Historic England

Merseyside

Building Stones of England

The Building Stones of England

England's rich architectural heritage owes much to the great variety of stones used in buildings and other structures. The building stones commonly reflect the local geology, imparting local distinctiveness to historic towns, villages and rural landscapes.

Historic England and the British Geological Survey (BGS), working with local geologists and historic buildings experts, have compiled the Building Stones Database for England to identify important building stones, where they came from and potential alternative sources for repairs and new construction.

Drawing on this research, plus BGS publications and fieldwork, guides like this one have been produced for each English county. The guides are aimed at mineral planners, building conservation advisers, architects and surveyors, and those assessing townscapes and countryside character. The guides will also be of interest if you want to find out more about local buildings, natural history, and landscapes.

This guide is based on original research and text by Mark Fletcher and Chantal Johnson (Matrix Archaeology Ltd).

First published by English Heritage May 2012 and republished by Historic England in 2017. This edition published by Historic England May 2023.

Please refer to this guide as:

Historic England 2023 *Merseyside. Building Stones of England*. Swindon. Historic England.

HistoricEngland.org.uk/advice/technical-advice/

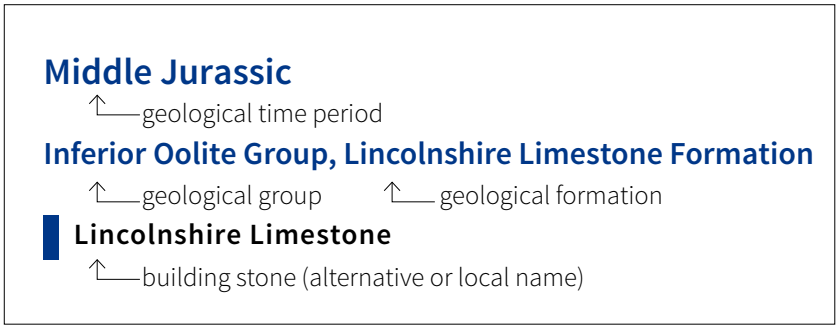
Front cover: Castle Moat House, Liverpool. Storeton Stone. © Mark Fletcher.

How to Use this Guide

Each guide describes the local building stones in their geological timescale order, starting with the oldest layers through to the youngest. The guide ends with examples of other notable building stones from other parts of England and further afield.

Geological time periods, groups, formations and building stones

Each building stone is listed under the relevant geological timescale, group and formation. A formation may be divided into members and where relevant these are referenced in individual building stone sections.



Bedrock geology map and stratigraphic table

To help you with the geology of the area, there is a bedrock geology map and a stratigraphic table which shows the layers of rocks and the associated building stones in this geological timescale, group, formation order.

Page numbers for each building stone are included in the stratigraphic table for ease of reference. The page numbers are inverted to correspond with the geological age order.

Contents list

If you click on the page number for a building stone in the Contents list, you will go straight to the relevant section in the guide.

Building stone sources and building examples

A companion spreadsheet to this guide provides:

- More examples of buildings. Information is included on building type, date, architectural style, building stone source, and listed/ scheduled status
- A list of known (active and ceased) building stone sources such as quarries, mines, pits and delphs
- Additional information on building stones including lithology, grain size, sedimentary structures, key identification features, and notes on failure/weathering, and use.

The Building Stone GIS map allows you to search the Building Stones Database for England for:

- A building stone type in an area
- Details on individual mapped buildings or stone sources
- Potential sources of building stone sources within a given proximity of a stone building or area
- Buildings or stone sources in individual mineral planning authority area.

Further Reading, Online Resources and Contacts

The guide includes geological and building stone references for the area. A separate guide is provided on general Further Reading, Online Resources and Contacts.

Glossary

The guides include many geological terms. A separate Glossary explaining these terms is provided to be used alongside the guides.

The guides use the BGS lexicon of named rock units.

Mineral and local planning authorities

This guide covers the metropolitan county of Merseyside and the five metropolitan boroughs: Knowsley, St Helens, Sefton, Wirral and the city of Liverpool. The Halton Borough area is covered in the Cheshire guide.

Contents

1 Introduction

The building stones of Merseyside fall into three well-defined groups, both stratigraphically and geographically. Stratigraphically, the oldest building stones were sourced from the Pennine Lower and Middle Coal Measures of the Upper Carboniferous. These rocks are found mainly within the eastern part of the area, forming higher ground around St Helens at the western extremity of the Rossendale Hills, and within the Lancashire Coalfield. Faulting has also brought these rocks to the surface further to the west, around Huyton and Prescot in the borough of Knowsley.

The Carboniferous rocks are overlain unconformably by the Triassic strata of the West Lancashire Coastal Plain. These dip gently in an easterly direction and are strongly influenced by north–south trending faults, resulting in a series of prominent north–south ridges. These ridges tend to be capped by the more resistant Triassic rocks of the Sherwood Sandstone Group, with the relatively softer Triassic sandstones forming the lower ground. The sandstones exposed on many of these ridges have been quarried for building stone. The relative isolation of the Wirral peninsula has ensured that pre-19th-century building stone had only two sources: the Chester Pebble Beds Formation and the Helsby Sandstone Formation. The Triassic building stones are characterised by colour variation, including different shades of red, pink, yellow, buff and white. Colour can vary over relatively short distances and also in proximity to the north–south faults.

The third group of building stones is encountered along the coastal plain, within Sefton area, where the paucity of rock outcrops, and hence quarries, means that there are very few stone buildings. Those that do exist are mainly churches and public buildings constructed of stone brought in from elsewhere in Merseyside, Cheshire or West Lancashire.

Building stone was generally quarried close to where it was to be used, although by the 18th century – and probably much earlier in the coastal areas and around the Mersey estuary – such a bulky commodity would have been moved by boat or barge. The deep navigable creek off the estuary at Bromborough, Wirral, was used by lighters (flat bottomed barges) to transport stone from the Storeton Quarries, to which the creek was connected by a tramway in 1837–8. Development of the turnpike, canal and railway networks, during the late 18th and early 19th centuries, ensured more cost-effective shipment of building stone.

Merseyside shows a wide variety of stone buildings and structures. During the pre-industrial era, in coastal areas including the Wirral peninsula, low-

Figure 1: Ince Blundell Hall, Sefton. Carboniferous sandstone dressings.

status domestic buildings tended to use thatch for roofing, whereas higher status buildings used local flagstone, possibly from the Tarporley Siltstone Formation (Tarporley Siltstone and Keuper Waterstones). By contrast, in the eastern part of the county, particularly around Billinge in St Helens, most buildings were roofed with flagstone, reflecting the local availability of thinly bedded Upper Carboniferous sandstones.

