



FOREWORD

This report has been prepared by the **Flooding (including strategic flood risk and sewerage) Group** on behalf of the SaveCapel Campaign Team. This group is made up of seven local residents who have lived in the area for a considerable length of time and are all familiar with the degree, frequency, and location of the flooding problems in the area which quite simply does flood on a regular basis. Members have detailed knowledge of flood prevention measures already taken and those being investigated to prevent flooding in Capel. In addition, members include professionals in their field of water management science, surveying, engineering, construction and accountancy.

Whilst this report raises specific issues relating to each of the above policies in the Draft Local Plan, there are also many common matters and relevant background information sections. Rather than duplicate many sections of this representation, it is intended that the contents are read as our response to the consultation on each of the above policies.

Whilst we all have many concerns about the development in general these are being addressed by other working groups. Our primary concern is to demonstrate the danger and costs that flooding issues will produce with a view to getting the existing plan moved to a more sensible and suitable location that will reduce costs and bring it into line with government policy of not building on areas liable to flooding.



Oct-2000 Capel East – Land parcels 313 (left) and 314 (right)



Area views - CA1 Tudeley Christmas 2013

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1 : GEOLOGY

- 1.1 The soil is described in the National soil resources Institute as “Loamy and Clayey floodplain soils with naturally high groundwater”.
- 1.2 Geology of the site mainly comprises of impermeable clay which does not drain easily and is susceptible to volume change, with changes in moisture content. The undeveloped land at both sites PW1 and CA1 is likely to contain high levels of sulphates from the agricultural use of the land which attacks the integrity of concrete. Historic Ironworks and mining deposits are scattered over the southern side of CA1 with shafts up to 15 metres deep.
- 1.3 Special material and Foundation design are likely to be required and building out of the ground would be costly with possible retaining structures and terracing design required to accommodate sloping ground in places.
- 1.4 The map below of the Capel area (Figure 1) has been built using the boundary maps from the Tunbridge Wells Borough Council Master Plan and the British Geological Society UK bedrock (625k Version 5) map and the British Geological Society UK superficial geology map. This shows sites CA1 Tudeley and PW1 Capel East in red outline.

