Historic England

East Yorkshire and northern Lincolnshire

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 Graham Lott and Stephen Parry (British Geological Survey).

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Front cover: St John the Baptist Church, Alkborough. Frodingham Ironstone. © Bildarchiv Monheim GmbH / Alamy Stock Photo.

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.

Middle Jurassic
↑ geological time period

Inferior Oolite Group, Lincolnshire Limestone Formation
↑ geological group ↑ geological formation

Lincolnshire Limestone
↑ building stone (alternative or local name)

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 joint mineral planning and unitary authority areas of the East Riding of Yorkshire, the City of Hull, and the northern part of the Lincolnshire mineral planning authority area; and the local planning authority areas of North Lincolnshire and North East Lincolnshire.

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1 Introduction

The geological succession of eastern Yorkshire and north Lincolnshire area comprises strata of Late Triassic to Quaternary age. In general, the rocks dip gently eastwards towards the North Sea coast. The area is divisible into several topographically and geologically distinct regions: in the west are the low-lying vale of York and the River Trent levels, which are underlain by Triassic rocks, whereas to the east is the ridge of higher ground forming the Yorkshire and Lincolnshire Wolds, which are underlain by Jurassic and Cretaceous rocks. The remainder of the area forms part of the low-lying drainage basin of the Humber estuary and includes the coastal plain of Holderness, an expanse of unconsolidated Quaternary sediments. Vernacular building stone and other building materials have been obtained from many of the geological units occurring within the area.

The apparent simplicity of the roughly north–south trending rock outcrop pattern belies major changes in both the geological history and structure across the area. A significant higher sedimentary fill in the basin abasement high, known as the Market Weighton Axis divides the area into two geological provinces, known as the East Midlands Shelf (to the south) and the Cleveland Basin (to the north). East Yorkshire, consequently, represents a geological transition zone characterised by significant lithological changes in its Jurassic and (unconformably) overlying Cretaceous rock successions.

North and south of the Humber, much of the area remains primarily rural, with many of the oldest buildings having been constructed of locally made bricks, as seen in Beverley, Howden, Roos, Hedon and Watton. In more prestigious buildings, however, notably including the area's many churches, a wide variety of local lithologies were used for walling. These were often not suitable for ashlar work, though, and stone from further afield was commonly imported. In the Holderness area, many of the churches are constructed with locally gathered Quaternary cobblestones. The cobblestones were supplemented, and indeed complemented, by a range of imported limestones and, occasionally, sandstones for mouldings, dressings and other decorative stonework.

Elsewhere, medieval higher status buildings such as Beverley Minster, Howden Minster and Wressle Castle, as well as churches at Hedon, Patrington, and Skirlaugh all had sufficient wealth to allow the import of ashlar block from a number of the Lower Magnesian Limestone (Late Permian) quarries in west Yorkshire. South of the Humber, Lincolnshire Limestone (Middle Jurassic) was introduced from the prolific quarrying areas around Lincoln, Ancaster and Heydour, and ironstones were sourced from the

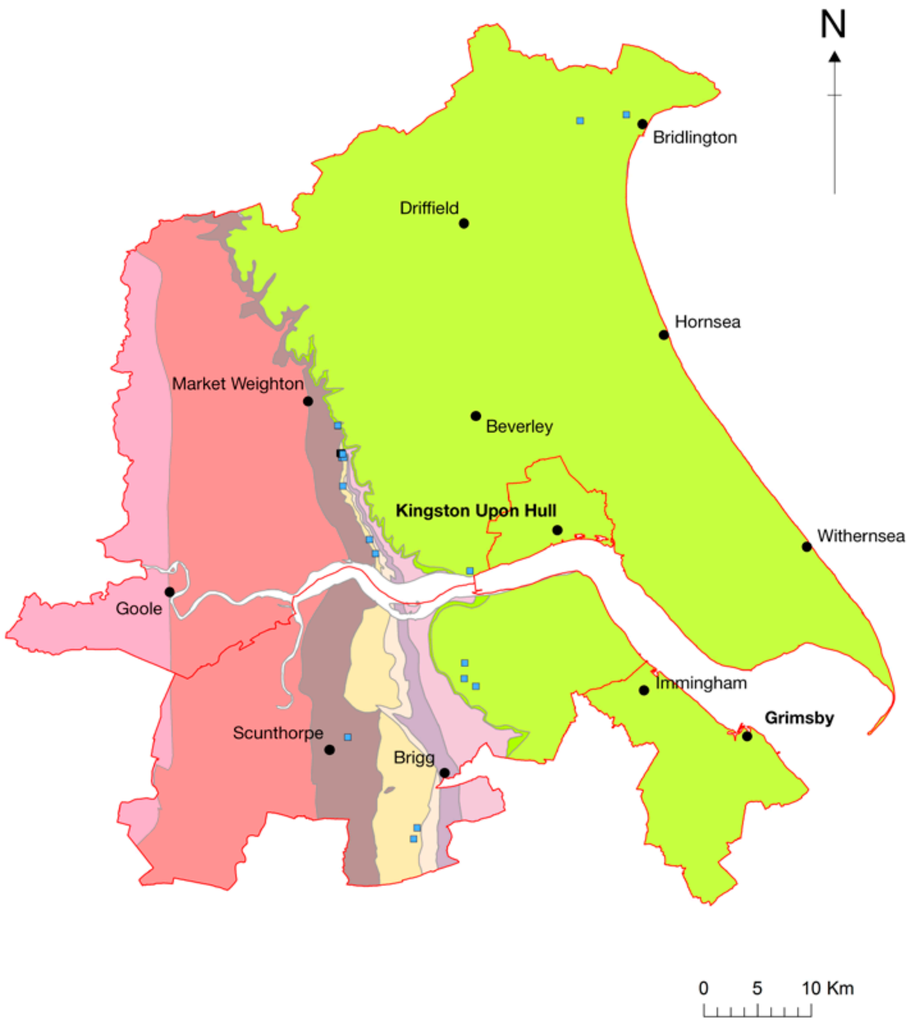
Upper Jurassic successions of the Claxby–Tealby area. The development and exploitation, from medieval times onwards, of overland, river (particularly along the Rivers Ouse and Aire from West Yorkshire) and sea transportation modes provided very effective means by which substantial quantities of stone could be moved into, and across, the area.

