

# Climate Change Impacts on Physical Hazards and the Risks to Property

One could be forgiven for overlooking the issues surrounding climate change these past couple of years. Understandably so, our own health, and that of our loved ones, has taken precedence during this time. However, as we look to overcome the trials and tribulations of COVID-19, I must put it bluntly: **Climate change is still the greatest risk facing us all**<sup>1</sup>.

understand the ground

## Introduction

**Around the world storms, floods and wildfires are intensifying, and unpredictable weather is causing untold damage to homes and livelihoods. We cannot afford to wait to act against these threats of climate change, and we must work together to protect our planet and people - ensuring a greener, more resilient future for everyone and every thing<sup>2</sup>.**

As I'm sure you will have heard, the UK recently hosted the UN Climate Change Conference 'COP26', in November 2021, to bring together world leaders to commit to urgent global climate action. But each of us has a part to play and as a legal sector, it is our duty to better understand what can be done.

With this in mind, and following TerraFirma's recent appearance at the 'Hitting Net Zero through Geospatial Innovation' conference for COP26, Modern Law felt compelled to explore their amazing work in more detail. Our hope is that by gathering more information around such a significant topic, as well as the views of the attendees who joined our discussions, we will be better placed as an industry to deal with the impending risks that climate change threatens.

Split over three days, the discussions were chaired by the ever-impressive Dr Tim Farewell, Science and Communications Director and Nicolien van Zwielen, Geoscience and Product Analyst at TerraFirma. Dr Farewell is a geologist-turned soil/data scientist, who works alongside geotechnical and mining engineers, geologists, climate scientists and more.

Speaking to him prior to the events, he told me that he felt it was important to look at these issues because "the property industry has had a tendency to look backwards to determine risk levels. We need to shift people's focus to looking at the outputs of well-crafted models, rather than historic losses".

Each of the three roundtables were attended by a different group of service providers within the property sector: Lenders, Insurers and Conveyancers. This was important to TerraFirma as ground hazards like subsidence, coastal erosion, landslides and hidden holes in the ground will impact all of them.

The hope is that by emphasising the jeopardy to these key players in the housing market, they might begin to see the need to be working off the same data/information as they determine risk levels for their clients. The attendees were able to give us a better understanding into what the knowledge of climate change is in the community and most importantly...how it can grow.

I must admit, before we set out on this journey, my knowledge around this subject matter was quite limited. Nevertheless, with the help of Dr Tim Farewell, I now feel compelled as editor to inspire as much change in our industry as possible - however terrifying it may be!

1. <https://ukcop26.org/>

2. <https://together-for-our-planet.ukcop26.org/>

**“ We cannot afford to wait to act against these threats of climate change**

## About

TerraFirma is a multi-disciplinary team that provides innovative and award-winning geospatial and climate risk solutions. They help financial organisations, property professionals, and homebuyers access accurate and intelligent information to reduce their exposure to UK ground risks. TerraFirma deliver over 10,000 reports monthly to the conveyancing sector and has grown to become the second largest provider of coal mining risk reports in England and Wales.

A team of expert geologists, scientists, and engineers, TerraFirma are widely recognised across the legal, lending, insurance and financial risk sectors as pioneers in ground and sub-ground data, information, risk assessment and reporting solutions. They ensure professionals and the public alike are forewarned of the reality and variety of risks the environment can pose to properties and land.

TerraFirma are passionate about improving the understanding of the ground, and the complex ways it interacts with the built environment. The National Ground Risk Model (NGRM: wClimate™) has been developed by TerraFirma's ground and climate risk experts to help financial institutions identify and understand the physical risk posed by ground instability today, and the impacts of climate change in the future.

**TERRA FIRMA**  
A Dye & Durham Solution

## THE PRESENTATION

On each of the three roundtable discussions that were held, Dr Farewell began the event by giving a short presentation to the attendees. Though he was keen to highlight this wasn't a lecture, the slides were an important way of observing the four most serious ground hazards in the UK at this present time. By putting these hazards into context, the hope was that the attendees would be better placed to understand the impending significance to their businesses and their clients.

The presentation kicked off with Dr Farewell's most valuable piece of advice: "the past isn't equal to the present. And the present certainly isn't equal to the future. This is what you **must** remember from today".