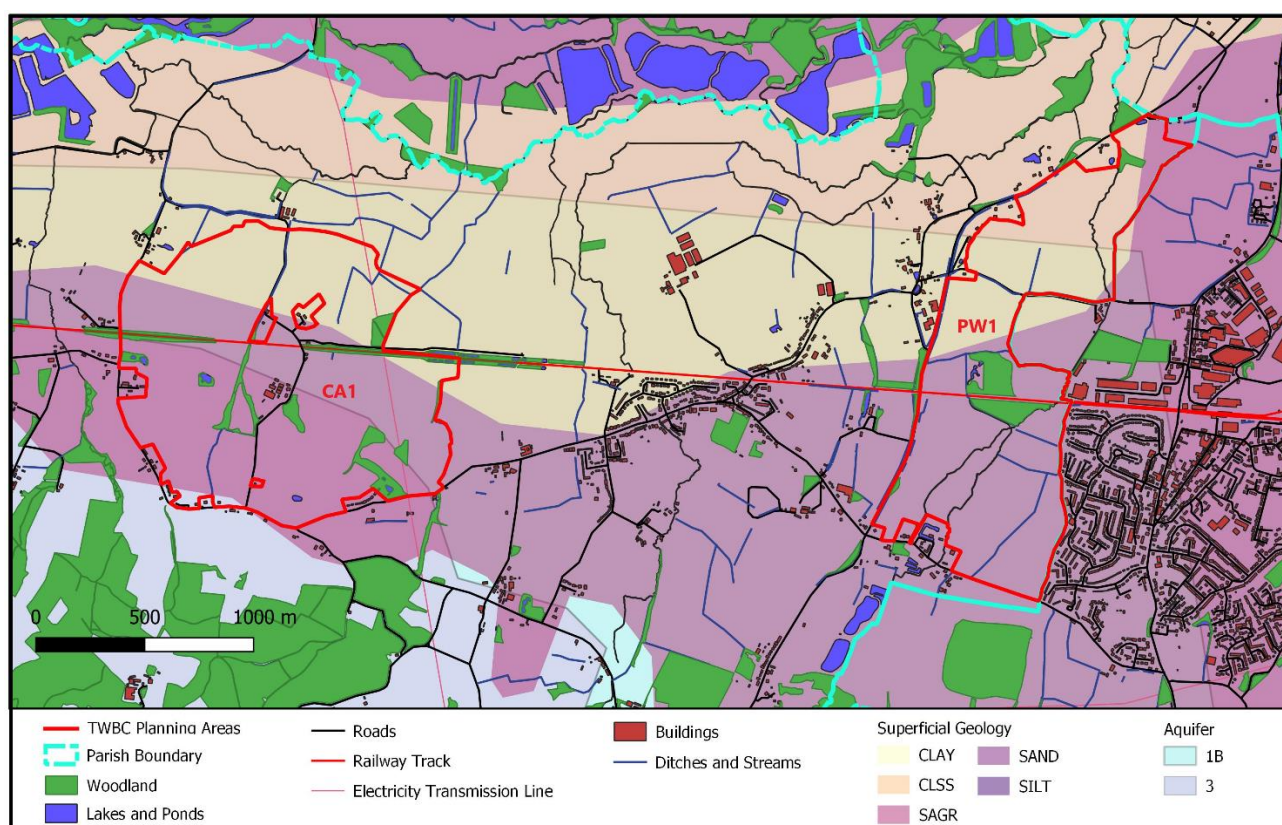


Figure 1 - Geological map of Capel

- 1.5 Variations in the superficial geology are shown, with the lighter colours indicating mainly clay and the purple areas largely sand.
 - CLSS – Clay Sand and Silt.
 - SAGR – Sand and Gravel.
- 1.6 The geology of a catchment can be an important influencing factor in the way that water runs off the ground surface. This is primarily due to variations in the permeability of the surface material and bedrock stratigraphy.
- 1.7 Potential development parcels located in the west of Paddock Wood are underlain by the Tunbridge Wells Sand Formation consisting of interbedded sandstone and siltstone whilst sites in the east are underlain by the Weald Clay Formation consisting of mudstone.
- 1.8 The area is therefore likely to have a varied response to rainfall events, with eastern areas of Paddock Wood underlain by typically less permeable mudstones being characterised by a quicker catchment response. Flood volumes will be more critical for areas underlain by the less permeable Weald Clay Formation with areas underlain by the Tunbridge Wells Sand Formation having a slower response to rainfall.
- 1.9 There is a variety of superficial (at the surface) deposits including River Terrace Deposits, head Deposits and Alluvium.
- 1.10 However, both of the proposed allocations have very similar immediate substrates; namely alluvial deposits under a clay cap. This is shown by the beige and purple areas. These immediate substrates will require significant ground works to make any buildings stable, as they are inherently unstable and liable to subsidence.

- 1.11 The southern area of CA1 shows the extent of the sandstone bedrock (the purple area that is darkly shaded). This is sufficiently porous that it allows the aquifer it contains to self-balance by expelling water through springs. This higher area is capped with impervious clay, which means that surface water run-off from this area must be considered a serious risk (see Tudeley levels map Figure 5).
- 1.12 In addition, this aquifer will seriously hinder excavations for building, sewage transport, and drainage; puncturing the clay cap will release the aquifer and mean that such excavations and any permanent holes will require constant pumping. The effects of compression on the aquifer of any buildings and roads/driveways, as well as the compaction of the surface clay, will affect the ability of the surface and underlying geology to take up surface water.
- 1.13 All three types of substrate have porous aquifer substrates under a clay cap. If that cap is punctured by excavations, pipes and flood defences, then the risk of aquifer leakage will be very high. In addition, the aquifer is often above capacity, as shown by the large number of local springs. This means that its capacity for taking additional water load will be low or indeed will have a negative contribution to water absorption. Interfering with this aquifer will have a seriously detrimental effect on flooding prevention.

2 : TOPOGRAPHY

- 2.1 **Topographical history:** From The History & Topographical Survey of The County Of Kent. Published in 1798. *“Capel is a very obscure and unfrequented place, the surface of it is very low and flat, except in the middle of it where there is a small rise, on which the church stands; ... in the rest of the parish it is deep miry clay.”*
- 2.2 Bagshaw’s Directory of Kent in 1841 refers to the soil as being *“mostly a miry clay”*
- 2.3 This clay is hydratable and extremely unstable; it is subject to swelling when wet and to contraction when dried out.
- 2.4 The only major change between 1798, 1841, and 2019 is that while we still have thick wet clay, and still have a slope, since the 1840’s there has been a railway embankment in place to prevent the water from getting away.
- 2.5 **Levels and Topography:** The map below (Figure 2) has been built using the boundary maps from the Tunbridge Wells Borough Council Master Plan and the European Union 10 metre resolution Digital Elevation Model. This Digital Elevation Model is produced from data collected as part of the SRTM (Shuttle Radar Topography Mission) and ASTER GDEM (Advanced Spaceborne Thermal Emission and Reflection Radiometer Global Digital Elevation Model) projects.