Rapid expansion of the larger towns during the 19th century, including Kingston-upon-Hull, Goole, Bridlington, Grimsby, Cleethorpes and Scunthorpe, coupled with the development of local rail networks led to such settlements importing an even wider mix of stone types for use in principal buildings, such as town halls and banks. Some lithologies, including Portland Stone and Ashburton Limestone, travelled from distant parts of the UK.

Figure 1: The Minster, Beverley. West Yorkshire Lower Magnesian Limestone.

Figure 2: Wressle Castle, Selby. West Yorkshire Lower Magnesian Limestone.

Bedrock Geology Map



Key

Building stone sources

Bedrock geology

White Chalk Subgroup — chalk

Grey Chalk Subgroup — chalk

West Walton Formation, Ampthill Clay Formation and Kimmeridge Clay Formation (undifferentiated) — mudstone, siltstone and sandstone

Kellaways Formation and Oxford Clay Formation (undifferentiated) — mudstone, siltstone and sandstone

Great Oolite Group — sandstone, limestone and argillaceous rocks

Inferior Oolite Group — limestone, sandstone, siltstone and mudstone

Lias Group — mudstone, siltstone, limestone and sandstone

Triassic Rocks (undifferentiated) — mudstone, siltstone and sandstone

Triassic Rocks (undifferentiated) — sandstone and conglomerate, interbedded

Stratigraphic Table

Geological timescale	Group		Formation	Building stone	Page
Quaternary	various		various	Cobbles	14
Upper Cretaceous	Chalk Group	White Chalk Subgroup	Rowe Chalk Formation	Chalk Flint	11 11
			Flamborough Chalk Formation		
			Burnham Chalk Formation		
			Welton Chalk Formation		
		Grey Chalk Subgroup	Ferriby Chalk Formation		
Lower Cretaceous	Cromer Knoll Group		Hunstanton Formation		
	Ungrouped		Carstone Formation		
Upper Jurassic	Ancholme Group		Kimmeridge Clay Formation	Elsham Sandstone	11
			Ampthill Clay Formation		
			West Walton Formation	Brantingham Sandstone	11
			Oxford Clay Formation		
Middle Jurassic			Kellaways Formation	Kellaways Sandstone	11
	Great Oolite Group		Cornbrash Formation	Great Oolite Limestone	10
			Blisworth Limestone Formation, Blisworth Clay Formation		
			Rutland Formation		
	Inferior Oolite Group		Lincolnshire Limestone Formation	Lincolnshire Limestone (Cave Oolite, Brough Stone)	8
			Grantham Formation		
			Northampton Sand Formation	Northampton Sand Formation Sandstone	8
Lower Jurassic	Lias Group		Whitby Mudstone Formation	Marlstone Rock Pecten Ironstone	8 8
			Charmouth Mudstone Formation		
			Scunthorpe Mudstone Formation	Frodingham Ironstone	6
			Redcar Mudstone Formation		
Triassic	Penarth Group		various	Dolomitic Sandstone (Skerry Sandstones), Gypsum	5
	Mercia Mudstone Group				
	Sherwood Sandstone Group				

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

2 Local Building Stones

Triassic

Sherwood Sandstone Group, various formations

The oldest rocks present within the east Yorkshire and north Lincolnshire area form part of the sandstone-dominated Sherwood Sandstone Group succession and extend as a narrow outcrop along its western edge, from Wroot in the south to Stamford Bridge in the north. However, the outcrop is largely obscured by superficial deposits, and there is, consequently, little evidence of either the quarrying or use of the red sandstones so typical of this group. With the exception of the many churches for which stone has commonly been used, the older village buildings within the confines of the Sherwood Sandstone Group outcrop are generally of local brick. Occasionally, imported stone was used, including at Wressle, Pollington and Wroot.

