Risk management for high value home renovation projects

A guide to loss prevention
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This overview document aims to provide a guide for those looking to develop a residential property, with a view to achieving a loss-free outcome to their building project; whether that be a new build or a refurbishment. This guide is not an A to Z of the entire construction process, but is designed to raise awareness of some of the key practical arrangements and working methods that should be in place to mitigate the risk of loss or damage.

A list of common terms and definitions is located at the end of this document.

First steps

A key decision at the outset is whether to project-manage the work yourself or engage the services of an organisation that can undertake this role for you. A hands-on approach can save money and be very rewarding, however if the work is complex or runs into difficulties, it can lead to project over-runs, considerable increased cost and additional stress.

Self-managing your project: The inexperienced should not underestimate the challenge of coordinating, planning, budgeting and programming a construction project. Should you decide to take on the challenge of project managing yourself, then the principles included in this guide, if adopted, can help you project-manage with success and ensure best practice is employed and major damage events avoided. A good, experienced project manager can make all the difference to the outcome of your project.

Employ a project manager: If you have any doubts over your ability or available time to take on a project management role, then another option is to delegate the role to a dedicated project manager (your architect or main contractor, for example). A good, experienced project manager can make all the difference to the outcome of your project and ensure the works are constructed safely, on programme and to budget. The principles in this guide can help to ensure your project is managed successfully, by applying best practices to the project and thus avoiding major risk/damage/hazard events.

Construction team competence and experience

If you decide to hand over your project to a construction team, then the selection and appointment of a competent and experienced architect and main contractor will be critical. There are many aspects to consider, including the following:

Experience in undertaking projects similar to your own: review the architect and main contractor’s websites and ask to see previous work undertaken. If your project has complex or structurally-challenging aspects (e.g. basement dig, internal or external structural changes), obtain assurances that your architect intends to employ an experienced structural engineer and your main contractor intends to employ specialist trade contractors (e.g. for underpinning, demolitions, roof works, etc). Also, ask about the robustness of their contractor selection process.

Talk to previous clients: as well as asking previous clients about the quality of the work produced, particularly by the main contractor, enquire about the standard of safety exhibited and any experiences related to fire, flood, escape of water, structural damage or breaches of security.

Dedicated site manager: ask if the works will be supervised daily by a dedicated site manager from the main contractor; enquire into their individual experience of undertaking similar projects.

Professional and trade body associations: check the architect, structural engineer and main contractor’s websites to see if their organisations hold membership of recognised professional or trade body associations. These should include the Royal Institute of British Architects (RIBA), Institution of Structural Engineers, Federation of Master Builders (FMB), National Federation of Roofing Contractors (NFRC), Construction Skills Certification Scheme (CSCS), etc.

Insurances: ensure all organisations you engage have appropriate insurances in place, including professional indemnity, and public and employer’s liability.

Construction (Design and Management) Regulations: these are the key construction site health and safety regulations, and require that contractors undertaking projects for domestic clients have a written construction phase plan in place. Check that your contractor intends to draw up such a plan which should detail provisions for general health and safety of the workforce, including fire safety and managing high risk activities (such as structural works, etc).

Major construction site hazards and how to control them

Fire
One of the most devastating events to potentially impact your project is a major fire. Fire can totally destroy not only the newly constructed aspects, but also much or all of the existing structure where refurbishment works are being undertaken.
Discuss the liability exposures and insurance products with your insurance broker or intermediary.

**Terms and definitions used in this guide**

Borehole: a deep, narrow hole drilled in the earth for the purpose of extracting a core of subsurface material for ground identification and testing. Undertaken as part of a site investigation.

Control measure: something which manages the hazard and reduces the risk.

**Design Team**: the professional team comprised of construction specialists including an architect and possibly a structural engineer, project manager, quantity surveyor, interior designer and building services engineer etc.

