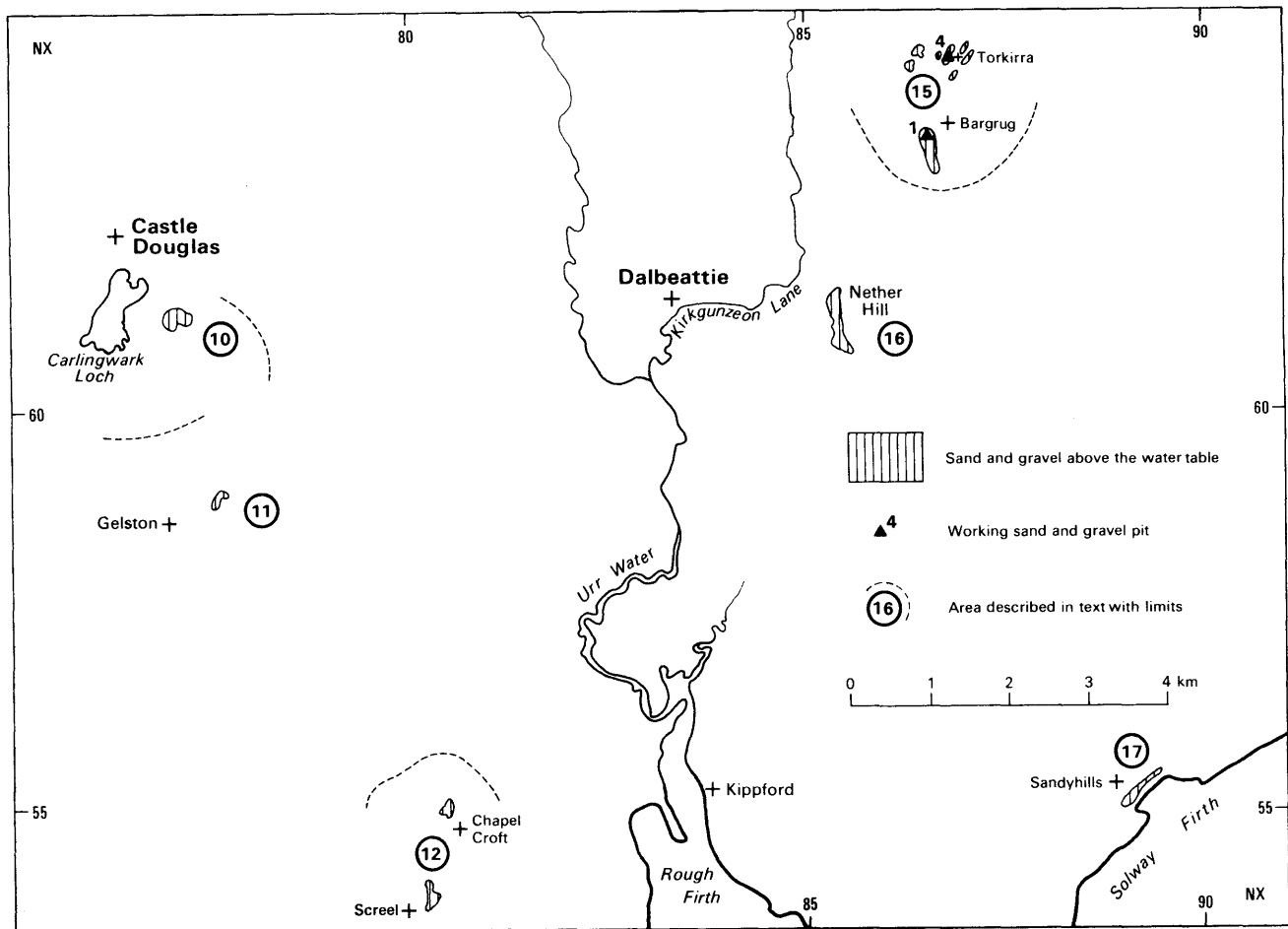


Figure 12. Stewarty District: Castle Douglas and Dalbeattie area

the resources are calculated to amount to about 0.84 million tonnes.

15. Torkirra and Bargrug

About 4 km north-east of Dalbeattie (Fig. 12), near Torkirra [NX 869 644] and Bargrug [NX 867 635] farms, there are several small mounds of sand and gravel which are up to 4 m high.

Two small pits have been opened up and worked intermittently, one at Torkirra and the other at Bargrug. The deposit consists of stratified sand and gravel with some cross-bedding, contorted in places. The gravel content is mainly granite with about 10 per cent greywacke set in a sandy gritty matrix. The size of the gravel ranges from boulders downwards. The matrix is slightly cemented in places.

There is estimated to be about 0.6 million tonnes of sand and gravel in a total area of 15 hectares.

16. Nether Hill

A deposit of sand and gravel on the west side of Nether Hill [NX 855 615], 2 km east of Dalbeattie (Fig. 12) may be a remnant of an old terrace. There are two pits in the deposit which may still be worked intermittently for private use. The material is bedded sand and gravel, ill-sorted gravel and hillwash overlying boulder clay. The gravel consists of granite and greywacke pebbles in roughly equal proportions with some large granite boulders in a gritty clayey matrix. There are some beds of fine silty sand.

The area of the deposit is 7 hectares and there is an estimated resource of about 0.42 million tonnes of sand and gravel.

Part of the area of the deposit is afforested.

17. Sandyhills

Fine blown sand has been deposited behind the foreshore at Sandyhills Bay (Fig. 12), 8 km south-east of Dalbeattie. It occupies an arcuate area of about 5 hectares and is up to 3 m thick. The sand tends to be fine and gravel is unlikely to be present. The amount of sand in the deposit is estimated to be about 0.2 million tonnes.

