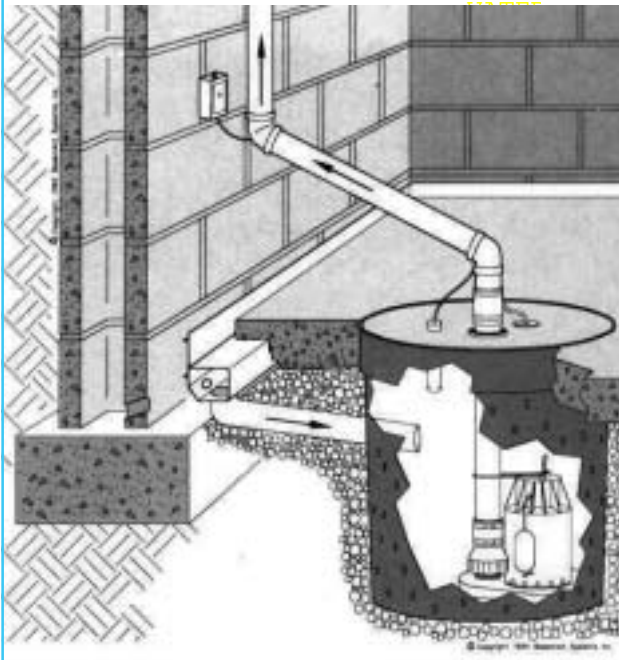


This Delivers
Dry Basements™

WaterGuard™



Within this 'technical' information sheet we will explain how we use Basement Systems™ products to deal with failed tanking systems, and how we incorporate them within newbuild and existing building waterproofing systems.

The primary philosophy is to control hydrostatic ground water pressure, preventing it from coming to bear on the waterproof barrier, waterproof structure or cavity drainage sheet.

This requirement is recognized and emphasized in our regulations, such as **BS8102:1990 Protection Of Structures Against Water From The Ground**.

Yet because of commercial considerations and the plethora of different waterproofing products and methods, and in view that systems are commonly installed by untrained personnel, the failure rate in tanking/waterproofing systems is higher than most realize, with repair and consequential damages being very costly. This has increased greatly in recent years in line with rising levels of rainfall in the UK, this forecast to continue, with installed systems being truly tested for the first time, and failing. Well, with Basement Systems™ products, particularly WaterGuard™, the original and only sub-floor drainage channel usable without secondary measures, we can now deal with such problems more safely and economically. Seeing is believing, so look at the typical examples of problems given herein, and learn why relieving ground water pressure The Trace Basement Systems Way, represents the future.

We joined the Basement Systems™ network, which originally covered the USA and Canada, in 1998, since when we have marketed and specified it, but because it takes time to educate and change common practices, it is only now that the UK construction industry is beginning to take note and accept that our methods and products represent the future of waterproofing. Since 1998 we have economically and successfully saved the day in dealing with failures in Type A, Type B and even Type C waterproofing systems, and if anyone out there believes that solely stopping up water pressure is safest and best, you are wrong! Please read on and if you want to disagree, phone me, George Hockey.

Let WaterGuard™ Take The stRain!

No matter which form of waterproofing or 'tanking' used, the most important factor in a basement situation is to control ground water. WaterGuard™ does this in the safest way possible, being installed internally at the vulnerable wall and floor joint, being serviceable via access ports for evermore, and linked to the state of the art SuperSump™, with an option for the battery backup UltraSump™. These and other Basement Systems™ products, along with cavity drainage membranes, are revolutionizing waterproofing in the UK. After all, the Romans drained their basements, so why don't we?