With this firmly imprinted in our minds, Dr Farewell brought up some fairly frightening sets of data concerning climate change in the UK.

### Climate

According to the data, there are four points to which climate change will have an effect by the end of the century: hotter, drier summers; warmer and wetter winters; more common extreme weather events; rising sea levels.

Dr Farewell explains that at Terrafirma, they are able to produce climate models which look at all the different types of scenarios which are available and predict through time where the climate will be in the UK. "Coming out of COP26 last week, depending on whether you trust that they will stick with their commitments or not, we're going to see a sharp rise in CO<sub>2</sub> emissions either way. If people don't stick to their commitments, it's going to be much higher".

### Sinkholes

It was explained to the group that sinkholes crop up all over the UK because of the massive history of mining and the many different mine types in the UK. "It's not just down in Cornwall or in the Northeast, these mines exist everywhere", explains Dr Farewell. Mines were often capped in the past just by using wood, before being backfilled and merrily forgotten about. One can imagine that over time the wood rots and collapses, causing traumas which are known as sinkholes. What we find is that these things do occur more when we have extreme rainfall events and so their occurrence is set not only to continue but also increase.

As you'll all agree I'm sure, there's a lot of food for thought from that presentation – do you now see what I mean by terrifying?! It was now time to find out what the attendees made of it all. Where did their knowledge on climate change and its impact on housing currently lie? How prepared are they for these coming risks? Our attention first fell to the lenders who joined the discussion...

### Landslides

You might not think landslides are a really big problem in the UK, and for a lot of it, they're not. But there are certain areas which are particularly at risk. Using the example of Ventnor on the Isle of Wight, Dr Farewell tells us how they can cause huge structural damage. "Terrafirma have a team which focus on improving the landslide models which we have for the UK and just making sure they're as accurate as possible". Again, he highlights the interrelationship between rainfall and the number of landslides when we have extreme rainfall events.

### Coastal Erosion

Using some brilliant images of the coastline at Birling Gap, East Sussex, we are shown how quickly parts of the coastline around the UK is eroding away. "This is probably the scariest in terms of number of properties at risk because as you move further inland, you have more and more houses being built. If we take the worst-case scenario, it's more than five times as many properties are at high risk by the 2080s", claims Dr Farewell. To help foresee where this destruction of property may occur, Terrafirma integrates their climate models with their erosion rate models, in order to predict where and when houses along the coastline will be lost to the sea.

### Soil Related Subsidence

Understanding the soil and ground conditions that your property is built on is really important. This is especially true for the future construction of properties – something that Dr Farewell argues means we need to dramatically increase our understanding of whether the soil can change in terms of volume, but also what the weather will be like in the future. "From the data that has been gathered, in relation to the summers becoming hotter and hotter over the next few decades, there will also be huge increases in subsidence. Huge swathes of the country, which are not typically known now for subsidence, are going to increase in terms of the rate of failure or the subsidence claims per postcode as we go into the future".

## LENDERS

Opening the discussion to the floor, the question was posed by the Chair Dr Farewell: "In terms of the preparedness of the UK property/finance industry, what do you see as the major risks/exposure to climate risks?".

"The drier summers element that you mentioned in your slides was an interesting one because we also identify that trend", begins **Mark Nunns, Ambiental**. He explains that the hotter, drier summers are bringing about another concern, and we've seen it this past summer, where drying of the ground leads to soil surfaces that are less able to absorb water. "What we're actually seeing in summer is an increased propensity to intense rainfall events and then surface-water-led flooding".

As a flood expert, Nunns tells us that this is causing huge confusion to their clients in both insurance and lending. They struggle to understand why their property is suddenly underwater, particularly in urbanised environments. "In fact, we are seeing intense summer rainfall events actually being more damaging and impactful now than the more traditional 'I'm next to a river, the river's burst its banks'-flood".

*Despite Ambiental's knowledge surrounding flood risk, others around the table didn't share the same level of preparedness that maybe one would hope for. So why was this?*

For **Ivan Guerreiro, Newcastle Building Society**, you need to firstly understand if the property is potentially subject to those risks that have been highlighted. "It's an industry problem". Guerreiro believes if you ask lenders how much data they hold on any given property, the answer will be 40/50/60%, depending on the lender. There isn't a lender that will have 100% of the latest data and therefore, for Guerreiro, you can't be fully prepared.