DEPOSITS BELOW THE WATER TABLE

Freshwater alluvial deposits are known to occur in the beds of the rivers of the District and riverside terraces. These deposits have not been investigated for this report and although there may be useful resources of gravel present, much of the material is likely to be too fine.

There is no information on drift-filled buried channels in the District.

Wigtown District

The oldest rocks of the District are Ordovician and Silurian greywackes (hard grey muddy sandstones) and splintery shales which are folded and steeply inclined.

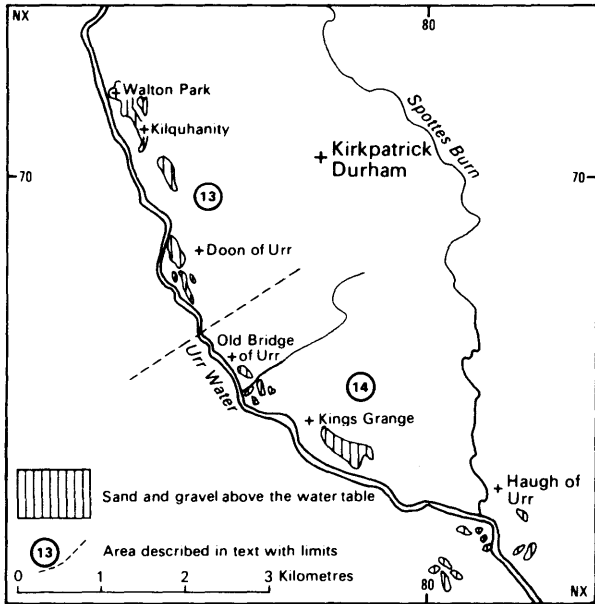


Figure 13. Stewartry District: Urr Water

Large granite intrusions occur to the north and east of Newton Stewart. The greywackes and shales in the area between Loch Ryan and Luce Bay are overlain by sandstones and mudstones of Carboniferous and Permian age.

The Pleistocene glaciation resulted in the deposition of boulder clay over most of the District. When the ice melted large volumes of melt water drained seawards carrying quantities of glacially eroded material. The deposits of the glacial melt waters are normally the main sources of sand and gravel in an area. The largest area of such deposits occurs in the Stranraer area and much smaller quantities are found in the valleys of the Water of Luce and the rivers Bladnoch and Cree.

The composition of the gravels corresponds to the more durable of the rock types occurring within the District. In Wigtown District by far the largest proportion of the gravels are composed of greywacke pebbles, with granite pebbles occurring more commonly in the vicinity of the major granite intrusions.

Raised-beach deposits in The Machars and especially in The Rhinns were not surveyed because the quantities involved were thought to be relatively insignificant in relation to the amounts available between Loch Ryan and Luce Bay.