Examples of the Cheshire vernacular, where timber-framed buildings were constructed on a stone plinth, can be found within Merseyside, such as at the 16th-century Speke Hall, Liverpool. Within the Wirral, it was a tradition from the late 17th to the early 19th century to construct farm buildings from handmade brick upon a red sandstone plinth.

In the area around St Helens, and extending into Greater Manchester, a late 19th-century ecclesiastical tradition developed of combining walling parpoints of yellow Carboniferous sandstone with dressings of red Triassic sandstone. This aesthetically pleasing contrast can be seen in the churches of St James at Rainhill, Holy Cross and St Helen in St Helens town centre, All Saints at Rainford and SS Mary and John at Newton-le-Willows, for example.

A significant increase in the quarrying of stone mirrored the rapid development of the ports of Liverpool and Birkenhead in particular. The first dock in Liverpool opened in 1715, and many more were constructed in the years that followed. Yellow Sherwood Sandstone from St James' Mount Quarry was used to line parts of the dock walls, before this site was exhausted in about 1825. As the pace of development of the docks increased, Scottish granite was brought in from specially leased quarries to face the dock walls.

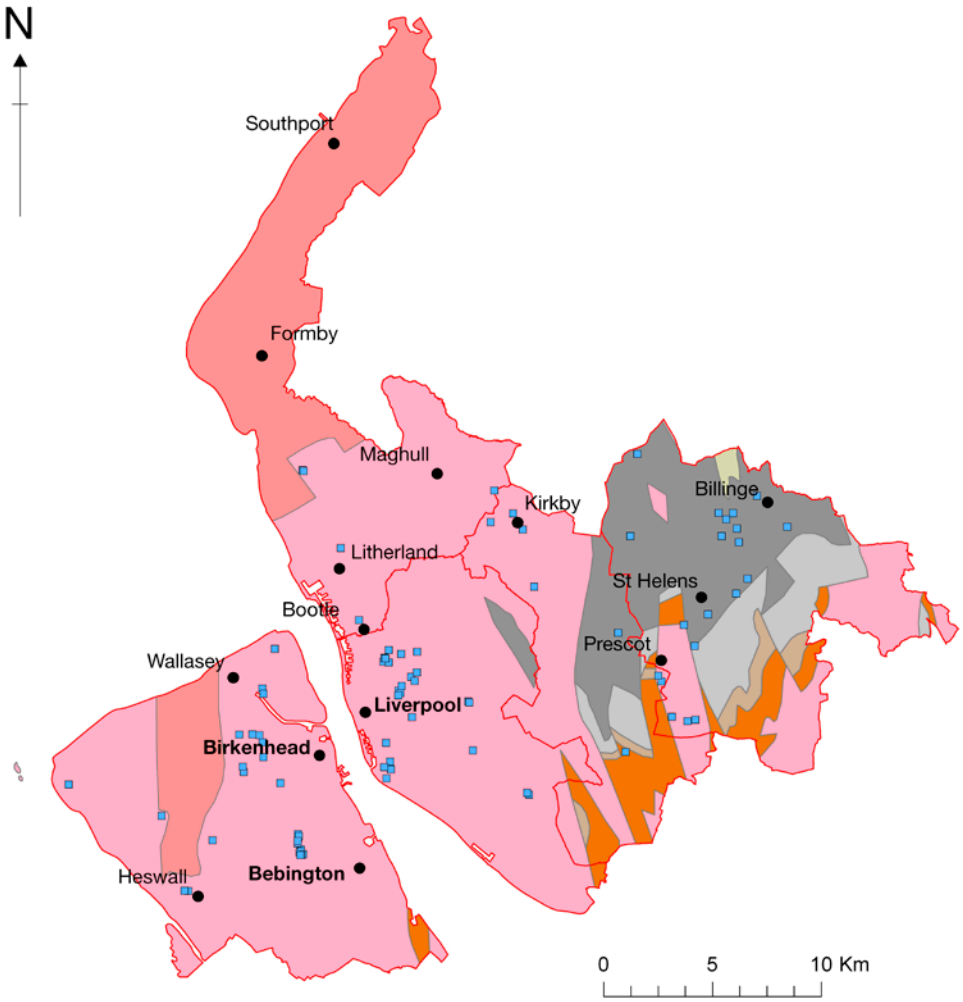
The rapid development of the port of Liverpool, as the major outlet for the industrial growth of North West England, led to a massive increase in demand for building materials to construct warehouses, factories, workers' houses and transport infrastructure.

Figure 2: Holy Cross and St Helen Church, St Helens. Yellow Carboniferous sandstone coursed masonry (probably Milnrow Sandstone) and red sandstone dressings.

The wealth generated from overseas trade, in particular the transatlantic slave trade, led to a spree of house building within the county by rich merchants and also saw a surge in the construction of prestigious civic buildings in the city of Liverpool, in particular. A variety of exotic building stones from other parts of the UK and abroad were used in the construction of the latter.

Most quarries in the county were probably established during the 18th and 19th centuries, with work continuing into the 20th century at sites such as Storeton, Rainhill and Woolton. The Sherwood Sandstone Group is still worked at Bold Heath Quarry on the St Helens–Widnes border, but the quarried stone is largely used for aggregate.

Bedrock Geology Map



Key

Building stone sources

Bedrock geology

Triassic Rocks — mudstone, siltstone and sandstone

Triassic Rocks — sandstone and conglomerate, interbedded

Permian Rocks — sandstone and conglomerate, interbedded

Warwickshire Group — siltstone and sandstone with subordinate mudstone

Pennine Middle Coal Measures Formation and South Wales Middle Coal Measures Formation

Pennine Lower Coal Measures Formation and South Wales Lower Coal Measures Formation

Millstone Grit Group — mudstone, siltstone and sandstone

Stratigraphic Table

Geological timescale	Group	Formation	Building stone	Page
Triassic	Mercia Mudstone Group	Tarporley Siltstone Formation	Tarporley Siltstone, Keuper Waterstones	22
	Sherwood Sandstone Group	Ormskirk Sandstone Formation	Ormskirk Sandstone	22
		Helsby Sandstone Formation	Delamere Sandstone	22
			Bidston Stone	21
			Claughton Sandstone	21
			Storeton Stone (Bebington Stone)	18
			Toxteth Park Stone	16
			Brownlow Hill Stone	16
			Wallesey Stone	16
			Knowsley Stone	15
			Lower Keuper Sandstone	
		Wilmslow Sandstone Formation	Woolton Stone	13
			Rainhill Stone	12
			Tranmere Stone	12
			Upper Mottled Sandstone	11
		Chester Pebble Beds Formation	Chester Pebble Beds Sandstone, Bunter Pebble Beds Sandstone	10
		Kinnerton Sandstone Formation	Lower Mottled Sandstone	10
Carboniferous	Pennine Coal Measures Group	Pennine Middle Coal Measures Formation	Pennine Middle Coal Measures Sandstone	9
		Pennine Lower Coal Measures Formation	Ravenhead Rock	9
			Cannel Rock	9
			Old Lawrence Rock	9
			Dyneley Knoll Flags (Upholland Flags, Lower Flags, Gannister Beds)	9
			Milnrow Sandstone (Billinge Beacon Flags, Crutchman Sandstone)	8
			Huyton Flagstones	7

Building stones in geological order from the oldest through to the youngest layers.

