EAST HERTS HERITAGE GUIDANCE NOTES

Guidance Note 1: Timber Framed Buildings

In East Hertfordshire most of our surviving early domestic buildings were originally or wholly timber frame construction.

Stone was not found in this part of the country and brick only became widely available after 1600. Timber, on the other hand, was readily available here for many centuries and was re-used over and over again when it became scarce later on. The earliest surviving framed building in this area dates from the C13th and the timber-framed system continued to develop with local variations until about 1650.

Timber framed buildings are often thought of as "humble" structures but this was the principal system of construction in England for hundreds of years. Large buildings were sometimes divided into smaller units such as a terrace of cottages, later in their life, but this in no way detracts from a structural system of such distinction and quality that it has lasted for centuries. In this area, many small cottages are part of former large yeoman houses or even, former manor houses and the first indication of this today is often the very high standard of their timber framing.

Timber Frame Characteristics

Timber framed buildings are totally functional. Every component part of the frame serves a purpose in taking a load or a stress to keep the whole structure in equilibrium. This is why the members of a frame should never be removed or cut through. Apart from destroying the completeness of the structure this disturbance will set up new stress patterns and may cause settlement, cracking of finishes or infill panels, failure of other members and serious instability. These problems may continue after the initial damage has been done. Even cutting channels for pipes and cables through the members can weaken them with similar results and should be avoided.

It is essential therefore, as a first step, to understand how your building works and always to remember that it is a framed structure, however monolithic it may appear at first glance, with its forces and loadings carried on the comparatively slender timber members of the frame and that every component is there for a purpose and is removed or cut through at your peril. If you are repairing a timber framed building you are strongly advised to seek professional help. It is not a job for an amateur.

Professional advice

The Royal Institute of Chartered Surveyors (RICS) and the Royal Institute of British Architects (RIBA) both keep lists of their Members who are accredited conservation specialists experienced in this type of work, who operate in this area. All full members of the Architects Accredited in Building Conservation (AABC) and the Institute for Historic Building Conservation (the IHBC) are also accredited and capable of giving professional advice. It is always advisable, however, to see for yourself other projects that they have completed to check the standard of work.

It is essential to understand the characteristics of your particular building. No two timber frames are the same so there are no standard solutions.

Movement of Timber Framed Buildings

Timber framed buildings move and distort more than other structures and this often adds to their charm. It is obviously necessary to work out why movement has occurred and to stabilise the structure if it is still moving but it is not usually a good idea to try to correct distortions which may have happened long ago.

Forcing a frame back into its vertical position may cause distortion elsewhere or fracture joints which have settled into their new positions, and can often do a lot more harm than good.

Choice of Timber to repair Timber Framed Buildings

Most timber frames in this area are constructed of oak - very occasionally elm or chestnut is found. Timber to be used for repair should match that of the original frame in its type.

In the case of oak repairs to simple structures such as barns or the roofs of most old buildings are carried out using "green" oak. This should have been felled for at least three years and be free from sapwood and major cracks (exceeding 150mm long) and knots. It should be straight grained.

There may be some subsequent distortions as the new "green" timber dries out but this should not adversely affect the strength of the frame.

In the case of repairs to fine carved or moulded work, however, fully seasoned oak with a moisture content of no more than 15% is essential - it must also be selected so that the grain matches the original. It is generally inappropriate to use re-claimed (second-hand) timbers for repair. Oak becomes very hard as it ages so it is difficult to work and the mortices or chamfers and mouldings from its original location will be visually confusing in a new situation.

In the interest of historical integrity new oak repairs should not be "distressed" "antiqued" or stained to look old. They settle down very quickly after they have been installed although they look very new at first and it is a nice idea to date them for the benefit of future occupants and historians.

Pegs in Timber Framed Buildings

Pegs are very interesting components of the timber frame and their presence or absence often hold the key to the way in which the frame has evolved over the centuries. They secure the joints between the timber members - nails are never used in an authentic timber frame. Like the rest of the frame they are made of oak and for new pegs this must be as dry as possible so that it does not shrink.

Pegs are tapered and rounded at the entry end and square in section at the projecting end. Second-hand pegs should never be used.

Concealed Framing in Timber Framed Buildings

Not all timber frames were intended to be exposed. The practice of plastering over the new frame externally grew during the C16th and was the norm by 1750 in this area. By this time the excellent timber used for earlier construction was not so readily available. The development of decorative external plasterwork (pargeting) was rapidly taking place.

Timber framing, in recognition of this, became less impressive with both poorer timber and poorer finishes which were always intended to be concealed. The plaster should be retained in such cases. If exposed, the timbers may not be able to withstand the elements. They may warp or contract and the nail holes left after removing the laths look unsightly and can allow water penetration into the centre of the timber, possibly leading to rot.

Conversely there are cases where timbers should be revealed. Chamfered, stopped and carved beams and joists were intended to be seen but are often concealed by later coverings.

The only way to decide the quality of the concealed timbers in your frame is to reveal a small area of timber, preferably during other repairs, and discuss the findings with your professional consultant and the Council's Conservation Officer. The opening up of timbers previously concealed needs formal Listed Building Consent.

Surface Treatments for Timber Framed Buildings

Oak is a maintenance free material, which actually needs little or no surface treatment. Historically, in this area, it was not painted although occasionally traces of natural pigments have been found on frames. Lime-washing, across both structural timbers and infill plaster panels was, and still is, an acceptable and attractive technique frequently used in East Hertfordshire.

Softwood used for joinery from the C18th onwards was, however, always painted and the fashionable practice of stripping pine in old buildings is generally historically incorrect. Internally, medieval buildings often had wall paintings. These were carried across both plaster and the structural timbers. They are becoming rare and should be preserved if discovered.

Originally medieval open halls had central open hearths. Escaping smoke caused soot blackening of roof timbers and, after so many centuries, the soot is now actually embedded into the timbers. This must be recognised as of great significance historically to the building and should never be removed.

In the C19th it became fashionable to darken structural timbers to achieve a "black and white" effect. The removal of the various substances used to blacken the timbers is recommended whenever possible but is not easy to carry out.

Sandblasting is unacceptable and could lead to prosecution as it always removes some of the timber as well as the surface coating. Mouldings, carpenter's marks, taper burns, soot blackening and the marks made by the original carpenter's tools are often lost completely or are blurred beyond recognition. The "scraped" surface which results has a dry "driftwood" appearance totally unrelated to the natural quality and character of old timber.

Cleaning should be done by hand and no mechanical tools should be used. Tar can be removed by applying sodium or potassium hydroxide in a clay poultice followed by thorough washing down and the application of two or three coats of limewash. After three days this should then be brushed down with a hard bristle brush.

Paints and stains usually respond to the application of a non-caustic proprietary stripper following the manufacturer's instructions. Always test on a small trial area first.

Caustic strippers, in paste form, can be successful but can cause bleaching of the timber. Scrapers, steel wool and sandpaper can all be used with care. Blowlamps should never be used, as fire is an ever present hazard in old buildings.

The removal of dirt often only requires a good brush down and a wash with soap and water to which a little household washing soda has been added. This should be followed by a thorough rinse with clean water taking care to protect adjoining surfaces. If it is considered that further treatment of the interior timbers is necessary then a thin coat of clarified beeswax dissolved in pure turpentine can be applied with a soft cloth.

Timber Problems in Timber Framed Buildings

When timber is attacked by insect larvae the honeycombed and powdery residue is known as "frass". Decay, either by insect or fungal attacks, is usually a major cause of failure in a timber frame because it is most common at joints where the vulnerable end grain can be attacked by wood boring insects. Overreaction to decay is, however, commonplace and timbers are often condemned unnecessarily.

Remember that many timbers in old buildings are over-sized by modern standards and thus can stand considerable loss of strength without being weakened to the point where they cannot take the load or stress required of them. Conversely though it should be noted that later timbers were not of such good quality and were often second-hand or undersized.

It is always essential to carry out an inspection at close quarters checking particularly at the joints to make sure that - for instance - the tenon still exists before deciding on the appropriate repair of any timber frame. Dry rot in oak is rare but wet rot does occur in saturated timbers. Lyctus and furniture beetle can attack sapwood. Death watch beetle is more serious because it destroys much more timber and generally attacks dark, inaccessible areas like roof plates and the ends of beams and timbers. It can cause structural damage.

In all these cases specialist advice is essential remembering that much needless damage and unnecessary expense has been caused by ignorant and over enthusiastic operators anxious to sell their product or service. Remember also that the cutting or removal of any timbers may need Listed Building consent even if the work is part of a repair programme, and before any such work is carried out you should submit sufficient details on the proposals to the Council's Conservation Officer.

Infill Panels used in Timber Framed Buildings

The three most common forms are:-

Wattle and Daub: This is the earliest method and usually consists of a clay, dung and straw wet mixture applied to a lattice panel of split hazel or willow boughs woven around staves. The outside faces were usually lime-washed after drying out.

Lath and Plaster: This method uses a soft lime plaster reinforced with animal hair on laths (thin timber strips). Again the outside surfaces were lime-washed after drying out.

Brick Nogging: Bricks were sometimes laid straight or sometimes in herringbone patterns as in-filling to a timber frame. It is unusual for brick to have been the original infilling in this area, although

examples do exist. Generally it is a later replacement of one of the two preceding methods and problems may result from this because the brickwork is heavier and can distort the frame. Brickwork, in taking much longer to dry out after rain than wattle and daub or lath and plaster, can also trap rainwater against the timbers causing rot. In such cases the removal of the brickwork and its replacement with a lighter infill should be considered, but discuss with your Conservation Officer as any changes to the panels will need Listed Building Consent.

Original Wattle and Daub or Lath and Plaster should be conserved. The daub or plaster may have cracked or lost its key with its wattle or lath backing but careful repair can save it and even if the covering is beyond salvage the wattle or laths can often be kept and re-plastered.

Sometimes infilling panels are so decayed that they have to be replaced. The traditional methods described above can be used but often are adapted nowadays to include modern thermal insulation and vapour barriers. The plaster finish on each face should, however, be neither too rough nor too mechanical. A smooth "wood-float" finish is recommended and the use of a lime plaster mix is essential because of its elasticity and ability to respond to the movement of the timbers without undue cracking. Some cracking has to be accepted as an inevitable consequence of a timber framed building, but the use of lime plaster (not cement) will reduce this. The use of plasterboard is not recommended on old buildings as its appearance is too uniform and mechanical and it does not fit well around old timbers.

Limewash is the correct traditional surface decoration for plaster in timber framed buildings and is now widely used in high quality conservation work. Some modern exterior paints have some ability to "breathe" and only these should be used (Dulux Weathershield is the most commonly used).

Resin based surface treatments which form an impermeable seal should never be used. Moisture cannot escape through them and this can damage the timbers.

Repairs to the frame of a Timber Framed Building

Frame repairs are highly complex and each building has to be dealt with on its own individual merits. There are many competent technical treatises on the subject and skilled professional advice is essential. Your contractor also needs to be highly experienced in timber frame work. The following notes cover briefly the main problems which are encountered and some solutions but they are not intended to offer anything other than broad guidance.

Cill plates are sometimes also called sole plates. They are the horizontal timbers at the bottom of the frame. They are vulnerable to rising damp and, in the case of barns particularly, impact damage. They are often laid on top of low brick plinth walls which are themselves crumbling. The vertical timbers, known as the studs, are tenoned into the cill plate and their most frequent point of failure is at their feet again due to dampness.

Both studs and cill plates can usually be repaired in situ by replacing the decayed sections with new inserted matching timber sections. The same approaches can be used in the more complex repair of timber roofs where an overall assessment of the structural problems is an essential first step in deciding how to repair.

A good basic starting point is to aim to retain as much original timber, in its original position, as possible and to achieve the same quality of materials and workmanship in any repair work as exists in the original frame. Where possible joints should be re-made authentically, but purpose made metal straps and plates can be used in some positions. Please also remember that the plinth wall brickwork can be of historic interest itself and should only be replaced where it has deteriorated beyond repair. Depending on the proposals, this may require Listed Building Consent, so contact the Council's Conservation Officer before carrying out the work.

Legal Aspects of a Timber Framed Building

Most historic timber framed buildings are statutorily listed and Listed Building Consent is needed for any works to the exterior or interior which change the character of a listed building or involve even very small amounts of demolition including the cutting or removal of individual timbers.

Guidance Note 2: Cleaning Historic Masonry

Historic masonry and brickwork is most often cleaned for purely aesthetic reasons, although there are sometimes practical reasons for removing dirt or encrustations in order to expose cracks or open joints for repair. Heavy soiling can lead to decay. Whatever the justification for cleaning brickwork, a careful and considered approach is required, as a great deal of damage can be done through inappropriate methods and careless execution. Most of the methods described here should only be carried out by professional operators.

East Hertfordshire is especially fortunate in having a great many beautiful brick buildings. Some of this brickwork may be early examples of the C15th or C16th - thin (probably about 2" thick) soft red bricks often quite irregular in size and texture. Georgian bricks are more regular in size - especially later in C18 - but they are still relatively soft. These earlier bricks will have weathered over the centuries and developed an often beautiful patina which is an essential part of their character. As they are comparatively soft they will be badly affected by ill-considered methods of cleaning and expert advice should always be sought before the commencement of works.

C19th brickwork is often far harder than earlier brickwork - but even so the visually 'softening' effects of weathering can add much to the appearance and sense of age to a building.

Cleaning should still not be undertaken lightly. Some techniques are notably hazardous both to the building and, potentially, the operatives. Cleaning is a highly specialist activity and should not be undertaken by general builders unless they have significant experience in this area. Please contact the Royal Institution of Chartered Surveyors (the RICS) and appoint an accredited conservation Building Surveyor to assess the building, specify any cleaning and oversee the works. Any proposed works should be submitted to the Council for pre-application advice prior to letting any contract.

Inappropriate or aggressive cleaning of brickwork can have disastrous effects that can severely damage the historic character of a building. The cleaning of brickwork should not be undertaken without good reason and generally should be avoided wherever possible. The aim of this article is to describe the cleaning methods available and some of the problems associated with their use.

It is more likely that larger, more 'formal' buildings would require cleaning, as often the patina on smaller vernacular buildings is intrinsic to the charm and interest and should not be removed. A single cleaned terrace house, for example, may look startlingly brash when compared to its uncleaned neighbours.

There are five general methods of cleaning brickwork. It should be noted at this point that although the methods are described here for the sake of completeness, the council in no way endorses their use on the historic buildings of East Hertfordshire without first obtaining pre-application advice from the Council's Conservation Officers. The methods are washing, mechanical cleaning, abrasive blasting, chemical cleaning and super-heated steam cleaning. Of these, the latter is the most benign and is often the most effective.

The method selected depends on several factors, such as the type and condition of the masonry, and the degree of soiling. A flexible approach in the choice of method is required, but whichever is used,

the technique must be applied carefully and correctly, or avoided altogether in order to prevent damage to the brickwork. Technique is as important as method. Additionally, on larger buildings, there must be some formal provision made for the disposal of waste matter produced in the cleaning process.

It may be necessary to try several techniques or a combination of methods to achieve success. A 'response test' should be made over a small trial area in the first instance to see if the brick can be cleaned without damage. Where the problem appears complex, or where the building concerned is of historic value, specialist advice or services should be sought, and the Conservation Officers can advise. Always seek advice before attempting any cleaning work.

Washing with Water

Washing is a simple process in principle and generally the safest, merely requiring sufficient water to be placed in contact with the surface of the brickwork in order to either wash away the dirt deposits of soften them enough to be brushed off. Most problems associated with washing are to do with saturation. There are several possible consequences of saturation, which can include staining due to salt migration, the washing out of weak pointing material (which would then have to be replaced on a like for like basis: please refer to "Brick Repointing and Repair"), water penetration through defective joints or cracks and the growth of algae on recently washed surfaces. In cold weather, considerable damage can result from the freezing of water trapped in the joints so ideally no washing should take place during winter months. Successful washing is therefore linked with putting the minimum amount of water exactly where it is needed for the minimum amount of time.

Nebulous ('droplets') spray washing is a most effective method of removing dirt, but heavy soil deposits may require an undesirable amount of saturation. Such heavy soakings almost inevitably lead to efflorescence, a process whereby salts in the brick rise to the surface to produce a disfiguring white bloom. Whilst this can be dry brushed away, there is a risk of a subsequent re-appearance. Saturation can be reduced by intermittent, or 'pulse' sprays, where short bursts of water achieve a progressive softening of deposits without soaking. Water at pressures that damage the brick surface or mortar joints must never be used. The deposits should ideally be brushed with nail brushes of compact natural bristle, particularly on the softest faces, such as gauged brickwork. Other more durable facings can be brushed with non-ferrous (most commonly made of brass) soft wire, or bristle; but never steel wire. Glazed brick, vitrified headers or engineering bricks can be cleaned using low pressure water lances and neutral PH soap, carefully rinsed off afterwards. Scrubbing with detergents should be avoided, as detergent powders contain sodium sulphate, which again can react with salts in the brick.

Mechanical Cleaning

This method removes dirt by scraping off the surface of the brick. Mechanical cleaning should be avoided at all costs due to the potential irreversible damage to the brickwork. Definitely seek expert advice before contemplating this method.