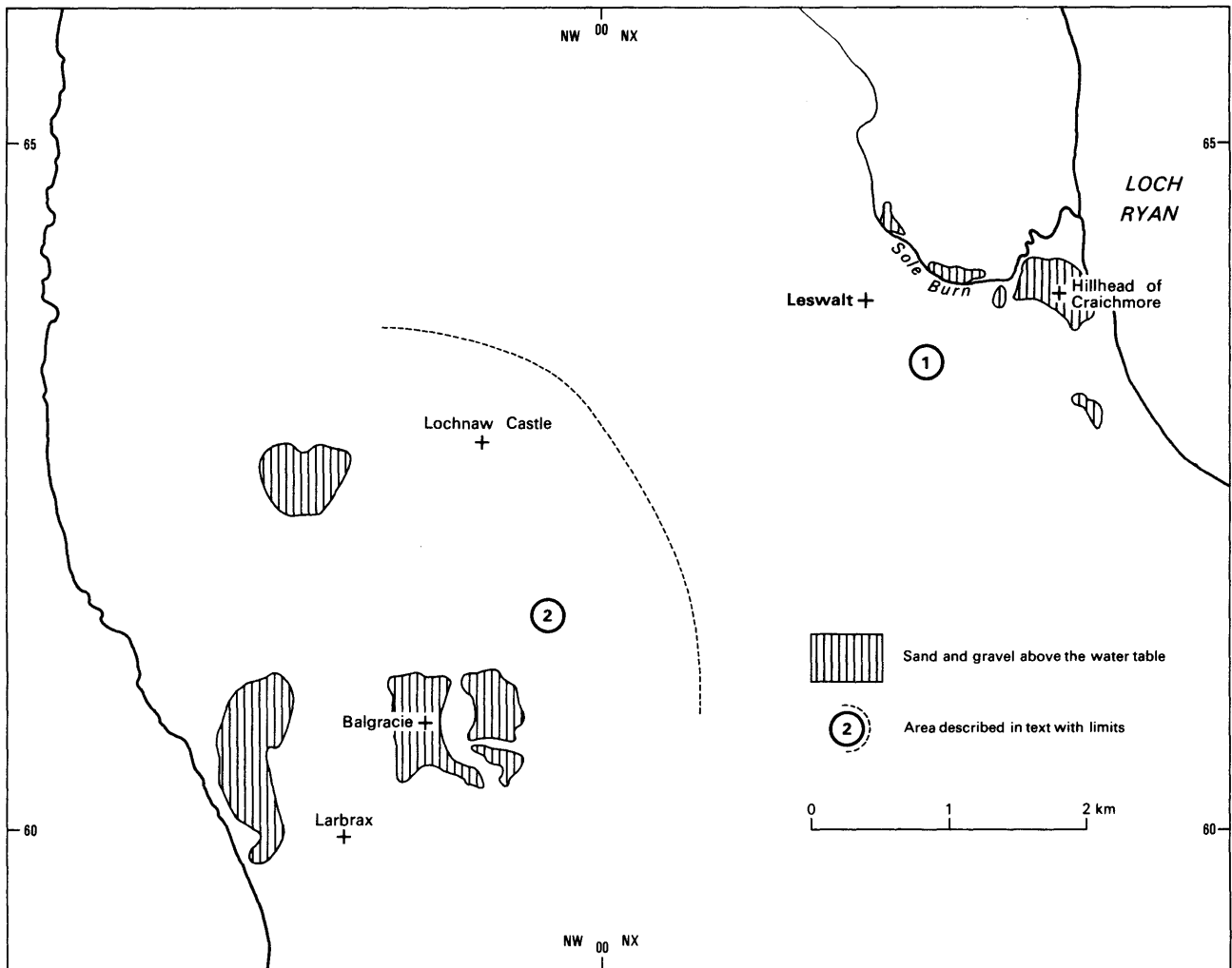


Figure 14. Wigtown District: The Rhinns

DEPOSITS ABOVE THE WATER TABLE

1. *Leswalt*

On either side of the Sole Burn (Fig. 14) near Leswalt [NX 020 639] there are remnant patches of a terrace deposit of sand and gravel. The thickest parts of the deposit occur nearest the burn and thin out north and south against the sides of the valley. The largest area of sand and gravel is around the farm of Hillhead of Craichmore [NX 033 634] and it is estimated to be up to 8 m thick at the seaward side. Natural exposure is almost non-existent and there are no pits in the deposit, which appears to consist of stratified sand and gravel with greywacke pebbles forming the largest constituent of the gravel.

The total area is 27 hectares and there is reckoned to be about 1.6 million tonnes of sand and gravel in the deposits.

2. *Larbrax*

In an area between Larbrax Farm [NW 981 600] and Lochnaw Castle [NW 991 628] there are several patches of a degraded terrace or terraces built up of sand and gravel (Fig. 14). They are assumed to be fluvio-glacial terraces and range in height from about 70 m OD to over 90 m OD. The northernmost deposit is a low mounded area with a thin peat cover. From the very poor exposure the material appears to consist mainly of reddish-brown medium sand. It is unlikely that the average thickness over the area exceeds about 2 m.

In an area around Balgracie [NW 987 608] there are mounds up to 6 m high, all with tops at about the same level. West of the farm the deposit forms an irregular terrace which is thickest on the west side. There are currently a borrow pit working and two small disused pits in the area. The material consists of stratified sand and gravel with the proportions of sand and gravel estimated to be about 50 per cent sand to 50 per cent gravel. The gravel consists of pebbles and a few cobbles of greywacke with about 10 per cent of other rock types including various igneous rocks, sandstone, vein quartz and, rarely, highland schists. The sand is medium and fine-grained and there are beds of silty clay in the working pit. The maximum thickness, which occurs in the north-west, is about 15 m.

To the west and north-west of Larbrax a north-south ridge consists of sand and gravel overlying boulder clay. The top of the ridge is gently mounded but flattish in places and generally at a consistent level. The deposit is poorly exposed and is not worked at all. The exposures show fine silty sand and weakly cemented pebble-gravel in a sandy matrix. There are also beds of silty clay. Some red boulder clay appears to underlie the clay-bound gravel, in some places at least. The boulder clay, which is up to 4 m thick, is in turn overlain by a thin spread of blown sand. The deposit is up to 15 m thick in the south and thins out northwards.

In the combined area, totalling 126 hectares, it is estimated that there is about 8.8 million tonnes of sand and gravel.

The ground is farmland and moorland and is crossed by minor roads. The coastal exposures of rock have been designated as a Site of Special Scientific Interest by the Nature Conservancy.

3. *Stranraer area*

In the isthmus between Loch Ryan and Luce Bay (Fig. 15) there are very large deposits of sand and gravel. Almost the whole area from Stranraer to Sandhead [NX

097 500] in the west and from Innermessan [NX 087 632] to Dunragit [NX 153 574] in the east is underlain by material described on the one-inch geological map as raised-beach deposits. The land is up to 45 m OD around Lochinch Castle [NX 107 619] but most of the ground is below 30 m OD. The higher ground around Lochinch Castle is rather mounded but elsewhere the topography is relatively flat.

Deposits other than those of the raised beach occur in the area. The underlying boulder clay protrudes through the sand and gravel as ridges and mounds mainly in the vicinity of Lochans [NX 067 568], and in the south in a coastal strip beside Luce Bay there is an extensive area of blown sand overlying the raised-beach deposits. In the mounded ground around Lochinch Castle the sand and gravel is better classified as kamiform fluvio-glacial deposits rather than raised beach.

Exposures in a pit near Aird Farm [NX 095 601] about 3 km east-south-east of Stranraer show well stratified beds mainly of gravel in a sandy matrix with thin beds of medium to fine sand. The proportions of sand and gravel are probably very variable within the area but at this locality they were estimated to be about 60 per cent sand to 40 per cent gravel. The constituents of the gravel are pebbles mainly of greywacke but with about 10 per cent of vein quartz, sandstone, and various igneous rocks including granite.

In a disused sand pit near Sandhead stratified sand and gravel can be seen. The sand is mainly rather fine brown sand and the gravel consists of small pebbles of greywacke. Most of the face at this pit is now obscured but a borehole close by recorded sand and gravel down to rock-head at a depth of 17 m, which is about 9.5 m below OD. The material penetrated in the hole varied from coarse gravel to fine sand.