2 Local Building Stones

Carboniferous

Pennine Coal Measures Group, Pennine Lower Coal Measures Formation

Some quarries within the Knowsley and St Helens areas lie within the Pennine Lower Coal Measures Formation outcrop, although the specific sandstone units cannot be identified. They vary in character from massive and coarse grained to cross-bedded, medium or finer grained and flaggy. Sedimentary features such as cross-bedding and lenticular bedding are common. The sandstones are often recorded as being white and grey when fresh, weathering to yellow, buff and brown.

The quarries at Billinge worked a number of the Lower Coal Measures sandstones, such as Old Lawrence Rock, Dyneley Knoll Flags and Milnrow Sandstone. The flagstones were both mined and quarried. All of these sandstones are likely to have been used as building stones and flagstones in the village of Billinge and its surrounds. St Aidan's Church at Billinge, by notable architect Henry Sephton, and the Elizabethan Birchley Hall with its flagstone roof were both constructed of sandstones quarried at Billinge. Flagstones from Billinge were highly valued and were, therefore, traded on a more regional scale.

The great house of Birchley Hall is one of a contemporary group, located in the Pennine foothills, associated with gentry class rebuilding. The walls are constructed of parpoints of locally extracted yellow fine-grained sandstone, probably Milnrow Sandstone.

Huyton Flagstones

The Huyton Flagstones, as they are known locally, were quarried from the Huyton area of Knowsley and were in demand over large areas of Lancashire. It has been suggested that the Huyton Flagstones derived from the Old Lawrence Rock. They were probably used on the perimeter wall of Court Hey Park, Knowsley, and the barn at Court Hey Park, which now houses the Merseyside BioBank, uses similar laminated, flaggy rock. Notable quarries also include Rainford Old Delf, where both building stone and flagstone were extracted.

Milnrow Sandstone (Billinge Beacon Flags, Crutchman Sandstone)

Milnrow Sandstone, also known as Billinge Beacon Flags and Crutchman Sandstone, crops out to the north of St Helens, where it has been extensively quarried since at least 1672 as evidenced in John Eddlestone's will. The sandstone is distinctly variable in character over relatively short distances, ranging from coarse grained and massive to fine grained and often flaggy. It was interbedded with siltstones and shales at the former quarry at Billinge Hill. These flagstones were used for roofing, paving, walling and building stone.

Figure 3: Birchley Hall, Billinge. Milnrow Sandstone.

Figure 4: Villa, West Kirby. Milnrow Sandstone.

Dyneley Knoll Flags (Upholland Flags, Lower Flags, Gannister Beds)

Dyneley Knoll Flags, also known as Upholland Flags, Lower Flags and Gannister Beds, crop out around St Helens and have been extensively quarried around Billinge. Exposures show a hard, fine-grained, mica-rich, flaggy rock with fine laminations, ripple marks and trace fossils. The extracted flagstones were used for paving, roofing and building stone.

Old Lawrence Rock

Old Lawrence Rock crops out to the north of St Helens, particularly around Billinge, where it has been extensively quarried for paving, roofing and building stone. It was also quarried around Prescot, Eccleston and Windlehurst. It has a flaggy, fine-grained character, and is mica-rich with fine laminations and wisps of darker material (which may be carbonaceous). It can have a green tinge when fresh, but often weathers brown.

Cannel Rock

Cannel Rock crops out in the St Helens area of Merseyside, particularly to the west and south-west of St Helens, around Eccleston. It tends to be grey or white when fresh, but weathers to ochreous yellow and brown. Its character can vary from massive to cross-bedded to flaggy. Cannel Rock can be relatively resistant, forming higher ground, and was probably used close to where it was quarried.

Ravenhead Rock

Ravenhead Rock crops out in parts of the St Helens area, notably around Thatto Heath, where it was quarried. Its character can vary from massive to cross-bedded and also flaggy. When fresh, it is white to grey but it weathers to a yellow or brown. Purplish weathered horizons have also been recorded. The quarry at Thatto Heath exposed flaggy layers, so presumably it was a source of flagstone, possibly used for paving and roofing slabs, or parpoints for building.

Pennine Coal Measures Group, Pennine Middle Coal Measures Formation

Pennine Middle Coal Measures Sandstone

Some of the building stone quarried in the St Helens and Knowsley areas of Merseyside is thought to originate from the Pennine Middle Coal Measures Formation. Quarries are known at Whiston in Knowsley, Stanley Bank and Burrows Lane, near Eccleston, in St Helens. The specific sandstone horizons are rarely identified. The character of the sandstone varies from coarse grained and massive to cross-bedded and lenticular bedded, medium or fine grained and flaggy. The colour is generally grey when fresh, weathering to shades of brown and yellow.

Triassic

Sherwood Sandstone Group, Kinnerton Sandstone Formation

Lower Mottled Sandstone

These sandstones were exposed in the Neston area of the Wirral peninsula and quarried around the Tarbock and Cronton areas of Knowsley. Their colour is generally bright red or red-brown, but they can also have a yellowish-grey mottled appearance, with yellow bands. Well-rounded 'millet seed' grains can also be observed, indicating an aeolian origin. A finer grain size and fewer pebbles help to distinguish the Kinnerton sandstones from those of the overlying Chester Pebble Beds Formation. The Lower Mottled Sandstones tend to be poorly cemented, although in the vicinity of faults the sandstones can be more strongly cemented. This rock is known to crop out in Tarbock village, where a red stone quarry has been noted, although it is not regarded as an important building stone within Merseyside.