**Employer’s Liability Insurance**: insurance that protects employers from liabilities arising from disease, fatality, or injury to employees resulting from workplace conditions or practices.

**Fire Risk Assessment**: an assessment of the fire safety hazards to people and property.

**Fire Safety Management Plan**: a stand-alone document detailing how fire safety will be managed on a construction site.

**Hazard**: something with the potential to cause harm or damage.

**Hot Work**: an activity involving the application of heat, naked flames or sparks.

**Hot Work Permit**: a form issued to allow hot works to proceed subject to certain conditions and control measures.

**Insurance Excess**: (or deductible) the initial cost of an insurance claim for which the insurer is not liable.

**Leak Detection**: equipment able to detect water, usually after it has leaked from a pipe.

**Loss**: a claim made under an insurance policy as a result of theft or damage.

**Party Wall**: a dividing wall between the buildings of two owners with the boundary between ownerships usually, but not always, positioned at the centre of the wall.

**Party Wall Agreement**: (also known as an ‘award’) the document produced by two party wall surveyors acting for the respective owners, consisting of the award itself, a schedule of condition with photographs and drawings showing the details of the proposed works.

**Party Wall Surveyor**: any person who is not a party to the construction works and has a good knowledge of construction and is well versed in party wall procedures, typically a building surveyor or structural engineer.

**Permit to Dig**: a form issued to allow excavation works to proceed subject to certain conditions and control measures.

**Pipework Jointing System**: method of connecting lengths of pipework, e.g. soldering, crimping, welding, gluing, push-fit, etc.

**Pressure Tests**: air or water put under pressure in pipework to check the integrity of a pipework system.

**Professional Indemnity Insurance**: insurance for professional services covering negligence, inaccurate advice, misrepresentation, violation of good faith and fair dealing.

**Public Liability Insurance**: business insurance covering injury to someone or damage to 3rd party property when carrying out work.

**Risk**: a measure of the impact and likelihood that a hazard will cause harm or damage (severity x probability).

**Schedule of Condition**: a narrative description of a property including any defects, accompanied by photographic evidence.

**Site Investigation**: a complete examination, investigation and testing of surface and subsurface soil and conditions. The report resulting from the investigation is used in the design of foundations.

**Temporary Support Arrangements**: load-bearing arrangements designed to provide temporary support or bracing until the permanent structures are in place.

**Trial Pit**: an excavation of ground, dug to determine the geology and the water table. Undertaken as part of a site investigation.

**Water Flow Management Device**: equipment able to assess and isolate the flow of water in a pipe thus limiting the impact of a leak.

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**References and Guidance**

- Fire Prevention on Construction Sites - the Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation' eighth edition July 2012 ([www.thefpa.co.uk](http://www.thefpa.co.uk))
- Structural Timber Association - health and safety guidance notes on fire safety and fire prevention on timber framed construction projects ([www.structuraltimber.co.uk](http://www.structuraltimber.co.uk))
- RC48 Risk Control / Arson Prevention - The Protection of Premises from Deliberate Fire Raising' available from ([www.stoparsonuk.org](http://www.stoparsonuk.org))

**Disclaimer**: The guidance in this document refers to industry best practice; loss control advice. Adoption of the advice contained within this document does not imply compliance with industry, statutory or HSBEI guidelines, nor does it guarantee that related losses will not occur.

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Theft, vandalism and arson

Construction work often opens up external walls, doors and windows and, if not secured, can provide easy access for unwanted intruders. Damage can result from the theft of expensive fixtures and fittings, cables from walls, lead-work from roofs and any remaining household contents. Even if there is little to steal or vandalise, fires can be deliberately started, which can quickly engulf a building, particularly where timber elements are exposed.

Help prevent a major loss

If you do not intend to live in your home during the project, then you should make allowances for securing the property when it is unoccupied. Crime statistics for your area can be accessed by referring to the Police UK website: www.police.uk.