Borings at West Freugh [NX 108 545] found rock-head at 42 m. The top 10 m of the superficial deposits consists of sand and gravelly sand, but below that much of the material is silty and clayey. At Dunragit there is about 9 m of gravel overlying boulder clay. Further north near Inch Parks Farm [NX 095 620] a bore passed through 39 m of unconsolidated material most of which was sand.

In the coastal strip north of Sandhead there are two working pits in the raised-beach deposits and the overlying dune sand. The raised-beach material consists of flat-bedded gravel in a medium sand matrix with beds of medium sand. The pebbles of the gravel almost all consist of greywacke with a very small proportion of vein quartz and various igneous rocks including granite. The proportions of sand and gravel were estimated to be about 50 per cent sand to 50 per cent gravel. The overlying blown sand is medium to fine-grained without pebbles.

To make a quantitative estimate of this area is almost impossible. The base of the deposit is not seen and its configuration is not known, but there are indications that it is mounded. The few boreholes which pass through the deposit are totally inadequate. The total area involved is about 56 km², but to estimate an average thickness over such a large area is beyond the scope of this report.

The area is crossed by several main roads and a railway line. A large part of the area in the south is occupied by the airfield and range at RAE West Freugh. The rest of the ground is rich farmland with a little forestry around Dunragit. Torrs Warren and White Loch at Lochinch Castle have been designated as Sites