Chester Pebble Beds Formation

Chester Pebble Beds Sandstone, Bunter Pebble Beds Sandstone

This formation is widely exposed around the county, underlying the suburbs of Liverpool to the east of the city centre and much of the southern and eastern parts of the Wirral peninsula. As its name suggests, this unit characteristically contains pebbles, although they tend to be sparsely distributed and sporadic, unlike the equivalent beds of the Midlands, where pebbles are prolific. At Pex Hill Quarry, near Cronton, pebbles occur in discrete bands. These pebbles are rounded and of quartz and quartzite. Occasionally, they are of granite, felsite, mica schist, chert and derived fossils. Soft red-brown marl clasts can also be found within the sandstone; being soft they often weather out leaving voids.

Figure 5: Morpeth Dock, Birkenhead. Bunter Pebble Beds Red Sandstone and Runcorn Red Sandstone.

The colour of the pebbly sandstones can vary from mottled reddish-brown to yellowish-grey, and examples are clearly visible at Olive Mount Cutting, Wavertree, on the Liverpool and Manchester Railway. The Williamson Tunnels in Edge Hill, Liverpool, were partially cut into a disused quarry face within the formation, and the facade of Joseph Williamson's house on Mason Street utilised this stone too.

Other examples of the Bunter Pebble Beds red sandstone include Christ Church, Eccleston which was built from stone from the Taylor Park Quarry, the walls of Morpeth Dock and Egerton Dock, and Tower Road Birkenhead where the pick marks can still be seen.

The late medieval solar tower at Brimstage Hall, Wirral, was constructed using Chester Pebble Beds sandstone. In contrast, the appended 17th-century house was erected using Storeton Stone. At Cronton village, Knowsley, the tiny Wesleyan Chapel is constructed of ashlar blocks produced from the Chester Pebble Beds at nearby Pex Hill Quarry.

The formation is still worked today, albeit mainly for aggregate, at Bold Heath Quarry on the St Helens–Widnes border.

Figure 6: Brimstage Hall solar tower, Wirral. Chester Pebble Beds sandstone.

Sherwood Sandstone Group, Wilmslow Sandstone Formation

Upper Mottled Sandstone

This sandstone crops out over quite a widespread area of Merseyside, and it is distinguished from the sandstones of the Helsby Sandstone Formation and Chester Pebble Beds Formation by its finer grain size and lack of pebbles. It is often bright red or yellow when fresh and shows a patchy yellowish-grey mottling on more weathered faces. The sand grains are generally well sorted and well rounded, with spherical 'millet seed' grains visible in some horizons,

suggesting that the rock was formed in an aeolian environment. Around the Thurstaston area of the Wirral, there is a very hard, often dark brown layer cemented with silica, known as the Thurstaston Hard Sandstone Bed. This provided a more resistant building stone, although it occurs in a bed only 2m in thickness.

Tranmere Stone

Tranmere Stone was quarried from the Tranmere area of the Wirral peninsula, where quarry faces can still be seen to the west of Queen Street. This sandstone is generally pale red or pinkish-red, with occasional yellow bands and streaks, and contains mica. Tranmere Stone was possibly used for Birkenhead Priory, and it was also employed to construct many of the buildings in the old village of Tranmere. The stone was noted for its greater durability compared to that of neighbouring villages.

Rainhill Stone

Rainhill Stone was quarried from the Rainhill area, most notably from Mill Quarries. This sandstone is generally reddish-brown or pinkish-red. The Manor Farm public house at Rainhill was constructed as a lesser gentry house in 1662, and it is one of a number of local post-medieval houses that employed the coarse-grained Rainhill Stone. Other Rainhill examples include the 19th-century industrialists' mansions that extend along Mill Lane, and St Bartholomew's Church, an impressive blend of Greek temple and Italian campanile, constructed in 1838–40. The skew bridge at Rainhill station, erected in 1828–9, is probably the best-known structure on the Liverpool and Manchester Railway. The layout and construction of the arch of this complex engineering structure would have been made easier by the highly visible bedding planes of the Rainhill Stone, which were required to be located at 90 degrees to the line of thrust. A small amount of Rainhill Stone was also used in conjunction with Runcorn Stone on the internal walls of Liverpool's Anglican Cathedral.

Figure 7: Manor Farm pub, Rainhill. Rainhill Stone.

Figure 8: St Bartholomew's Church, Rainhill. Rainhill Stone.

Figure 9: Skew Bridge, Rainhill Station. Rainhill Stone.

Woolton Stone

Woolton Stone was quarried at Woolton village in Liverpool, where many of the buildings were erected in this material. It is generally a dull red-brown sandstone, but rarer bands of white sandstone have been recorded. Rounded pebbles, up to 150mm across, can be seen within the sandstone, but they are generally sparsely distributed or concentrated along bedding planes. The best quality stone was reputed to have been quarried from the lower thick-bedded layers.

The Village Inn, built in 1854 at Woolton, stands near the entrance to the main Woolton Quarries, and it was probably intended to relieve the quarrymen of their wages. Built in Woolton Stone, the pediment is unusual in such a building. Woolton Stone is also reputed to have been used in the village to build Woolton Hall and the entrance gateway to Strawberry

Field, Beaconsfield Road, previously a Salvation Army children's home and originally the home of a wealthy merchant. Allerton Hall, Liverpool, was constructed within its own parkland by a wealthy Liverpool merchant in the 1730s and represented the introduction of Palladianism to the county. Now used as a public house, it was almost certainly constructed of Woolton Stone. The massive bulk of George Gilbert Scott's 20th-century Anglican Cathedral in Liverpool rises sheer above the depths of the former quarry and cemetery at St James' Mount. A total of 23,300m^3 of sandstone was cut to build this colossal Gothic Revival church, most of which was Woolton Stone, with lesser amounts of both Rainhill Stone from St Helens and Runcorn Stone from Cheshire. The Picton Clock Tower in Wavertree, built in 1884, is allegedly constructed of white beds in the Woolton Quarries, as opposed to the more usual red-brown sandstone.

Figure 10: The Village Inn, Woolton, Liverpool. Woolton Stone.

Figure 11: Allerton Hall, Liverpool. Woolton Stone.

Figure 12: Liverpool Cathedral. Woolton Stone with Rainhill Stone and Runcorn Stone.

Sherwood Sandstone Group, Helsby Sandstone Formation

These sandstones are among the most widely used building stones in Merseyside. They are a variety of colours from red to yellow to brown and buff, and are sometimes white or even pink tinged, often mottled, and showing colour variations over relatively short distances.

The sandstones are generally thick bedded and provide versatile freestones. They are well cemented with silica, and so are hard and resistant. They are relatively soft to cut and work, but later harden upon exposure to the elements. Marl clasts are another common feature of these sandstones, but, being soft, they soon weather out leaving voids in the rock.