Mercia Mudstone Group, various formations

Dolomitic Sandstone (Skerry Sandstones), Gypsum

A large portion of the western part of the area is underlain by strata assigned to the Mercia Mudstone Group. This Middle to Upper Triassic succession is dominated by red-brown, occasionally grey-green mudstones with gypsum beds. Like the Sherwood Sandstone Group, it is largely concealed by unconsolidated Quaternary deposits. The thin, hard, dolomitic sandstones known to the south and east (referred to as Skerry sandstones) are not well developed in this area, and they appear to have yielded no building stone of note.

The thick mudstone beds near Epworth, however, were locally worked for brick clay. The nodular gypsum beds present around the Isle of Axholme, meanwhile, were once important as a source of upstairs flooring material for nearby houses.

With the exception of a good number of churches, for which imported stone was used, the older village houses and buildings located within the outcrop area of the Mercia Mudstone Group are generally of local brick. Examples include Tetley Hall near Crowle and the small town of Epworth. The Church of St Andrew at Epworth is constructed of Jurassic Lincolnshire Limestone, while the housing is of local brick.

Penarth Group, various formations

This thin, poorly exposed sequence of rocks largely comprises dark grey, fissile, marine mudstones, and it marks the end of non-marine, 'red bed' Triassic sedimentation. The group as a whole represents a transitional interval before the establishment of fully marine conditions during the subsequent Jurassic. Despite the presence of occasional thin sandstone horizons, there is no evidence of any of the beds having been worked for building stone.

Lower Jurassic

Lias Group, Redcar Mudstone Formation, Scunthorpe Mudstone Formation, Charmouth Mudstone Formation

The Lias Group is characterised by a thick succession of grey mudstones and argillaceous and occasionally bioclastic limestones, with sporadically developed but, nonetheless, economically important sedimentary ironstone horizons. The narrow, irregular outcrop extends from Bishop Wilton in the north, skirts the Market Weighton Axis and broadens along the western margin of the Yorkshire Wolds, before crossing the Humber and continuing to Messingham in the south. The thin, blue-grey limestone beds, commonly used as building stone in other areas where the lower Lias Group (Blue Lias Formation) is present, are only poorly developed, and not quarried for building stones. In general, local village housing on the Lias Group outcrop is of brick, with the more prestigious buildings being constructed of imported Magnesian Limestone ashlar.

At higher stratigraphic levels within the Lias Group, limestones become less common, and several significant ironstone beds occur to the south of the Humber. Each one of these ironstone beds has, in the past, served as a source of low-grade iron ore. However, only the Frodingham Ironstone is thick enough and extensive enough to have supported a substantial commercial iron industry at Scunthorpe. These ironstone beds were also once important locally as sources of vernacular building stone.

Lias Group, Scunthorpe Mudstone Formation

Frodingham Ironstone

The distinctive, ooidal and bioclastic, variably calcareous Frodingham Ironstone Member bed crops out mainly to the south of the Humber in North Lincolnshire, notably around Scunthorpe. The ironstone represents a gradual change in depositional setting: from the open marine environments of the Lias Group to a generally more restricted, marginal marine environment. The unit progressively thins northwards across the Humber, and becomes less ferruginous and more calcareous in character, before finally thinning out against the Market Weighton Axis.

The Frodingham Ironstone formed the basis of a substantial local iron-making industry, which reached its peak in the early 20th century. When freshly exposed, the ironstone is greenish-grey in colour, but after prolonged exposure it becomes more variegated, ranging from yellow-brown to red-brown. These latter colours are more typical of the ironstone blocks found in local buildings around Scunthorpe and Frodingham. Any modern replacement stones may retain their unweathered colouration for some time (termed ‘blue-hearted’), before taking on the more familiar brownish colour. The Frodingham Ironstone was used fairly widely as a building and walling stone along its outcrop, but it does not appear to have travelled very far from its quarry sources. Examples include the 20-21 Visual Arts Centre (a former church) and the Church of St Lawrence at Scunthorpe, where it is used as a coursed rubblestone with pale Lincolnshire Limestone dressings. Ironstone churches can also be seen at Messingham and Flixborough.

Figure 3: St Andrew's Church, Burton upon Stather. Frodingham Ironstone rubble.

Figure 4: St Andrew's Church, Burton upon Stather. Frodingham Ironstone rubble.

Lias Group, Whitby Mudstone Formation

Pecton Ironstone, Marlstone Rock

This poorly exposed grey limestone and calcareous, silty, mudstone-dominated succession includes two comparatively thin ironstone beds, the Pecten Ironstone Member and the Marlstone Rock Member, both of which have been worked to some degree as iron ores.

The Pecten Ironstone is best developed south of the Humber, but it is poorly exposed overall. As its name suggests, it contains a significant shelly fauna that includes an abundance of very large Pecten bivalve shells. The yellow-brown ironstone itself is typically ooidal and very similar to the Frodingham Ironstone in character, but it is a far more thinly developed unit. When used as a building stone, removed from its outcrop, it is difficult to distinguish Pecten Ironstone from Frodingham Ironstone.