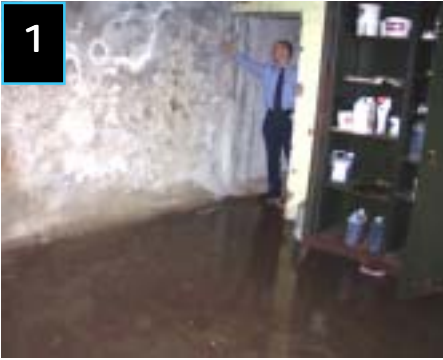


Go Back To The
Future with
WaterGuard™

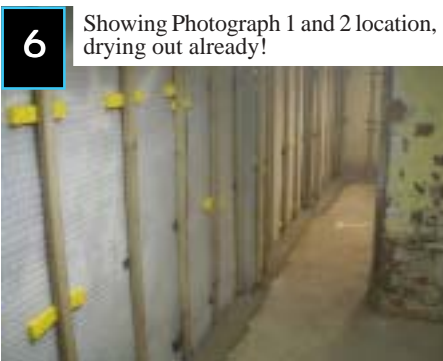
You'll be sunk without Trace!

Type B, 'Integrally Waterproof' concrete, in the Assembly Hall of Acland Burghley School in Tufnell Park, London, failed and intermittently flooded. A typical problem, easily corrected by Trace Basement Systems™.





Mid-floor chases are cut out, ready for TrenchDrain™ (ACO), and a hole excavated for one of the sump locations.



6 Showing Photograph 1 and 2 location, drying out already!



8 Even difficult obstructions can be lined with a little effort.



10

Case Study

ATE, Oldham, Lancashire

The plant room' basement of this 1950's brick wall and concrete floored Automatic Telephone Exchange has flooded for years, with many past unsuccessful attempts to stop up the dam.

Photographs 1, 2 and 3 were taken during initial inspection, with 1 and 2 showing how hydraulic cementitious tanking was added and added at wall and floor joints to try to prevent escape of water.

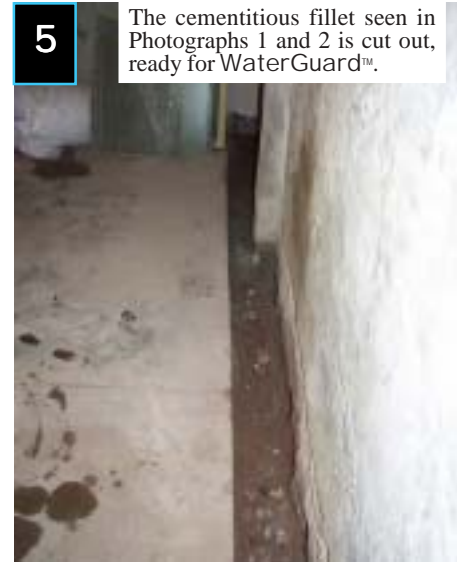
Because of health and safety in respect of electrical equipment, the requirement was to provide a BS8102:1990, Grade 2 environment, i.e. no standing seepage, but some vapour acceptable.

The layout included six rooms and linking corridor, with numerous obstructions limiting access to wall and floor areas, and particularly the vulnerable wall and floor joints. One room was totally inaccessible, containing a disused oil tank, but presenting problems in that water escaped from it.

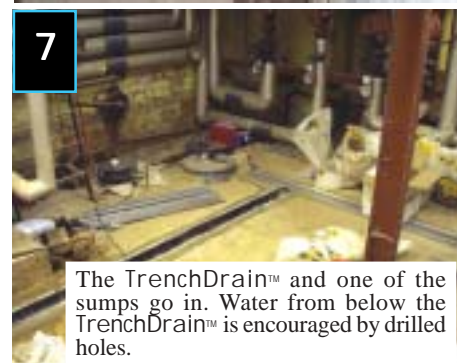
We designed a system that included WaterGuard™ at accessible periphery wall and floor joints, TrenchDrain™ in mid-floor areas and placed to control water from inaccessible areas, and lined the problem periphery walls where accessible with cavity drainage membrane, covered in treated battens and plasterboard. This even included the solid bench seen in Photograph 8, through which water escaped.

Two UltraSump™ systems were installed, with extract pipes taken out to drains some away from the basement. The client now a reliably dry basement for the first in years, with the heating boilers accidentally almost forming a Grade 3 environment!