Grinding dirt deposits off with a carborundum head is quite unacceptable as this method removes the hard fired surface of the brick, causing scouring or "dishing", and especially damages the brick's

arrises (edges). The use of mechanical cleaning works best on sand stones and grit stones, little of which is used as a building material in Hertfordshire.

Abrasive Blasting

As a general rule blasting should be avoided. Abrasive blasting was popular in the early days of cleaning masonry because dramatic results could be achieved relatively quickly. This system projects an abrasive, such as sand, glass beading or even crushed eggshells, through a nozzle in a stream of compressed air. Some systems use water. A harmful dust is usually generated.

Sand or grit blasting commonly tears and pits the surface of the brick which will then soil and weather more rapidly. The fired face of the brick can be removed by this method, rendering the brickwork porous to rainwater often an unpleasant scoured surface is the result. The harsh texture and colour is often quite startling.

Small-scale air abrasive tools can in some circumstances be used successfully, but the failure rate is so high as to recommend avoidance of such methods. Often the brickwork can be more safely cleaned by other methods.

Chemical Cleaning

This method should only be undertaken by specialist professionals. Chemical cleaners are usually based on alkalis or acids. Most react with the brick to form soluble salts, so that the cleaner must be removed at the end of the cleaning operation. The only exception to this reaction is hydrofluoric acid, but is so hazardous a corrosive material that its use should be left to experienced operatives. General builders using ‘Disclean’ or other proprietary brick and tile cleaners should never be used.

Acidic chemical cleaners are unsuitable for elevations containing Portland or other lime-based (chalk) stonework and architectural and stained glass.

Nevertheless, some of the most effective cleansing of brickwork can be carried out using weak (2-8% concentration) solutions of hydrofluoric acid. The soiled area should be pre-wetted (usually with a water lance) to limit the action of the acid upon the surface of the brick. Windows, paintwork or polished surfaces must be fully protected, and operatives must wear protective clothing, particularly the face and hands.

The acid should be brushed on and left for about five minutes before washing off with a water lance. Unless thoroughly washed off, any hydrofluoric acid based cleaner will cause a disfiguring white silica "bloom" to be left on the brick face, which is extremely difficult to remove. It is very effective on soft and heavily soiled brickwork which would not respond well to washing or would be irreparably damaged by blasting.

The disadvantages of using hydrofluoric acid include the hazards of etching glass and attacking the polish on marble or granite. These surfaces should be heavily protected. Most alkaline cleaners depend on caustic soda as their active ingredient, and are particularly used on glazed brick and faience. Their use on porous brick is not advised as the brick may absorb more of the cleaner than can be washed off, leading to efflorescence and blooming. This method is really only suitable for light deposits, where heavier soiling or encrustations may better be left to another cleaning method.

Mortar and mortar slurry stains can be removed using a 10% concentration of hydrofluoric acid. Most paints (including graffiti applications) can be softened using a proprietary paste that incorporates caustic soda. The type of paint applied to brickwork should be identified by an expert before cleaning. There is a risk of efflorescence with any brick cleaning agent other than hydrofluoric acid, and all must be applied to a properly damp surface and thoroughly washed off.

Super-heated steam cleaning

Recent years has seen huge progress in the developing of gentle and vortex-jet super-heated steam cleaning techniques that 'lift' the dirt off the surface while avoiding over-wetting of the masonry. The DOFF system is the market leader and has been used very successfully to clean all types of masonry including soft brickwork, terracotta tiling and highly carved stonework. It is the most specified cleaning method used by Historic England. We would generally recommend that this method is tried first to clean buildings before turning to the more aggressive techniques listed above.

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Guidance Note 3: Brick Repointing and Repair

East Hertfordshire is especially fortunate in having a great many beautiful brick buildings. Some early examples date from the mid-C15th and the Tudor, Elizabeth and Jacobean periods - such as Rye House, Stanstead Abbotts (c1443), Hertford Castle Gate House (1461-5), part of Hunsdon House (1525-8), the hunting lodge at Queen Hoo, Tewin (early Elizabethan), The Lordship, Standon (1546) and Hadham Hall (c1575). These earlier bricks tend to be principally in the red-orange range of colour. There are also many fine later C17 and Georgian buildings in all of the towns and some villages. Regency, Victorian and Edwardian brickwork can also be of high quality and interest and the brickwork of modest Victorian terraces and smaller houses and other buildings contributes greatly to the character of the District's conservation areas.

These later bricks covered a wide range of colours from traditional dark reds, reds and oranges to browns, yellows, purples, blues, greys, creams and whites. By the C19th large quantities of bricks were imported into East Hertfordshire and so began the decline in the previously extensive traditional localised brick manufacture based on small scale kiln production using local clays. There are now no brick works in East Hertfordshire.

Most listed buildings in East Hertfordshire incorporate some brickwork in their structure. In timber-framed buildings the frame is generally on a brick base and the chimney stack, whether original or inserted in an already existing house (in the late C16 or early C17 as a 'modernisation'), would be of brick construction. Even medieval churches may have a later brick porch or some additions in brick. In conserving and repairing old brick walls or chimney stacks, a thorough understanding of the brick - its origins, texture, size, colouring and weathering properties - and the techniques and craft of construction, such as the bond and especially the composition of the mortar and the finished joint or pointing profile - is essential.

The earlier bricks were relatively thin - typically about 2" in width though sometimes thinner and sometimes wider. These red-orange bricks were employed only in buildings of high status and it was not until the later C16th that they were in more general use - and only then in superior buildings for the most part. By the C17th brick became more widely used due to fashion and a marked decline in oak and other structural timber for building. Brick manufacture was also associated with tile production, which was replacing thatch at this time. There was an attempt to regulate brick size in 1625 and during the C17th there was a move from the general use of English bond to Flemish bond.

Brickwork reached new heights of sophistication and excellence from the 1660's and during the C18th with precisely detailed window and door arches using soft rubbed and gauged bricks and meticulously accurate tuck pointing. The Brick Tax of 1784 slowed demand for brick building and stucco became popular principally in the towns.

New industrial techniques throughout the C19th allowed for mass production of standardised bricks of consistent colour. In 1840, the Imperial brick of a nominal size of 9" x 4½" x 3" was widely adopted. Yellow 'London stock' bricks and yellow/grey Gault and cream and white bricks became increasingly popular. Portland cement was used in mortars in the latter part of the C19th with a resulting change in the character of brickwork. Red brick continued to be widely used however,

especially in the neo-vernacular and Arts and Crafts inspired houses of the late Victorian and Edwardian periods.

Getting skilled advice

If you think a historic wall needs repair or repointing get some skilled heritage advice before commissioning any works. A conservation accredited building surveyor (see the Royal Institution of Chartered Surveyors – the RICS) will be able to advise you as to what is necessary and which contractors have the skills necessary to do the works.

Is listed building consent needed?

Listed building consent will be required if the repair or repointing proposed is not a matching like-for-like repair using the same mortar composition, finished pointing profile and matching brick and bond. It should be remembered that it is a criminal offence to alter a listed building without first obtaining listed building consent, and the penalties can be heavy. A fine historic brick wall or chimney stack can be ruined by ill-informed or thoughtless repairs or pointing. Once carried out, such works are often difficult if not impossible to reverse and reinstate without extensive damage to the brickwork. You are strongly advised to contact the Council's Conservation Officers before you commence repairs or repointing of any historic wall. You will be asked to provide a specification of the works (which the above conservation accredited building surveyor can provide) or a sample area of repair or repointing to be agreed before work can begin. Where this is deemed by the Conservation Officer to be acceptable, listed building consent may not be necessary, which would allow a prompt start to the works.

Conservation and repair of historic brickwork

Substantial harm to once beautiful walls and chimney stacks has occurred in the past by ill-advised or simply crude attempts at repair. This can severely diminish the special interest and significance of the building in itself and, where relevant, the character and appearance of the conservation area. It is possible to achieve a close match to old bricks using carefully selected new handmade bricks or second hand bricks, but exact replacement is often impossible - the source of the original clay, methods of manufacture, weathering characteristics, ageing and 'pleasing decay' cannot be reproduced. Consequently, great care should be taken to salvage and reuse existing bricks where possible.

Cutting out damaged or spalled bricks should be undertaken with great caution to prevent damage to surrounding sound bricks. By using a fine, sharp chisel surrounding joints may be cut out and raked back before removing the failed brick. Power tols, particularly angle grinders, must never be used. Replacement bricks must 'match' in every respect - size, strength, colour, texture and, if possible, degree of weathering. Inserted bricks can stand out like bright 'sore thumbs' and have a most disconcerting effect in a mellow old wall. Close attention to maintaining bond, using lime based mortar and matching the historic pointing profile is essential.

Mortar ('plastic') repair to spalled brickwork should be avoided. It is almost always unsightly and unsatisfactory and should only be considered in exceptional circumstances and in small areas of individual bricks. Brick dust is best used to colour the mortar. Artificial colouring agents are likely to fade.

The cause of large bulges, large cracks or fractures must be carefully investigated and a decision made to leave alone, cut out and point, stitch and grout in-situ or to take down and rebuild. If the wall is stable and there is no obvious structural failure or water penetration the best solution is often to leave well alone. If there are large obvious or unsightly cracks that may allow excessive water penetration into the wall, it is often advisable for these cracks to be stopped with lime putty mixed with brick dust to achieve matching colour. Any intervention should be the minimum necessary to retain the wall or chimney stack in a safe and sound condition.

Brick Bond

The bonding of historic brick walls is an important part of its interest providing a characteristic pattern, texture and richness. Most old brickwork is bonded in English bond (alternative courses of headers and stretchers). From the late C17th and especially since the C18th onwards most brickwork is built in Flemish bond (headers and stretchers alternatively in the same course). Occasionally early brickwork may be found in a random bond with no discernible pattern. Some other lesser used historic bonding types are: English garden wall bond, rat trap (or Chinese) bond, Flemish garden wall (or Sussex) bond and header bond. It is essential that repairs, alterations or extensions to historic buildings should faithfully match the existing bond.

Repointing Historic Brickwork using Lime Based Mortars

Repointing old brickwork requires considerable skill and expertise. Incorrect diagnosis and the use of inappropriate methods of repair and unsuitable mortars are amongst the most common causes of damage to the character, appearance and structural soundness of historic brick walls. A great deal of unnecessary repointing of brickwork is carried out.

Mortar joints serve two main purposes: To bed bricks neatly so as to take up any differences in size or shape; and to effectively fill and weatherproof the joint between bricks whilst allowing the free evaporation of moisture. Sound old pointing should be retained as this is an important element in the character of historic walls. Repointing work shall only be undertaken where absolutely necessary and by agreement with the Conservation Officer.

Repointing is generally only needed when mortar has clearly failed and is powdery, loose and crumbling or has weathered or eroded away or decayed. Obvious causes of localised failure, such as blocked, overflowing gutters or damaged rainwater downpipes should be repaired before repointing and brick repair takes place.

Repointing of brick walls and chimney stacks to listed buildings and other historic brickworks should be carried out using lime based mortar, which is compatible with the strength, porosity and texture of the brick and a close match to the original mortar.

Mortar should be understood as the ‘sacrificial’ element in a brick wall – albeit that that sacrifice may take 100+ years. Consequently, it is essential that the mortar should be slightly weaker than the brick to allow the wall to 'breathe' and for moisture to evaporate through the joints and to discourage excessive moisture loss through the face of the brick - which would accelerate the rate of decay. The inclusion of cement in a mix will usually make the mortar harder than the bricks – the exact opposite of what should be done. Hence the inclusion of cement should be avoided. In rare circumstances where an early set is essential it should be restricted to the minimum absolutely

necessary and, if possible, it should be avoided altogether. The inclusion of a traditional pozzellan (an agent such as brick dusk that accelerates the set of the lime can usually achieve the same accelerated set as cement without the subsequent damaging hardness and impermeability.

The finish to the new pointing should carefully match the existing original historic profile. In the majority of cases this would be flush pointing, but the walling should be carefully examined to ascertain the most original and historically appropriate pointing (later repairs may have been bodged and should not influence any decision).

Preparation for Repointing

The existing weathered and friable or otherwise failed joints or pointing shall be carefully raked out by hand to a depth of between 25mm and 40mm - or at least to twice the width of the joint. The open joint should be thoroughly brushed cleaned of dust and flushed out with clean water (avoiding saturation). Suitable tools for cutting out joints are fine, sharp chisels, flat bladed quirks or plugging chisels. Hacksaw blades can be useful for fine joints.

The use of mechanical cutting discs/angle grinders is not acceptable as this is likely to cause great damage to arises and increase the width of joints or to cut into the bricks. As a general rule, if the mortar will not cut out readily using hand tools it does not need replacing. Sand blasting or the use of other grit or abrasive cleaning is unacceptable as it often destroys the hard baked 'crust' of the bricks making it vulnerable to accelerated weathering.

Mortar Mix for Repointing

Lime putty based mortars should only be used. As a rough guide, a mix such as 1-part lime putty to 3-parts sand - well washed and well graded with a large proportion of coarse sharp sand is generally suitable for old brickwork in a relatively sheltered position with a fairly coarse texture.

Do not add dyes or modern plasticisers to lime mortar. Achieve the right colour through the mixing of assorted sands. Do a range of test mortars and pick the best match. Lime mortar does not need a plasticiser.

The use of soot-water or other 'ageing' finishes should generally be avoided. Leave the weathering to nature.

At warm, dry times of the year, when frost is unlikely (between mid-April and mid-November) the addition of cement is generally not necessary. Repointing should not be attempted if there is a threat of frosty weather conditions. When a small amount of cement is required, white cement is usually preferred, as the colour of the lime-based mortar can then be determined solely by the sand. The usual proportions are 1-part binding agent (lime putty or lime and a small addition of cement, or lime and a pozzolanic agent - such as finely ground brick dust) to 3-parts sand - part sharp sand (well washed and well graded). In the past mortar was almost always simply a mix of local sands and lime - to give a porous and flexible material ideally suited to this use. The mortar should be prepared with the minimum amount of water required to give a cohesive and workable mix. This will reduce the overall amount of shrinkage which inevitably takes place when using a lime-based mortar.

Cement-based mortars are unacceptable for historic old brickwork. Repointing in a strong cement and sand mortar is a disaster for an old wall. It will prevent the wall from breathing and lead to the rapid degradation of the brick - especially the soft red stock bricks characteristic of old walls in East Hertfordshire. By preventing the evaporation of moisture through the mortar joint, following rainfall or other wetting, the trapped moisture can only evaporate through the external face of the brick. Through frost action and/or the crystallisation of soluble salts, the exposed face of bricks will begin to deteriorate, then break down or flake, leading to widespread spalling and disintegration of the brick wall with typical concave "powder weathering" of the brick once the surface has gone, with the hard joints or pointing standing out. Cement based mortar joints also look harsh and hard.

Slightly weathered mortar is very rarely the cause of dampness and water penetration through a wall. Repointing old brick walls should not be seen as a means of 'toughening up' or 'waterproofing' a wall - this is a misguided idea that has resulted in hard cement based mortars being used for repointing and has caused great harm.

Repointing Technique and Pointing Profile

Once carefully raked out, the joint should be cleaned of dust and residual mortar particles by brushing and then thoroughly flushed out with clean water (avoiding saturation). As the repointing is carried out, if the joints have dried, they must be rewetted before placing the new mortar so as to control suction, especially in warm or drying conditions. A pointing iron or a wood spatula should be used (not a steel trowel) to push the mortar into the joint as firmly as possible.

Repointing should faithfully replicate the existing original pointing profile - where this can be ascertained. In most old brickwork the mortar face will be finished as a neat flush joint (depending on the original profile and treatment) or very slightly recessed where, for example, the arises of the bricks are damaged or rounded through weathering, so that the mortar does not spread across the face of the brick, giving an over prominent wide appearance to the joint. Perpendicular joints are filled before bed joints.

Other special forms of pointing or jointing should be carefully matched, such as 'tuck' pointing or 'lined' pointing, dating from the C18th or C19th. Gauged or rubbed brick arches in Georgian or Edwardian brickwork should only be repointed in exceptional circumstances and then only by experienced specialist craftsmen, as the fineness of the joint makes this a highly skilled and time consuming operation. If re-bedded, only fine lime putty should be used for the joints. Comparatively recent forms of joint finish or pointing such as 'weather-struck', 'bucket handle' or raised 'strap' or 'ribbon' pointing are completely unacceptable in historic brickwork.

In terms of the appearance of the old brick wall it is important to match the texture of the surviving weathered flush pointing by using the same proportion of coarse sharp well graded sand and roughening the surface of the mortar joint, as it sets and hardens, by lightly stippling and tamping the surface with a brush or sacking, a stick or a wooden spatula to raise the grit or aggregate present in the mortar. The finish should not have a brushed or dragged appearance but should be finely tamped with the brush to give an even roughened finish. This roughening should be carried out as work proceeds to give a consistent appearance. Great care should be taken to avoid smearing mortar onto the faces of the bricks and thorough cleaning should take place as work proceeds.

In periods of adverse weather conditions for repointing, i.e. cold or hot or rapid drying weather, if it is not possible to postpone work until more favourable conditions, the repointed brickwork should be completely protected by sacking or tarpaulins (and periodically lightly dampened if there is concern for excessively rapid drying), for up to 7 days or longer as necessary.