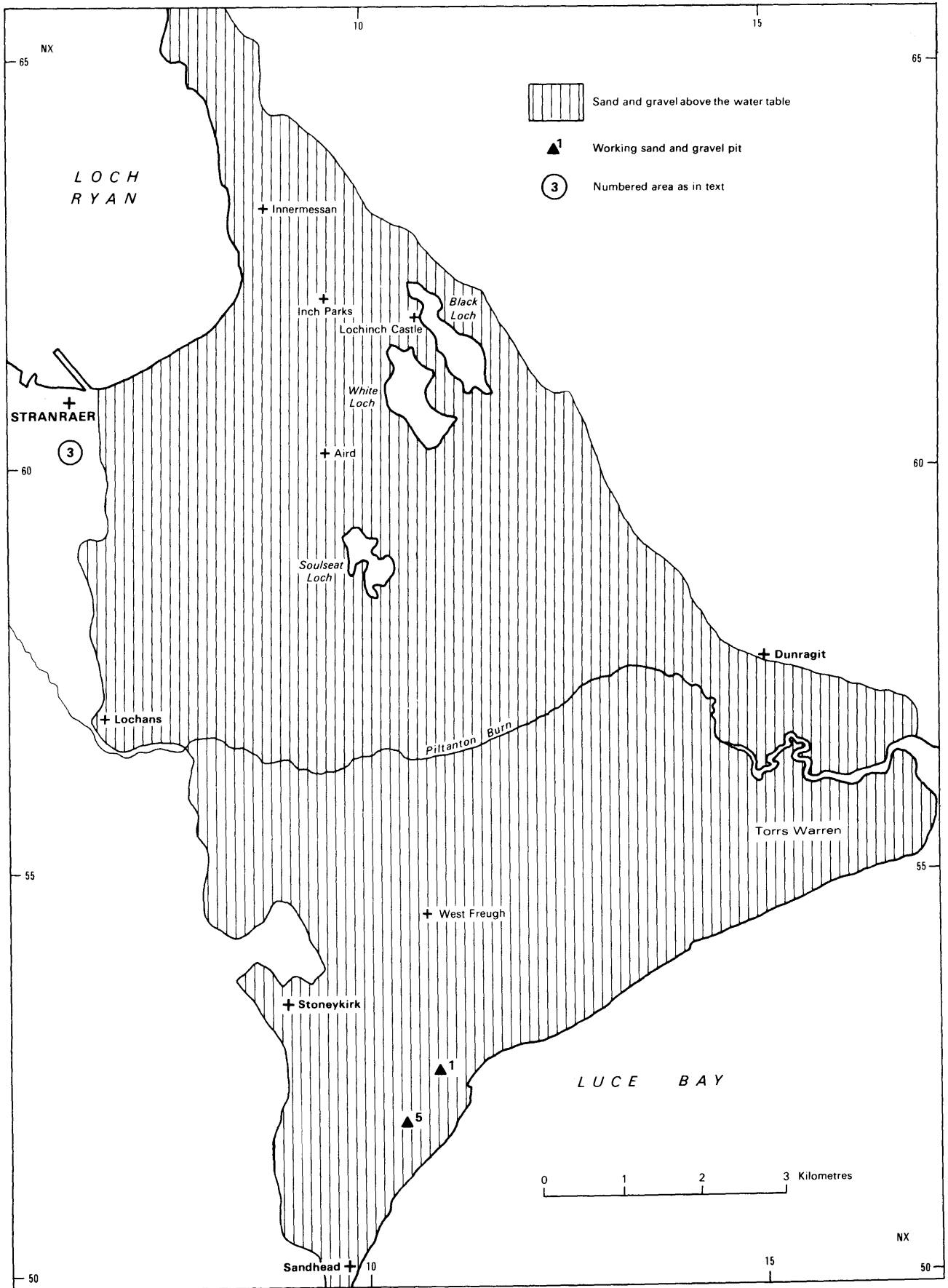


Figure 15. Wigtown District: Stranraer, Sandhead and Dunragit area

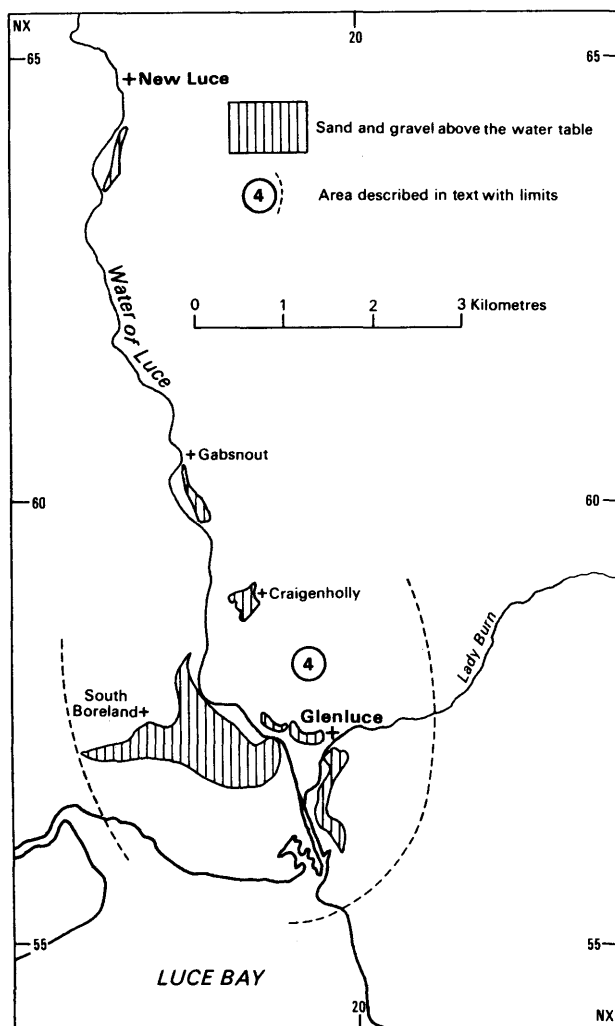


Figure 16. Wigtown District: Glenluce

of Special Scientific Interest by the Nature Conservancy Council.

4. Glenluce

Some sand and gravel deposits occur on either side of the Water of Luce (Fig. 16) between New Luce [NX 174 648] and the sea.

About 0.5 km south of New Luce a narrow strip of sand and gravel occupies an area of about 5 hectares on the east side of the river. It consists of greywacke-gravel up to 6 m thick at the western margin and thins out eastwards against the valley side. A minor road crosses the deposit. Near Gabsnout [NS 181 606], 4 km south of New Luce, a similar deposit consists of pebbles and cobbles of greywacke in the form of a narrow strip of degraded terrace on the east side of the river in an area of 5 hectares. A minor road limits the deposit on the east side. The maximum thickness is about 8 m.

At Craigenholly [NX 188 590], 2 km north-west of Glenluce a patch of sand and gravel is partially exposed in an old gravel pit. The deposit is a degraded remnant of a terrace on the east side of the Water of Luce. It is composed of pebbles and cobbles of greywacke but no sand was noted. A maximum thickness of about 6 m was recorded from the west margin of the deposit which thins out eastwards. The area involved is about 6 hectares.

At Glenluce a considerable area of sand and gravel has been dissected into three parts by the Water of Luce and the Lady Burn. It consists of a terrace of sand and gravel which has been deposited where the valley of the Water of Luce opens out. The terrace merges into a mounded area in the west, to the south of South Boreland Farm [NX 176 576]. In the south-west the deposit has been modified by marine action and passes into areas mapped as raised beach.

In the west, near South Boreland a small pit shows stratified, cross-bedded sand and gravel. The gravel is composed of pebbles and cobbles of greywacke with a very small percentage of vein quartz, granite and red sandstone, set in a matrix of medium sand. In a river-bank exposure to the east of South Boreland, 1 to 3 m of greywacke-gravel overlies at least 3 m of laminated silty clay. The extent of this bed of silty clay within the sand and gravel is not known. Sand and gravel similar to that seen near South Boreland is exposed in a steep bank to the south of Glenluce. It is estimated that about 13.7 million tonnes of sand and gravel occur in 152 hectares in the Glenluce area, most of it lying south and east of South Boreland.

The land is part forestry part agricultural land and it is limited to the south by the main road (A75).

5. Shennanton

Some small patches of sand and gravel lie on either side of the River Bladnoch (Fig. 17) north of Shennanton [NX 343 633]. On the west side the sand and gravel occurs as several low mounds of greywacke gravel with some very large boulders of granite. On the east side of the river there is a group of mounds up to 10 m high. The material is very poorly exposed but appears to consist mainly of greywacke-gravel with a very small percentage of vein quartz, granite and other igneous rocks. The gravel contains a proportion of boulders and cobbles.

Of about 1.2 million tonnes of sand and gravel in an area of 20 hectares the best material is on the east side of the river where access is poor. There is an area of peat between it and the main road (A75).

6. Penninghame

Several patches of sand and gravel on either side of the River Cree (Fig. 17) near Penninghame House [NX 384 698], north of Newton Stewart, are mostly small mounds and ridges up to 4 m high, mainly of greywacke-gravel, but larger deposits occur near Challoch Farm [NX 384 669]. To the east of the farm there is a mounded ridge up to 10 m high in which there is a sand-and-gravel pit. The material consists of cross-stratified gravel with thin bands of gritty sand. The gravel is composed almost entirely of pebbles of greywacke.

About 1 km east of Challoch, on the south side of the river, a patch of sand and gravel is the remnant of a degraded fluvio-glacial terrace. The material rests of rock and boulder clay and is up to 5 m thick along the northern edge. It thins to a feather-edge southwards. Small exposures in the river bank show gravel composed of greywacke pebbles.

In a total area of 38 hectares there is estimated to be about 1.9 million tonnes of sand and gravel.