**Aimee Smith, Principality Building Society** feels that this might be changing with 'SS3/19' being introduced in the finance sector. In 2019, the Bank of England's Prudential Regulation Authority (PRA) issued a Supervisory Statement (SS3/19) that sets expectations for firms regarding their consideration of the financial risk of climate risk across four areas—governance arrangements, risk management, stress testing and scenario analysis, and disclosure. (1) However, Smith is very conscious to express that a lot more needs to be done. "This is the first step on a very, very long journey but I think it will speed up over the coming years because of the disclosures that we have to make, which will force lenders to step up".

Agreeing completely that the industry is not prepared, **Simon Das, 978 Finance**, progresses the conversation by getting the group to look at it from a wider perspective than

“It's an industry problem

just an issue for lenders. In his eyes, investing in property is going to get a lot more expensive very suddenly, because insurance policies are going to go up rapidly or just not be available. This will lead to people not being able to get a mortgage or becoming a mortgage prisoner because they can't sell the house. "Policy from government is going to be absolutely key, as is the support to put those policies in place because what we seriously risk is the consumer being burdened with this issue, which is no fault of their own, and it's going to put them in an impossible position".

This point around greater government involvement was echoed by everyone throughout the lender discussion. It was widely agreed that the government need to do more to incentivise the companies who build houses on future developments.

For all, the planning system rapidly needs a huge shake up. Future developments need to be in more resilient locations that aren't prone to ground hazards or flooding hazards. Based on the understanding of how these hazards might be realised in the future, the attendees spoke about the mortgage industry really needing to put some pressure on the government and the planning regulators to get this shift in thinking.

If we don't, "we're going to see more developments being built in these high-risk zones", claims **Lee Taylor, Terrafirma**. The homeowners will become "mortgage prisoners" where they can't get out of their mortgage and their homes will be blighted by flooding and ground hazards.

Nunns took this opportunity to make a case in point that a lot of the available land to build new properties on is now, unfortunately, in a flood risk area. "We've taken up most of the space that is a viable, non-risk area". Instead, he explains there are mitigations that developers have to go through to build on that land, and that leads to sustainable urban drainage systems, new water drainage designs, et cetera. For Nunns, it's not necessarily about location of new builds in the future, but how we look to maintain them through sustainable measures.

In reply, **Lucy Lewis, AMI & AFB**, makes a very poignant point about government involvement. Worryingly, the government hasn't managed to solve the cladding issues at the moment, and there are still hundreds of people who are stuck in properties. They are not able to sell and are essentially at risk of dying because of the way those homes are built. "The government says that they will fund changes to the cladding, but nobody's stepped up to do anything else, and everybody is trying to solve it essentially, but not getting anywhere, and it's a bit of a concern. If they can't solve that, then how are we going to move on and solve the environmental issues?".

3. <https://www.greenfinanceplatform.org/policies-and-regulations/supervisory-statement-ss319-enhancing-banks%E2%80%99-and-insurers%E2%80%99-approaches>

“Mortgage prisoners

## INSURERS

On the Thursday, we were joined by our second group of attendees, this time representing the insurance community. The process by Terrafirma was the same: a short introduction followed by the presentation. When the discussion was opened to the floor, one question that stood out to me concerned the role insurers play in educating their clients on such matters as these physical hazards.

“What responsibility does your company have for educating your clients about the impact of climate change on their homes?”, asks Dr Farewell.

Kickstarting this part of the discussion was **Richard Done, Polygon UK**. He thought in general, that a clients’ mindset was that the insurer would just pick up the bill. Done draws on a past event, the flooding in Doncaster along the River Don in 2020, to highlight how many clients he spoke to whom hadn’t even realised that their

insurer had taken away their flood insurance. They simply hadn’t read their policy and assumed because they had insurance, they’d be covered for floods. “Sadly, people don’t always understand the wording within their policy. It’s not explained to them in a very clear manner and people quite honestly don’t always read the small print. We’ve got to be better at letting people know they’re not covered for these physical hazards”.