As with the stratigraphically lower ironstones of the Lias Group, the Marlstone Rock forms a distinctive ridge in the landscape. Unlike the other ironstone beds of the group, however, the Marlstone Rock comprises a lower interval of calcareous sandstone and an upper interval of fossiliferous, ooidal ironstone. The latter has been worked as an iron ore in the past. The ironstone was also used locally as a vernacular building material, but it can be difficult to distinguish from the other Lias ironstones when seen out of context in a building.

Middle Jurassic

Inferior Oolite Group, Northampton Sand Formation

Northampton Sand Formation Sandstone

This formation is only thinly developed in North Lincolnshire and does not extend north of the Humber into Yorkshire. The unit itself, lying at the base of the Middle Jurassic succession, comprises a variegated, strongly ferruginous, yellow-brown to red-brown, bioclastic sandstone. Unlike its much better developed stratigraphic equivalents in Northamptonshire, it does not appear to have been worked to any great extent for local building stone, nor has it formed the basis of a local iron-making industry. Locally, though, it was sometimes used as a building rubblestone.

Inferior Oolite Group, Lincolnshire Limestone Formation

Lincolnshire Limestone (Cave Oolite, Brough Stone)

The Lincolnshire Limestone Formation is dominated by ooidal, bioclastic and finer grained micritic limestone beds, which are of variable thickness. Their outcrop extends from Kirton in Lindsey in the south to Sancton on the north side of the Humber estuary, and it is usually evidenced by a prominent north–south trending ridge. Quarrying of the Lincolnshire Limestones for both lime and building stone was once a very significant local industry. Former building stone workings are known at Hibaldstow, Kirton in Lindsey, Winteringham, Brough, Brantingham, South Cave, North Newbald and Sancton, and the quarried stones are often named eponymously: for example, Cave Oolite, Brough Stone and so forth. Most of the villages with associated quarries feature the pale yellow, ooidal and bioclastic limestones in their buildings, to a greater or lesser extent. The impressive cruciform Church of St Nicholas at North Newbald, which dates to Norman times, is constructed of locally quarried Cave Oolite.

Figure 5: Church of St Nicholas, North Newbald. Cave Oolite.

A further example of Cave Oolite use is the Church of All Saints at North Cave. The external fabric of the building exemplifies the colour variation shown by this particular Lincolnshire Limestone. The outcrops of the Lincolnshire Limestone Formation have served as the principal sources of vernacular building and walling stones for the towns and villages within this part of the east Yorkshire–north Lincolnshire area. It is quite likely, however, that a substantial proportion of the higher quality Lincolnshire Limestone ashlar employed in the building of churches and high-status houses was sourced from quarries further south, in the Ancaster–Heydour area, where the limestone beds are much thicker. Certainly, a considerable amount of modern repair and conservation work relies on Lincolnshire Limestone supplied by the active quarries found around the Ancaster area of Lincolnshire.

Figure 6: Church of All Saints, North Cave. Cave Oolite.

One particular, often cited, example of the use of Cave Oolite limestone is the original walls of the Roman–medieval town of Kingston-upon-Hull. Sadly, little evidence remains of these walls in the much-expanded modern city.

Great Oolite Group, Blisworth Limestone Formation, Blisworth Formation

Great Oolite Limestone

The thick ooidal limestone developments that characterise the Great Oolite Group in southern England (notably the Bath Stone successions of Somerset) are not present in the east Yorkshire and north Lincolnshire area. Here, the group, instead, comprises a thinly developed succession of interbedded limestones (variably fossiliferous and ooidal), mudstones and sandstones.

Nonetheless, in the South Cave area, and occasionally elsewhere near their outcrops, small quantities of limestones and fine-grained sandstones have been used for construction purposes. These units do not, however, appear to have provided a significant amount of local building stone.

Upper Jurassic

Ancholme Group, Kellaways Formation, West Walton Formation, Kimmeridge Clay Formation

Kellaways Sandstone, Brantingham Sandstone, Elsham Sandstone

Within the Upper Jurassic and Lower Cretaceous strata, the presence of the Market Weighton Axis had a significant impact on sedimentation across the east Yorkshire and north Lincolnshire area.

To the north, a rapidly subsiding basin developed in which a thick succession of limestones, sandstones and mudstones was deposited (Ancholme Group and Corallian Group). To the south, a more slowly subsiding shelf or platform became established, over which the sedimentation was 'condensed' (Ancholme Group only).

In both north Lincolnshire and south-east Yorkshire, the Ancholme Group succession is, in general, poorly exposed. Where present, it is dominated by fossiliferous mudstone and siltstone lithologies, with occasional thin developments of sandstone. Only the latter have proved suitable for building purposes. Three principal sandstone horizons are present in the group and these lie within the Kellaways Formation, the West Walton Formation and the Kimmeridge Clay Formation. Sporadic evidence of the localised use of these sandstones is found around North Cave, Brantingham and Elsham, but, evidently, the stones were not sufficiently durable to have warranted export beyond their respective outcrop areas.

The Elsham Sandstone is pale grey to greenish-grey and medium to coarse grained. It has a variable carbonate cement. There is evidence of quarries within the outcrop, but few surviving buildings constructed using the sandstone have been identified.