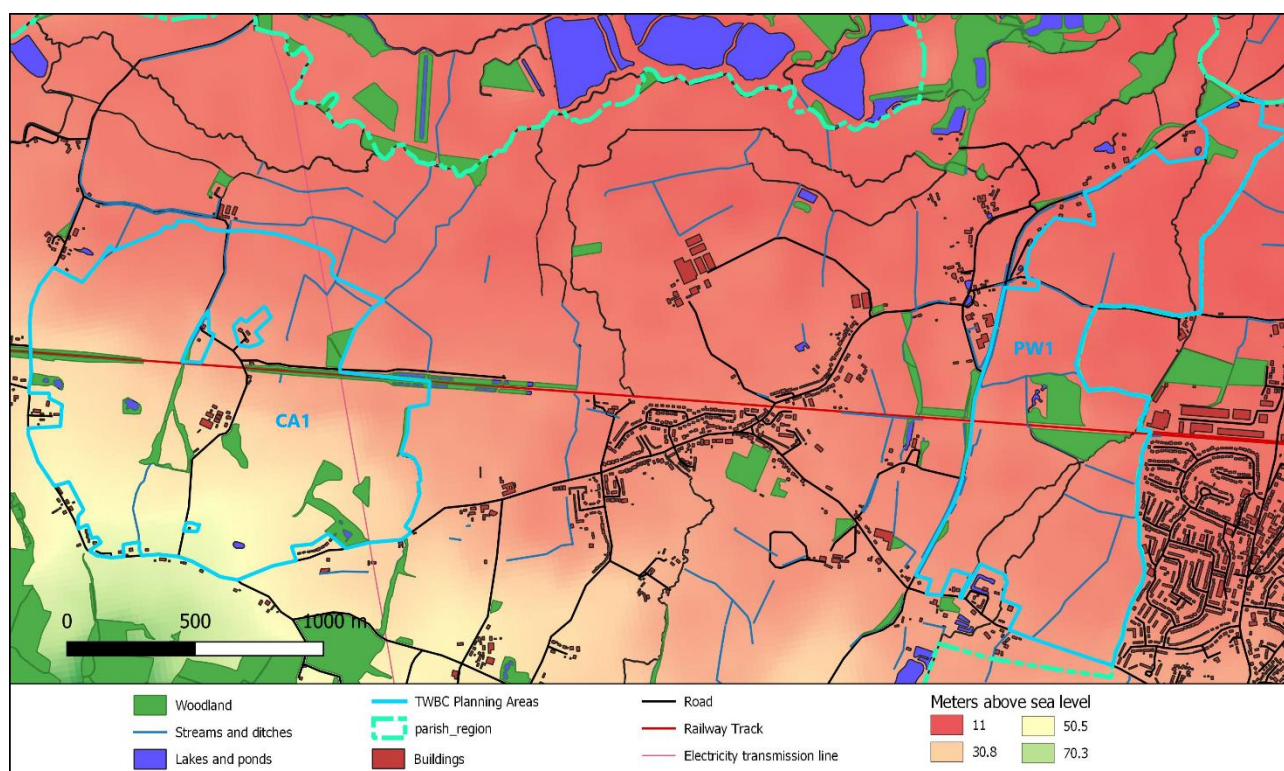


Figure 2 - Topographic map of Capel

- 2.6 What this map shows is how little variation in levels across the PW1 and the northern side of the CA1 area: for the majority of both areas there is around 1m variation in levels. Such small variations in Height above Mean Sea-Level [HSL] indicate a greater risk of flooding.

- 2.7 The clay cap, aligned with slower drainage times and an over-abundance of supply, would mean that these areas are more likely to flood, even under moderate rainfall or moderate storm events.
- 2.8 **CA1 Flood Risk:** The Draft Local Plan has not included a comprehensive assessment of flood risk at the proposed site in Tudeley. However, Flood Risk Assessments were prepared in 2018 by Waterco to inform KCC's Mineral Plan, sites M10 Moat Farm and M13 Stonecastle/Hartlake, which are in close proximity and relevant to this allocation (see Figure 7, page 16). The issues relating to Stonecastle Quarry are discussed in more detail in section 7 below.
- 2.9 The border of the M13 site is within 500 metres of CA1 and this [FRA¹](#), in particular, is relevant to our understanding of the ground levels in the allocation. Waterco predict flood water levels of up to 1.12m, calculations have been used for the "Defended 1% AEP + 35% Climate Change event" modelling, and shows that much of the solar farm at risk of being seriously flooded (see Figure 4 below).
- 2.10 The land levels from the Hammer Dyke moving south towards the railway line remain low before dropping lower in the fields prior to the start of the solar farm. The Waterco report data indicates a potential flood risk level at this point of up to 1.7 metres, allowing for climate change of 35%.
- 2.11 Furthermore, the Waterco mapping clearly shows much of the land in M13 to be at risk of flooding between 0.6 metres to 1.2 metres, with some areas at risk of flooding between 1.2 - 2.4 metres. The EA stress concern in a letter dated 5.7.2018 contained within the document that flooding could be increased elsewhere as a result of the proposed mineral extraction. This has implications for CA1 and this FRA provides the best evidence available.
- 2.12 **Ground survey:** The Flood Group decided that further investigation into the ground levels of the north-east section, in particular, of the proposed CA1 development site (north of the railway line) was needed.
- 2.13 A levels survey was undertaken from footpaths at both the Tudeley and Capel East sites on the 13.7.2019. This used laser technology and followed a traditional rise and fall method. The results of the survey confirm this minimal variation of ground levels.
- 2.14 A map showing the path of the survey undertaken at CA1 Tudeley is shown below (Figure 3):