If the new areas of repointing are obviously standing out in the old wall, in some circumstances it may be desirable to tone down the surface by the application of a soot wash (prepared by immersing a cloth bag of soot in a bucket of water for about 24 hours). Repeated applications should be carried out until the desired tone is achieved. Other artificial colorants should be avoided.

In many situations a sample area of the proposed repointing will be required to be provided for inspection by the Conservation Officer. Once agreed, this can be used as a reference area for other repointing. The areas to be repointed shall be specifically agreed and defined. Repointing is to be restricted to the minimum necessary and it should not be assumed that whole walls may be repointed if only a part has failed.

A summary of what to do and what not to do

If you think historic brickwork need repair or repointing get skilled heritage advice from an accredited conservation building surveyor.

Contact the Council's Conservation Officers. They will be able to advise you whether listed building consent is required.

Do use lime putty-based mortar for repointing and re-bedding bricks.

Do restrict repair and repointing to the minimum necessary to keep the wall (or stack) in a weatherproof and safe and sound condition.

Do take great care to match replacement bricks and mortar with existing wall.

Do use small hand held tools (not power-tools) to carefully take out decayed joints or pointing avoiding damage to the historic brickwork.

Do use well graded sand usually including some coarse sharp aggregate to match the texture of existing historic mortars.

Do carefully match existing pointing or jointing profile and finish.

Do enquire from the Conservation Officers whether grant assistance is available.

Do not use cement-based mortar for repointing and repair. If necessary use a pozzallana.

Do not use dyes or modern plasticisers. Achieve the right colour through the mixing of assorted sands. Do a range of test mortars and pick the best match. Lime mortar does not need a plasticiser.

Do not repoint whole walls when only a small area has failed or take down walls when it may be possible to carry out repair in-situ.

Do not compromise and use readily available bricks or standard mortars which are not a very close match to the historic brick wall or stack.

Do not use mechanical angle grinders to cut out resistant joints. If the joint or pointing is sound - leave well alone.

Do not use 'off the shelf' builders sand for all of the aggregate in mortar.

Do not use a harsh and jarring standard modern pointing profile, such as weather struck pointing or bucket handle pointing or ribbon pointing.

The use of soot-water or other ‘ageing’ finishes should generally be avoided. Leave the weathering to nature.

Do not rush into the repair of repointing of an old wall and use a cheap 'cowboy' builder who has no genuine knowledge or sympathy with historic building conservation. Bear in mind a cowboy builder has a vested interest in maximising the amount of works to be done; this may not be necessary or in the best interests of the building (or your bank balance!).

Always remember that unauthorised alterations to a listed building or wall can be a serious criminal offence.

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Guidance Note 4: External Plaster and Render

Lime plasters are an important element in defining the character of many historic timber framed buildings in East Hertfordshire. Such external plasters, or renders, may cover the whole wall face of a timber framed building - especially after the C16th, or may, in earlier buildings, be a surface covering to a daub panel infill between an exposed oak frame. These earlier and older plaster finishes, where they survive, will usually exhibit a most attractive aged appearance and an often interesting and sometimes delightful surface texture - especially where they have, correctly, been regularly maintained with successive applications of limewash. Lime plasters are soft, flexible, low-to medium strength and porous - they allow a building to "breathe" – i.e. moisture which has been absorbed can evaporate from the exterior surface.

Unfortunately, it is now all too obvious that many C20th so-called 'repairs' and alterations to historic plastered elevations of buildings and infill panels of timber framed structures, have been carried out in wholly inappropriate cement renders. Also surviving old plaster has often been painted with modern synthetic paint systems which form an impervious film. As well as being offensive to the appearance of historic buildings such hard, flat, unyielding finishes are also likely to be highly damaging to the timber structure, the infill panels and, quite possibly, also the interior finishes. This is because timber frames usually move around slightly both seasonally and in the medium and long-term. Lime-washed lime plasters and earth-based daubs on timber backings are soft and can accommodate gentle movement. Cement-based renders and modern impermeable paint are inherently rigid and will be far more likely to crack - admitting rainwater. Moisture becomes trapped within the structure unable to evaporate through the hard dense cement render or an impermeable paint skin surface.

This trapped moisture can often lead to rot, mould, damp and decay and eventually to a failure of the historic structure. In winter conditions, trapped water can freeze and expand causing dramatic failures where large sheets of solid cement render have fallen off walls. All towns and most villages have many examples of unsympathetic modern cement renders replacing traditional soft lime plasters. The problem is very widespread and serious.

Modern rigid, hard cement renders - together with a raising of ground levels at the feet of walls and lack of maintenance of rainwater disposal - are a most common cause of damage to old timber frames and fabric. Hard cement render is incompatible with traditional buildings. Wherever possible such unsuitable cement render should be replaced with lime-washed lime-based plasters. There has also been an unfortunate trend in removing old plasterwork to reveal relatively lightweight timber framing, which was never intended to be exposed. Recovering with plaster is encouraged in these situations.

Pargetting, during the medieval period, meant plastering of any type - internal or external, plain or decorated. Now it is used to describe decorative patterning or plaster moulding. During the C18th and early C19th, stucco became very popular in towns and for substantial country houses, partly due to the demands of fashion - e.g. the ‘Classical’ architectural style from the late C17th. - and the availability of new technological developments in building materials - Coade Stone, "Roman" cement and Portland cement (patented in 1824 - though not widely used until after the mid-C19th). Stucco

was popularised by the Adam brothers and John Nash and their influence is to be seen in the main towns and some country houses in East Hertfordshire. These harder stuccos are normally applied direct to brickwork. The use of traditional lime plaster on vernacular buildings, however, continued in East Hertfordshire throughout the C18th and C19th, and even into the early decades of the C20th. Refined stucco finishes were restricted, for the most part, to the grand buildings and houses of the wealthy and aspiring merchant and professional classes.

Prior to the use of cement in the later C19th and C20th, external plasters and renders were of lime and sand, with added animal hair as reinforcement. Strong cement-based renders should not be used for repair or replacement plaster on timber framed buildings.

Traditional Lime Plasters and Infill Panels

Earlier close-studded heavier framed timber buildings in East Hertfordshire typically had daub infill panels. The daub varied widely in composition, but generally included mostly clay mixed variously with sand, cow dung, chopped straw, flax sticks, coarse animal hair - chopped to varying lengths. Sands and gravel are sometimes present and in parts of the district where chalk or chalky clay is readily available, crushed unburnt chalk/lime is common. The daub was thrown (par jêter) pushed or pressed onto a backing framework of closely spaced vertical staves and horizontal laths that held the staves in position. The staves, particularly in better quality work, were bound together with fibrous twine. In good quality work considerable expertise and effort was put into the fabrication of the backing framework. The staves and laths, given pointed ends, were located in trenched 'v' grooves and sprung into auger bored holes vertically and sometimes horizontally. This backing formed a type of "wattle".

The staves may take the form of circular or split sections of oak, ash, chestnut, beech (or occasionally other coppiced or pollarded trees, such as hornbeam, hazel, etc). The cross laths (or binders, slats or ledgers - if of heavier sized wood) would either be in the same timber or, because of the need to be pliable, are more likely to be hazel or sometimes willow. Where old daub panels are found they must be conserved in-situ. Where damaged it should be possible to reconstitute the daub by crushing and mixing with water and then reapplying to a repaired backing frame. Usually the cross laths were fixed horizontally - though occasionally they may be inclined diagonally.

Where the lime plaster covered the whole face of the timber frame, as is increasingly common after the mid-C16th (when fashion demanded plastered walls and the quality and size of the timber-framed construction did not any longer warrant its display) the plaster was affixed over both the frame and daub infill or, later, to closely spaced horizontal laths nailed on the face of the slighter timber structural frame studs and braces. The earliest fixed horizontal oak laths were riven (about 25 - 40 x 12 mm) and of an irregular appearance nailed close together, later C18th and C19th laths are sometimes sawn - though not always - and look far more regular. Laths not only provide a supporting substrate to the plasterwork but also have an important structural role in bracing the timber framing and studwork to which they are fixed.

Traditional historic lime plasters vary considerably in composition, texture and in numbers of coats, or layers, but most usual for houses is three-coat work. Outbuildings or lesser quality buildings may only have two coats or even a single coat of daub or lime plaster. The coarse undercoat, and usually the finer thinner finishing coat, will incorporate chopped animal hair. Some old plasterwork is the

product of highly skilled and competent craftsmen; other work for low grade buildings can be rough and crude in execution.

Repair to Lime Plaster and Replacements

Most failures of old exterior plaster are due to excessive water penetration - caused by damaged or blocked rainwater gutters, heads or downpipes, severe cracking due to lack of correct maintenance (such as repairing damaged areas with cement-based render) or neglect in regular protective lime-washing. The cause of failure should always be determined and remedied before any repair is carried out. Plasterwork needs regular monitoring and care to stave off decay.

Sound old plaster that is still well fixed to the backing laths should be retained. In normal circumstances total stripping of plaster is to be avoided and must only be undertaken by agreement with the Council's conservation officers. The amount of historic old plaster surviving is declining rapidly - much is lost quite unnecessarily. Where old plaster is involved repairs should be attempted rather than renewal of the render in total. A common failure is loss of adhesion either from the backing laths or brickwork or flint-work, causing patches to bulge or fall away. The usual remedy is to re-plaster to new riven (or sawn) oak or chestnut laths, unless some interesting pargetting or patterning is involved, in which case, fixing back and consolidation of the surface should be attempted.

Repairs should be as close as possible a 'like-for-like' match to the surrounding backing and surface lime plaster. The texture, composition and thickness of coats should be based on that of the surviving old plaster.

Expanded metal sheets or steel ribbed "laths" - much used in more recent repairs to timber frames (often in association with strong, rigid cement render) are unsympathetic as a conservation repair and are generally unacceptable. There may occasionally be exceptional circumstances where such use can be argued, but in most normal circumstances a like-for-like traditional approach to repair or replacement work will be required using riven or sawn laths of oak or chestnut or, in some circumstances, usually in later buildings, good quality treated softwood.

In East Hertfordshire old exterior lime plaster coats typically found on timber framed buildings are a Basecoat or Undercoat followed by a Second Undercoat (or float or floating coat), followed by a Top or Finishing Coat. The Basecoat or Undercoat will be 9-16 mm thick, applied to wood laths (or direct to brick, flint or stone) - will include coarser sharp sands and chopped animal hair also sometimes broken chalky clay or unburnt lime. It will be well scored horizontally to provide a good sound key fro the next undercoat. The Second Undercoat will be 9-16 mm thick, often with less very coarse sand, incorporating chopped animal hair, will be comb scratched in wavy horizontal lines to provide a sound key for the top coat. The Top or Finishing Coat will be 4-9 mm thick. This will usually be the most porous layer or coat to encourage evaporation of moisture - to enable the wall to "breathe".

Old plasterwork was for the most part an economical mix of three to six times as much sand as lime. The base coat and second coat are usually reinforced with chopped animal hair - well mixed (teased) and were usually chopped less than 50 mm in length - which provides fibrous reinforcement and greatly reduces the risk of shrinkage cracking. It was also often used in the finishing coat. In rough

work chopped straw is sometimes found. Occasionally exotic ingredients such as old cheese and milk seem to have been added and wood shavings and even broken bone are sometimes found.

As a rough guide for a repair work a typical external plaster mix would be one part lime to three or four parts 'all-in' well graded sand (wide range - including quite coarse sharp sand). Care should be taken to match, as closely as possible, the strength, composition and texture of surrounding existing lime plaster. To allow for a more rapid set it may, in some circumstances, be desirable to include a pozzalan in the mix such as crushed red brick.

Each coat is usually thinner than the last. It is normal for each successive coat to be slightly less strong than the last to assist in the evaporation of absorbed moisture - helping the plaster to "breathe". However, in some plasters the finishing coat is lime rich and is very thin - a few millimetres only. In any event it is good practice to match to the existing historic plaster finish.

Each coat should dry slowly and naturally (with no use of warm air blowers). Typically undercoats should be left at least 2 days in summer and at least 7 days in cooler damper months. Longer intervals are usually desirable, to allow for any shrinkage drying out cracking to take place. It is good practice for the least possible water to be added to the plaster to produce a workable mix. Should rapid drying be likely in hot or windy conditions, the surface should be protected by damp sacking or heavy duty plastic sheeting. If there is any threat of very cold conditions or frost, then work should not be undertaken as this will ‘kill’ the lime making it ineffective and likely to fail.

The surface of each undercoat should be dampened down by light spaying with clean water - but not over wetted - to reduce and control suction, just before application of the next coat. If this is not adequately carried out, moisture will be sucked from the new coat and failure of adhesion of the interface may occur.

Unless matching to an existing surface pattern or marking, panelling or rectangular lining out as 'ashlar' or pargetting, the top coat should be given a neat plain wood float finish or given a slight raised texture by lightly scraping with a hacksaw blade. It is important that this finish is not overworked. If the old plaster is lined and/or patterned the existing design should be recorded by photograph and measurement prior to the work so it can be authentically reinstated. Any lining out should exactly match the previous pattern (using levels and plumb rules). For patterning, see the note below.

Spurious conjectural pargetting or other patterning - which has no previous historic reference or basis for the building - must be avoided. An application for Listed Building Consent will be required for work that does not precisely match the existing original or early plasterwork/rendering or for new plasterwork not in the spirit of vernacular tradition in East Hertfordshire.

Metal beads, stops and edgings should not be used - arrises, corners, angles and drips should be moulded and rounded in a traditional manner, or finished up to oak battens. These details should match existing historic edges.

Daywork joints or working list joints can be difficult to disguise on a wall and should be planned to be lost, as far as possible, at a physical break or opening. Where this is not possible, true level lines should be struck - with no ragged edges.

Limewash

Decoration of newly repaired areas of plasterwork should be in limewash. Modern synthetic non-porous film forming or impermeable paint systems are unacceptable. A range of pigmented lime-washes are available from specialist contractors and conservation suppliers.

Limewash is essentially mineral lime suspended in water with or without added pigments to colour. As well as providing of soft, aesthetically pleasing surface texture it gives protection to the underlying lime plaster and fills surface cracks. It allows the plaster or render to "breathe", so that any absorbed dampness can evaporate through the surface and not become trapped, and it has a consolidating effect on the surface.

A disadvantage of limewash is that it needs regular re-coating. In the past this may have been a regular annual task. Tallow (hard clarified animal fat) or raw linseed oil are sometimes added to improve the water-shedding ability of limewash.

Limewash should be applied in thin even coats, and never in extreme conditions of wet, frost or in hot direct sunlight. The plaster surface should dry out completely before application. At least 3 coats (more if possible) should be applied to new work.

Pargetting and Decoration

The term pargetting describes the use of external lime plaster in a decorative manner with incised or moulded surfaces. East Hertfordshire has a tradition of pargetting and lining styles that are, for the most part, relatively simple and low key in character. There are however some examples of elaborately formed pargetting - most notably the exquisite heavily modelled, spiralling, foliated patterns on the upper floors of Nos 3 - 11 Fore Street, in Hertford town centre.

Common East Hertfordshire plaster patterns for traditional buildings are: lining out to form rectangular framed, plain smooth faced decorative panels - sometimes with beaded border edges; a repeated chevron pattern within a panel (particularly in Sawbridgeworth and close to the Essex border); repeated interwoven fan patterns - hand combed or wood block stamped, basket weave patterns; stippling and indented coursed (or un-coursed) pecked patterns; other types of interlocking motifs in regular patterns.

Many of these surface patterns are formed by hand incised in the curing plaster (sometimes referred to as 'stickwork'), and thus have a pleasing irregularity. Some historic patterns were pressed in by wood block stamps. Modern stamped patterns are often, regrettable, quite harsh, mechanical and hard-edged without the subtlety of historic patterns.

On more formal buildings, patterns can be highly stylised and include initials, cartouches, swags, plaques, friezes, date panels and strapwork - moulded in bas relief or cut into the surface to form motifs and decoration. Jacobean panelling and joinery designs from Italy, France and the Low Countries, seem to have influenced patterning on these more polite buildings. Friezes were usually in the form of interlaces or trails of repetitive oak leaf, vines or honeysuckle designs.

Often these sophisticated design ideas were interpreted in a rather provincial folk manner in the villages and rural parts of the District, while the towns, generally better off and with much easier

access to London, were more fashion conscious and ‘correct’ in their interpretation of the then current architectural styles. Care should be taken to maintain this important differentiation when repairing historic buildings.

Principles

Old plaster surfaces should be respected and conserved. The play of sunlight and shadow across an irregular ancient plastered wall gives a building a liveliness, delight, patina and special character quite lacking in dull, too precise and regular, modern rendered walls - and even in some new lime plastered walls. It takes many decades - even centuries - to achieve such a surface texture. Listed Building Consent is required for the removal of any historic fabric unless it is part of an agreed conservation repair. Surviving old daub and plaster should be conserved.

Key Points

Hard cement renders are incompatible with traditional buildings.

Lime and hair plasters are porous and flexible - they allow a building to "breathe".

Sound old plaster and daub should be conserved.

Riven or sawn laths are suitable for conservation repairs in preference to metal.

Plasterwork should be finished with coats of limewash.