Upper Cretaceous

Chalk Group, various formations

Flint, Chalk

Hard, white and off-white, micritic limestone lithologies, with variable developments of flint nodules, dominate the Upper Cretaceous Chalk Group succession, which crops out extensively in the Wolds of east Yorkshire and Lincolnshire.

Buildings constructed entirely of chalk are a comparative rarity over much of this area, but surviving examples can be seen in Towthorpe, Carnaby, Wold Newton (Old Vicarage), Flamborough (former lighthouse, farm buildings), Londesborough, Langtoft (chalk cottages with brick dressings) and Burton

Fleming. The remains of a cruck-framed longhouse of brick and chalk at Octon, near Thwing, is perhaps typical of a once more common use of this stone type as a building material in the Wolds area. The large 12th-century brick manor house at Burton Agnes, meanwhile, makes extensive use of chalk for quoins and internal stone dressings. In the North Lincolnshire Wolds, a small number of buildings constructed at least in part of white chalk block remain. They include churches, cottages and farm buildings at Goxhill, Thornton Curtis, Wootton, Ulceby, Croxton, Barnetby le Wold, Wold Newton, Elsham and Buckton.

Figure 7: Former lighthouse, Flamborough. Chalk.

Unlike the Chalk Group successions of southern England, these chalks have not proved to be a reliable source of flints suitable for building purposes. Consequently, there are no examples of the elaborate flint pattern work that is well known, for example, in East Anglia. However, large, pale grey flint nodules are used quite extensively in some church wall fabrics, including at Barnoldby le Beck, Ashby cum Fenby and Hatcliffe.

Figure 8: A cottage, Langtoft. Chalk.

Figure 9: Farm buildings, Buckton. Chalk.

Quaternary (Pleistocene)

Various groups, various formations

Cobbles

The Quaternary deposits of Spurn Head to Holderness coastal strip represent one of the most significant sources of building materials in east Yorkshire. From at least the 18th century, this particular area supplied cobbles, gravel and sand not only for building purposes, but also for road making and for ship ballast. In some parts, this quarrying, or more commonly gathering, of cobbles and boulders (glacial erratics), either directly or indirectly from the eroding till/boulder clay sea 'cliffs', was extremely important to the local economy. Ongoing natural erosion of these cliffs replenishes the Holderness beaches with cobbles.

The cobblestones collected were lithologically varied and included fine and coarse-grained, igneous (Whin Sill dolerite, Shap and Peterhead granites, and red porphyritic rocks for example), metamorphic (gneisses and schists, for example) and sedimentary (Carboniferous, Permo-Triassic and Jurassic sandstones; Carboniferous, Permian and Jurassic limestones; plus ironstones and flints) rock types. Some of the lithologies present are quite clearly of Scandinavian origin. The cobbles and boulders were collected on a very large scale and delivered overland by the cartload or by boat for use in buildings and dock construction along the coast. The industry became so large that serious concerns were raised that the removal of the cobbles was, in part, responsible for occasional breaching of the peninsula during severe storms.

There are numerous examples of these cobblestones being used in houses, farm buildings and, particularly, churches, including at Hornsea, Aldbrough, Tunstal, Withernsea, Preston, Burstwick, Keyingham, Skeffling and Easington. At Easington, for example, the church tower is constructed principally of pale Magnesian Limestone from the quarries at Roche Abbey near Rotherham, with the rest of the fabric largely comprising an exotic mix of cobblestones from Spurn.

The pattern of use of these cobbles in buildings is quite variable. In the cottages at Easington, the wallstone cobbles form a herringbone pattern, with bricks being used for quoins and dressings. Elsewhere, the walls have a more random placement of cobblestones of differing sizes. In yet other cases, such as the Church of St Alban at Withernwick, the walls are coursed using a brick and cobble mix.

Some wall fabrics, meanwhile, incorporate cobbles of different sizes, colours and lithologies, which appear to have been used selectively to produce small-scale patterning. In most instances, the cobbles form the principal walling stones, with a variety of other imported lithologies being employed for ashlar work, mouldings and dressings. Magnesian Limestone, Lincolnshire Limestone and cross-bedded Middle Jurassic sandstones (presumably from North Yorkshire) all appear in church buildings in the Holderness area.

Figure 10: St Alban's Church, Withernwick. Cobbles with brick.

Figure 11: Cottages, Easington. Cobbles.

3 Examples of Imported and Reused Building Stones

The east Yorkshire and north Lincolnshire area, despite its considerable geographical extent, is generally lacking in indigenous high-quality building stones suitable for ashlar and decorative stonework. Indeed, as already noted, most of the built structures in the villages and towns principally make use of local brick (for example, Burton Constable Hall, near Hull), with stone being used only for decorative features such as window mouldings. It is clear, however, from Norman times onwards, that stone was the building material of choice for important buildings, such as churches, and a number of the great houses. To meet the demand for such stone, it had to be imported into the area by river, sea or over land, and it is these imported stone types that have the greatest impact on the character of the stone architecture over much of the area.