Security can also be managed by your builder and provisions should include:

- A solid, timber hoarding around the property with lockable gates and doors
- Securing all openings in external walls, basements, doors and windows, with temporary boarding, metal sheeting or bars, at all stages of the project when the site is unoccupied
- A temporary, internal motion-sensor intruder alarm system linked to a remote monitoring centre
- Scaffold alarm and motion-sensored site lighting
- Lockable steel containers for materials, equipment and tools

Bulk storage of expensive materials, fixtures and fittings on site should be avoided.

Further advice and guidance on security measures against arson is included in the publication, RC48 Risk Control ‘Arson Prevention – The Protection of Premises from Deliberate Fire Raising’; available as a free download at www.stoparsonuk.org

Damage or injury to third parties

Construction activities on your building project can lead to damage to surrounding property owned by others, as well as personal injury to your neighbours, site visitors or passers-by; for which you may be held liable. Typical damage scenarios include undermining of neighbouring foundations leading to settlement or collapse, structural cracking due to vibration, settlement due to lowering of ground water, damage to underground utilities or tunnels due to ground heave, overturning of mobile cranes, spread of fire, pollution, etc.

Personal injuries can result from any of the above scenarios and from many other hazards typically found on construction sites, including slips, trips or falls, site vehicle impact, materials blown from roofs, debris falling from scaffolds, etc.

Help prevent major loss or injury

Discuss mitigation measures with your construction team. Some of the hazards will need to be addressed at the design stage, particularly where they relate to the proximity and/or condition of existing structures, proposed design solutions and anticipated construction methods. Ensure designers thoroughly risk assess the potential for damage resulting from the above scenarios and either offer alternative, safer solutions or ensure adequate controls are in place which are clearly communicated to the contractor.

Key aspects to consider early in the design process with your architect and structural engineer include the following:

- An adequate site investigation to determine the ground conditions and presence of ground water
- Condition surveys of your own and all existing property in close proximity to the site
- The nature and location of existing subterranean services
- The specification of low-vibration construction methods
- The impact of lowering the ground water for deep excavations
- The potential for pollution of watercourses, drains, etc
- The potential for fire spread to neighbouring properties, etc

Once work has started, engage with your contractor to ensure the potential for damage or injury to third parties is adequately risk-managed on site. Key aspects to consider include:

- Adequate, full-time site supervision and management
- Continuous monitoring of third party property for signs of damage or movement
- All excavations controlled with a ‘permit to dig’ system, with hand digging to and around any expose underground services
- Control of high-risk activities through risk assessments and method statements with on-going communication between the contractor, architect and structural engineer
- Regular inspection and maintenance of temporary, structural support arrangements (shoring, propping, etc)
- Management of mobile cranes – contract lifts in preference to crane hire, well planned lifts (method statements), adequate working platform, competent operator and supervisor, etc
- Formal safety, health, environment and quality (SHEQ) management system in place, including arrangements for fire safety and prevention
- Competent contractors personnel and trade contractors (evidence of appropriate skills, knowledge, training and experience)
- Use of a ‘banksman’ to control delivery of materials and movement of plant and vehicles in roads around the site
- Good standard of housekeeping on site – avoid storing materials on roof or scaffolds
- Keep adjacent footpaths and roads clear of mud and obstructions; providing adequate signage, lighting and barriers to open excavations, etc

You should ensure both you and your construction team have sufficient liability insurance cover in place for all stages of your project.
Fire is sustained by three elements: heat, combustible material and oxygen. Remove any one of these and a fire will cease to exist. Construction projects will, at various stages, have all three elements in place. The key is ensuring they are not combined in an uncontrolled manner.

Typical sources of heat include soldering of pipes, welding, grinding, hot tar boilers, lead work, smoking, combustion engines, temporary heaters, lights, temporary electrical supplies, arson activity, etc.