7. Barbuchany

A few small ridge-and-mound deposits of sand and gravel overlie the boulder clay around Barbuchany

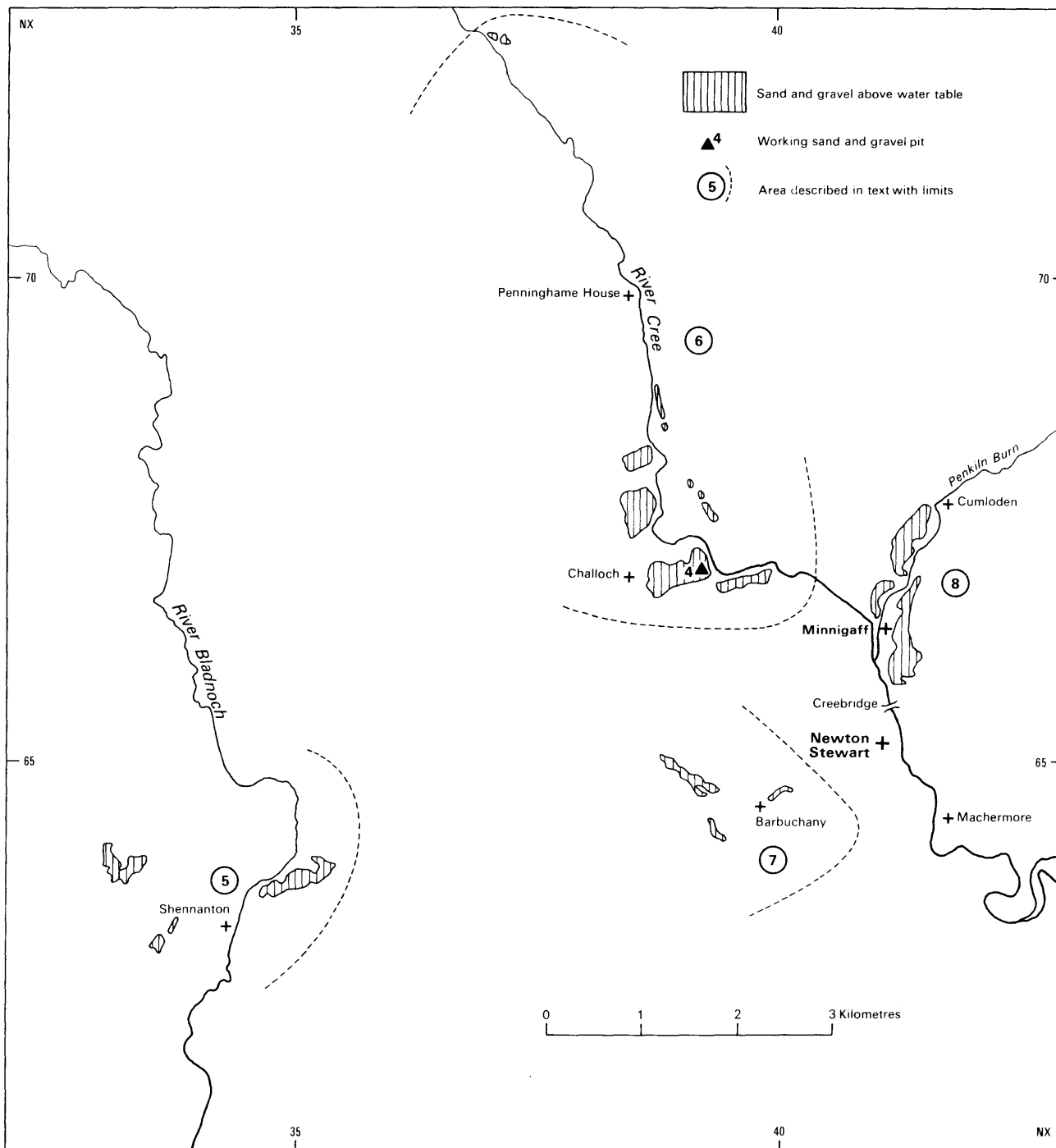


Figure 17. Wigtown District: Newton Stewart and Shennanton area

Farm [NX 398 645] (Fig. 17). The biggest of these deposits is a ridge up to 5 m high trending north-west to south-east. There are no good exposures but a few scrapes show pebble-gravel composed of greywacke.

In an area of 5 hectares there is reckoned to be about 0.2 million tonnes.

8. Minnigaff

From Creebridge north to Cumloden [NX 412 677] sand and gravel deposits on either side of the Penkiln Burn (Fig. 17) are the remnants of a dissected fluvioglacial terrace. The material is thickest in the south at the side nearest to the burn and thins out against the valley

sides. Between Creebridge and Minnigaff there is a kettle hole known as the 'Punch Bowl', one of two with that name in the area.

The material, exposed in several small bank exposures, consists of ill-sorted clayey gritty gravel, weakly cemented in places, and containing beds of brown rather clayey sand. There appears to be more gravel than sand although no estimates could be made. The gravel is composed of pebbles and cobbles of greywacke with a very small proportion of granite and other igneous rock types. The granite pebbles are commonly decomposed.

Some bores at the site of the Penkiln Bridge showed up to 8 m of sand and gravel.