Working With Water!



5 The cementitious fillet seen in Photographs 1 and 2 is cut out, ready for WaterGuard™.



7 The TrenchDrain™ and one of the sumps go in. Water from below the TrenchDrain™ is encouraged by drilled holes.



9 The full system was returned onto internal walls by 1.5 metres, protecting against water from high level. In one area this had to be further extended after initial completion.



11

Ground water pressure had caused the added cementitious tanking screed to heave and crack. It was agreed that a periphery system of WaterGuard™ and two UltraSumps™ would be installed in sealed chambers, but because there was no evidence to indicate that water was escaping through the walls, they were excluded from the work on the premise that once WaterGuard™ relieved the pressure, penetration through the walls was even less likely.



Although not shown here, the first operation was to install the UltraSump™ systems, because otherwise water would have escaped in an uncontrolled manner. This photograph dramatically illustrates how much water was present.

Skirting boards were removed from all walls, including from internal block walls constructed off the floor slab, with chases cut at periphery walls to allow WaterGuard™ to be installed. Although patterns of water escape indicated a mid-floor problem, it was reasoned that the coved cementitious tanking, being structural, had caused the water to spread inwards below the screed where thinner and more prone to cracking and escape of water.

Although WaterGuard™ on it's own may have controlled the water, this was the third time the water problems were being addressed, so a cavity drainage dpm was formed, with a sealed and linking skirt of the same dressed up all walls, but only to skirting board height. The importance of this is that if water does eventually penetrate higher up the walls, more cavity drainage membrane can be applied to those walls without disturbing the floor or WaterGuard™.



Case Study

Anthony Nolan Bone Marrow Appeal Laboratories, Royal Free Hospital, Hampstead, London

Newbuild constructed ten years ago in brick, waterproofed with adhesive membrane on negative side within cavities and below floor screed, flooded upon completion and then cementitiously tanked, only to flood again when the UK rain-fall levels increased, after several years . Trace Basement Systems™ were then consulted and a Basement Water Control system was designed.



We used 22mm Wey-roc PFB waterproof chipboard upon the 8mm floor membrane to limit loss of head-room to 30mm. This is a special plastic coated chipboard designed for on open construction sites and does not spoil when immersed in water.



The system included service ports, with one seen here in the background, so that the channels can be tested during our annual inspections.



An externally adhesive membrane tanked new-build basement floods upon completion, with water pressure causing build-up within the inner hollow block walls. Should the external and below floor waterproofing be opened up for repair, causing extensive disruption, or should Basement Systems™ water control be considered?



Yes, and in this case decorative stone flags had been laid upon the concrete slab, so the periphery flags were removed and holes drilled in the bottom of the block-work to allow the water out. See it standing where the flags were removed? It couldn't wait to get out once the build-up of ground water was released.



A skirt of cavity drainage membrane was added to compensate for the stone flags bridging the WaterGuard™ channels, allowing the basement to be used again. In waterproofing terms, WaterGuard™ sub-floor drain drainage channels are akin to reinventing the wheel.



Now an architectural drawing office



Cavity drainage technology was used to turn an unusable cellar into a comfortable and warm shop. Southport, 1990



Yes, we did deal with the Dry Rot



Now a restaurant

Showing how below pavement soffits can be lined and made dry, with water drained down sloping soffits and walls.



Now a theme pub

Private House Basement Conversion



A typical dwelling house in a leafy suburb. It's basement has gradually become damp over the years, and at times of heavy rainfall, suffered from penetrating water, leaving usage limited.

The client wished to form a children's playroom and a study. Headroom was limited, so we excavated downwards, formed a concrete oversite, incorporating temporary polystyrene around the periphery. This was taken out after setting to allow Basement Systems WaterGuard™ drainage channels to be installed, linked to a Basement Systems SuperSump™.

