

PRECAST CONCRETE PAVING SLABS

Large rectangular concrete slabs (“two by threes”) have been used widely in urban areas in Suffolk from the 19th Century onwards and as such are a traditional feature of many of our towns and larger villages. The use of this material is entirely appropriate in many locations, including sensitive areas. Many of those in existence were made in Suffolk using locally sourced gravel or granite imported from elsewhere. These slabs should be retained wherever possible, relaid if necessary or used elsewhere in the vicinity. Care should be taken in choosing second-hand slabs to ensure that they match others which exist in the area.

New concrete paving slabs are available in a variety of textures and colours. Thicknesses vary and some slabs are designed so that they can be overridden by traffic. Sizes range from ‘small element’ to larger rectangular slabs. From a visual point of view rectangular slabs are almost always preferable to square. The largest size slab that is practicable should be used. This may require mechanical laying which may increase the cost.

Concrete slabs are relatively inexpensive and most slabs are now sourced from large national companies. Those from reputable manufacturers will be produced using materials from certified sources.



Above: Old concrete paving slabs in Woodbridge



Right: New rectangular concrete paving slabs laid in Bury St Edmunds

Due to the range of products available there will generally be slabs to suit all locations and requirements. However, it is preferable to restrict choices to a limited palette for visual and maintenance reasons. Slabs which derive their natural colours from aggregates, for example gravel, Yorkstone or granite, complement the Suffolk environment and are preferable to strongly coloured products dependent on dyes.

The appearance of concrete slabs will alter over time with weathering and this could improve or detract from their appearance. This should be considered when designing a scheme. Although cheaper than natural stone, concrete slabs normally require replacing after a shorter period.



A wide range of concrete slabs are available, however care should be taken when choosing colours. Strong coloured products will not be appropriate in many locations.



Slabs should be laid to an agreed pattern carefully cut to fit the required space. Small 'left over' spaces which necessitate the excessive use of pieces of cut slab should be avoided.

Traditionally slabs are laid with the continuous line of the joints at right angles to the kerb and building line. Infilling using concrete paviors to avoid cutting is not acceptable as it results in a 'zip fastener' effect.



Rows of slabs should not be laid parallel with the kerbline



A well laid footway using concrete slabs with an exposed pink granite aggregate (Woodbridge)



Infilling using concrete paviors is no longer an acceptable practice



Small pieces of cut slab and infilling with concrete should be avoided.

Technical Information

1. Normally precast concrete paving is laid with a staggered bond for visual and technical reasons. Other laying patterns may be used, for example in more contemporary environments.
2. Slabs should usually have slightly chamfered or rounded edges in order to avoid spalling.

Flags larger than 450mm x 450mm

3. These flags should not normally be used in areas that can be accessed by vehicular traffic. If they are used then special requirements of unit thickness and bedding will need agreement with SCC.
4. The flags shall be laid on a 1:3 lime sand mortar bed. A method of working and

inspection should be agreed with SCC. 90% of the flag shall be in contact with the surface under the flag.

5. The flags shall be provided with wide joints and if the length exceeds 12m in any direction, provision shall be made for thermal expansion. If work carried out in between June and September the length may be extended to 20m.

Flags 450mm x 450mm or smaller

6. These flags shall be laid on a sand laying course.
7. Narrow sand filled joints are to be used except where the flags are to bond in with larger units. In this case the joint requirements of the larger units are to be used.

COBBLES

Cobbles are rounded stones which are used unworked in their natural (irregular) state and as they reflect local geology, they vary significantly in colour.

In Suffolk, local flint cobbles are quite common and were traditionally used to improve an unmetalled surface, or as a curtilage treatment for properties fronting a highway.

In the past, cobbles were taken from riverbeds, fields, beaches, or boulder clay deposits. Nowadays they are a by-product of the sand and gravel extraction industry where they are referred to as 'rejects'. Care should be taken when sourcing cobbles to ensure they are not being taken illegally from beaches or riverbeds because of the impact of their extraction on the local environment. Although the percentage of cobbles in any deposit varies across the region there should be no difficulty sourcing locally, therefore reducing transport costs. In addition, secondhand cobbles are available.