The Helsby Sandstone Formation was quarried at The Breck, near Wallasey, which is thought to be a possible source of the stone used to build many of the old buildings in Wallasey and much of the coastal embankment at Leasowe. It was also quarried for building stone at New Brighton, Flaybrick and Heswall, all on the Wirral peninsula, and also around the Bootle area of Sefton.

Knowsley Stone

Knowsley Stone was quarried around the Knowsley area, with a notable quarry located at Knowsley Delf. It is a hard, well-cemented and resistant sandstone with rounded pebbles, usually of quartz and quartzite. It has a distinctive brown colouration, as opposed to the more common red-brown of the Triassic sandstones occurring within the area. Many of the buildings in Knowsley village, including St Mary's Church, were constructed of this material. Due to its hardness, it was much used for roads in Liverpool, such as Parliament Street in the city centre. The distinctively brown-hued Knowsley Stone contrasts markedly with the ubiquitous red-brown Chester Pebble Beds sandstones used elsewhere in the county.

Figure 13: Devonshire Barn, Knowsley. Knowsley Stone.

Wallasey Stone

Wallasey Stone was quarried around the Wallasey area on the Wirral peninsula, and it is generally pale buff to yellow in colour. Quarrying near Poulton station has revealed a sandstone that is coarse and pebbly, but at other quarries the stone is generally finer grained and even rather soft. Most of the old village of Wallasey, probably including the detached tower within the graveyard of St Hilary's Church which dates from 1530, was built of stone from the quarries on the sandstone ridge known as The Breck. The Breck sandstones were also used to build the original coastal embankment at Leasowe in about 1830, and probably the multi-phase Leasowe Castle hotel.

Brownlow Hill Stone

Brownlow Hill Stone was quarried in the area of Liverpool now largely occupied by the University of Liverpool buildings, near to the junction of Brownlow Hill and Mount Pleasant. Liverpool's workhouse was erected in 1769 to 1772 adjacent to the quarries, with inmates being employed to cut and break the stone for local highways. Excavations at the university campus revealed exposures of yellow, medium to coarse-grained sandstone, with cross-bedding, and soft marl pellets.

Toxteth Park Stone

Toxteth Park Stone, supplied from the quarries of the Earl of Sefton in Toxteth Park, is known from historical sources to have been used as a 'durable and beautiful' building stone within the city of Liverpool.

The name Toxteth Park Stone may also encompass some beds of sandstone from the Helsby Sandstone Formation that were quarried from nearby Rathbone Street and also from St James' Mount Quarry, which was reclaimed in the 18th century and in 1829 opened as a cemetery. The quarry faces are still visible. In 1795, John Aikin, a medical doctor and surgeon, described this quarry as extensive, being '380 yards long, and in many places 16 yards deep, forming a vast perpendicular wall, without a vein or crack'. This sandstone was also described as 'of a yellowish hue, soft when cut, but afterwards hardening'.

Stone from St James' Mount Quarry was used to build many prestigious buildings and early dock structures, probably including Thomas Steers' Old Dock of 1715. Liverpool Town Hall was constructed of this sandstone, as were a number of Liverpool's churches, including those of St Nicholas, St Paul, St John and St Peter. Built in 1749 to 1754 to resemble a Classical Revival country house, Liverpool Town Hall is possibly the earliest surviving building within the city centre. The buff-coloured sandstone may have derived from quarries at Toxteth Park. The Great George Street Congregational Church in Liverpool was constructed of a multi-hued, coarse sandstone, which was reputedly obtained from a quarry in Toxteth Park.

Figure 14: Liverpool Town Hall. Toxteth Park Stone.

Figure 15: Great George Street Congregational Church, Liverpool. Toxteth Park Stone.

Storeton Stone (Bebington Stone)

Storeton Stone is perhaps the best-known and most extensively exported of all Merseyside's building sandstones. It was extracted from a series of large quarries that developed along the western edge of the elevated north–south ridge at Bebington, Wirral. It is a thick-bedded, hard, versatile freestone, widely used for ashlar. The colour can vary from white to buff to pink tinged and yellow, and, less commonly, red. It often weathers grey to buff-grey. Some horizons contain numerous soft marl clasts, which weather out leaving voids. Relatively soft when quarried, the sandstone hardens on exposure to the atmosphere. This stone type may also have been described as 'Bebington Stone', as one of the Storeton quarries was known as the Higher Bebington White Freestone Quarry.

The sandstone was allegedly used for Roman gravestones in Chester, although the earliest confirmed use was at Storeton Hall, a great medieval house dating to the 1370s, located just to the west of the quarries. The industrial-scale exploitation of the quarries can be attributed to Thomas Brassey, later to become one of the world's greatest railway engineers. The road bridge at Saughall Massie, Wirral, is his earliest known engineering work. As land agent to the Lord of the Manor of Birkenhead, and also manager of Storeton Quarries, Brassey utilised Storeton Stone for the development of Birkenhead during the 1820s and 1830s, including many of the buildings erected in the grid pattern plan around Hamilton Square. In 1837–8, he created a gravity tramway to take stone from the quarry to a wharf at Bromborough Pool, on the River Mersey, from where it could be shipped elsewhere. During the 1820s, he met George Stephenson, who was then building the Liverpool and Manchester Railway, and Stephenson used Storeton Stone to construct elements of the George Stephenson's nine-arched Sankey Viaduct built in 1830, and also the Mill Lane viaduct, both at Newton-le-Willows. These two structures were major engineering challenges at the time, requiring a durable sandstone with high compressive and shear strengths. The Sankey Viaduct was the first major railway viaduct to be built in the world. Stephenson was probably influenced in his choice of Storeton Stone for the key elements by Thomas Brassey, then manager of Storeton Quarries.

William Lever, Lord Leverhulme, acquired the quarries in 1911 and used the stone in the model village of Port Sunlight, Wirral. The impressive facade of the Unilever offices at Lever House offices, Port Sunlight, serves as an excellent example of the large-scale use of this building sandstone. The tramway between the Storeton quarries, acquired by Lever in 1911, and the quay at Bromborough passed in front of this building. Lord Leverhulme also used Storeton Stone in his home village of Thornton Hough, Wirral.

Numerous other fine Liverpool buildings used Storeton Stone, including the Liverpool Custom House, Liverpool Lime Street station, St James' Cemetery mortuary chapel and Castle Moat House, and also the massive entrance arches and lodges to Birkenhead Park (1847) on the Wirral.

Figure 16: Storeton Hall, Wirral. Storeton Stone.

Figure 17: Lever House, Port Sunlight. Storeton Stone.

Figure 18: Lime Street Station, Liverpool. Storeton Stone.