The Church of St Peter at Humberston near Grimsby provides one particularly interesting example of stone reuse. This large, structurally complex church dates back to the 15th century and has a fabric that includes a brick nave, a large tower that is, in part, of imported pale Magnesian Limestone, and footings that include a mix of recycled medieval Magnesian Limestone tombstone fragments and weathered fragments of dark grey, fossiliferous Purbeck Marble (also probably from a medieval tomb slab).

Figure 12: Tower footings, Church of St Peter, Humberston. Reused medieval Magnesian Limestone and Purbeck Marble.

Figure 13: Church of St Peter, Humberston. Magnesian Limestone and reused Purbeck Marble.

Lower Carboniferous

Carboniferous Sandstone

The reuse of previously dressed stone was important in other parts, too. The best examples of such stone 'recycling' are probably provided by the large, pre-dressed blocks of coarse-grained Carboniferous Millstone Grit sandstone that are seen with some frequency in the churches located along the Humber coastal strip in North Lincolnshire, at Barton-upon-Humber and Alkborough, for example. These gritstone blocks were probably robbed from nearby Roman sites and transported along the Humber by raft or boat. Recycled blocks of Carboniferous Millstone Grit sandstone were used for both the pilaster strip work and the 'long and short' work on the Saxon tower of the Church of St Peter at Barton-upon-Humber.

Figure 14: Church of St Peter, Barton-upon-Humber. Carboniferous Millstone Grit Sandstone.

Elsewhere, in later times, there is also evidence of a considerable trade in the finer grained, brown-coloured Pennine Coal Measures sandstones, such as the Ackworth Rock and Mexborough Rock. These sandstones were suitable for decorative window and door mouldings and, in some cases, they were even put to use as ashlar blocks, at the Church of St John the Baptist at Stamford Bridge, for example.

Figure 15: Church of St John the Baptist, Stamford Bridge. Pennine Coal Measures Sandstone.

Permian

Lower Magnesian Limestone

Perhaps the best example of the importation of stone into the area is the widespread use of the dolomitic limestones of the Late Permian Cadeby Formation (Lower Magnesian Limestone). These dolostones were quarried extensively from medieval times onwards along their north–south trending outcrop, which lies just outside the area in West Yorkshire (notably around Warmsworth, Steetley, Pontefract, Huddleston and Tadcaster). The structures of the massive minsters and parish churches at Beverley, Hedon, Patrington and Skirlaugh are dominated by white or cream Magnesian Limestone. The church at Howden owned the rights to work stone at a Tadcaster quarry, which was duly used to construct the very substantial Howden Minster. Other smaller, but no less significant Magnesian Limestone buildings include the Bishop's Manor, Howden; the Church of St John the Baptist, Carnaby; the Church of St Mary, South Dalton (Steetley Stone); Wressle Castle; the Priory Church of St Mary the Virgin, Swine. Other examples of use of Magnesian Limestone in churches include St Michael and All Angels, Sutton-upon-Derwent; St Mary, Ellerton; All Saints, Bubwith; and St Oswald, Crowle.

Figure 16: St Oswald's Church, Crowle. Late Permian Magnesian Limestone.

In North Lincolnshire, Magnesian Limestone was imported from quarries near Tadcaster and put to decorative use in the construction of Thornton Abbey's magnificent 14th-century brick gatehouse. The stone was carried from the quarries first to the River Wharfe, then moved along the Ouse and down the Humber, before being taken to the abbey site. Also evident in the fabric of the gatehouse are large blocks (presumably repairs) of now badly weathered, yellowish limestone with large bivalve fossils. This is the more locally sourced Tealby Limestone.

Figure 17: Gatehouse, Thornton Abbey. Magnesian Limestone.