Cavity drainage membrane was applied to the walls, taken down the back of the channels to cause penetrating water to be harmlessly diverted into the basement water control system. All walls were fully lined in the membrane to equalize the surfaces and to protect against ordinary rising dampness and salt contamination, all via special fixing plugs sealed back to the membrane where breaching.

The membrane was laid upon the concrete oversite and sealed to the wall membrane, with underfloor central heating fitted directly over.

The floors were then screeded with a 65mm fibre reinforced compound. Treated timber battens were fitted over the wall membrane via holes in the fixing plugs, with plasterboard applied.

The original features, including chimney breast arches and two light wells were retained.

The environment within the basement is now controlled and comfortable, being very warm, very dry and economical to heat.



Common Sense At Work™



water proofing for the 21st century:

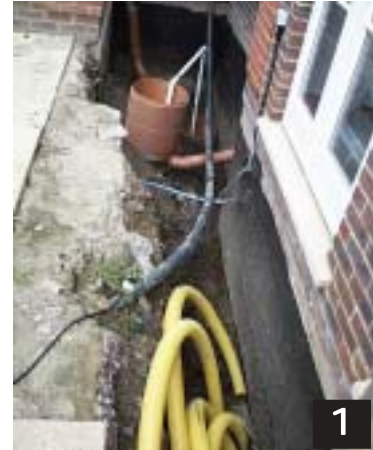


Basements
in the UK
are
Under-used

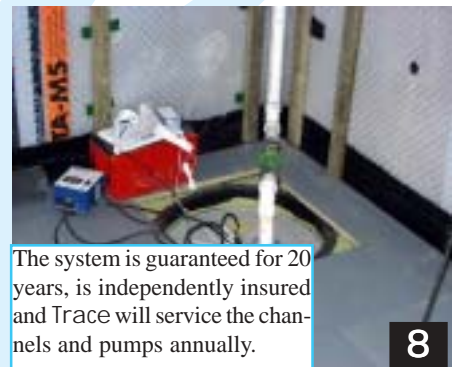
CASE STUDY - £5.5m Newbuild Mansion - Flooding in basement cinema Every Developers and Architects Nightmare!



The basement contained a cinema and plant room off, the latter including services for a swimming pool, with plant both on the floor proper and upon concrete plinths. The original method of tanking involved sandwiched asphalt. However, water had penetrated at the basement wall and floor joints during construction, and after completion, with remedial measures at those times including adding of additional asphalt floor screeds and supporting concrete screeds. Attempts were then made externally, as seen in Photograph 1, to alleviate water pressure from outside, along with seeking the impossible by using hydraulic tanking internally at suspect wall and floor joint areas, only to find the water escaping elsewhere. Phil Hewitt Associates (01494 766655), the leading independent experts on waterproofing (Phil was the Expert Witness in the Outwing v Weatherald case which has changed the waterproofing liabilities of designers for evermore), were called in to advise. A remedial specification was drawn up and Trace Basement Systems were asked to inspect and quote. Liaising with Phil Hewitt and the instructing parties, a final specification was agreed, this taking into account our own recommendations based on our widening experience of dealing with flooded basements. By the time we were called to site, the cinema fittings, wall and floor finishes had been stripped out, with Photograph 2, showing what we saw, with water standing upon the floor, being advised that it intermittently worsened during and after heavy rain. Photograph 3 shows where we drilled the first hole in the plant room in the added hydraulic cementitious tanking, relieving the ground water pressure. It spouted out for over half an hour!. Basement Systems WaterGuard™ sub-floor drainage channels were laid within the floors, fully around the footprint of the cinema, kept away from the wall and floor joints to avoid undermining the block walls constructed off the screeds, as seen in Photograph 4, but because of the concrete plinths in the plant room, we fitted one central channel at floor proper level, and to avoid total disturbance of the plant, dressed 8mm stud cavity drainage membrane over the floor, up the plinths and up the walls only high enough to cover the vulnerable wall and floor joints. Photograph 6 shows the floor membrane over the channel in the plant room, which was then screeded, with water pressure relieved, controlled and the surfaces only sufficiently covered to ensure that it no longer escapes. The criteria in the cinema section called for a totally controlled environment, so the floor was fully covered in 3mm profile cavity drainage membrane, linked to 8mm stud cavity drainage membrane on the walls, with treated 50mm by 25mm timber battens, left ready for plasterboards. We covered the floor membrane with plastic covered Weyroc PFB chipboard (Photograph 7), with this combination leaving the client with thermally equalized finished surfaces, which can be fixed into without breaching the system. The environment will be economical to heat and totally protected against ground water by the products and methods already mentioned, along with the battery backup Basement Systems UltraSump™ seen in Photograph 8, which is the result of 14 years development, with more than 140,000 in the ground in the USA, Canada and the U.K.