Figure 19: The Oratory, St James' Cemetery, Liverpool. Storeton Stone.

Figure 20: Entrance to Birkenhead Park. Storeton Stone.

Figure 21: Road bridge at Saughall Massie, Wirral. Storeton Stone.

Figure 22: Birkenhead Museum. Storeton Stone.

Claughton Sandstone

Fine red sandstone from Claughton Quarries, west of Birkenhead, was used to build St Anne's Church at Birkenhead. It is likely that Christ Church at Birkenhead, which was completed in 1849, on top of a prominence of solid rock, was built from the same stone.

Bidston Stone

Bidston Stone was quarried around the Bidston area of the Wirral peninsula, and the best-known quarry was at Flaybrick. The sandstone at Flaybrick is recorded as coarse grained, very pebbly and pale coloured.

An early tramway existed to transport stone from Bidston Hill down to Birkenhead, for the building of Birkenhead Docks. Stone from Flaybrick was also used at St James' Church at Birkenhead.

The colour of Bidston Stone varies from yellow to pale red to white and buff. Bidston village retains many of its old stone-built structures, with their distinctive buff to grey colour. They include St Oswald's Church (with its tower of 1520), Bidston Hall (erected in *c*1593) and Church Farmhouse (probably built in the early 16th century).

Figure 23: Bidston Hall, Wirral. Bidston Stone.

Delamere Sandstone

Within the Helsby Sandstone Formation lies the Delamere Sandstone Member. It has been quarried at West Kirby and Caldy on the Wirral peninsula, and exposures show a coarse-grained, pebbly, hard and often brown rock, with occasional mudstone beds.

Sherwood Sandstone Group, Ormskirk Formation

Ormskirk Sandstone

The sandstones exposed around the Sefton area of Merseyside tend to be predominantly yellow. The quarries were generally small and for local use, but there was notable quarrying around Bootle and at Litherland.

Mercia Mudstone Group, Tarporley Siltstone Formation

Tarporley Siltstone, Keuper Waterstones

Exposures of the Tarporley Siltstone Formation are somewhat limited, but they are noteworthy at St James' Cemetery in Liverpool and at various locations around the Wirral peninsula, such as The Dungeon – a Site of Specific Scientific Interest west of Heswall – Oxton, Greasby and Irby. The formation is generally thinly bedded, finely laminated, flaggy, mica rich and very fine grained. The brown sandstone layers are found interbedded with layers of reddish-brown and greyish-green, thinly bedded siltstone, grey shales and reddish-brown mudstone. They can be observed in two disused quarries at Irby and are flaggy in nature. Historic descriptions of Wirral buildings refer to blue flagstones and blue slate stones, which may imply use of siltstones and/or sandstones from this formation for roofing materials.

3 Examples of Imported Building Stones

Sedimentary building stones

Carboniferous

Millstone Grit Group, Marsden Formation

Ashover Grit (Darley Dale Sandstone), Derbyshire

Ashover Grit, or Darley Dale Sandstone, from Derbyshire is well represented in the impressive 19th-century civic buildings on William Brown Street, Liverpool. St George's Hall, the World Museum, Picton Reading Room, the Walker Art Gallery, the former Great North Western Hotel and Wellington's Column are similarly all constructed of this stone, which has weathered well. By contrast, the plinth of the Walker Art Gallery is formed of an unidentified Triassic sandstone, which is now flaking and spalling.

St George's Hall is a fine neoclassical building and forms the centrepiece of the civic buildings on William Brown Street. The scale demanded a uniformity only provided by the likes of this Derbyshire sandstone, which set a pattern for many later buildings in the city centre.

Figure 24: St George's Hall, Liverpool. Darley Dale Sandstone.

Pennine Coal Measures Group, Pennine Lower Coal Measures Formation

Lower Coal Measures Formation sandstone, Greater Manchester

Longridge Stone was used in the Albert Dock, Liverpool, and was mentioned in a 19th-century description of the Morpeth and Egerton docks, Birkenhead. In this area of the dock system is a series of arches forming a quay, described

thus: ‘These arches, apparently about twenty in all, and also the piers, are beautifully built of Bolton and Longridge Stone. The whole of the hollow of the gates are of Anglesey limestone, as well as the rubbing bands round the piers and entrances.’ ‘Bolton Stone’ possibly refers to Ousel Nest Grit (Pennine Lower Coal Measures Formation), extensively quarried near Bolton, Greater Manchester.

Triassic

Sherwood Sandstone Group, Helsby Sandstone Formation

Helsby Sandstone (Runcorn Red), Cheshire

Sherwood Sandstone Group Helsby Sandstone (or Runcorn Red) from Cheshire has been used within the Merseyside area due to the close proximity of the quarries. During the 1820s, this sandstone was employed in parts of the dock systems at Birkenhead and Liverpool, including Prince’s Dock, completed in 1821. It can also be seen at Fort Perch Rock battery, Wallasey, and St George’s Church at Thornton Hough.

Upper Jurassic

Portland Group, Portland Stone Formation

Portland Stone, Isle of Portland, Dorset

Like many cities and towns in the UK, there are fine examples of buildings using Portland Stone (Upper Jurassic) within Merseyside, particularly within the city of Liverpool. The striking white colour of this variably bioclastic, ooidal limestone can be seen at the Cunard Building, the India Buildings, the Port of Liverpool Building and the Queen Victoria Monument. The Cunard Building, in particular, includes finely carved blocks of this versatile freestone, which is easy to work and later hardens on exposure to the atmosphere. The white Portland Stone of the Edwardian Adelphi Hotel is simply a cladding over a more prosaic steel and concrete frame.

Figure 25: Adelphi Hotel, Liverpool. Portland Stone cladding.

Igneous building stones

Granites, Scotland and Ireland

Imported granite was used extensively as kerb stones and setts in both the city centre and dock areas of Liverpool, and also in the Birkenhead dock area. During the 1820s, the Liverpool Dock Trustees acquired leases of land in order to open quarries in Dumfries and Galloway, Scotland – near Dalbeattie and south of Creetown at Kirkmabreck – to exploit the Criffel Granite, which is grey with pink feldspar crystals. This strong, durable rock type was used to impressive effect at Albert Dock, Liverpool, where Jesse Hartley created his trademark pseudo-medieval architectural style. The Canning Half-Tide Dock was rebuilt by Hartley in 1842–4, using coping stones and rubble of Criffel Granite, with the retaining walls probably of Runcorn Stone. Initially, dock construction at Liverpool and Birkenhead used local sandstone from quarries such as St James' Mount.