Guidance Note 5: Flint and Flint Wall Repair

No readily available stone suitable for building work is to be found in Hertfordshire making its use prohibitively expensive. However, the county has an abundance of flint readily picked from its fields or quarried from pits. Consequently, flint-faced walls with brick or sometimes stone bases, cappings, facing courses, piers, buttresses or corners are extensively to be found in the towns, villages and farmsteads of East Hertfordshire. In some parts of the District, as for example in Great Amwell, Anstey, High Wych and the Hadham Road approach to Bishop's Stortford, flint walls make a very significant contribution to the character and genius loci of the conservation area. The principal use of flint has been in mass walling to provide the rubble core for walls and exterior face of a great many of East Hertfordshire's medieval churches - so flint, often regarded as a humble utility material only used in the absence of quality freestone, is a major material in the construction of usually the most significant building in a town or village.

When split, or 'knapped', flint has a wonderful lustrous quality ranging from glassy black through tones of dark blueish grey, grey, brown, reddish brown, pale creamy brown to almost pure milk white. There are often flecks of lighter or darker hues or whorls of wispy pale grey. When left whole, as found as nodules on the surface of fields or excavated from pits, it often possesses eccentric and irregular rounded and lobed shapes, covered with a white lime cortex or 'coat.' These shapes were sometimes used by Henry Moore in his Perry Green studios (near Much Hadham) as inspiration for his imaginative sculptures.

This white coating to a flint nodule can darken upon exposure on a Field surface - in East Hertfordshire typically many take on a pale or mid-brown colour as iron oxide and other chemicals are absorbed from surrounding clays or sands and gravels. When dug straight from chalk, the cortex is pure white. As flints are exposed to movement and erosion - historically by glacial, sea and river action - continuing even today in the rivers of East Hertfordshire, the less resistant coating is worn away as the flints become rounded pebbles commonly found in the District's soil.

Flint is composed almost entirely of silica. The geological origins of flint are somewhat obscure although it is generally agreed that flint beds were formed either at the same time as the chalk in the Cretaceous period between about 140 and 70 million years ago. It formed as either a gelatinous silica-based mass derived from the skeletons of sponges (occasionally found as the nuclei of flint nodules) or from ground water subsequently percolating through chalk during the following Tertiary era and depositing proto flint, as a concretionary or replacement form of silica, in voids in the chalk, or as a combination of these processes working at different periods in the chalk formation. Cretaceous chalk is divided into three main divisions; the lower, middle and upper. In East Hertfordshire, surface field flint is mainly derived from the soft white upper chalk which is rich in flint. Other flint is often associated with glacial deposits.

Smooth, rounded flint pebbles have been employed to good aesthetic effect in the past as a paving and surfacing material. There are excellent examples in Much Hadham High Street and many other villages as well as in the towns.

Historically, flint has been valuable as a tool to Neolithic man (mines at 'Grimes Graves' in Suffolk and quarries and mines in Sussex may be the earliest known industrial sites); for the manufacture of flintglass in the late C17; and for gun flint manufacture, which reached a peak during the Napoleonic Wars; as well as a building material. The Romans used flint, for the construction of fortification and defensive walls and the Normans continued the tradition in the erection of defensive sites and castles. In East Hertfordshire, Hertford Castle, the summit of the motte at Waytemore Castle, Bishop's Stortford and Benington Castle are good examples. These three sites are Scheduled Ancient Monuments. The C12th Bailey walls to Hertford Castle (though much altered and repaired) are built almost entirely of un-coursed rubble flint in a generous matrix of lime mortar with some knapped faces and although reinforced with occasional brick piers and brick and tile lacing courses, and are between 20 and 30 feet high. The rounded Postern Gate Tower in the curtain wall is also of mostly flint rubble construction.

Flint continued to be used throughout the medieval period through into the C17th in vernacular small scale buildings, as un-coursed 'rubble' flint walling and frequently in the foundation base or plinth of timber-framed structures or early brick buildings – and, in the absence of readily available building stone, in more formal 'polite' buildings.

In Georgian times and C19th, flint tended to be used, in East Hertfordshire, for cottages, (for example at Anstey, Westmill, Hamels, Ardeley, High Wych and Great Amwell) outbuildings, gazebos and grottos (such as Scott's Grotto in Ware - the largest subterranean grotto in England, described by Dr Johnson in 1773 as 'a fairy hall'), boundary walls and farm buildings, sometimes in fairly regular coursed work. In church architecture it was used as a deliberate and conscious reference to English regional Gothic precedents.

Flint was in great demand locally in the C18th and C19th for road construction and maintenance where it was used to form a solid base for a gravel or hoggin top surface, prior to the widespread introduction of macadamized roads. Until 1888 road repair was principally a Parish Council responsibility. In East Hertfordshire flint-picking to provide material for road maintenance from arable fields, in winter and early spring, was often used to employ those who qualified for parish relief.

Puddingstone

The only other stone native to East Hertfordshire is Puddingstone, which occurs as scattered lumps, sometimes quite large lumps, in geologically more recent drift deposits. It is a sort of very hard natural concrete or conglomerate composed mainly of rounded flint pebbles cemented together with silica and iron oxides, thought by some to resemble a (rather inedible) plum pudding! Puddingstone is generally brown or ginger in colour, although pink pudding stone has been recorded (rarely), and can be found in the bases of some church towers, as for example St John the Baptist, Cottered; St Mary's, Brent Pelham; St Mary's, Stocking Pelham; and St Nicholas', Great Munden, or as a monument - as in Standon, the base to a War Memorial - as at Brent Pelham or incorporated in boundary wall as at Hadham Cross, Much Hadham, or as a roadside boulder, where it is thought to bring good luck, as at Bridgefoot, Little Hadham, The Square, Much Hadham and Wormley West End.

Characteristics and Appearance of Flint Walls

Flint walls have liveliness quite unlike other stone walls, when consistency and uniformity of colour and texture is often the overriding objective. Each flint is unique - no other individual nodule will possess the exact same colour range or precise shape. Even when knapped the near oval or rounded amorphous shape of the flint produced will be unlike any other. These characteristics are clearly visible only on close inspection of walls.

At a distance, a certain homogeneity is possible, and this was often a sought after appearance for Victorian designers. A very precise specification relating to size, shape and colour, with strict tolerances must have been used in the rebuilding of the Church of St Andrew, Hertford (1869-70 by J Johnson Jnr, with the nave and steeple completed 1875-6).

Most flint-work, other than prestige buildings prior to the C19th, was however of an altogether more rustic nature. Field flints in an often un-split lump form were commonly used for smaller parish churches for example the church of St Peter, Tewin. It would seem that with this rubble walling – an admittedly rather unsophisticated look - was often not the original finish as they were often originally covered with lime plaster and lime wash. This plaster was, in the C19th, often removed to expose the underlying rubble walling - a not untypical but regrettably inauthentic Victorian romantic 'restoration', contrary to the SPAB Manifesto and modern conservation practice. There are a few examples of high quality knapped flint-work as for example, flush-work at the parish church of St Andrew, Much Hadham but none that compare with the artistry and craftsmanship of flushwork and squared, coursed knapped flintwork in the foremost examples in Essex, Suffolk and Norfolk ecclesiastical buildings, medieval guildhalls and grand houses.

Whole field flints together with some with knapped faces are often mixed to create a pleasing randomly patterned face to a wall for smaller houses or cottages or for boundary walls. The inherent irregularity of these rather rough faced walls adds to the liveliness of flint rubble walls, most notably in sunlight, where a rippling, highly contrasted shadow and light pattern can be created.

In churches or grander houses, locally available flint would form the main bulk of a wall but details around windows and openings, and particularly the bases of walls or plinths and quoins or corners and tops of walls, will be built in brick or, more usually for churches, stone. Importing stone, even for such important buildings as churches, was very expensive, depending on navigable rivers and carting to the site before the development of canal and rail communications. Using a local material for the bulk of the walling made good economic sense - as well as happily creating or continuing a distinctive vernacular tradition.

The design of the protective capping or water-shedding coping of a free standing flint boundary wall is of great importance. The failure of this top protection will lead to the rapid washing out of the mortar core and matrix by driving wind and rain resulting in inevitable collapse. Great care has been spent in past centuries in devising effective capping and coping bricks and methods. In East Hertfordshire half round bricks often associated with canted (splayed) plinth bricks and purpose-made curved or angled top coping bricks or tile creasing are much used and are an attractive 'hat' to such a wall. Stone cappings or copings are less common though sometimes found in association with churches or other important buildings. Brick on edge cappings are frequently used - especially in C19th walls - and require 2 or 3 brick courses below the top course as extra protection.

The protection of flint walls to buildings is equally important. Eaves with a pronounced overhang are common - large amounts of water washing down the face of flint walls is undesirable and can lead to washing out of the soft lime mortar and localised failure - especially near blocked rainwater down pipes or overflowing gutters. Where water penetration has led to a washing out of the inner core of the wall, grouting of the core may be a possible remedy, to provide a reliable backing to the surface wall flints.

Brick through courses at intervals and almost always at the base and top of walls is normal. Regular brick piers and corner or quoin details are traditional although some very old (and very high) flint walls have survived with remarkably few brick piers. Traditional East Hertfordshire soft red stock bricks blend very harmoniously with mixed field and knapped flint walls. C19th yellow stocks can also create an interesting effect.

Repair and Maintenance

Careful and regular monitoring of the capping or coping, the associated brickwork and the mortar joints of the flint wall is essential. Once the surface flints have been dislodged, a soft inner core of mortar and rubble is exposed - then the stability of the whole wall is at risk.

Repointing flint and brick walls and the capping or coping bricks (or stone) is a skilled task and should only be carried out by a specialist experienced in such work. Unfortunately, a great deal of repair and repointing of flint walls is poorly executed with mortar smeared crudely over the faces of the flints, using an incorrect cement rich mortar.

Mortar Mix

As flint is such a hard and impervious material, water absorption from mortar is minimal and restricted to the outer cortex or coating only. The mix should be as dry as possible, with only sufficient water added to give a workable mix. A strong cement based mortar is quite inappropriate. In the past, as with all brickwork, lime mortar was used for bedding and hulking out the core of flint walls together with ballast and rubble. Portland cement was patented in 1824 but not in widespread use until much later in the C19th. Lime mortar was still in use in more remote parts of the District until relatively recent times.

If a strong mortar is used, shrinkage cracking around the flints is likely, which can lead to the ingress of water into the soft core of the wall. This can result in washing out of the loose flint rubble and mortar or in freeze/thaw damage and general degradation of the all-important mortar matrix.

As with traditional East Hertfordshire soft old red bricks a lime-based mortar is essential. One part prepared lime putty to three parts well washed and well graded sand, including a substantial part of coarse angular sharp sand, is a standard, widely used type of mix. A small proportion of white cement, so that the colour derives from the aggregate/sand (and not the grey Portland cement) may be acceptable to give a mix of say 1/10 cement: 9/10 lime putty: 3 sand although at warm dry times of the year, when frost is unlikely (between mid-April and mid-November) the addition of cement is not necessary.

Standard mixes such as 1 part cement: 2 parts lime: 9 parts sand/ aggregate, which are common in specifications, even for church repairs in architect's Quinquennial Inspection repair schedules - are

the strongest mixes usually suggested. Mortars with a greater proportion of lime are normally recommended, however. As with all historic building repairs the inclusion of cement should be restricted to the minimum absolutely required. 'Standard' specifications often also give the option of using bagged hydrated lime as an alternative to prepared lime putty - either slaked and prepared on site or delivered to site in airtight tubs, barrels or heavy duty plastic sacks. If this is to be considered, (although specialist technical advisers far prefer prepared lime putty) it is important that the hydrated lime is soaked for a minimum period of 24 hours (the longer the better) in enough clean water to produce a thick cream consistency.

As close a match, in texture and composition, as possible to the existing remaining historic mortar present in the flint walling should be sought. This may include some quite large sized aggregate - almost small gravel and small unburnt lime chunks or chalk.

Pointing/ Jointing Finish

Close reference should be made to existing historic finishes. Often un-weathered jointing, many centuries old, can be found in protected areas of walls, such as under wide eaves or in hidden corners or in recesses behind buttresses or piers.

In relatively rough rustic field flint walls a similarly rough joint is normal, which may be 'buttered' or spread well over the edge of the flint. Sometimes in old work it is difficult to be certain if this was the original technique, as these feathered edges to the 'buttered' joints tend to fall away over time, revealing more of the flint face - which may now appear rather more pleasant than the 'workmanlike' original. The surface texture of the joint or pointing was always fairly rough with sharp sand/coarse aggregate and small lumps of unburnt lime or chalk often exposed on the surface. This can be achieved by rubbing over the joint with a rough cloth or stick or by dabbing (not dragging) a coarse brush onto the hardening surface.

Flat steel trowel jointing - with a smooth 'flat' surface, weather struck pointing, beak pointing - with a 'v' point, raised strap pointing and other obviously modern finishes should never be used. They unwisely emphasise the joint and totally diminish the importance of the flint itself. In most situations the joint or pointing should be consistently flush or very slightly recessed behind the front face of the flint. This is especially important with knapped flintwork or more formal or coursed flint walling or flushwork, where a more considered and careful pointing was historically employed. In any repointing or repair of the flints in knapped flint walls it is essential that the flint faces are cleaned thoroughly as work progresses. Once the mortar is set the faces of knapped flints can be wiped with linseed oil to bring out the lustrous finish. Galleting (the pushing of large numbers of flint slivers into the fresh mortar beds to give a ragged appearance) is extremely rare in East Herts and should be avoided unless already present in the wall being worked on.

In some C19th flintwork the mortar was darkened by the use of additives such as stone or brick dust, charcoal, soot, coal dust, fuel ash etc to give a definite architectural and aesthetic effect. Such detail should be faithfully reproduced.

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Guidance Note 6: Thatch

Thatch was a common form of roof covering throughout much of Britain until the end of the medieval period. In many rural areas, it remained as the most practical and available material until the mid-C19th.

It is one of the oldest building methods still practiced today. In Hertfordshire, the thatching tradition has led to very attractive and distinctive roof forms that contribute greatly to the character of the county. In East Hertfordshire, most thatched roofs are in rural areas on a variety of buildings. Each thatched roof is unique, consisting of a variety of roofing details.

It is desirable to re-thatch a roof in the appropriate original thatching material - normally long straw in East Hertfordshire.

In the case of Listed Buildings, changes from one type of thatch to another need Listed Building Consent. A change from thatch to tiles or slates would also require Listed Building Consent and would not usually be approved not just because of the change in the building's character but also because the heavier loading imposed often requires alterations to structural roof timbers.

In terms of life expectancy, there are a number of factors to consider - including the degree of exposure of the roof and the quality of the material and the skill of the thatcher, but all thatches should last at least 15 years. Long straw if laid well will last for between 25 years - 35 years, combed wheat reed can last for between 30 - 40 years, and Norfolk Reed can last for up to 60 years.

<u>New Works to Thatched Buildings</u>

If you are contemplating an extension to a thatched building, there are several points to bear in mind.

The extension to be thatched should be designed and constructed so that it is technically possible to thatch satisfactorily. Additional features planned may be quite unsuitable for thatch. In order therefore to avoid unnecessary expense and delay, it is always worthwhile discussing the outline proposals with a thatcher.

New windows should be of the correct proportions and design to fit the building. Windows on the first floor should be eyebrow or eaves windows. Their design allows the proper draining of surface water. Dormer windows drain inefficiently, are costly to install and difficult to thatch. A particularly common problem occurs where new windows are planned in a position which makes thatching difficult. The thatcher requires space to work and turn his material. Thus windows, chimneys and vent pipes should be clear of the gables and valleys. It is also important to note that surface run-off will be greatest in the valley joining the existing thatch to a new extension.

New rafters should be at least 2 inches deep in order to hold thatch hooks.

A new thatched roof should have a minimum pitch of 45 degrees.

Providing gutters can be a problem, since they look unsightly and cannot be secured very easily. It is rare to find gutters on a thatched roof, although where found, they are usually of timber and of

much wider section than modern gutters. Timber gutters are less likely to clog with fragments of thatch and can be lead lined to prevent leakage.

In new buildings, the chimney should conform to the Building Regulations. Easy access is advised in order to regularly inspect the condition of the stack. A new stack should ideally be placed at the ridge to avoid awkward detailing. Lead flashings can be secured to the thatch at the base of the chimney, although a lime-based mortar flaunching may also be used.

Always ensure that the building is properly insured during a building contract and that strict fire precaution measures are taken at all times by all workmen on the site.

The Ridge

Patterned ridges or a block ridge, with hazel liggers are not traditional. They first appeared in the mid-C18th. The traditional finish for a long straw thatch is the flush ridge, a simple and unfussy finish. The patterned ridge which many thatchers decorate as their trademark arose from the use of reed in thatching, which could not be bent over the ridge. The ridge lifespan is shorter than the rest of the roof, since this bears the most impact of rain, snow and wind. A ridge may require re-thatching after 10 - 15 years, although this is only a guideline, since each roof is unique. Again, a thatcher will advise you if the ridge needs renewing. If you are contemplating the renewal of your ridge, it should be in the historically correct simple flush ridge in a long straw thatch.

Any rethatching works to a Listed Building not in long straw with a simple flush ridge will need Listed Building Consent – even where the existing roof is in different materials or with a patterned or block cut ridge. Please check with the Council's Conservation Officer when planning any thatching works.