Cobbles extracted as a by-product of gravel workings (Wangford)



Old cobbles in Needham Market

Today, cobbles are mostly used to deter pedestrians from walking on certain areas as their irregular surface makes it awkward to walk on or push prams or wheelchairs across. However, in suitable locations well laid cobbles provide an attractive hard and resilient surface which harmonises with the Suffolk environment.

Compared with some other forms of paving, cobbles are moderately priced. However, they are time consuming and labour intensive to lay. Cobbles can be supplied ready graded according to size but some sorting will still be required on site to ensure an appropriate laying pattern. It is important to ensure that contractors are experienced in laying cobbles as the skills required are not the same as those required for block paving.

Cobbles must be laid butt jointed and pushed into the wet concrete with their longest side vertical so that a minimum of 75% of the length is below the finished level. The cobbles should be selected and arranged so that they make up at least 75% of the total area to be covered. This is essential to avoid the impression of an area of concrete with a few stones added in arbitrary fashion.

Historic examples in Suffolk include Needham Market High Street, where extensive areas of cobbles form the 'private' forecourt of many properties. New cobbles have been laid where the historic cobbles have previously been removed.



Large cobbles can be used to discourage use by pedestrians



Well laid small cobbles



Cobbles neatly laid between an historic building and a riven Yorkstone footway



Traditionally cobbles were used to demarcate forecourts



Examples of poorly laid cobbles

Technical Information

1. If the cobbles are to be laid in a small area (less than 400 m²) then the concrete support should have a minimum overall depth of concrete of 200mm.
2. If the area exceeds 400m² then a specialist design will be required.

Concrete

3. In order to ensure full closure of the mix around the cobbles the maximum nominal aggregate size in the concrete will be 8mm
4. The consistency of the concrete shall be chosen to allow the cobbles to be handplaced and packed without sinking and to allow full closure around the side of the cobbles.
5. Full details of the concrete specification are included in Appendix B.

Cobbles

6. In Suffolk flint cobbles are preferred as they are a local material.
7. Cobbles shall be clean and from a reputable quarry source.

8. They should generally be of rounded or sub-angular shape and of 63mm/90mm nominal size. Full details of cobble size within Appendix B.

Laying

9. If subgrade is permeable it should be sprayed with bitumen road emulsion or covered with polythene sheeting.
10. Bottom crack inducers should be provided at 3m centres.
11. Cobbles are to be pushed into the concrete with their longest axis vertical.
12. At least 75% of the cobble should be below the level of the finished concrete.
13. The cobbles should be arranged such that the cobbles cover at least 75% of the area being surfaced.
14. The surface between the cobbles should be finished to allow the free drainage of surface water and be within 15mm of the designed level
15. The highest point of any cobble shall be within 20mm of the designed level.

STONE SETTS

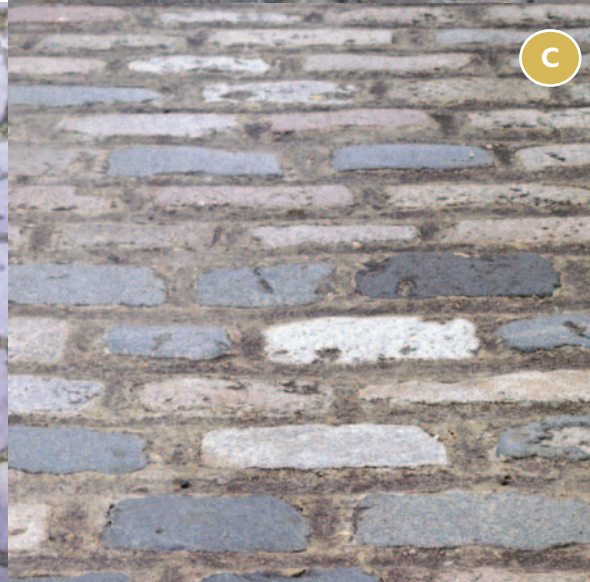
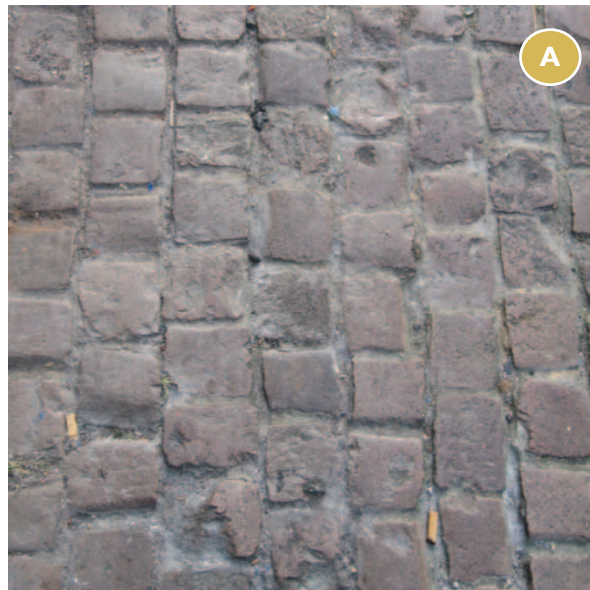
Stone setts are a traditional material, used in Suffolk since the 18th Century. Setts were used to pave surfaces which took some form of vehicular traffic; they were also used for gutters and accesses across footways.