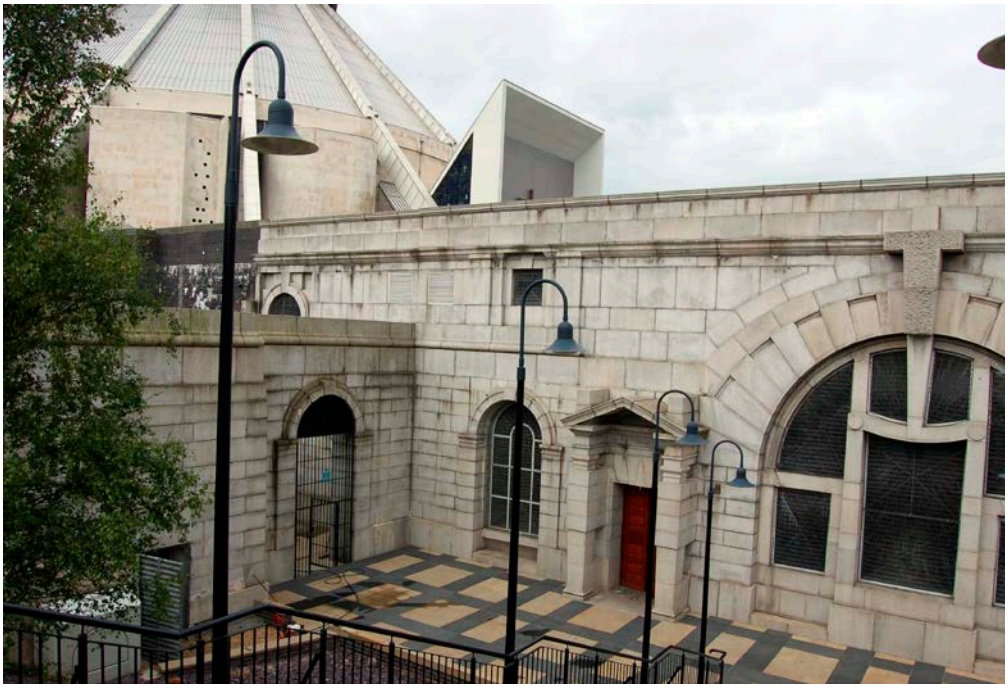
From about 1830, however, granite was used for edgings, kerb stones and setts in those parts of the docks most likely to be damaged by either boats or wheeled vehicles. It has been suggested that many of the granite kerbs and setts used in Liverpool were produced near Newry in Ireland, where the rock is pinkish-grey in colour.

During the early 20th century, granite cladding was used at a number of impressive Liverpool landmarks, including the Royal Liver Building and the Roman Catholic crypt, now part of Liverpool Metropolitan Cathedral. The Royal Liver Building is the most impressive of the 'Three Graces' that dominate Liverpool's waterfront. Built of reinforced concrete with granite cladding, it was the tallest building of its period in the country. The classically styled crypt, partially set into the former quarry at Brownlow Hill, was faced in white coarse-grained granite, and was later used as a base for Liverpool Metropolitan Cathedral.

Figure 26: Canning Half-Tide Dock, Liverpool. Criffel Granite and Runcorn Stone.

Figure 27: Royal Liver Building, Liverpool. Granite cladding.

Figure 28: Liverpool Metropolitan Cathedral crypt. Granite facing.



Slates, Wales and Cumbria

Slate, mainly from North Wales, but with a significant contribution from Cumbria, has been widely used throughout the county as a roofing material. The development of the docks, and the canal and railway networks, provided the means to import slate throughout Merseyside. The abolition of slate duty in 1831 led to a significant increase in the amount of slate being used for new-builds and also the widespread availability of slate to re-roof the existing building stock. The Church of St Peter Apostle and Martyr at Formby, Sefton, has a roof of graduated Westmorland Slate, which was used in increasing quantities in the county during the 19th century.

Figure 29: Church of St Peter Apostle and Martyr, Formby. Westmoreland Slate roof.

International sources

A wide range of building stones from different parts of the world were used within Liverpool during the 19th and early 20th centuries, reflecting the wealth and status associated with this thriving port city. They include a variety of marbles from Italy, Ireland and Greece; Rapakivi Granite from Finland; Larvikite from Norway; limestones from France and Germany; granites from Sweden, Norway and many parts of the UK; gneiss from Sweden and gabbro from South Africa. The regeneration of Liverpool city centre in the late 20th and early 21st centuries has led to a revival of this tradition, with the Liverpool ONE retail and housing development providing an excellent example.

4 Further Reading

The Further Reading, Online Resources and Contacts guide provides general references on:

- Geology, building stones and mineral planning
- Historic building conservation, architecture and landscape.

There is also a separate glossary of geological terms.

Merseyside references

Aiken, J 1795 *A Description of the Country from Thirty to Forty Miles Round Manchester*. Newton Abbot: David and Charles

Anderson, D 1973 *Underground Flagstone Workings of the Billinge–Ashurst Ridge*

Baines, E and Parson, W 1824 *History, Directory and Gazetteer of the County Palatine of Lancaster: Volume 1*. Liverpool: W Wales and Co

Bathurst, R G C *et al* 1965 *Geology Around the University Towns: Liverpool*. Geologists' Association Guide, No 6. Colchester: Benham and Company

Binney, E W 1855 'On the Permian beds of the north-west of England', *Memoir of the Manchester Literary and Philosophical Society, Series 2*, **12**. London: H Bailliere

Friends of St James' Cemetery website http://stjamescemetery.co.uk/

Friends of Storeton Wood website http://friendsofstoretonwoods.org.uk/

Friends of Williamson's Tunnels website https://williamsontunnels.com/

Giles, C 2008 *Building a Better Society: Liverpool's historic institutional buildings*. Swindon: English Heritage

Grayson, R F and Williamson, I A 1977 *Geological Routes Around Wigan*. Wigan and District Geological Society

Hull, E 1872 *A Treatise on the Building and Ornamental Stones of Great Britain and Foreign Countries*. London: Macmillan and Co

King, C D 'The Liverpool Brownlow Hill Institution', Liverpool Medical Institution https://www.lmi.org.uk/

Liverpool Waters 2010 *Environmental Statement, October 2010, Volume 2, Appendix 4, Cultural Heritage and Archaeology* https://liverpoolwaters.co.uk/

Lewis, S 1848 *Topographical Dictionary of England* (7th edition) https://www.british-history.ac.uk/topographical-dict/england

Liverpool Geological Society Archives and Liverpool Geological Association Archives held by Liverpool Museums at North Street, Liverpool. NH/LGS/6/1 Minute book of Liverpool Geological Association June 1880–Sept 1883