Typical combustible materials can include timber joists, floorboards, roof trusses, insulations, joinery, waste (cardboard, polythene, timber pallets, etc), gas bottles, diesel, petrol, sawdust, vehicles, fuel-driven plant, temporary buildings, temporary protective coverings, etc.

Oxygen is ever present but is also enhanced through oxidising agents and oxygen bottles.

**Help prevent a major loss**
Engage with your construction team to enquire if they are following current best practice in construction site fire prevention. Practical guidance is provided in the Fire Protection Association’s document, ‘Fire Prevention on Construction Sites - the Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovation’. The document can be accessed at www.thefpa.co.uk. Compliance with the document will almost certainly be a condition of your residential development insurance policy, and you can ask your construction team to demonstrate how they are meeting its requirements and recommendations. Key written outputs should be a Fire Risk Assessment and a Fire Safety Management Plan. Hot works (e.g. soldering, welding, etc) must be controlled by a strict ‘Hot Work Permit’ system.

If your project involves a timber frame structure, then significant additional control measures will be required. Your structure should be constructed by a contractor registered with the UK Timber Frame Association (UKTFA)/Structural Timber Association (STA) and built in accordance with UKTFA/STA guidelines. These guidelines will include fire safety and fire prevention arrangements as well as the need to risk assess the possibility of fire spreading to neighbouring properties. These guidelines can be accessed at www.structuraltimber.co.uk.

### Example loss 1
Fire tore through a large terraced house, causing significant damage to the building itself and to a neighbouring property. The house was being refurbished at the time, with an upgrade of plumbing and heating services forming part of the works.

In accordance with design specification, the plumbing contractor was installing copper heating pipes between the first floor timber joists and was soldering pipework connections with a gas blow torch. The torch’s open flame came into contact with debris which had accumulated between the joists, resulting in both the debris and the timber joists igniting. The fire escalated very quickly, causing significant damage to the property as well as damage to one adjoining structure (for which no third party insurance cover was in place), and which resulted in considerable personal cost to the property owners.

**Prevention**
The fire could have been avoided if the designer had recommended an alternative ‘cold’ pipework connection system (e.g. crimped or pressed fittings), therefore eliminating the need for any hot works/open flames in the plumbing process. Alternatively, the plumbing contractor should have implemented a strict ‘Hot Work’ permit system on site. This would have ensured that combustible materials (for example, debris) were removed from the immediate work area prior to any hot works commencing. In addition, it would also have ensured appropriate fire extinguishing equipment was present; which could have been used to quickly extinguish the fire before it took hold.
**Water damage**  
Water, like fire, can have a major impact on the success of your project. Considerable damage can be caused to plastered walls, timber joinery, carpets, cables, kitchen and bathroom fittings at the later stages of your project.

Water from external sources: this includes rivers, culverts, stormwater, broken sewers, ground water or water mains and can enter your property prior to the building becoming watertight. This can occur during replacement of windows, open basements and replacement roof works, etc. Exposure to your site of flooding from rivers can be viewed on the Environment Agency’s website: www.environment-agency.gov.uk.

Help prevent a major loss: external sources  
Engage with your construction team to enquire if they intend to employ temporary protection measures to keep water from external sources entering your property. Provisions could include temporary canopies, bunding or cut-off ditches. Ask if a ‘Permit to Dig’ system is in operation to control excavation work which may impact existing water mains or sewer pipes.

Water from internal sources: this includes underfloor heating and central heating systems, sprinklers and, particularly, mains-fed supplies through temporary (as well as permanent) pipework systems. A failed joint on a mains-fed pipework system can potentially allow water to run undetected for a significant amount of time; for example, over an entire weekend if a failure occurred on a Friday evening or later on an unoccupied site.

Help prevent a major loss: internal sources  
Engage with your construction team to enquire about their control measures for mitigating the risk of escape of water from internal sources. Key topics to discuss should include the routing of temporary water supplies (preferably external only), responsibility for control of water, appointment of a competent plumber (i.e. one who is experienced in the specific pipework jointing system), pressure in the specific pipework jointing system to be employed, pressure tests and possibly leak detection or water management flow devices. A simple but effective risk reduction strategy is key to ensuring the water mains into the building are isolated whenever the site is unattended.