**Judith Ellison, JBA Risk Management**, was next to speak. Ellison questioned whether people who currently have flood insurance even realise they might be living in a flood risk area (*think back to Mark Nunns and how climate change is causing flash floods in urbanised areas*).

“It would be really valuable if data about the risk of flooding in the future, not just right now, could get into the hands of people buying homes. Yes – you can get a report of what risk you have now, but you don’t necessarily know the situation in 10–20 years – will your house still be able to get insurance then?”.

However, slightly disagreeing that it was the responsibility of the insurers to educate their clients on what their policies contained was **Rachel Gillespie, Willis Re**: “People don’t often maintain their boilers. How do you expect people then to pay to look at sewage systems or invest in flood defences?”. Gillespie feels that people just don’t have the money, or the want, to invest in

“Are we being myopic?”



“Maybe that’s something as a community to consider

precautions against climate change. Instead, she feels there needs to be harder regulations put in place and funding from the government. Unless this happens, “I eventually just we could see insurers and reinsurers retracting. We’re seeing that already where books are going into runoff and they’re not insuring property CAT now in certain areas of the world.”

*Met with a chorus of nodding, this was another attendee who felt the government need to do more – it’s interesting to see the crossover of the lenders and insurers on this...*

“I believe there’s an argument for societal culture playing a role in the lack of knowledge from our clients”, states **Pete Hobson, MortgageConfident.co.uk**. Hobson suggests that the nature of aggregator websites for home insurance now means that people lose sight of basic information. “They’ll have a quick look and if there’s two policies side by side, they’ll go for the cheaper one”. He argues that people are so busy these days that they don’t check the small print and just prioritise cost. Agreeing with Done, one recommendation Hobson gives is for mortgage brokerages or insurance brokerages to be more up front about what their clients have or haven’t got in their policy – “make it clearer and simpler”.

**Mark Varley, Addresscloud**, continues this conversation. “We work with one of the leading aggregators and as far as I’m aware, there’s no flood checks apart from maybe a question to the customer like ‘has your property ever flooded?’”. Varley explains that there’s no educational or data-driven flood checks that happen.

“I’m not aware of any site where you can go on and do a flood assessment on your house”. Yes, you can pay for a homebuyer’s report when you buy a new property, but there is no simple way to do a single search on your property. “Maybe that’s something as a community to consider. Is there a pricing model that would allow a consumer to look up on a public website what ‘JBA’ think about flood risk or what ‘Terrafirma’ think about the subsidence risk? Is there a way we can do that?”.

Dr Farwell jumps in and plays devil’s advocate: “Do you think that the public is focused on the visual risks such as flooding and missing these increasing other risks? Are we being myopic?”.

Lending her expertise was **Jill Boulton, JBA Risk Management**. “Flood wasn’t popular to buy before 2000, so yes I do think we can be a bit myopic!”. Boulton describes how the rise in the number of floods around the UK over the last two decades has forced insurers and customers to more widely request/provide cover. “One problem I see with coastal erosion is that it’s not something that insurers cover. Unfortunately, there are going to be a lot of people who suffer because under the current system of 1 year policy renewals, the risks to housing are made to seem a long way off”.

**Tom Perkins, Willis R**, makes an interesting point in response to this. He highlights the issue of the unknown: if people haven’t experienced a certain risk in the past, then it’s often not seen as a tangible risk in the present. “I think from an insurers point of view, there is an opportunity to perhaps consider that uncertainty in a more explicit way”. He explains that there’s always a temptation to take a single number for what a one in 100-year flood might look like. But in reality, it’s a pretty meaningless number unless you have some context of what that means.

Perkins concludes this question succinctly to the group by arguing that the more we can interact between the different industries and bodies the better. Education to the clients needs to come from all. “It’s all about the importance of establishing common goals and equally the common holes in our approaches”.

With the room satisfied with the answers given by all, Dr Farewell concludes the Insurer roundtable with one final question: “If you could make one law or requirement that would positively disrupt the industry and lead to more resilient homes, or lower carbon emissions, or similar benefit, what would it be and why?”.