Liverpool Geological Society 2001 *Rock around Liverpool. William Brown Street* https://liverpoolgeologicalsociety.org/wp-content/uploads/2020/12/William-Brown-Streetv2.pdf

Liverpool Geological Society 2004 *Rock around Wirral: a guide to the geological sites of interest in the natural landscape and to the building stones in some towns of the Wirral Peninsula* Liverpool: Liverpool Geological Society

Liverpool Geological Society 'Rock around campus' trail guides https://liverpoolgeologicalsociety.org/rock-around

Liverpool History Society website https://liverpoolhistorysociety.org.uk/

Mather, J D 2007 'The story of Liverpool spa: Its history and hydrogeology', *The North West Geologist*, 14

Merseyside RIGS records held at Merseyside BioBank

Mortimer, W 1847 *The History of the Hundred of Wirral*. London: Whittaker and Co https://archive.org/details/historyhundredw00mortgoog

Morton, G H 1891 *The Geology of the Country Around Liverpool including the North of Flintshire* (2nd edition). London: George Philip and Son

Tresise, G 1995 'Triassic vertebrate footprints from Cheshire, England: Localities and lithologies', *in* Sarjeant, W A S (ed) *Vertebrate Fossils in the Evolution of Scientific Concepts*. Amsterdam: OPA

Tresise, G 2007 'Chirotherium and the quarrymen', *The North West Geologist*, 14

Sharples, J and John Stonard, J 2008 *Built in Commerce. Liverpool's Central Business District*. Swindon: English Heritage

Storeton Quarries archive, Wirral Archives at Birkenhead. ZST/7 1905–47, ZST/11 1914–53

Watson, J 1911 *British and Foreign Building Stones*. Cambridge: University Press

Wilding, J 1890 'The paving materials of Liverpool', *Transactions of the Liverpool Geological Association*, **9**, 24–7

Wilding, J 1931 'The stones of a city (The buildings stones of Liverpool)', *Proceedings of the Liverpool Geological Society*, **15**, 149–56

Woolton Village website http://wooltonvillage.co.uk/

British Geological Survey publications

Edwards, W and Trotter, F M 1954 *British Regional Geology, The Pennines and Adjacent Areas*. British Geological Survey. London: HMSO

Howard, A S *et al* 2007 *Geology of the Liverpool District: A Brief Explanation of the Geological Map Sheet 96*. Keyworth: British Geological Survey

Hull, E 1862 *The Geology of the Country Around Wigan: Description of the Geological Map Sheet 89 SW*. Memoirs of the British Geological Survey of England and Wales. London: HMSO

Hull, E 1882 *Geology of the Country Around Prescot, Lancashire: Description of Quarter Sheet 80 NW and Corresponding Six-inch Maps Nos 107 and 108*. Memoirs of the British Geological Survey of England and Wales. London: HMSO

Jones, R C B *et al* 1938 *Wigan District: Explanation of Sheet 84*. Memoirs of the British Geological Survey of Great Britain (England and Wales). London: HMSO

Wedd, C B *et al* 1923 *The Geology of Liverpool, with Wirral and part of the Flintshire Coalfield*. Memoirs of the British Geological Survey of Great Britain (England and Wales). London: HMSO

Wray, D A *et al* 1948 *The Geology of Southport and Formby: Explanation of Sheets 74 and 83*. Memoirs of the British Geological Survey of Great Britain (England and Wales). London: HMSO

England and Wales Sheet 96 Liverpool 1:50 000 bedrock and superficial deposits, 2006. Keyworth: British Geological Survey

5 Contact Historic England

East of England
Brooklands
24 Brooklands Avenue
Cambridge CB2 8BU
Tel: 01223 582749
Email: eastofengland@HistoricEngland.org.uk

Fort Cumberland
Fort Cumberland Road
Portsmouth
Hampshire PO4 9LD
Tel: 023 9285 6700
Email: fort.cumberland@HistoricEngland.org.uk

London and South East
4th Floor
Cannon Bridge House
25 Dowgate Hill
London EC4R 2YA
Tel: 020 7973 3700
Email: londonseast@HistoricEngland.org.uk

Midlands
The Foundry
82 Granville Street
Birmingham B1 2LH
Tel: 0121 625 6888
Email: midlands@HistoricEngland.org.uk

North East and Yorkshire
Bessie Surtees House
41-44 Sandhill
Newcastle Upon
Tyne NE1 3JF
Tel: 0191 269 1255
Email: northeast@HistoricEngland.org.uk

North East and Yorkshire
37 Tanner Row
York YO1 6WP
Tel: 01904 601948
Email: yorkshire@HistoricEngland.org.uk

North West
3rd Floor, Canada House
3 Chepstow Street
Manchester M1 5FW
Tel: 0161 242 1416
Email: northwest@HistoricEngland.org.uk

South West
Fermentation North
(1st Floor)
Finzels Reach
Hawkins Lane
Bristol BS1 6JQ
Tel: 0117 975 1308
Email: southwest@HistoricEngland.org.uk

Swindon
The Engine House
Fire Fly Avenue
Swindon SN2 2EH
Tel: 01793 445050
Email: swindon@HistoricEngland.org.uk

6 Acknowledgements

The Building Stones of England series was developed by Geckoella Ltd (Andy King), the British Geological Survey (Don Cameron, Graham Lott, and Stephen Parry), and Historic England (Clara Willett).

Historic England and the British Geological Survey developed the Building Stones of England database with advice from many local geologists and historic building experts and all these individuals are thanked for their contributions.

For this guide, Historic England would like to also thank Peter France of Wirral Archaeology, Joe Crossley of the Liverpool Geological Society, Geoffrey Tresise, David Bridson of Williamson Tunnel Heritage Centre, Merseyside Biobank, Merseyside Environmental Advisory Service, Cheshire RIGS Group, Alan Davies and the Lancashire Mining Museum, Liverpool Museums, David Gelsthorpe of the Manchester Museum, and Terry Hughes of the English Stone Forum.

The Department for Levelling Up, Housing and Communities supported the development of the Building Stones of England database project.

Figures

Historic England

We are the public body that helps people care for, enjoy and celebrate England's spectacular historic environment.

Please contact NationalSpecialistServices@HistoricEngland.org.uk with any questions about this document.

HistoricEngland.org.uk

If you would like this document in a different format, please contact our customer services department on:
Tel: 0370 333 0607
Email: customers@HistoricEngland.org.uk

All information and weblinks accurate at the time of publication.
Please consider the environment before printing this document.

Product code: HEBSE27
Publication date: May 2012
Reissue date: December 2017
Reissue date: May 2023
Design: Historic England