Common Sense At Work™



The system is guaranteed for 20 years, is independently insured and Trace will service the channels and pumps annually.



The property shown dates back 900 years, and although greatly altered and extended over the centuries, started out as Knights Templar Chapter House.

It includes basements of various ages, with the arch construction shown dating from the original time of construction, so is listed.

Typically of such old construction, below the stone flag floors in the oldest part of the basements, there are in addition to a water well, sub-floor drainage channels formed of stone, with one seen in the photograph above. Taking advantage of sloping ground, this **basement water control** system was linked to a pipe taken out at basement floor level, running through the ground for a considerable distance, to evacuate the water before coming to bear.

In 2002 we are to install a new **basement water control** system and drained protection waterproofing using cavity drainage membranes. The listed arch and adjacent wall will be left exposed, with local ground water pressure relieved with WaterGuard™ to replace the 900 year old channels. Cavity drainage membranes are particularly sympathetic to listed building because unlike direct applied tanking systems, the system is reversible and can be removed if required. A new bay was built off the arch position at ground floor, so we lined the arch in membrane before foundations were formed for the bay, preventing new concrete coming into contact with it..

The waterproofing contract includes dealing with several differing construction types, including soffit lining below two cloisters, with one seen above. Because the property is located on a hillside, water will again be removed naturally without sumps and pumps.

A history Lesson we fail to learn



Newbuild Basement Into Sloping Hillside - Standen Park for Gleeson Homes - 1998

The simplest yet safest way to waterproof properties of this type. The only external measures included covering the top of the retaining wall sections with a cementitious slurry tank to limit water penetration into the steel reinforced concrete. The slab and reinforced concrete wall sections were constructed as normal, with the outer walls built up above proposed ground level, following which we cut chases into the slab (they could have been preformed when forming the slab), inserted Basement Systems WaterGuard™ sub-floor drainage channels, drained to low ground at the front (actually linked direct into the drains). The outer walls and slab were then lined in cavity drainage membrane, a screed laid and the inner block walls constructed, with sealed plugs fitted to accept wall ties. Any ground water that does penetrate through the retaining walls, will simply drain into the Basement Systems WaterGuard™ sub-floor drainage channels and from there evacuate to the drains. Is this not better than trying to form a perfect seal with a direct applied by 'tanking medium!'. We know it is not, because now that we have marketed our drainage technology since 1998, we currently undertake remedial works in both newbuild and existing 'tanked' basement on a constant basis!



Newbuild Basement Fully Bridged By Ground - Private House, Bowden, Cheshire - 2001

Although a land drain was formed around the basement footprint, no other external waterproofing was undertaken, yet the system fully complies with BS8102:1990, Protection of Structures Against Water From The Ground. The Type C system met Grade 3 of that standard, with a sump chamber formed whilst laying the slab, and Basement Systems WaterGuard™ sub-floor drainage channels laid around the internal periphery, a lower screed laid inside the battens seen against the channels. The battens were removed, the space filled with stone, a cavity drainage dpm laid, linked to the same on the walls, with battens and plasterboard over. An upper screed was laid and the floor timbered over, although the timber could have been laid direct upon the floor membrane. The system included the light-well, with a meshed direct rendered membrane applied there to the retaining walls. Water is removed by a Basement Systems UltraSump™. Structural considerations in newbuild basements include whether the chases can be pre-formed in the slab, and whether to use a perforated sump to drain the soil, or a sealed sump to limit water collection to that entering from the WaterGuard™.