Thatching Materials

There are three main thatching materials - long straw, Norfolk or water reed and combed wheat reed. Long straw is the traditional thatching material in East Hertfordshire being the most readily available. Though Norfolk reed thatching does exist in this area (mostly to its north east), it is less common and not a local material. Combed wheat reed is alien to East Hertfordshire.

1/ Long straw thatch - the wheat used for long straw thatching is grown specially. The wheat is subjected to strict control of fertilizers and other modern farming methods, so the quality for thatching is sustained. Farmers who grow wheat for thatching tend to specialise in it. The wheat used for straw thatching is harvested when it is slightly green, of lengths of 2.5-3 feet. Long straw is composed of loose uncombed material which is dampened and shaken into a bed. It is then pulled out and formed into yealms (bundles) ready for laying.

Long straw thatch has a distinctive appearance, with both ears and butts visible on the surface with a thickness of at least 15 inches. It is also recognisable by the hazel spars and liggers (see glossary) which hold the straw in place. Long straw is almost invariably covered with wire netting to protect the thatch from bird and vermin damage, the exception being where a tree overhangs the roof of long straw when netting is not used since this catches leaves and causes rot and fungus

2/ Norfolk or Water Reed is less common to East Hertfordshire, being a native of East Anglia, and was used on a limited number of C19th estate cottages and early C20th houses. Some reed is now

imported from the continent. The reed needs to be about 4 feet long, and when laid looks harder than straw. Liggers and spars are not used at the verges of gables and eaves.

3/ Combed wheat reed - this material was originally produced by combing the ears and leaves of wheat from the stalk, to leave a straight reed. It also must be about 2.5-3 feet in length and the finished thatch about 12 inches thick. All the sharp stalk ends are exposed, so that the rain drips off the end, rather than running down the roof, as with long straw.

Choosing a Thatcher

Skilled thatchers generally undergo a 4 year training period, and are usually members of the Master Thatchers' Association. It is best to obtain estimates from more than one thatcher and to ask them at the 'estimating' stage to provide names and addresses of properties where they have worked, so that you can inspect the thatch and establish their expertise and talk to the owners.

Approach the local Master Thatchers' Association who will be able to offer a specification for the work. Also, if a thatcher is at work in your area, then first-hand experience in his techniques and ability are there for you to see. Finally, select a thatcher who knows the local traditions, the climate, and local suppliers of long straw.

Thatching Repairs

It is often unnecessary to thatch a complete roof. Instead, patching or replacement of the straw or reed can be undertaken to remove the decayed material. This enables the lifetime of a whole roof to be extended.

There are several indications to show when repairs are necessary. Where the netting is loose and the long straw has begun to shift, it may be possible to patch the appropriate area. In particular, repairs around the chimney and to the ridge must be carried out every ten years or so - this gives an opportunity to check the condition of the chimney as well. However, there will come a time eventually when the whole roof will require replacing.

Signs to be aware of are obvious vertical lines in the thatch, which show that the courses of long straw or reed are rotten and exposed hazel ties and spars that have moved, or visible holes. The holes show that birds and animals are attacking the roof.

A further major sign of the failing of the thatch is dampness. A damp thatch will often have patches of moss and fungus growing on it. The dampness weakens both the thatch and the roof structure, and the roof will require rethatching imminently.

Assessing the remaining life of a thatch is not easy. The rate of deterioration varies greatly, according to the location, thatching material, the thickness of the coat and the skill of the thatcher.

If it is possible to obtain details from the previous owners about the history of the roof, it is best to do so. It is not advisable to disturb the thatch, and maintenance by way of climbing onto the roof should be kept to a minimum. If you have any doubts about the length of life span left in the roof, it is always best to consult the original thatcher. If he is not available seek another member of the Master Thatchers' Association.

A long straw thatched roof is not normally stripped to the rafters. The lowest layers of straw tend to be left in place, often dating from the time of the first coat. These layers provide an invaluable historical record of the traditional thatching techniques, such as tarred cord ties and split hazel sways. A water reed roof is completely stripped to the bare rafters and new reed applied.

Costs of Repairs and Re-Thatching

There is no clear cut cost of a new thatched roof. The price is dependent on many factors including the following:

- The size of the roof and the number of valleys, junctions or other complex features such as dormers and eyebrow windows.
- The availability of the thatching material and its type.
- The availability of a thatcher.

Other 'hidden' costs, which are only revealed once the thatch is removed, may include repairs to the structural timbers which support the roof.

Causes of Fire and Precautionary Measures

Fire is a particular risk associated with thatched roofs. Historically thatch would often catch fire from sparks from the open fire rising through the smoke vent in the roof and onto the thatch.

The introduction of brick chimneys reduced the danger, but nevertheless, a thatched roof is always at some risk from fire. It is essential therefore to be prepared - adequate water supplies and speed are of the essence. An adequately sized loft access is essential for Firemen's access.

The most common causes of fire in thatch are:

1. Log burners and other enclosed fuel burners. These newly- fashionable appliances have proven to be a very high-risk source of fires to thatched roofs, in particular when first lit. East Herts has lost a number of listed thatched buildings in recent years due to fires caused by log burners. We strongly advise not installing such equipment. If already installed, we advise that it is removed and the open fire place restored and the chimney checked for its height over the thatch and any faults or leaks.
2. Electrical faults.
3. Lightning affecting the television aerial on the roof.
4. Stray sparks from the chimney, discarded cigarettes and garden bonfires.

As a precaution against fire, you should:

1. Establish a water supply with adequate pressure to extinguish the fire. A swimming pool, pond, or rivers are all possible sources of water.
2. Speak to a Fire Prevention Officer at the Fire Brigade who will offer advice about fire precautions. You should also notify them if you believe you face particular problems, such as difficult access or an isolated property.
3. Fit the television aerial or satellite dish to a free standing pole, some 20 feet distance from the thatch. Alternatively, the aerial could be attached to a gable end. Aerials are at risk of conducting lightning and starting a fire.

4. Check electrical wiring routinely. This is a major cause of thatch fires.
5. Regularly look in the loft area for straw debris, and remove. Never store combustible items in the loft space, these can start the fire in the first place.
6. Enclose electric lights in the loft space in glass. Avoid leaving lights on in the loft unnecessarily.
7. Sweep chimneys twice a year, and do not use fuels which emit smoke or cause sparks or unseasoned logs.
8. Maintain a draught free roof space. A draught will fuel a fire.

Precautions which an expert should undertake:

1. Ensure that new rafters are coated in a fire retardant.
2. Ask your thatcher to check the pointing and mortar joints of the chimney stack. Those joints which are hidden from view below the thatch may well require repointing.

Steps to take in the event of a fire:

1. Call the Fire Brigade immediately. Remember to inform them that the property is thatched.
2. Do not attempt to remove the burning thatch - this will only fuel the fire.
3. Evacuate all occupants, closing all doors, windows and hatches on the building.
4. If it is safe to do so, use a garden hose with adequate pressure to help extinguish the fire, before the Fire Brigade arrive.

Glossary of Thatching Terms

Leadwork - this provides an invaluable drainage system to the roof, particularly at valleys and also around the base of the chimney on the thatch.

Liggers - hazel sways which are about 3 feet long, used to secure Iong straw roofs at the eaves, barges and ridge. Liggers are used in reed roofs at the ridge only.

Netting - this is used with long straw thatch - it protects the straw from being pecked away by birds. It is not there merely to hold the thatch on. Netting does have disadvantages. It can trap leaves and other debris, and can prevent the smooth flow of surface water. This in turn may cause the growth of moss and fungus. It is also a drawback if there is a fire, for there is delay whilst the netting is removed. The netting is laid vertically from ridge to eaves and does not overlap, but is secured with special metal hooks at 9 inch intervals.

Sways - split hazel rods about 9 feet in length used to secure the courses of thatch as they are laid. Metal hooks hammered into the rafters secure the sways.

Guidance Note 7: Tiles and Slates

The first impression approaching a town or village is often the view of its roofs seen from a distance.

The textural richness, variety and the distinctive dark orange or red colour of beautiful steeply pitched old peg tile roofs is one of the great delights of the District's many listed buildings and conservation areas.

Slate began to emerge as a popular roofing material, usually on lower pitched roofs, in the late C18th and early C19th. The improvement in transport (canals and roads) at this time made them more affordable (historically, slate came from Wales or, more rarely, Cumbria - quite a distance). Many C19th terraces in the District's towns as well as some larger, higher status houses are roofed with slate. Slate has been absorbed into the traditional range of East Hertfordshire roofing materials.

Pantiles are often found on subordinate roofs, such as lean-tos and catslide roofs, or on single storey agricultural buildings or other outbuildings. They are most common in East Hertfordshire towards the Essex border.

During the Victorian period machine-made clay plain tiles and ornamental tiles - in a range of colours became popular. These tiles, as with plain tiles, have nibs to hang on battens.

The conservation, repair and reinstatement of these beautiful roofs is fundamental to preserving the character of our listed buildings and conservation areas.

Building Regulations

When it is proposed to alter roofing material - especially to a heavier material, say from slate to tile - it is advisable to discuss the works with officers to determine whether a formal application is required. Please contact the Building Control department for more information.

Peg Tiles

There is a very long tradition of using peg tiles for roofs in East Hertfordshire, which is thought to predate the medieval revival of brick (in important buildings). From later medieval times until the C19th local tile manufacture was generally closely associated with brick making. Production was often highly localised near to suitable clays, even to the extent of supplying the materials for a single large house. Peg tile roofs are traditionally steeply pitched, often more the 50 degrees.

All old clay tile roofs are now weathered, often to a far darker red-brown colour than the original distinctly red/orange or paler red/brown colours. It is common for there to be a variety of shades of red and brown in old tiled roofs. This range of colour is often accentuated after repairs or retiling - especially where a significant number of replacement tiles have been introduced. It is often difficult to achieve a very close match - great care is needed in selection.

The pleasing irregularity and liveliness of an old tile roof with the peg tiles gently cambered in both length and breadth creating a characteristic undulating unevenness is especially notable. Some peg tiles are almost flat whilst others may have a very pronounced curved surface. In surviving old roofs

which still have riven oak laths (rather than sawn softwood battens) the undulations can be even more distinct.

Peg tiles have two holes through which an oak peg was pushed - hence the name. This located the tiles to hang over the laths or battens. Where oak pegs or riven oak laths survive they should be reinstated or replaced for like-for-like - especially where the underside of the roof is visible - as in barns or outbuildings. Modern equivalents are steel or aluminium pegs but these would rarely be acceptable on a historic building.

Peg tiles used historically in East Hertfordshire generally measure approximately 10" or 10 ½" x 6½" (254mm or 267mm x 65mm) and are about ½" (12mm) thick, although it is usual for a roof to display variations in size of tiles (as well as shape, texture, thickness and colour). There have been past attempts to standardise the size of peg tiles (in 1477 and 1725), but their hand made manufacture and small scale clamp production made variation inevitable.

These subtle variations and the aesthetic pleasure of hand made and aged, weathered appearance give peg tile roofs a special patina and character. Modern substitutes, which lack these variations, often result in a dull and monotonously uniform roof.

Ridge and hip tiles

These too are also handmade, in similar colours and textures to peg tiles making them often rather irregular in line due to slight variations in size and shape. This irregularity, within limits, can also add considerable interest to an old roof.

When repairing old roofs, excessive 'straightening up' should be avoided. Half round, one third round and hogsback ridges are traditional 'edge' details, bedded in a lime based mortar. Bonnet hip tiles seem to have been a later innovation. Valley tiles may have been in common use for longer.

When repairing old tile roofs, care is needed to detail gables, verges, ridges, hips, abutments, parapets, eaves and valleys correctly. In most situations, cut slip tiles should be used at gable verges, and not modern tile-and-a-half purpose made tiles.

A tile undercloak course, at the verge, with face side downwards, should project from the wall (or bargeboard) by at least 35mm preferably 50mm. The tiles forming the verge may be tilted back towards the main roof to encourage rain water to run down the main roof and not over the verge. The lime based mortar bedding between the top verge course and the undercloak course should be finished flush. Modern substitutes such as cement fibre board or similar are not acceptable.

In lieu of lead flashing, sometimes cut tiles, set at an angle and bedded in lime mortar at junctions to provide weather protection, can be an alternative detail. It is usually good practice to form lead valleys with cut mitred tiles over.

Some tile manufacturers have starting producing new hand-made peg tiles and plain tiles, though they generally have a regular camber and tend towards uniformity. There are some situations where such tiles would be appropriate - on new buildings for instance, but they should be used judiciously in the repair of existing old roofs or in important historic contents. The mixing of modern smooth machine made clay plain tiles or concrete tiles in with an old tile roof is not acceptable. Quite apart

from spoiling the aesthetic purity of an old roof by 'spots' of alien materials they can look very odd with 'lanes' or courses of jarring tiles, where thoughtless repair has been undertaken.

Occasionally, tile hanging as a wall cladding or patterned or ornamental tiles (such as bullnose, scalloped, club, point or fishtail tiles) are encountered in Victorian and Art and Crafts style houses or on the roofs of some churches built or restored in the C19th - such as the Church of the Holy Trinity, at Hertford Heath.

Carved or moulded bargeboards, finials and other detail sometimes associated with old tiles roofs, can be very distinctive and of great interest. Close attention to detail should be taken to conserve and repair such features very carefully.

Modern ridge ventilation systems are not traditional and can be unsightly, interrupting the ridge line. Alternative solutions to this problem vary with individual cases. It is often desirable to cut back roofing felt each side of the ridge apex by 300mm to allow roof void ventilation together with eaves ventilation.

'Spray on coating' systems applied to the outside surface or the underside of old tile roofs should not be used and are unacceptable as a 'repair'. They prevent sound tiles from being salvaged for reuse in the future and make further traditional repair difficult if not impossible. Such treatment may also result in restricted roof space ventilation with the consequent risk of fungal and insect attack to roof timbers.

Slate

Slate is a metamorphic rock which is impermeable, hard, close in texture, quick drying, frost resistant, fine-grained and fissile - i.e. it splits easily into thin leaves. It is brittle and needs to be handled carefully. Slate roofs are quite different in character to traditional East Hertfordshire old tile roofs. By their regular nature, usually lower roof pitches and generally subtle colour variation and texture they present a more formal and refined impression.

Welsh slate was most commonly used, especially in the mid and later C19th, on terraced houses. This slate, mostly from the great Penryhn quarry at Bethesda, in North Wales, is thin and is riven relatively smooth. It can be cut accurately giving a consistent shape and size. The colour ranges from dark grey through to quite distinctively purplish hues to paler silver grey and what is commonly known as blue-grey. When wet these slates have a distinctive shine.

This thin slate lies quite happily upon roofs of low pitch, which commended it to the Georgian and Regency builders, who chose to conceal as much as possible of the roof behind parapets, or at least to minimise its prominence and height. On the terraced houses in the C19th the roof structure timber should be reduced in size, due to the relative lightness of the material and the lower pitches which could be attained. Welsh slate is laid in regular spaced courses, not in the diminishing course of some other slates.

Slates from other sources can be found in East Hertfordshire. Westmoreland green slates laid in diminishing courses are an indication of high quality work. These can be seen at Balls Park Mansion in Hertford, through there is evidence here that the roofs were all originally covered in clay peg tiles.

A great deal of unnecessary reroofing of slate roofs is carried out. Very often the cause of slipped slates is not the slate itself but 'nail rot' – I.E. the cutting through of a rusty 'necked' iron nail by the hung slate moving in the wind. Such *ad hoc* faults can often be rectified without wholesale reroofing. The absence of sarking or other under-cloaking should not be a concern; a well laid and maintained slate roof will be reliably weather-proof. Where reroofing is, finally, deemed necessary, great care should be taken in removing and stacking the slates for rehanging. This will minimise the number of 'make-ups' needed. Slate is millions of years old and quite capable of withstanding the British weather for a few hundred years, so there is no reason why it should not be rehung time and time again. Remember, it is old iron nails that are usually the problem, not the slates. If you see your builder throwing good slates into a skip it is so he can reach into your wallet and charge you for new ones. Slates are a finite and precious resource – don't waste them.

Today more and more slates are being imported from abroad and Spanish slates and other exotic slates can be found. In appearance these slates can be similar to British slates, but it has been found that their quality and durability can be markedly more variable. In this instance British really is best.

Modern artificial 'slates' are too uniform in appearance, colour and shape to be suitable for historic buildings and will not be approved. If supported by visible 'tingles' or clips they can be particularly unattractive.

Slates may be head or centre nailed. Centre nailing is best for larger sized slates to avoid wind damage. The modern practice of fixing slates with clips looks very unsightly and should be avoided.

There should be a double course of slates at eaves using a short under-eaves slate, supported by a tilting fillet (or fascia board), above which is laid the first full course of slates. The overhang should be approximately 50mm to ensure that water discharges into the centre of the cast iron gutter.

The verge should normally be formed with an undercloak course of slate, which is bedded on mortar and nailed if possible. The upper slate should be well bedded in mortar and finished flush with the undercloak slate course. It is good practice to carry the battens over the edge of the undercloak slate to give additional support. The unsupported overhang of a verge should not normally be less than 40mm and not more than 50mm. Undercloaks formed from cement fibre sheets are not acceptable.