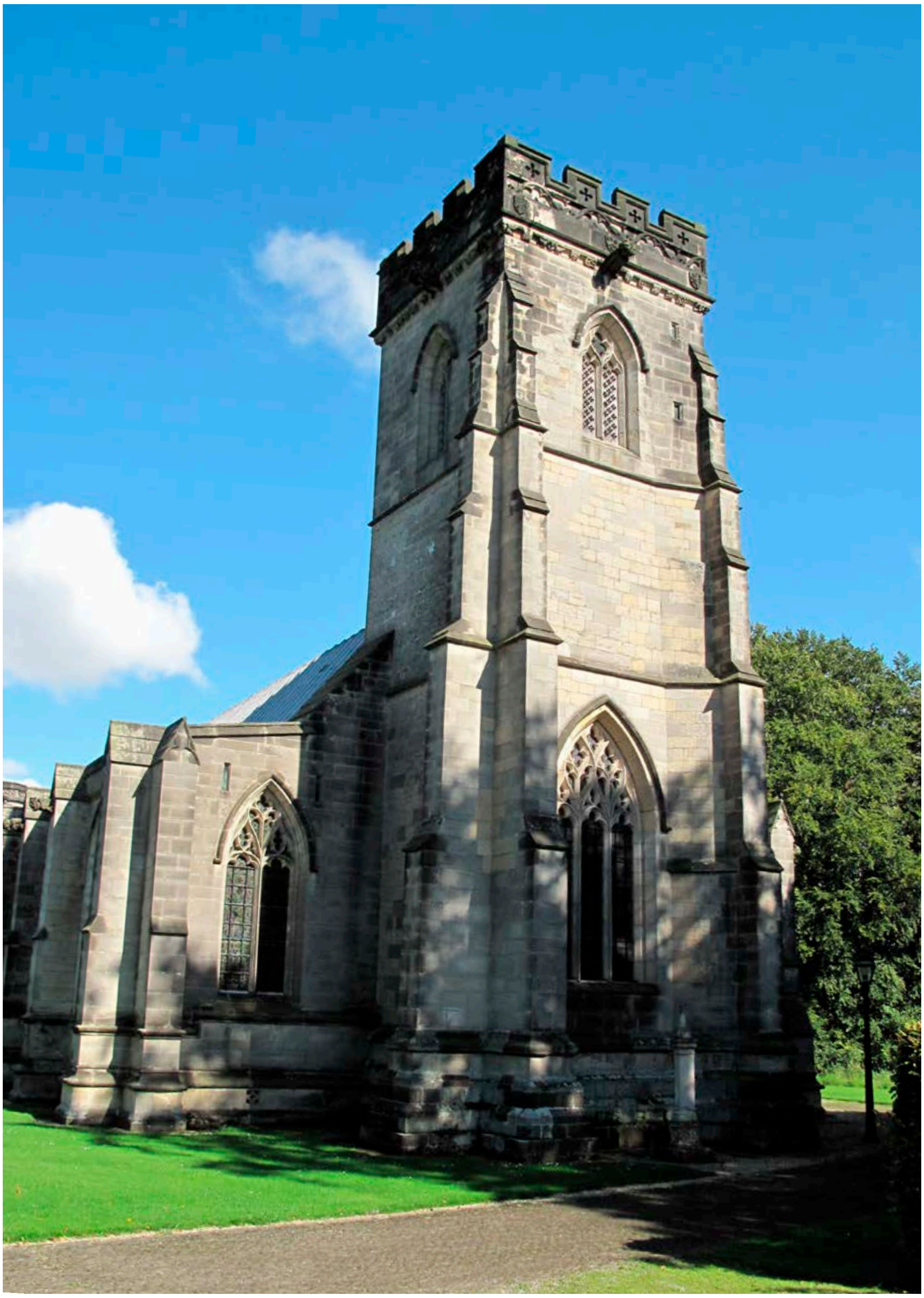
Middle Jurassic

Whitby Stone (Aislaby Stone)

In the northern part of east Yorkshire, fine-grained sandstones worked from the Middle Jurassic successions of the Cleveland Basin are conspicuous. These sandstones almost certainly originated from quarries located near Whitby, which produced what is now commonly known as Whitby Stone or Aislaby Stone. This sandstone was used for decorative work in conjunction with less suitable locally available stone types.

The Church of the Holy Trinity at Bridlington apparently also used this Glaisdale-produced Aislaby sandstone. The Aislaby Stone quarries are still actively supplying stone to the east Yorkshire area and elsewhere.

Figure 18: St Mary's Church, Sledmere. Busca Gill Stone with Whitby Stone dressings.



Upper Jurassic

Corallian Group Calcareous Grit Sandstone

The Upper Jurassic succession tends to be both poorly developed and poorly exposed in east Yorkshire. Where present, it is characterised by interbedded, fine-grained, mudstone/siltstone lithologies, which generally do not provide suitable building material. To the north-west, however, outside the east Yorkshire area, the succession comprises a thick sequence of fine-grained spicular sandstones (including the Lower, Middle and Upper Calcareous Grit formations) separated by beds of ooidal and bioclastic limestone. Collectively, these sandstones and limestones comprise the Corallian Group.

Sandstones quarried from this Upper Jurassic succession, in the Howardian Hills and Tabular Hills, have seen common use in north eastern parts of Yorkshire. Although comparatively soft and sometimes coarsely fossiliferous and ferruginous, these sandstones are seen with some frequency in church fabrics, mainly as ashlared blocks, but also as decorative mouldings and dressings. Examples include the Church of St Cuthbert at Burton Fleming, the Church of All Saints at Thwing, the Church of St Mary at Fridaythorpe, the Church of St Martin at Fangfoss, the Church of All Saints at Kilham, the Church of St Michael at Bempton and the Church of All Saints at Wold Newton. Ashlared blocks of Upper Jurassic Corallian Group Calcareous Grit sandstone (likely Lower Calcareous Grit Formation) dominate the external stonework of All Saints' Church at Wold Newton. The nave dates to the 12th century, whereas the south porch, bell turret and chancel were built in the 19th century.

Figure 19: Stamford Bridge. Calcareous Grit Sandstone.

In general, the Calcareous Grits are fine to medium-grained, calcareous, marine sandstones, which are often characterised by large crustacean (Thalassinoides) burrows, concretions and bioclasts. These sandstones were comparatively easy to cut and dress and were, therefore, used as large ashlar blocks. However, they are relatively weakly cemented and can often show signs of significant weathering and cavernous decay. Blocks of Calcareous Grit sandstone were employed in bridges, including the 18th-century River Derwent crossing at Stamford Bridge. In general, the sandstones have not weathered well. In the northern parts of the east Yorkshire area, stone was imported from the Acklam Hills quarries.