*Though many of the answers were great, there were two that stood out...*

“I feel there’s something about asking every developer in their proposal to take into consideration current and future insurance costs”, proposes **Katherine Greig, Flood Re**. The beauty of including insurance is that you’re not then just looking at flood risk, you’re also considering fire risk and subsidence risk as well. “The extent to which risk overall is considered in a developer’s mindset, needs to shift considerably if affordability is to be preserved in the face of climate change”. Greig goes on to argue that you then need to consider denying the automatic hook-up to existing sewers for new developments – with increasing surface water risk many sewers will be overwhelmed which will cause flooding even great distances from rivers and the sea. Lastly and related to the challenge of surface water flooding, Greig notes that “England is behind on requiring Sustainable Urban Drainage on all new developments, those should be mandatory as they are in Scotland already”.

Greeting this view with a thumbs up was **Dr Bronwyn Claire, ClimateWise**. Not only did Dr Claire agree with this point around the developers but she believed we could go a step further. “For me, it should also include the district planners because often these sorts of planning decisions need to be made at a landscape scale”. Dr Claire suggests that if there is a way to line up the building of new developments, with the potential for reservoirs, on a golf course or the like – this would be a step in the right direction. “It would be much better for the environment, and it would create more sustainable housing if more bodies were forced to work together in the planning stage. We shouldn’t be looking at it on an individual level. House planning decisions should be looked at, at a district level”.

## CONVEYANCERS

Last but certainly not least, on the Friday, we were joined by a group of conveyancers representing the legal community. For this roundtable, we were welcomed by a new Chair, **Nicolien van Zwieten**, **Geoscience Product Analyst at Terrafirma**.

The first question put to the group by Van Zwieten concerned “Buying habits – is a home on the seafront no longer a desirable location?”.

Though not a conveyancer himself, and with his flood cap firmly on, **Aaron Jones**, **Ashfield Flood Risk**, is the first to dive in. “I don’t think it matters too much to home buyers. I’ve been banging the drum for 15 years, trying to explain to people that though a certain area hasn’t flooded in the past, the property can still be sat within a flood risk area”. Jones describes how difficult it’s been to win some round. The predictions are very clear and though people are starting to listen to the science and starting to take it more seriously, it’s still a massive hurdle to overcome. “With Covid-19, people have tended to learn that following the science is the intelligent way of understanding something, so there is a renewed hope”.

“I also agree that the clients buy with their heart and not their head”, responds **Julie Davis, LCF**. “It doesn’t matter what you tell them or how much you point out, if it’s CML compliant, and the lenders are happy to lend, then the clients take that as gospel”. Davis adds that they currently work with a company called Citu in Leeds who provide carbon neutral housing which are all self-sustainable. Despite clients having more knowledge around sustainable housing, Davis feels buying habits haven’t changed because “it comes with a huge cost which is not accessible for most of the public”.

“Clients buy with their heart and not their head

“OK, so what can experts within ground risk assessment like Terrafirma, do to aid conveyancers better?”, asks Van Zwieten.

“I think reports could be made much simpler. It can be quite confusing when trying to pull information out of a report. Like you said, we’re not geologists”, replies Davis.

Due to the fact that perhaps traditionally, physical hazards have been quite low on people’s priority list, many around the table agreed that education from companies like Terrafirma could be more accessible to the wider public. This idea was brought up time and again in this roundtable, with the conveyancers possibly giving a more honest answer of the current state of affairs.

“COP26 has done a lot to raise the profile on climate change issues, but more needs to be done to explain to



the public that when buying a house, you shouldn’t just be considering the local school and the crime rate in the area”, claims **Charlotte Bull, Aconveyancing**.

“Education is definitely the way forward but it will take time to really bring about change in people’s psyches. It will probably be the younger generation who are more attuned with the risks surrounding physical hazards and will be more likely to want to consider this when buying a house”, suggests **Mike Leeman, Bell Lamb & Joynson Solicitors**.

With this in mind, Van Zwieten was keen to find out what the invitees’ own attitudes to climate change were and where it currently sat in their consciousness: “What adjustments if any, have your firm made to become more sustainable?”.

“Education is definitely the way forward

“Our firm measure our carbon output and we’ve been net-zero for a couple of years now”, says **Usha Sharma, Brabners**. Sharma explains with real passion and gravitas that it came to the forefront of their minds last year and has become integral. Every single decision is made around it. “It’s all about sustainability with us, as well as equality, diversity and inclusion”. Sharma believes that in the past, law firms were only worried about profit and that’s just how it worked. In order to change that, you have to help encourage each individual within the firm. “We’re a firm of 400 people, so you have

to get everyone to feel invested if you really want to make a difference”.