Ridges and hips may be protected with a half or third round terracotta or clay ridge tiles or with dark grey/black angle tiles or, as is usual on lower pitched roofs, a lead roll ridge or hip. Hips may also be formed from mitred slates, interleaved with lead soakers. In exposed situations, the mitred hip slates can be fixed with brass screws and washers. As always, it is best to follow local tradition and relate to the existing traditional roof details and repair methods.

Valleys may be formed by a lead gutter lining - gutter width minimum 100mm; by mitred valley slates interleaved with lead soakers (code 4) fixed by nailing to battens at the top edge. More rarely there may also be swept valleys or laced valleys using specially sized and cut slates.

Sloping edge abutments and junctions or roods with parapets or chimney stacks or changes in roof pitch (as for example in mansard or gambrel roofs) should always be detailed with lead flashings (usually code 4, 5, or 6) and not cement fillets.

Care should be taken when repairing old slate roofs to closely match the size, texture, colour and detailing of the existing slate roofs - an odd purple slate in a grey slate roof can be very visually disruptive.

Where bands or patterns of a different colour or shaped slates (e.g. fish-scale) exist, these should be carefully replicated in any reroofing so as to restore the original appearance.

Traditional names for sizes of slate are listed below, along with the minimum pitch:

Smalls – 12” x 6” – 45 degrees
Doubles – 13” x 7” – 40 degrees
Ladies – 16” x 8” – 35 degrees
Countesses – 20” x 10” – 30 degrees
Duchesses – 24” x 12” – 25 degrees
Princesses – 24” x 14” – 25 degrees
Empresses – 26” x 16” – 22.5 degrees

Metric sizes are listed below, along with their minimum pitch:

305 x 205 mm – 45 degrees
330 x 180 mm – 40 degrees
405 x 205 mm – 35 degrees
510 x 205 mm – 30 degrees
610 x 255 mm – 25 degrees
610 x 355 mm – 22.5 degrees

Pantiles

Pantile roofs are occasionally found as secondary roofs to a larger building such as lean-tos, single story additions, or as outbuildings. Pantiles are rarely used for main roofs of buildings in East Hertfordshire. It seems that pantiles were imported from Holland in the late C17th; during the C18th and C19th they were manufactured in East Anglia. The remaining pantile roofs in East Hertfordshire are most common towards the Essex border.

Pantiles have a shallow 'S' shape profile that overlap one tile beneath and also have a sideways lap. They are laid in a regular, wavy grid, unlike peg or plain tiles and slates which are staggered in courses, and have a distinct bold undulating roof surface, which produces dramatic light and shade patterns when the sun is low.

The size of a pantile was fixed in the early C18th at 13½" x 9½" (343mm x 240mm). Typically, pantile roofs have simple ridge forms. It is difficult to cut pantiles to form hips and valleys. They generally are laid at relatively low pitch, say between 30 to 40 degrees, which provides a comparatively lightweight roof structure. The underside of the pantiles was usually torched with clay or lime mortar to reduce rain or snow penetration.

Pantile roofs develop a similar patina as peg and hand made plain tile roofs. Old roofs are usually an orange/red colour, but can darken considerably with algae and lichens.

Verges may be detailed in a variety of ways - with a top cover bargeboard, finished almost flush jointed with the wall, with an undercloak, usually plain tiles or sometimes slate, or finished against a protective parapet - more common in higher status buildings.

Ridges are traditionally a third or half round or hogsback or saddleback ridge tiles. The gaps created between the ridge tile and the top course of pantiles is normally packed out with peg or plain tiles slips in horizontal lines bedded in lime based mortar.

In the 1920s and 30s it became fashionable to hang glazed pantiles to emphasise the 'Continental modernity' of some new buildings – often green and occasionally dark blue, black and brown. These are rare in East Herts and if found should be carefully conserved (they are difficult and expensive to replace).

Extensions and Roofing Materials

It is usual when designing additions to old houses to relate roofing materials to those of the original main house - but this is not always the case. In the past, it is clear that alternative readily available materials or other reusable materials that came to hand were often employed to good effect. A main house which was originally thatched may have been re-roofed when a cross-wing was added, using more durable and fashionable peg tiles in the C17th; it could then have a late C18th extension roofed in slate and a C19th lean-to in pantiles. This succession of organic growth of such a house, in a mix of traditional materials, adds much to the interest and gives a clear record of the incremental historic development of a building.

In many cases, however, when designing a new extension to an historic building, it will be desirable to respect the traditions of scale and form and to use the main building as a reference for roofing material and detailing.

Because of the inherent difficulties of extending roofs on the same roofline and plane - which often results in an ugly and jarring transition of new and old tiles or slate - it is generally desirable to establish a break between the old and new. It is usual for extensions to be clearly subordinate in bulk and form, and a physical distinction is likely to be desirable.

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Guidance Note 8: Rainwater Goods

Cast iron gutters and downpipes should normally be used for any listed building and are the first choice for any other historic building (or new building), in a conservation area unless lead is the existing material. Indiscernible aluminium replicas are also sometimes acceptable if replacing failed plain cast iron gutters or downpipes, or if replacing inappropriate PVC pipes. Traditional cast iron rainwater goods are solid, robust, rigid, and durable and have been in general use since the C18th. Before the C18th their use was restricted for the most part to the more important buildings. Lead rainwater goods were used in earlier high status buildings. Plastic rainwater goods are never acceptable on a Listed Building.

Cracked or broken cast iron rain water goods should be de-rusted and repaired, or replaced in matching material and section - i.e. half or third round, extra deep half round, beaded half round, box moulded or ogee gutters, with round or rectangular section downpipes. Sockets with or without ears, shoes, bends, branches, offsets, holderbats, earbands, drop ends and stop ends for sockets or spigots, union clips and a range of support brackets are normally readily available from suppliers or merchants. A number of manufacturers can supply "one-off" or unusual patterns.

Cast iron rainwater goods were normally painted black, or a dark colour. Lighter colours can be discoloured by rust staining. If in doubt, black is generally the most appropriate colour - though dark maroon, dark blue or dark green can be effective in suitable buildings. ‘Gutter paint’ (all the left-over bits of exterior paint mixed together in a storage tank) was often used for the unseen interior of gutters and hoppers; today Bitumen paint is more often used. Rust inhibiting paint is commonly used before priming. Particular care should be taken to paint all surfaces and especially to fully cover the unseen vulnerable backs of downpipes and the insides of gutters.

Downpipes should be fitted on spacers or holderbats sufficiently distant from the wall to allow overflow water (or water leaking from a broken downpipe) to run down the back without wetting the adjacent wall, as well as allowing ventilation space to facilitate drying out.

Lead downpipes, decorative ears and heads and unusual or ornate cast iron hopper heads are of particular interest and should be repaired by a skilled craftsman wherever possible. As their use is normally restricted to important buildings, heads will often include dates, coats of arms, emblems, initials or monograms. The very careful conservation of these features is most important. There are some excellent examples at Aston Bury (Grade I) and many other larger country houses, schools, civic buildings and churches in East Hertfordshire.

Failure to carry out regular maintenance and the poor designing of gutters, hopper heads and downpipes are two of the most common faults and causes of dampness and resulting rot, moulds and insect attack and washing out of mortar and saturation of brickwork plaster, render or weather-boarding in old buildings. Regular inspection and maintenance of rain water goods is essential. Large sums of money spent on repairs could often have been easily avoided by prompt attention to rainwater disposal. It is advisable to inspect the efficiency of rainwater goods during heavy rainfall.

When earlier cast iron gutters and down pipes have been thoughtlessly replaced by plastic, they are sometimes undersized. The Building Control department can advise on the sizing of rainwater goods and any other technical aspects of design. Great care is needed to provide adequate sized gutters and down pipes to cope with heavy storm rainfall - especially for large roof areas - where chutes or other overflow provision is prudent. It is always advisable to provide access trap doors to internally drained roof areas and close to lead valleys and flat roofs to facilitate maintenance and cleaning.

Thorough inspection, repair and clearance of gutters, downpipes, lead valleys and lead flat roofs - and all other means of rainwater disposal - is most important with any building, but all the more important where the building is listed as being of special architectural or historic interest. This is particularly important in the autumn where tall trees overhang roofs or are in close proximity to buildings. Neglect of rainwater disposal is one of the most common causes of the deterioration of old buildings. Water or dampness penetrating or soaking the external brickwork and washing out lime mortar joints and the saturation of external plaster, render, or cladding may rapidly lead to fungal or insect attack or frost damage in winter. Modest expenditure or routine maintenance can prevent far more extensive (and expensive) repairs becoming necessary at a later date.

At ground level, blocked gullies and drains can lead to flooding close to a wall and the risk of rising damp, which is especially a problem for timber framed buildings with low sole plates. Leaf guards over gullies are a good idea. It is advisable to provide sufficient space and easy access for rodding. Rodding eyes may also be incorporated at vulnerable points to ease clearing blockages in long or complex rainwater disposal systems. Fallen birds' nests and leaves are particularly likely to block shoes of downpipes, where the downpipe disgorges into a gully, or curved swan necks at the top of downpipes, where they join to gutters. Wire balloons at the top of downpipes reduce leaf and other debris blocking downpipes, but they do need regular cleaning.

Gutters and lead valleys or lead flat roofs are functional and rarely prominent elements in the appearance of buildings, although gutters can be moulded or ogee in section. Cast iron downpipes, hopper heads, ears (securing downpipes to walls), and even gutter support brackets can, however, be decorative and may be quite noticeable features, contributing to the character and interest of a building. Later alteration or additions to the rainwater disposal system can lead to an awkward unsightly clutter of pipes which can mar the building. Every opportunity should be taken to seek to rationalise and simplify the design of disposal pipes. Some complicated roof forms, often found when old buildings have been successively extended and added to in a rather 'ad hoc' manner, may have extremely tortuous rainwater disposal. Sometimes this may include internal gutters running through attics or roof voids to reach the outside wall of a building, with the consequent dangers of overflowing water within the building. Where the external appearance is all important, an internal rainwater disposal pipe may have been provided, as at the Grade II* listed Stratton's Tower (1789) in Little Berkhamsted, which is 155 feet high.

All too often downpipes discharge into unsuitable places, where an unsuspected blockage can cause considerable damage, such as near to basements, cellars, or steps down to ground floor level or into butts leaning against walls.

Emergency Repair of Rainwater Goods

Short term temporary repair may be necessary in an emergency to gutters, downpipes or lead parapet or eaves gutters, lead valleys and flat roofs to limit damage due to water penetration or saturation. Diversion of water away from vulnerable roof areas or walls may be possible by the use of temporary metal sheets, tarpaulins, plastic sheeting or pipes to throw the rainwater away from the building.

Very few rainwater disposal systems can cope with rare torrential downpours, but extensive damage can be done in a very short time and it is prudent to ensure, at all times, that rainwater disposal systems operate efficiently. When a 4 inch wide half round gutter is laid to a gentle fall it can dispose of 26 gallons of rainwater per minute.

Cracked downpipes and sockets can be temporarily bandaged with bituminous or mastic tape. Defective gutters can be lined with bituminous or mastic tape. Adhesive flashing strip can be used as a short term repair for lead valley and parapet gutters and even, at a pinch, for flat roofs, until permanent repairs can be made.

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Guidance Note 9: Lead

There is a long tradition of the use of lead in East Hertfordshire buildings. Its uses include providing cames (lead supports in leaded light windows), weatherings and flashings. For rainwater disposal - pitched valley gutters, parapet gutters, box gutters, tapered flat valley gutters, hopper heads, spouts and downpipes. It was also used as a roofing material for flat roofs (i.e. less than 10 degrees pitch), pitched roofs and cladding.

Lead is malleable (that is to say pliable, relatively soft and bendable and able to be beaten or pressed without fracture or breaking) and durable, if correctly detailed and fixed. It can be worked by bossing (i.e. shaped by hardwood tools) or lead-welded - fusion welding using lead as the filler rod.

Until the early C19th roofing lead was cast in rather heavy sheets and these survive today only rarely. The early use of lead was restricted to the most important buildings, grand houses, churches and ecclesiastical buildings. In the C18th and C19th lead flat roofs (never actually flat but at a very low pitch, less than 10 degrees) and pitched roofs, became more popular in larger houses and even in some smaller houses. The use of lead for flashings, weatherings and cladding also became more widespread.

In repairs to lead or in replacement of lead, it is essential that the Lead Sheet Association guidelines and technical advice are followed. Architects, surveyors and competent builders will be familiar with current specification standards and good practice in detailing. Sand cast lead sheet is still available for specialist conservation work.

Close adherence to technical standards is important with regard to maximum sizes and fixing detailing, as it is well known that premature failures of sheet lead in all situations are almost always due to oversizing and consequent thermal fatigue and stress failure (caused by the high coefficient of linear expansion of lead) and consequent buckling, creasing, ridging up and rippling and ultimately cracking and tearing, and incorrectly specified over fixing, that restricts or prevents thermal movement - expansion and contraction.

The general principle is the thinner the lead - the smaller the piece. The thickness of the sheet lead determines its code.

A common fault is in the design of stepped tapering valley gutters. Although initially more labour intensive and costly, it is often better to err on the side of heavier codes of lead and of smaller sizing with more drips or steps and expansion joints, rather than merely meeting the minimum standards required. Extra thickness will give more mechanical strength and can compensate for the extra length of a sheet.

The need to always take great care when lead welding (or lead burning) joints to avoid any risk of fire cannot be over emphasised - the likely cause of the disastrous fire at Uppark in Sussex.

In old cladwork, iron nails were frequently used. These inevitably rust and fail - copper, brass or stainless steel clout nails are now used. Galvanised mild steel and aluminium nails are not recommended by the Lead Sheet Association.

It may be desirable, in certain circumstances, to consider the use of patination oil to avoid the formation of a white carbonate which can discolour new leadwork or adjacent masonry.

It is essential with lead roofs that a suitable base and underlay is provided. Geotextile non-woven underlays, or similar, are commonly used - these take up imperfections in the substrate, allowing ventilation and free movement of the lead. Lead sheets cannot be laid directly on to oak and lead can react unfavourably with creosote and bitumen-coaled fabrics or bituminised treatments. Where a new substrate is flat and even - such as exterior quality plywood - an alternative underlay is building paper (to BS 1521, Class A).

The Lead Sheet Association recommendation for a suitable code of lead sheet for different applications is given below. A range of codes is given, but the final choice should be dependent on the location and degree of exposure or shelter.

Flat roofing (i.e. less than 10 degrees pitch) – Use Code 4 - 8
Parapet, box and tapered flat valley gutters – Use Code 4 - 8
Pitched roofing (10 degree to 80 degree pitch) – Use Code 4 - 8
Vertical cladding – Use Code 3 - 6
Chimney flashings – Use Code 3 - 5
Lead slates (i.e. lead fitted around a projection through roof) – Use Code 3 - 4
Hip and ridge flashings – Use Code 4 - 5
Pitched valley gutters – Use Code 4 - 5
Weatherings to parapets and cornices – Use Code 3 - 6
Damp-proof courses – Use Code 3 - 4
Apron and cover flashings – Use Code 3 - 5
Soakers – Use Code 3 - 4

For lead sheets in flat or near flat applications on listed buildings - parapet or box gutters, flat roofing, or ridges it is often advisable to increase the code of lead specified. For lead used in inclined positions such as pitched roofs, pitched valley gutters, or vertical cladding increasing the code can encourage the inherent tendency for lead to "creep", i.e. stretch under its own weight. This is particularly a potential problem in south facing elevations.

In all cases, fixings must not (significantly) restrict free thermal movement. The lead sheet must be allowed to expand and contract when subject to changes in temperature.

Head fixing - i.e. nailing (with copper, brass or stainless steel clout nails) the top of the lead sheet - in a double row staggered pattern or other traditional method is recommended by the Lead Sheet Association. Typically this will be one row 25 mm from the top of the sheet, the second row 50 mm from the top.

A further requirement of fixings is that they provide adequate resistance at free edges against wind lift. Fixing clips (50mm wide) should be fixed as low as possible to be effective and there should be an allowance for expansion. Overtight clips can restrict movement and cause buckling of edges of

the lead sheet. In positions of severe exposure careful thought is required in detailing clips - advice and information can be supplied by the Lead Sheet Association.

Joints connecting the individual pieces of roofing and cladding are formed by wood-cored (or hollow) rolls, drips, welts and laps. Traditional methods of forming the joints should be used as a reference, although wood rolls are generally accepted as the most effective joint for larger areas. All joints must be weather tight whilst allowing for thermal movement. Drip heights should normally be between 50 and 60 mm.

Run-off from lichens and mosses can form an organic acid solution, which over a long period may create the breakdown of the lead at drip points. Where it is desirable to retain lichen for an aesthetic effect, a sacrificial lead strip may be provided at the "drip-off" points.

It is essential that there is effective ventilation to the underside of lead roofs as condensation corrosion can be a potential source of failure. The maximum length of any piece of lead flashing should be 1.5 metres. The lead should be inserted at least 25 mm into the joint. Where lead is in contact with cement it should be coated with bitumen to prevent corrosion.

Lead patch repairs to splits can be acceptable in certain circumstances although the reason for the split should be ascertained. The old lead should be cleaned back to a bright surface and cut away at least 40 mm each side of the split to ensure that all fatigued lead is removed. The new patch should lap over the old lead 25 mm all around. Butt joints should not be used.