Specific guidance to pass on to your construction team on this aspect is entitled ‘Guidance Note on the Avoidance of Water Damage on Construction Sites’, which is free to download at www.cireg.org/library.htm. You can also download our own free guide, ‘Water damage on construction sites, at www.munichre.com/HSBEIL/knowledge-centre/document-library.

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**Example loss 2**
Flooding occurred to a large property following the failure of the contractor to properly connect a 15mm elbow joint located on the hot water service return pipework in the ceiling void of a first floor corridor.

The entire first and ground floors were flooded, causing extensive damage to all internal finishes, plasterboard walls and the vinyl flooring. The damage occurred late at night and was not discovered until the next morning.

The fitting had been pushed on with a rubber O-ring and a mechanical joint formed by crimping the fitting with a motorised crimping tool. It was later discovered that one end of the elbow had not been crimped.

The pipe was pressure tested eight weeks earlier. It is thought that friction kept the O-ring in place for a time but the joint eventually worked loose.

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**Prevention**  
A significant proportion of the damage could have been avoided if the mains feed water supply to the building had been isolated when the site was unattended (overnight), limiting the water flow to that held within the hot water system. Alternatively, had a water flow management device been fitted during the construction works, the water would have automatically shut off once the water had reached a pre-determined flow rate.
Structural collapse, heave and settlement
If your project involves removing or opening up doors or arches in load-bearing walls, new basements, extensions or underpinning works, then there is the risk of structural collapse, heave or settlement occurring to your own and your neighbour’s property.

Help prevent a major loss
For anything other than minor structural works, the services of a structural engineer will be required. You should ensure a competent and experienced structural engineer is engaged to design the permanent and temporary support arrangements (e.g. propping of floors or walls, shoring of deep excavations, etc). They should also review any contractor-designed temporary arrangements (e.g. formwork supports and scaffolds) and inspect these installations on site.

The formation of deep basements and underpinning is high-risk work and suitable specialists will need to be engaged to follow an agreed sequence of work. The work should be supervised at all times to ensure it is undertaken in accordance with design specifications, construction drawings and construction best working practices.

Any interaction with neighbouring party or boundary walls will require a Party Wall Agreement to be in place. This will be drawn up by the party wall surveyors and will include a pre-construction ‘Schedule of Conditions’, supported by photographs for each property. This is critical if future claims are made by your neighbours for damage, which may have been pre-existing.

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Example loss 3
A young couple were forced to flee for their lives from their north London ground floor flat, together with their upstairs neighbours, when their recently-completed basement extension failed, causing their semi-detached period property to collapse.

In court, the judge ruled that “the contractor was “completely out of its depth” and “not competent to do the job which it had been employed to do”. The judge also stated that “…the overwhelming probability is that the contractor failed to carry out their work with reasonable care and skill. The firm had taken no effective steps to prop up the flank wall or to lay a concrete floor slab which could have averted disaster.”

Some neighbouring properties were damaged by the collapse, including one that the gable wall fell against. Some of the neighbours sued the couple.

The damage was considerable and the house rendered unsafe. It was subsequently completely demolished.

The builders were ordered to pay £290,000 in compensation, but the couple were told they may not receive any compensation because the firm had gone into administration.

Prevention
This loss demonstrates the need to have a clearly defined plan when it comes to selecting and appointing the right team to do the job. Aspects to be considered include:

- the contractor being able to demonstrate they have experience in undertaking projects similar to your own
- visiting one or more of the contractor’s ongoing projects, and obtaining references from previous clients
- insisting on a dedicated ‘competent’ site manager to oversee the works for the full duration of the project.

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NOT IF, BUT HOW