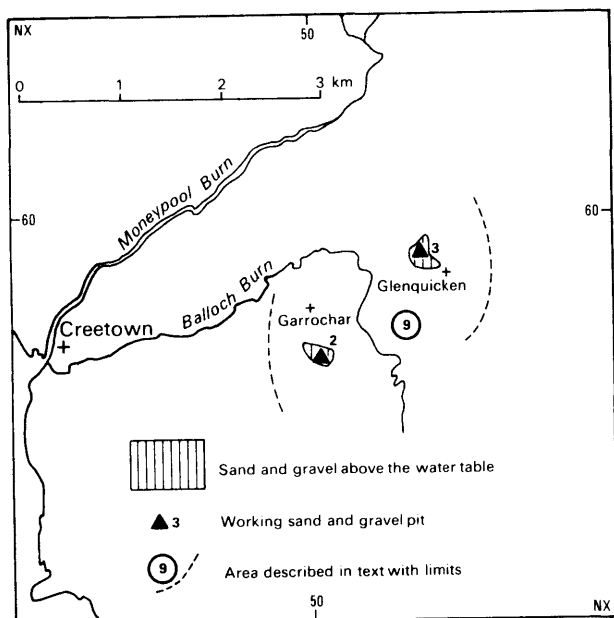


Figure 18. Wigtown District: Creetown area

In an area of 32 hectares there is estimated to be about 1.6 million tonnes of sand and gravel.

The raised-beach deposits south of the A75 around Machermore [NX 418 644] may offer considerable resources of sand and gravel but they have not been estimated due to lack of information.

Near Machermore, in a terrace deposit a kettle hole at least 10 m deep is quite dry; this may indicate the presence of sand and gravel not less than 10 m thick. However, this thickness is not consistent throughout the area of the terrace because solid rock and mounds of

boulder clay project above the general level of the terrace in several places.

9. Garrochar and Glenquicken

East of Creetown (Fig. 18) near Garrochar [NX 500 591] and Glenquicken farms [NX 513 594] there are sand and gravel deposits. At Garrochar the deposit is mounded and banked against the slope of the hill. The material has been worked, but the pit was disused in the summer of 1976. Beds of medium and fine sand, and silt occur interbedded with gravel composed of pebbles and cobbles of greywacke and granite. The proportions of sand and gravel were estimated to be about 50 per cent sand to 50 per cent gravel.

The sand and gravel at Glenquicken consists of low kames up to a maximum of 5 m high. Pale-brown medium and fine-grained sand occur with layers and irregular patches of gravel. The gravel is made up of pebbles and cobbles of greywacke and granite (approximately 60 per cent greywacke to 40 per cent granite). The sand and gravel proportions were estimated to be 70 per cent sand to 30 per cent gravel.

It is estimated that about 0.72 million tonnes of sand and gravel occupy an area totalling 12 hectares.

DEPOSITS BELOW THE WATER TABLE

Parts of the deposits described above in the Stranraer, Glenluce and Minnigaff areas may well extend below the water table, but the available information is insufficient to enable estimates to be made.

There are no known buried channels in the District.

Alluvial deposits

Freshwater alluvial deposits occur in the beds of the rivers of the District and in riverside terraces. These deposits have not been investigated for this report and although there may be useful resources of gravel, much of the material is likely to be too fine.

Table 1. Estimated resources above the water table

	Area	Thickness		Quantity	Remarks	
		Av.	Max.			
	ha	m	m	Million tonnes		
ANNANDALE AND ESKDALE DISTRICT						
1	Hunterheck	26	2	6	1.0	
2	Beattock	93	3.5	6	6.5	
3	Craigbeck	19	2	8	0.76	
4	Upper Murthat	30	3	6	1.8	
5	Poldean	6	3	6	0.36	
6	Stenrieshill	11	3	8	0.66	
7	Orchard	7	2	6	0.28	
8	Gateside and Girthhead	60	2.5	8	3.0	
9	Johnstonebridge	13	3	8	0.78	
10	Courance	10	2.5	10	0.5	
11	Lochmaben	30	2	8	1.2	
12	Dalton	55	3	10	3.3	
13	Springfield	14	3	6	0.84	
14	Dunnabie	2	2	4	0.08	
15	Waterbeck	4	2	7	0.16	
16	Solway Bank	10	2	6	0.4	
17	Barnglieshead	21	4	12	1.7	
18	Ryehills, Tarcoon, Mossknowe	8	3	12	0.48	
19	Hagg	2	2	5	0.08	
20	Claygate	3	3	8	0.18	
NITHSDALE DISTRICT						
1	Kirkconnel and Sanquhar	13.5	2	4	0.54	
2	Durisdeer	8.5	2	4	0.34	
3	Drumlanrig	10	3	10	0.6	
4	Carronbridge	3.5	3	5	0.21	
5	Burnhead	4.5	2	4	0.18	
6	Templand Mains	1	1.5	3	0.03	
7	Closeburn Mains	13	2	5	0.52	
8	Shawsholm	34	3	15	2.0	
9	Auldgirith	27	5	15	2.7	
10	Cairn Water	8	2	5	0.32	
11	Huntfield	70	2	6	2.8	
12	Speddoch	8	2	6	0.32	
13	Allanton	96	3	10	5.7	
14	Killylung	76	3	8	4.6	
15	Newtonairds	32	2	6	1.3	
16	Terregles	2	2	4	0.08	
17	Forrest	6	2	5	0.24	
18	Quarrelwood	196	3	8	12	
19	Kirkton	387	2.5	10	19	
20	Locharbriggs	208	3	10	12	
		331	?	?	?	Southern part
21	Tinwald	80	2	6	3.2	
22	Roucan	12	2	5	0.48	
23	Racks	64	2	5	2.6	
STEWARTRY DISTRICT						
1	Nether Rusko	14	3	8	0.84	
2	Pulcree	48	2	6	1.9	
3	Laurieston	19	3	8	1.1	
4	Bargatton	51	2	6	2.0	
5	Ringford	31	4.5	8	2.8	
6	Chapel	41	3	6	2.5	
7	Twynholm	4	3	8	0.24	
8	Crossmichael	20	2	4	0.8	
9	Bridge of Dee	5	2	3	0.2	
10	Castle Douglas	6	2	3	0.24	
11	Gelston	4	1.5	2	0.12	
12	Chapel Croft and Screele	7	2	4	0.28	
13	Kilquhanity	28	3	5	1.7	
14	Haugh of Urr	21	2	3	0.84	
15	Torkirra and Bargrug	15	2	4	0.6	
16	Nether Hill	7	3	4	0.42	
17	Sandyhills	5	2	3	0.2	Blown sand
WIGTOWN DISTRICT						
1	Leswalt	27	3	8	1.6	
2	Larbrax	126	3.5	15	8.8	
3	Stranraer	5600	?	?	≈500+	Fluvioglacial and raised-beach and blown sand
4	Glenluce	152	4.5	14	13.7	
5	Shennanton	20	3	10	1.2	
6	Penninghame	38	2.5	10	1.9	
7	Barbuchany	5	2	5	0.2	
8	Minnigaff	32	2.5	8	1.6	
9	Garrochar and Glenquicken	12	4		0.72	