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Basements in Great Britain are under-used because of inadequate protection against the effects of ground water. This results in loss of usable space, which if correctly waterproofed, would gain back valuable living or storage areas.

Designing and installing effective systems to waterproof buildings against high ground are critical parts of the construction process, because if defects occur, flooding can and often results.

IT IS NOW PROVEN LAW (Outwing Case) THAT DESIGNERS MUST ACT AS THOUGH INSTALLATION WILL NOT BE PERFECT, SO THEY MUST INCLUDE PROVISION TO REDUCE OR REMOVE WATER PRESSURE BEFORE IT COMES TO BEAR.

FAILURE TO DO SO NOW BRINGS LIABILITY TO THE DESIGNER, NOT THE INSTALLER, IN THE EVENT OF THE PRIMARY WATERPROOFING SYSTEM FAILING.

Working to British Standards and using the most suitable products, Trace Basement Systems™ will design and install effective waterproofing systems in existing and newbuild basements.

In Type C Drainage Protection, as defined by BS8102:1990, in which it is recognized as the safest method of waterproofing, hydrostatic ground water pressure is controlled rather than being blocked. The air gap drainage spaces divert water harmlessly and naturally with gravity to daylight, or to sumps and pumps via drainage channels, so is consequently less vulnerable to design or installation defects than a direct applied 'tanking' system.

Because of the specialist drainage products available to us, we spend much of our time dealing with failed tanking and waterproofing systems, this throughout the UK. Therefore, be assured that when you employ Trace Basement Systems™, you will be in the safest hands available and will be provided with the perfect basement.

Benefits of Cavity Drainage Membranes in Type C, Drained Protection

- High thermal values result in low heating bills and easy environmental control
- User friendly in making fixings after completion without breaching the system
- No need to sand blast walls
- Quick drying out because of limited involvement of wet trades
- Screeded or timber floors, catering for mechanical wear and or comfort
- No adverse effect on adjoining areas or party properties
- Not easily effected by chemicals, or by ground salts
- Acknowledged in BS8102 as being the safest method of waterproofing

Battery Backup UltraSump™

Purpose made 24" deep sump with holes in the sides, thus collecting water from the channels and oversite, or sealed sumps without holes.

A sealed lid to prevent excessive water vapour from the sump escaping back into the basement environment. The lid is strong enough to walk on. It has a ball valve that allows entry of water in the event of a plumbing leak.

A Zoeller mains powered M33 1/3hp pump, capable of moving 2,200 gallons per hour at a head of 8' feet. Battery powered WaterWatch™ alarm that sounds off in the event of water rising above the pump, i.e. if the pump fails or during a power cut.

An automatically charged DC battery backup pump that sits above the mains powered pump and takes over in the event of the primary pump failing for whatever reason. One battery will keep the pump operative for a period of three hours at it's full pump rate, which is 1,500 gallons per hour at an 8' head, so it would last significantly longer in the event of only limited water collection. The use of two batteries on one pump will increase the capacity by approximately 66%.

More powerful, 6,600 gallons per hour pumps, are available.

Basement Systems™ have installed more than 140,000 sump units so far and are continuously developing and improving the technology.

Flooded Basements Are Our Business!™

THE WAY WE WORK

We work ethically, and have done so since inception in 1974.
We carry professional indemnity insurance to backup our advice.
We carry product liability insurance to protect our work.
We issue guarantees, protected by the above.
We offer independent guarantee backup insurance, protecting you even if we are no longer here.
We protect your basement with an annual service contract.
We are experienced, having trained in both the UK and America.
We are backed by Basement Systems™ USA and various membrane manufacturer research and development departments.
We will advise you on any basement project or problem, always giving you the best advice and options at a fair price.