In the past, unfortunately, it has been common practice to coat defective lead parapet gutters with bitumen. This is not acceptable as it makes identification of further faults difficult and also reduces the credit scrap value of lead - which can be recycled and set against the cost of new lead - when it is eventually replaced.

An increasing issue is the theft of metal (particularly lead) from historic buildings – notably churches. Brightwater marking of lead is a good deterrent which, together with well-informed vigilant neighbours can help prevent this crime. Nevertheless, some isolated and rural locations are particularly vulnerable. We would usually insist on stolen lead being replaced on a like-for-like basis.

Terne-coated stainless steel - i.e. lead (alloyed with tin) coated stainless steel - may sometimes be acceptable as an alternative to lead sheet in certain situations.

Copper is the other sheet metal sometimes used historically as an alternative to lead. It is very distinctive, its weathered green surface can be seen on the domed chapel at Haileybury College (copper replaced the original slate in 1927) and some of Hertfordshire's church spikes such as the parish church of St Mary the Virgin, Braughing.

Zinc sheeting has also been used in the past but tends to patinate in a patchy way giving a poor appearance. Modern coatings seek to overcome this disadvantage.

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Guidance Note 10: Windows and Doors

Windows and doors are an essential part of the historic and architectural character of any building and one of the most damaging and most common alterations to the appearance of any building is the unsympathetic replacement of windows and doors.

New replacement windows and doors of inappropriate design, scale, size, proportions, materials, texture, colour, profile and detailing are, unfortunately, all too frequently used and can significantly harm the architectural quality of an individual building or badly disrupt the appearance and rhythm of a group or terrace.

This gradual degrading of the character and visual amenity of the District's towns and villages is, in part, due to ill-informed, so-called 'improvements' due to inexpensive modern "standard" doors and windows being easily available and heavily advertised.

Listed Buildings

The proposed alteration or replacement of the windows and doors or doorcases or surrounds of a listed building requires Listed Building Consent. With buildings of special architectural or historic interest the repair of original or other interesting windows or doors is always encouraged and required where this is reasonable, as they represent an often significant element of the character, and aesthetic, architectural and archaeological importance of a listed building. Repairs can require the splicing in of new sections and/or the use of modern 2-pack repair compounds such as Windowcare repair systems.

If existing historic windows or doors have deteriorated to such an extent that replacement is the only possible course, an exact replica of the original frame moulding, glazing bar profile and overall design, appearance and method of hanging or fixing should be used. If possible old glass should also be carefully removed and reused if of interest. Where historic windows or doors have previously been replaced by modern inappropriate joinery, then research should be commissioned of a heritage expert (see the IHBC website's HESPR page for suitable professional consultants) as to the original pattern or one authentic to the age of the building that can inform the replacements. When done correctly, this can be a significant restoration and enhancement of the building.

Replacement of windows and doors is often carried out quite unnecessarily and this inevitably results in a loss to the building that, in the hands of a joiner skilled in such repair, could be avoided. Existing stone steps, foot-scrapers and interesting door or window fittings should be retained.

Unlisted Buildings in Conservation Areas

Some of the more obvious excesses of the replacement of windows and doors are apparent in the great many unlisted Victorian and Edwardian houses, usually included in the town and village conservation areas. One of the most devastating alterations to such buildings, especially if in a terrace or closely related group, is the enlargement (or reduction) in the size of a door or window opening. This will always have a most unsettling and discordant effect on the proportions of the house in itself and the nearby houses and often looks self-evidently wrong. Gauged, rubbed or curved brick arches over openings should always be retained.

Traditionally, historic windows were of three main basic types: vertical sliding sash, horizontal (Yorkshire) sliding sash, or outward opening side hung or fixed casement windows. The frame and pane size of these windows invariably had a balanced, vertical emphasis or overall vertical proportions. Unfortunately many of the new modern standard windows incorporate unsymmetrical size panes, unbalanced opening casement windows and top hung ventilation lights, which always jar in a building originally conceived with traditional balanced and harmonious patters of fenestration. A sash window should not be replaced with a casement type window. "Bow" windows similarly are never appropriate in Victorian/ Edwardian houses in East Hertfordshire where window design was usually understated.

Many so called "period doors" which have little or absolutely no authentic historic reference are intended to evoke an impression of “Tudor", "Elizabethan", "Colonial" or "Georgian" precedents which have been very widely used often replacing quite serviceable and carefully proportioned original panelled doors. Anachronistic, wholly out of place "reproduction" door furniture, detail and fittings, such as letter boxes, handles, escutcheons, latches, knockers, hinges, bulls eye glass, integral fanlights, are common. Simple, understated, uncluttered painted wood panelled or boarded doors based on historic precedent are always a far preferable alternative.

In the vast majority of Victorian/ Edwardian houses, windows and doors were simply painted and not stained to show off the grain. PVCu, aluminium and powder coated steel replacement windows and doors cannot match the construction, detailing or overall appearance of traditional softwood sash or casement windows and are rarely appropriate.

Frame and glazing bar design and finishes always identify such a window. The position of the window and door frames in relation to the outside face of the wall should be respected. In most C19th houses the frame is recessed to create a defined shadow line effect, which was a conscious part of the original concept of design.

As with listed buildings the careful repair of existing original windows and doors should be fully considered before deciding on replacement. In many cases only part of the window such as the bottom rail or sash box will be damaged or rotten and it will often be easier and cheaper to ease, adjust and overhaul the existing window and avoid large scale disruption. The wood used in C19th window and door construction is often slow-grown Nordic pine, which is superior to that of the cheaper modern replacements.

Leaded lights are out of place in the vast majority of Victorian and Edwardian houses and should not be used unless the house was originally designed as such. Bull’s eye glass should be avoided in windows and doors.

Choosing double glazing usually means the replacement or destruction of the original windows. A common solution used in historic buildings is the installation of secondary glazing – i.e. separate glazed unit fixed within the reveal behind the window. This helps retain the external appearance of the building. Not only is this solution thermally efficient it substantially reduces noise pollution, which can be important if the house stands on a busy road. Improved thermal performance can often be achieved through the easing and adjusting of stop and parting beads or through the installation of Ventrolla or similar draught-proofing methods. However, it should be noted that complete draught exclusion is not always advisable as it can lead to condensation and dampness.

Roof extensions and dormer windows often destroy proportions and the relationship of walls and openings to the roof. Roof extensions should always be avoided where they would be prominent and detract from the character and appearance of conservation areas. Any necessary rooflights should be small conservation-style rooflights carefully positioned to align with the architecture and fenestration of the host building and be located on rear slopes.

The essential point to bear in mind is to respect the original character and appearance of the house. The alteration of windows and doors can mar the impression of your house or street and in fact lessen its resale value. Original doors and windows should be regarded as a positive asset. C19th and early C20th houses, however small or large, all have a distinctive character and interest.

Conclusion

If you live in a listed building, windows and doors should be repaired in the first instance; this will often be less disruptive and cheaper than replacements. Any replacement windows and doors will need Listed Building Consent and must be fully justified. Please consider using the Council's pre-application advice service before making an application or commissioning any works – the advice given can help you in the long-run. If you live in an unlisted building in a conservation area, please carefully consider the effect of any alterations to the original pattern, style and design of windows and doors. All houses and other buildings have a defined identity which should be respected.

What to do and what not to do

Do repair historically interesting doors and windows rather than replace unless beyond any reasonable repair.

Do check with the Planning Department whether Listed Building Consent, Building Regulations Approval or Planning Permission is required before starting work to alter or replace any doors or windows.

Do insist on exact replicas of existing windows - matching glazing bar profile and frame moulding - and door patterns and designs.

Do retain and recycle historic window catches and stays, stone steps, bootscrapers, existing historically interesting door knockers, letter boxes, knobs, handles, locks, hinges, number plates or other letters or signs or other door or window fittings of interest.

Do select simple historically appropriate styles if any fittings need to be replaced or renewed.

Do use carefully selected wood for repairs or for replacements grown by sustainable and managed methods.

Do use secondary glazing in preference to sealed double-glazing on historic buildings. 'Stick-on' glazing bars, even with spacers, are never appropriate. For listed buildings, sealed double glazed replacement windows are hardly ever acceptable. There may be a case for Slimlite or similar 10mm or 12mm double glazed units on curtilage buildings or rear elevations and modern extensions that do not contribute to the special interest or significance of the listed building. Please seek pre-application advice from the Council before making an application.

Do seek advice from an experienced and accredited conservation professional – an IHBC member or a RICS building surveyor or RIBA or AABC architect. Be aware that window manufacturers have a vested interest in condemning existing windows as 'beyond repair'; any of the above accredited conservation experts will give you independent advice. Often windows and doors that appear to the layman to be in a very poor condition can be repaired and give many more years serviceable life at a fraction of the cost of new windows.

Do respect the character and individuality of historic windows and doors and treat them for what they are - interesting and often very important elements contributing significantly to the appearance and value of a building.

Never take advice from a seemingly knowledgeable general builder (or non-conservation accredited other professional) who is not specifically familiar with the requirements and specialist approaches to repairs and alterations to historic buildings.

Do not needlessly replace historically interesting wood or iron windows with unsympathetic, standard, modern materials and styles. Repair, if possible, is always preferable to replacement and it is usually cheaper.

Never start works of alteration to listed buildings unless you have checked that an application for consent is not required or before you have received formal listed building consent, planning permission and Building Regulations approval. There are heavy penalties for unauthorised works to listed buildings as it is the duty of owners to obtain all necessary consents before the commencement of works. To fail to do so is a criminal offence.

Do not choose inappropriate standard "ubiquitous" replacement windows or "off the peg" tropical hardwood door patterns - they will often reduce the resale value of your house and always look out of place. Obviously modern doors with integral fanlights or non-historical panel patterns and detail should always be avoided.

Do not bring windows or door frames flush with wall if they were previously designed to be recessed. The shadow line created by such setbacks is an important element in the appearance and liveliness of a building.

Do not increase or reduce the size window or door openings and remove or alter brick arches or stone sills or steps - this can destroy the proportions and scale of a building.

Do not stain new replacement windows if they were previously painted or intended to be painted.

Do not replace distinctive old glass, for example crown glass or cylinder glass, with modern glass. If necessary carefully remove and reuse.

Do not use "up and over" garage doors.

Guidance Note 11: Shopfronts

The main shopping streets in East Hertfordshire are all in conservation areas. Hertford, Ware, Buntingford, Bishop's Stortford and Sawbridgeworth are traditional country towns and all contain a large number of statutorily listed buildings. The Council recognises the importance of well-designed shopfronts to the character of such historic towns and believe that quality will encourage investment and spending, thus benefiting all the traders in the area.

The quality of any shopfront design relies on its detailing and materials. The following notes offer guidance to all those involved in this design process. Further help can be obtained by contacting the Planning Department for pre-application advice which, it should be noted, is a chargeable service. Please contact the Planning Department before starting work to make sure you are not infringing the law. It is an offence to carry out work on a listed building which affects its character without consent. It is also an offence to carry out certain works of demolition in a conservation area without consent.

Shopfront design

Few, if any, complete shopfronts in East Hertfordshire date from before the early C19th. Many of our most attractive examples are Edwardian or even later.

Shopfront design has always been strongly influenced by both fashion and the prevailing architectural trends of the time. Many of our old buildings have a later shopfront in a different architectural style, some of which are of such quality that they justify repair and retention in their own right. This approach should always be considered first in the case of a Listed Building or in a conservation area.

Where change is to be made to an existing shopfront or one for a new building, experience shows that the key consideration in good shopfront design is to respect the architecture above and around in terms of scale, proportion and materials.

Where change is appropriate, the Council will positively encourage good new shopfront design. The Council will discourage the use of synthetic and untraditional materials in the sensitive historic areas of the towns. The Council has adopted policies which incorporate this approach and pursues them vigorously in proposals affecting Listed Buildings or in conservation areas.

Historically, timber is the traditional material for shopfront construction in this area although there are a few good examples where cast iron or other metals have been used instead.

The Use of Timber in Shopfronts

Timber has been the traditional material for shopfront construction over the centuries, because it has proved to be both versatile and durable and can readily accommodate the changing designs of shopfronts. Traditionally, the timbers used were teak, oak, black walnut and mahogany, chosen for their aesthetic as well as practical qualities. Nowadays, although there is a vast range of timbers available for shopfront joinery, it is still imperative that specifiers are aware of the properties of the timber and its durability. It may be useful to contact TRADA, (Timber Research and Development Association) who have produced technical guidance on the properties and uses of timber.

The durability of the timber chosen will also depend on the aspect of the shopfronts and the finish applied to the timber. External finishes, such as paint, varnish or wood stains will extend the life of the timber greatly. It is also necessary to apply preservatives to some timbers, such as plywood, or surfaces which are to be painted.

A suitable grade of plywood for exterior use (e.g. marine ply) must always be specified when used in the construction of stall risers or other components of the shopfront.

The Use of Cast Iron in Shopfronts

Cast iron was sometimes used for mullions, pilasters and transoms and occasionally in this area for structural columns; it was also used for decoration. It is becoming rare and every effort should be made to retain and repair it.

Rust on cast iron can be treated with "stabilizers" or "converters" that will prevent further oxidisation. These usually take the form of primers which are easy to apply in paint or spray form. Converting solutions, however, are often in the form of acid and require specialised application.

Cast iron components sometimes need replacing and in this case new castings can be made using, if possible, original components as a pattern. Repairs to cast iron should ideally allow minimal disturbance to the historic fabric, so retaining as much as possible of the original features. The cast iron may need to be welded during the course of repair. Alternatively, cold repairs may be more satisfactory, such as strapping or metal stitching. All repairs should be carried out by an experienced craftsman.

Signs and Advertisements

These are essential to the success of any business. Remember, however, that too many signs in too small a space can be confusing and counterproductive. The towns of East Hertfordshire each have a distinct personality and each has conservation area status. Great care needs to be taken to ensure that an escalation of competitive signage and illumination does not occur.

The Council, therefore, takes the view that the corporate image approach to shopfronts and advertisements design is not necessarily appropriate or acceptable and that it may have to be modified to fit in with local character. In such cases, it is recommended that the Planning Department pre-application advice service is used.

Design of Signs

In conservation areas, or on listed buildings, fascia signs should sit above the shop window, below the cill of any First floor windows and should be sympathetically related to the scale of the shopfront and the whole building. This will often mean within the dimensions of the side capitals or brackets to the dividing party pilasters.

Fascias should normally be painted wood with the name of the shop sign written (hand painted). Individually applied metal letters can be acceptable if a fascia board is unsuitable for the building. These letters can sometimes be placed on the side or flank elevation of a building. The individually applied letters should be simple and clear to read - black or gold letters can be particularly effective.

The lettering of a shop sign should, in most cases, be simple and in proportion to the scale of the building - although, of course, sympathetic imaginatively designed signs of clear quality are encouraged. If the fascia sign is overloaded, the letters can appear squashed and illegible. Additional signage or lettering can instead sometimes be applied to the stall-riser, or on the shop window itself.

However, the shop window should not be blocked by vulgar obtrusive signs.

Projecting box fascias are out of place in sensitive locations. Internally lit box fascias or box lettering will not be accepted in conservation areas or on listed buildings.

Hanging Signs

A hanging sign is not always suitable for every building, although thoughtfully designed traditional hanging signs of an appropriate size can enhance the character of a street or building. Generally, they should be of wood or metal construction and be simple and easy to read, depicting the name of the business below.

Brackets should be simple and not overly ornate. The design of the bracket is important as it forms part of the street scene.

Illumination

As with signage, great care needs to be taken to avoid an escalation of competitive illumination, especially in conservation areas.

Where lighting is acceptable, the source of illumination should be low key and discreetly positioned. Individually illuminated letters, halo- lit letters, swan neck and projecting spotlights and fluorescent neon lighting will be considered very carefully to assess their impact on the building and setting in the street scene.

Internally illuminated acrylic box fascia signs are unacceptable.

Brash and garish projecting illuminated hanging signs, encased in plastic boxes, are unacceptable in historic streets. Normally, only those premises which open at night, such as public houses, restaurants or similar late opening premises, will actually require external illumination.

Canopies and Blinds

Certain traditional shops have always tended to have retractable blinds. Butchers, bakers and fish mongers needed blinds to prevent the sun from damaging their goods. They could be pulled down when required.

Modern 'balloon' blinds or shiny plastic Dutch canopies are often used as a means of increasing commercial advertising space. Generally this type of blind obscures the fascia and introduces an uncharacteristic and jarring form into the street.

The preferred materials for blinds are heavy duty cotton types. The glossy plastic or stretchy shiny fabrics which are sometimes used are totally unacceptable for historic shopfronts and shopping areas.

Security

Security is an important issue to all retailers, however, a balance has to be struck between obtaining a safe and secure building without losing the intrinsic character of the building.

In designing a new shopfront, security measures, such as roller blinds (where appropriate) are designed within the whole shopfront, and can be discreetly positioned behind the fascia board. The stall riser can be constructed of brick concealed behind a timber panel. Smaller paned glass windows, transoms, mullions and stall risers are more difficult to break into than large areas. Mullions can be reinforced with metal T-sections to improve strength.