Old stone setts vary greatly in terms of texture, size and colour, depending on their source. In Suffolk granite, Yorkstone and limestone setts are all found, but they are used much more sparingly than in other parts of the Country where the stone can be quarried locally. Existing stone setts should be retained insitu or, if that's not possible, relaid on site or reused in the same vicinity.



Old granite setts in Ipswich

- A** *Cropped pink granite*
- B** *Butt jointed limestone*
- B** *Different coloured rectangular setts with mortar joints*



New setts are readily available from quarries in the UK and abroad. Transport and handling costs are high due to their weight. Setts from countries such as Portugal and China are often cheaper than their UK equivalent but sustainability issues should be considered before setts are ordered from abroad.

New stone setts are available in a variety of finishes both rough and smooth. Sawn setts may be tumbled to give them a weathered look.

The stone type and surface finish should be appropriate for the location and its use.

Laying setts often requires on-site sorting, and is labour intensive and therefore expensive but once laid, very little maintenance should be required.

Care should be taken to ensure that where vehicle turning movements occur the size of the setts and the specification for laying them is sufficient to prevent the setts working loose.



Granite setts used in a parking bay (Bury St Edmunds)



Tumbled Yorkstone setts (Eye)

New stone setts



A Smooth pink granite

C Cropped, silver grey granite cubes

B Butt jointed tumbled Yorkstone setts

D Rectangular cropped dark grey granite

Technical Information

1. Frost resistant material will be required for all bedding materials within 300mm of the finished surface on sand and gravel subgrades; 350mm on clay; and 400mm on chalk.
2. If reclaimed setts are used they should be from a reputable source and suitably cleaned prior to laying.
3. Granite setts are to be laid on 200mm of subbase.
4. Setts are to be bedded into a minimum thickness of 70mm of fine concrete.
5. Joints between setts should not exceed 20mm
6. Careful selection of setts is required prior to laying to give uniform coursing and joints.
7. Joints should be finished with smooth pointed cement/sand mortar (4:1) to approximately 10mm below sett surface to allow water runoff below the running surface.
8. All mortar staining shall be cleaned from setts on completion to give a clean polished finish.
9. Sett paving shall be fully cured before trafficking.

10. Yorkstone setts shall be sawn or tumbled sawn yorkstone.
11. Limestone setts shall not be used in trafficked areas due to their low skid resistance.

Bedding and joint filling

12. As an alternative to sand, crushed and ground glass can be used for bedding and joint filling if it has the same characteristics as that of the specified sand.

Laying

13. Rigid laying systems to BS7533 Part 7 shall only be used where the pavement is designed to carry greater than a million standard axles.
14. A membrane to restrict migration of sand shall be required where a flexible laying technique is used over an existing cracked surface such as a road..
15. Cement or hydraulic binder shall not be used in any materials for the laying courses or joint filling in flexible systems.