Figure 20: All Saints' Church, Wold Newton. Calcareous Grit Sandstone.

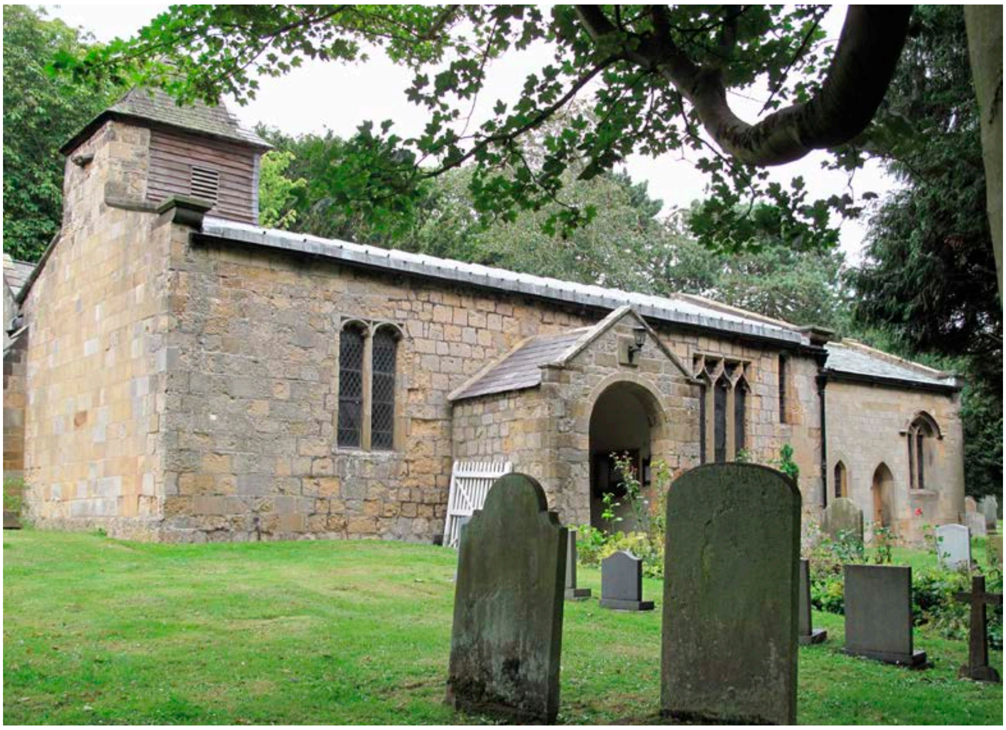


Figure 21: All Saints' Church, Wold Newton. Calcareous Grit Sandstone.

Lower Cretaceous

Spilsby Sandstone, Ironstone, Tealby Limestone

A thin, but lithologically complex, Lower Cretaceous succession is present along the western scarp of the Lincolnshire Wolds. It includes the Spilsby Sandstone Formation, Claxby Ironstone Formation, Tealby Formation and Roach Formation. The comparatively thick limestone unit occurring within the Tealby Formation (the Tealby Limestone Member) was an important source of local building stone, despite the fact that its outcrop does not extend into the east Yorkshire and north Lincolnshire area.

Spilsby Sandstone is a distinctive, grey-green, fossiliferous and glauconite-rich stone has been widely quarried and used as a building stone in eastern Lincolnshire, but it is seen only infrequently in north Lincolnshire where it has been employed occasionally for repair work.

The Tealby Limestone comprises dark yellow-brown, argillaceous, ferruginous limestone that is often characterised by the presence of very large mollusc shells, occurring either in isolation or in clusters. The limestone was worked into large ashlar blocks, but its fine-grained, soft, muddy nature means it has weathered badly. The wall fabrics of the many churches in which it has been used, in both Lincolnshire and north Lincolnshire, show sizeable areas of serious decay. A particularly striking feature of many of the weathered stone blocks is the nests of the aforementioned thick-walled bivalve fossils, which tend to stand proud of the block surface. The limestone was unsuitable for carved work, mouldings and dressings, and so paler, ooidal Lincolnshire Limestone was generally used for this purpose. Examples include the Church of St Clement at Worlaby and the Church of All Saints at Cadney.

Figure 22: St Mary's Church, Hatcliffe. Tealby Limestone.

Tealby Limestone was also employed extensively in churches in north east Lincolnshire, at Hatcliffe, Brigsley, Barnoldby le Beck and Ashby cum Fenby, for example, and it was used occasionally for housing and farm buildings in this area, including at Wold Newton. Furthermore, Tealby Limestone was used, at times, in the construction of dwelling houses, such as in The Welfitts (the Old Manor) in Wold Newton. Extensive repair work has evidently been necessary, presumably because of the failure of the limestone blocks.

Figure 23: The Welfitts, Wold Newton. Tealby Limestone.

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.

East Yorkshire and northern Lincolnshire references

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