It is more difficult to adapt an existing historic shopfront. Translucent film can be applied behind the glass, giving a quality of strength similar to laminated glass. Lattice grilles are less offensive and, if positioned behind the shop window, do not destroy the character of the street.

Security shutters can deaden the appearance of the street at night while reinforcing a negative urban crime image and should be avoided in historic areas. But, if the only solution is an external shutter, an open mesh design is preferable to a solid screen. It is important that the shutter does not cover the whole shopfront, only the vulnerable glazed areas, so that it is integrated into the visual framework of the shopfront. It should then be painted or finished in a colour to complement the rest of the shopfront.

Planning Permission, Advertisement Consent and Listed Building Consent

Planning permission is required for material alterations to the external appearance of a shop, such as altering the size of the window, or installing a completely new shopfront.

Fascia signs and hanging or projecting signs will, in addition, need Advertisement Consent and illuminated advertisement signs require consent. Blinds displaying advertisements require Advertisement Consent, and those without advertisements may still need planning permission.

In addition Listed Building Consent is necessary if the shop is a listed building, for any alteration which affects its character. Consent must be received before works begin.

The following alterations would normally require listed building consent: new display window or new doors, security alarms, illumination, security shutters and blinds, extractor fans, advertisements, altering the shop interior, repainting the exterior. This list is not exhaustive and if you are in any doubt, then please discuss the alterations proposed with a Conservation Officer.

Sources

The Town and Country Planning (Control of Advertisement Regulations) 1992
Planning (Listed Buildings and Conservation Areas) Act 1990
East Hertfordshire Local Plan Adopted First Review (March 1993) Policies BE25 and BE27 relating to shopfronts and advertisements within conservation areas.
'Shopfronts and Advertisements in Historic Towns' - published by the English Historic Towns Forum - 1991
Book of Details and Good Practice in Shopfront Design - English Historic Towns Forum 1992
'Conservation in Essex No 5: Shopfronts' - Essex County Council

Guidance Note 12: The Conversion of Farm Buildings

Historic barns and traditional agricultural buildings are an essential element in the landscape and heritage of East Hertfordshire. The pleasantness and character of the countryside would be greatly impoverished by their gradual loss.

Over the years, however, many of these fine barns and other interesting agricultural buildings, granaries, cart shed, implement stores, animal shelters and sheds, storage buildings, dovecotes, dairies, milking parlours and pigsties have not been used in an economic way and have fallen into disrepair, due to changes in agricultural management and practices. Sometimes they are in a state of serious dilapidation or decay and are often in need of urgent repair.

The majority of the historic barns in East Hertfordshire are typically of C16th or C17th timber-frame construction, on a red brick and flint plinth and are clad in black weatherboarding with a beautifully weathered old tile or thatched roof. Associated buildings may be of similar construction or might be of C18th or C19th brick and slate or pantile. There are approximately 300 listed barns and 200 other listed agricultural buildings in East Hertfordshire.

Most barns are of 3, 4 or 5 bays in size, although there are a number of notable examples of exceptionally large 10 and even 12 bay barns; some are single or double aisled. The barns are characterised by a steeply pitched sweeping roof, over unbroken dark walls often with a gabled porch (midstrey); a simple and robust form and a solid outline.

If a barn is considered "at risk" and is seriously threatened, sympathetic residential conversion may be the only reasonable and realistic means of generating sufficient financial interest to save and conserve the structure. Barns and associated outbuildings are characterised by their simplicity of form and their robustness as elements of the rural landscape. Any residential conversion can compromise the essential feel and integrity of the buildings. Some residential conversions have been so detrimental to the special interest and character of barns and outbuildings that they have been "delisted" thus totally negating the original aim of the preservation of a listed building.

The main points of concern relate to:

- The large number of windows that must be introduced in order to meet the minimum requirements for residential accommodation;
- The subdivision of the large internal volume, the essence of a barn's character, is inevitable and articulation and rhythm of the bays can be lost;
- Over-restoration and reconstruction inevitably leads to a loss of the patina of age and the "memory" of the past associations of the building.
- Residential use can also be damaging because the paraphernalia associated with a dwelling cannot reasonably be controlled.

The setting of the barns and outbuildings is an essential part of the character of the building or group. Treatment of boundaries, paved areas, planting and gardens should be simple, plain and robust. The public side of the building or group should reflect the original agricultural character of the building - grass, gravel or simple clay brick paving may be appropriate and must not include any

of the residential paraphernalia referred to above. It is always preferable to err on the side of plainness and simplicity. Simple post and rail fencing or native, indigenous hedging and tree planning is in most cases functional and appropriate to define boundaries and to provide privacy.

The conversion of a barn should retain the sense of internal space that is so much a part of the barn character. Open plan layouts are therefore the preferred internal design form. Where partitions and inserted upper floor platforms are proposed they should be structurally independent of the timber frame. A large proportion (usually at least one half) of the internal volume must remain open from ground floor to ridge.

Brick chimney stacks are alien to the form of barns and are unacceptable - black painted metal flue pipes may be acceptable but should not be prominently located or project above the ridge of the roof. Any stack is unlikely to be acceptable in a thatched roof.

The primary aim in any conversion is to retain as much as possible of the character of the barn or outbuilding, which is the very reason for its inclusion in the statutory list of buildings of special architectural or historic interest. All the main structural elements of the timber frame must be retained in-situ wherever possible.

A schedule of repairs will be repaired to accompany an application for listed building consent, clearly specifying the extent of repairs and the proposed method of repair of:

- The timber frame, including main structural elements - corner and bay posts, sole plates/ sills, beams, girding beams, braces, principal rafters, collars, struts, roof posts, purlins etc, as well as intermediate studs and secondary rafters. Repairs to an oak frame should be in new oak of the same section/ dimensions as existing. Wall frames and roof structures should not be straightened up unless they are structurally unsound.
- Plinth or sill walls or main loadbearing walls and foundations including materials, bond of brickwork, mortar mix and type of pointing, external cladding for example, the size and profile of weatherboarding.
- Roofing materials - peg tile, plain tile, thatch, slate, pantile.
- Doors.
- Rainwater goods and drainage. If applicable, replacement gutters and down pipes should be cast iron or indiscernible aluminium replicas.

A set of accurate survey drawings (scale 1:50) clearly showing the structural frame and including sections of each bay, will be required to be submitted with the application for listed building consent together with detailed specifications.

It is often possible, in a carefully considered design, to make use of the opening of the double doors, in a porch (midstrey) to provide a glazed screen set back slightly from the line of the doors, to enable the doors to be fastened back in daytime and closed at night. The insertion of windows and doors should be kept to an absolute minimum. Windows and doors should be concentrated on the internal, private side of the building. Large modern ‘picture’ windows –even when fixed in front of the frame are unacceptable, as are roof-lights and, in particular dormer windows.

The design of inserted floors and partitioning to provide for bedrooms and bathrooms (and the appropriate privacy) needs great care if the openness of the barn is not to be overly compromised and harmed. While voguish, modern materials such as planar glass (which, in practice, is never as transparent as architects imagine) and exposed steelwork too readily draw the eye, to the detriment of the appreciation of the historic building itself. Better to use traditional materials, designs and techniques befitting these simple rural buildings.

Barns or smaller buildings should not be extended or linked to other buildings. With regard to the external appearance of the barn and outbuildings, the simple bulk form and plain outline of the building must be retained.

Weatherboarding should be painted in black barn paint. Windows and doors should be purpose made and be positioned to fit behind or between elements of the timber frame and studs and be of a simple, plain design. For windows this will often result in 'long-work' shaped vertical windows. The external frames of doors and windows should be painted or stained black.

Conclusion

Conversion to residential use is, generally, the use which most damages the essential character and integrity of a barn or other agricultural building. Nevertheless, it is the most profitable use and tends to, at least financially, 'trump' all other uses. More low key uses, involving far less extensive alteration to the character of the building, are in most situations strongly preferred and should be explored fully before any concessions to conversion is considered.

Guidance Note 13: Hard Landscaping in Historic Areas

East Hertfordshire is fortunate in having a largely very attractive environment. Streets, pavements and gardens provide the setting for historic buildings but whereas the quality of a town's character depends on making the best of its own unique personality, the demands of traffic and safety has, in the post-war period, often required standard nationally imposed measures, and these two worthy objectives can find themselves in conflict. By careful attention to detail and a sympathetic approach in principle, such conflicts can invariably be overcome to the benefit of all interests.

This advice aims to ensure that local character is preserved from harm and, where change is necessary, enhanced. New elements should reinforce local character in both design and materials and, wherever possible, the opportunity to reinstatement any lost elements or features should be taken.

History

Until the mid-C18th the streets of the towns and villages of East Hertfordshire were constructed of rammed earth, gravel or cobbles often with a central drainage channel. The mud in winter on Hertfordshire roads was notorious and the main roads out to the country from London were rumoured to grow to as much as half a mile wide in places in winter as traffic spread out and tried to find a firm surface to travel on.

Until the 1760's the onus lay on the individual occupiers of adjacent buildings to pave and cleanse the areas in front of their houses - up to the middle of the street in towns and villages.

After this time responsibility for roads transferred to commissioners with the power to levy rates so management became less hit and miss. The permanent surfacing of some roads began about this time.

With its absence of locally quarried stone, it is likely that in East Hertfordshire, local gravel and cobbles, together with granite kerbs and setts imported from elsewhere predominated. Setts, used long ago to surface drives under carriage arches, can still be found, in Hertford, Ware and Bishop's Stortford. As well as looking very attractive, they are extremely functional and durable. Where they remain, setts, granite kerbs and stone paving should never be removed or discarded.

Stone slabs, setts and brick paviours are still quite common in the back yards, paths and terraces of older properties. Gravel drives and carriage sweeps were and still are fashionable for grander buildings. These surfaces are historically important and should be retained. It is interesting to note that almost all these traditional materials have only survived to any extent in "private" spaces.

Tarmacadam and concrete swept through East Hertfordshire's urban areas during the last century and have predominated ever since. Setts can however turn up unexpectedly underneath the tarmac on occasions and good granite kerbs are still frequently to be found even in quite low key areas. Pebbles, readily available in Hertfordshire, were, and still are used, generally to fill in odd spaces but occasionally to create whole paths. Local bricks were too soft to last as long as paving but would certainly have been used in the past as they too were readily available. Blue engineering bricks (usually from Staffordshire) were imported by railway to East Anglia from the C19th but are not as

common as paving surfaces in East Herts. Stone slab paving for footways would have arrived by the same means for use in town centres in the C19th and some of this, of course, still survives although generally only in small areas and often in damaged form as heavier cars and lorries took over from horse drawn traffic.

Design in Public Areas

The urban townscape in England was renowned across continental Europe during the 18th and 19thCs for the quality of its materials, its restrained palette and the simplicity and functionality of its design. It often created a harmonious backdrop to the architecture and the buildings of the town. Sadly, these qualities have been smothered since WWII by an accumulated plethora of traffic-related signage, posts and markings installed in a fruitless attempt to cope with the explosion in the numbers of cars on our roads. This clutter has been, since the 1980s, made worse by declining maintenance standards, the use of cheap artificial paving materials and ill-conceived fussy roadway and pavement patterning. Together these have done significant harm to the visual quality of many areas.

Happily, the often thoughtless application of MOT standard designs has come increasingly into question and recent years have seen a more flexible approach to traffic management, signage and markings as the design maxim of the forced segregation of different users has fallen out of fashion. Today, a more sophisticated approach to the needs of different users has taken hold, the pre-eminence of the car is no longer a given, and the need to 'de-clutter' the streetscene of the accumulated detritus of the last 50 years, particularly in conservation areas and other historic settings, is more clearly recognised.

The total impact of any new street improvement scheme must be given careful consideration. The entire historic environment, the needs of pedestrians, cyclists, the disabled and vehicles all have to be accommodated. While it is true that solutions which are purely traffic-led have proven highly detrimental in historic and other towns in the past, we must be guarded against succumbing to the other extreme; it is clear that some 'shared-surface' schemes have lost sight of the simplicity and functionality of the pavement and roadway format.

The relationship between pavements, carriageways and buildings is subtle and makes a fundamental contribution to good townscape. As a general rule it should be preserved even where vehicles are being partly or fully excluded. The linear geometry gives interest and visual 'purpose' while kerb shadow lines are often a crucial element in guiding the way – particularly at night or for the partially sighted.

Consequently, low-key design solutions respecting and reinforcing the basic "bones" of the townscape are both more historically authentic, but also, much more successful in producing a calm non-competitive visual foil to the more complex architecture and appearance of the buildings in historic areas.

Consideration should also be given to the texture and feel of materials, often the only thing we touch when out walking. Good quality traditional materials can often be felt as well as seen, subtly enhancing the experience for the pedestrian and other road users.

Stone Paving

When properly used, stone is invariably the best performing and most durable material. There are wide colour and textural variations within and between each piece which create an attractive and subtle backdrop for buildings and people. When wet these qualities are accentuated and stone mellows beautifully with age.

Artificial stone or block paving can appear too regular and unyielding over large areas and its long term weathering can be very disappointing.

Stone is more expensive initially but has a much longer life than its artificial alternatives. It also has good self-cleansing properties because of its fine grained composition unlike many artificial materials which show up stains and chewing gum marks only too clearly. In small awkward shaped corners granite setts or local pebbles provide an acceptable more flexible alternative to cutting large stone slabs to fit. Granite kerbs, often used in conjunction with granite sett drainage channels form an appropriate edge of pavement detail or where additional strength is necessary.

Traffic

The demands of traffic, and the measures taken to cope with this, produce visual clutter which can harm the character of a historic area. Sign posts, brackets, bollards, and yellow lines all are placed in many historic areas, with no regard for surrounding buildings or character. Wherever possible, clutter should be reduced and redundant posts and signs should be removed. Street lights can be fixed to buildings, and one post can serve more than one function. Standard signage is being improved and in some instances can now be sensitively fixed to walls rather than to individual posts.

The total effect of rationalising existing clutter in an enhancement scheme can by itself make a very significant improvement to the visual quality of an area.

Traffic Calming

The need to slow down town centre and village traffic creates its own problems in historic areas. Speed bumps, pinch points, chicanes and other popular means of slowing traffic can have a detrimental and over-complex effect on the appearance of historic streets and rural roads even when traditional materials are used. The speed constraint of traditional noise-generating stone/granite setts and cobbles used traditionally in vehicular carriageways can be just as effective in slowing traffic, warning others of the approaching vehicle and also has the advantage of reinforcing simple historic character.

The use of bollards to separate vehicles and pedestrians or deter "pavement parking" can also become very visually intrusive. This is particularly true where attempts to prevent vehicles from parking have produced "serried rows" of bollards which are historically, as well as visually, wholly inappropriate and a potential impediment to the disabled or partially sighted.

Careful design with attention to detail and taking the operational use of the area into account will reduce bollards to a safe minimum so that they enhance rather than detract from a scheme.

Materials

Traditional materials are used for the repair and commonly for the extension of Listed Buildings, and often for new buildings in conservation areas in East Hertfordshire. This approach recognises the attractive weathering qualities of traditional natural materials and the often disappointing performance of artificial substitutes, as well as respecting historic continuity. The floor in historic areas deserves equal respect, and natural stone paving should be used where possible for pedestrian areas.

Materials for use on carriageways present more of a problem. The original material, rammed earth, is not practical nowadays while granite setts give an excellent traditional appearance and slow traffic effectively, but are expensive to lay in large areas and their irregular surface can present walking difficulties for pedestrians.

In these circumstances it is often best to look for a low key solution. Re-surfacing in tarmac, perhaps with a rolled, bound-gravel top is much preferred to the introduction of synthetic modern block paving with its inflexible and over-insistent bonding pattern. Particular attention is necessary however to all the edging details if tarmac is used, with granite kerbs and setts being most effective. Longer stretches can be divided by single rows of setts which provide some visual interest and deter vehicle speeds.

Street Furniture

Street furniture can create visual clutter in repaved areas and must be carefully designed into any schemes from an early stage. Traffic and directional signs should, wherever possible, be mounted on walls, bollards or lamp columns to minimise the number of posts. Non statutory signs - directional and information - should be grouped on one purpose designed post. Posts and poles for traffic signs can now be painted black rather than grey. Yellow lines can be particularly intrusive and should be avoided if possible or waivers sought.

Ensure that newly paved areas are not filled with unnecessary new street furniture. Planters, bins, benches, bicycle rails, bollards and advertisements all need very careful location and design co-ordination if visual clutter is to be avoided.

Trees and plants can help to conceal eyesores but can be inappropriate in a hard formal townscape. Ensure that, when included, trees have enough space so that future lopping and pruning can be kept to a minimum and that suitable species are selected.

Existing historic furniture, pillar boxes, telephone boxes, cattle troughs, milestones, memorials etc should be preserved in-situ - some of them are Statutorily Listed and it is an offence to remove or alter them without consent. Properly incorporated at design stage they can help minimise the need for new bollards and barriers.

Walls, statues, steps and railings are often Statutorily Listed in their own right in historic areas. Many others are protected by virtue of being in the curtilage of Listed Buildings or in conservation areas. Always seek advice of the Conservation Officers before altering them in any way.

Most trees are protected in conservation areas and many, in the grounds of Listed Buildings, are covered by Tree Preservation Orders. Always check with the Arboricultural Officer before lopping, topping or felling them.