On the opposite end of the scale in terms of size was **Samantha Burrows, Aconveyancing**. “We’re a team of about 40, so in comparison, very small. However, I definitely agree that things are starting to change in terms of attitude to climate change at our firm”. Burrows informs the group that though they are still very much at the beginning of their journey, they are now consciously looking to make decisions within the firm that are more environmentally friendly. “The next step will be our outward look, so attending events like this are hugely helpful, just to educate ourselves more than anything!”.

*A perfect place to finish, I think...*

## CONCLUSION

After the events, I caught up with Terrafirma to discuss what we had heard from our attendees. At the beginning of the week, the aim of the roundtable discussions was to create awareness of physical hazards and to understand the risks that they bring to property.

It is indisputable that there will be an increase in climate-related physical risk to property, and increased financial risks. Climate change is impacting extreme weather events, which will, in turn, increase the severity and frequency of ground hazards. Legal professionals play a pinnacle role in reshaping the property industry alongside assisting clients in addressing, managing and mitigating the risks of climate change.

What I found with all three industries that took part was that there was still a long way to go in their understanding. I can hopefully speak on behalf of the other attendees when I say we were all amazed and shocked at the facts and figures provided by Terrafirma. Though the conversation had often naturally leant on how we could better insulate our properties and how we can use greener energy, the aspect of ground hazards was not something that many (except the risk experts) had thought of before.

*Personally...when I think of ground hazards, I think of tectonic plates, volcanoes, and far away exotic countries, NOT the UK!*

All jokes aside, it is this lack of knowledge that needs to change. The three industries need more education from the government and from the experts on the frontline, whose amazing work might yet lead to a brighter and better future for all. Communication is key in that. The industries must collaborate and this conversation must carry on. We must remember Dr Farewell's mantra:

"The past isn't equal to the present. And the present certainly isn't equal to the future"



 <b>Mark Nunns</b> COO Ambiental Risk Analytics	 <b>Aimee Smith</b> Sustainability Manager Principality Building Society	 <b>Simon Das</b> Managing Director 978 Finance	 <b>Lucy Lewis</b> Senior Policy Adviser AMI & AFB	 <b>Katherine Greig</b> Head of Transition Flood Re	 <b>Racheal Gillespie</b> Head of UK Catastrophe Analytics Willis Re
 <b>Ivan Guerreiro</b> Head of Lending Newcastle Building Society	 <b>Lee Taylor</b> Senior Geotechnical Manager Terrafirma	 <b>Luke Parsons</b> Business Growth Manager Terrafirma	 <b>Jill Boulton</b> Technical Director JBA Risk Management	 <b>Judith Ellison</b> Business Development Manager JBA Risk Management	
 <b>Thomas Perkins</b> Senior Catastrophe Risk Analyst Willis Re	 <b>Mark Varley</b> Founder and CEO Addresscloud	 <b>Dr Tim Farewell</b> Director of Science & Communications Terrafirma	 <b>Sam Burrows</b> Associate Aconveyancing	 <b>Dr Bronwyn Clark</b> Senior Programme Manager Cambridge Institute for Sustainability Leadership	 <b>Richard Done</b> Commercial Operations Director Polygon UK
 <b>Pete Hobson</b> Director MortgageConfident.co.uk InsuranceConfident.co.uk	 <b>Nicolien van Zwieten</b> Geoscience Product Analyst Terrafirma	 <b>Victoria Stinchcombe</b> Customer Success Manager Terrafirma	 <b>Will Cotton</b> Editor Modern Law Magazine	 <b>Mike Leeman</b> Managing Partner Bell Lamb & Jonynson Solicitors	
 <b>Usha Sharma</b> Senior Associate Brabners	 <b>Aaron Jones</b> Director Ashfield Flood Risk	 <b>Julie Davis</b> Partner LCF	 <b>Charlotte Bull</b> Solicitor Aconveyancing	 <b>Eleanor Ivey</b> Shadow Trainee Brabners	