Appendix: Pits in operation in spring 1976

ANNANDALE AND ESKDALE DISTRICT

1. Grange [NY 112 745], Dalton
1-inch Sheet 10; 6-inch Sheet NY 17 SW
Owner: James Crombie and Son (Annan) Ltd,
Carrutherstown, Dumfriesshire DG1 4LE
Preparation: crushing, screening, grading
Uses: sand and gravel for concrete, sand for building
Markets: local.
2. Isle [NY 119 732], Dalton
1-inch Sheet 10; 6-inch Sheet NY 17 SW
Owner: Hoddam Contracting Co., The Grapes, High Street,
Ecclefechan, Dumfriesshire DG11 3DF
Preparation: crushing, screening, grading
Uses: sand for building, sand and gravel for concrete
Markets: local.

NITHSDALE DISTRICT

1. Auldgirth [NX 902 884], Closeburn
1-inch Sheet 9; 6-inch Sheet NX 98 NW
Owner: Auldgirth Sand and Gravel, The Beeches, Stepford
Road, Dunscore, Dumfriesshire
Preparation: screening
Uses: sand for building and asphalt, sand and gravel for
concrete, fill
Markets: local.
2. Drummuir [NY 045 735], near Collin
1-inch Sheet 10; 6-inch Sheet NY 07 SW
Owner: J. and J. Currie Ltd, Dargavel Stores, Lockerbie Road,
Dumfries DG1 3
Preparation: screening
Uses: building sand, fill
Markets: local.
3. Locharbriggs [NX 994 809]
1-inch Sheet 10; 6-inch Sheet NX 98 SE
Owner: Baird and Stevenson (Quarrymasters) Ltd,
Locharbriggs Quarry, Locharbriggs, Dumfries DG1 1QT
Preparation: screening, grading, crushing, washing
Uses: concrete
Markets: local.

STEWARTRY DISTRICT

1. Bargrug [NX 865 634], Kirkgunzeon
1-inch Sheet 5; 6-inch Sheet NX 86 SE
Owner: J. Hood, Newhouse, Beeswing, Dumfries DG2 8JF
Preparation: none
Uses: building sand, fill
Markets: local.

2. Gatehouse [NX 592 583], Gatehouse of Fleet
1-inch Sheet 5; 6-inch Sheet NX 55 NE
Owner: J. Fitzpatrick and Sons, 17 Catherine Street,
Gatehouse of Fleet, Castle Douglas, Kirkcudbrightshire
DG7 2JD
Preparation: none
Uses: building sand
Markets: local.
3. Retreat [NX 676 653], Laurieston
1-inch Sheet 5; 6-inch Sheet NX 66 NE
Owner: J. Fitzpatrick and Sons, 17 Catherine Street,
Gatehouse of Fleet, Castle Douglas, Kirkcudbrightshire
DG7 2JD
Preparation: screening, grading, washing
Uses: concrete, building sand, fill
Markets: local.
4. Torkirra [NX 868 643], Kirkgunzeon
1-inch Sheet 5; 6-inch Sheet NX 86 SE
Owner: J. Hood, Newhouse, Beeswing, Dumfries DG2 8JF
Preparation: none
Uses: building sand, fill
Markets: local.

WIGTOWN DISTRICT

1. Clayshant [NX 110 524], Sandhead
1-inch Sheet 3; 6-inch Sheet NX 15 SW
Owner: Andrew Slavin, Clayshant, Stoneykirk, Stranraer
Preparation: screening, grading, crushing, washing
Uses: sand and gravel for concrete, building sand
Markets: local.
2. Garrochar [NX 500 586], Creetown
1-inch Sheet 4; 6-inch Sheet NX 55 NW
Owner: W. J. Barr and Sons, Heathfield Road, Ayr
Preparation: none
Uses: sand and gravel for concrete, building sand, fill
Markets: local.
3. Glenquicken [NX 512 596], Creetown
1-inch Sheet 4; 6-inch Sheet NX 55 NW
Owner: W. J. Barr and Sons, Heathfield Road, Ayr
Preparation: screening, grading, washing
Uses: sand for building, sand and gravel for concrete
Markets: local.
4. Linloskin [NX 392 671], Newton Stewart
1-inch Sheet 4; 6-inch Sheet NX 36 NE
Owner: Eric Hyslop, 16 Princes Street, Newton Stewart
Preparation: none
Uses: sand for building, sand and gravel for concrete, fill
Markets: local.
5. Sandmill [NX 105 516], Sandhead
1-inch Sheet 3; 6-inch Sheet NX 15 SW
Owner: John Bell, Sandmill Farm, Stoneykirk, Stranraer
Preparation: screening
Uses: sand for building, sand and gravel for concrete, fill
Markets: local.

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