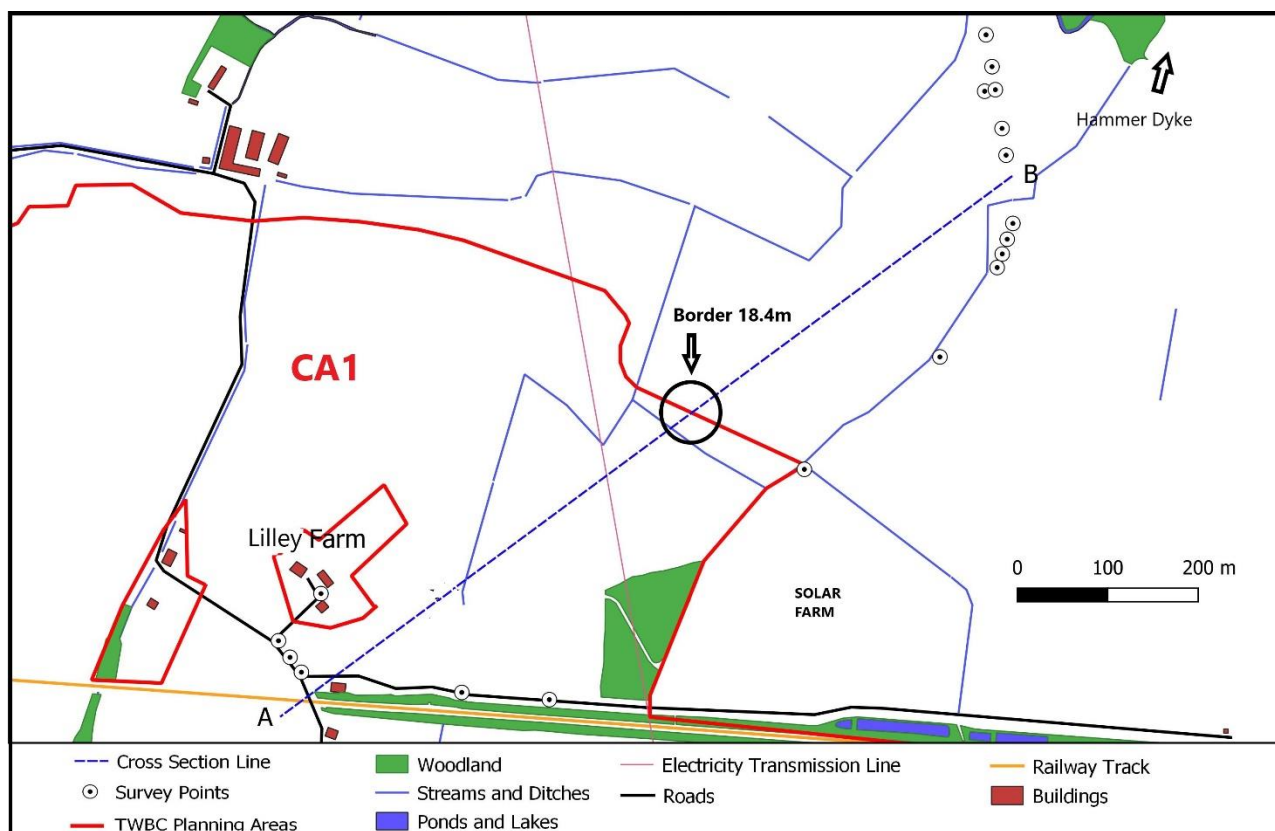


Figure 3 - Map showing the path of the survey

- 2.15 This map shows the position of each survey point (●) and the blue dotted line shows a cross-section of the mean values. This should be read in conjunction with the graph below (Figure 4) which highlights the recorded levels and anticipated flood levels from point A to B.
- 2.16 From the Environment Agency's Flood Model, the highest flood level above sea-level in the proximity to the site is 18.4m which is the likely path level rather than field level at the border position of CA1 (circled).

- 2.17 The graph below (Figure 4) shows the variation in levels along the survey undertaken compared with anticipated flood levels and should be viewed in conjunction with the survey map above (Figure 3):

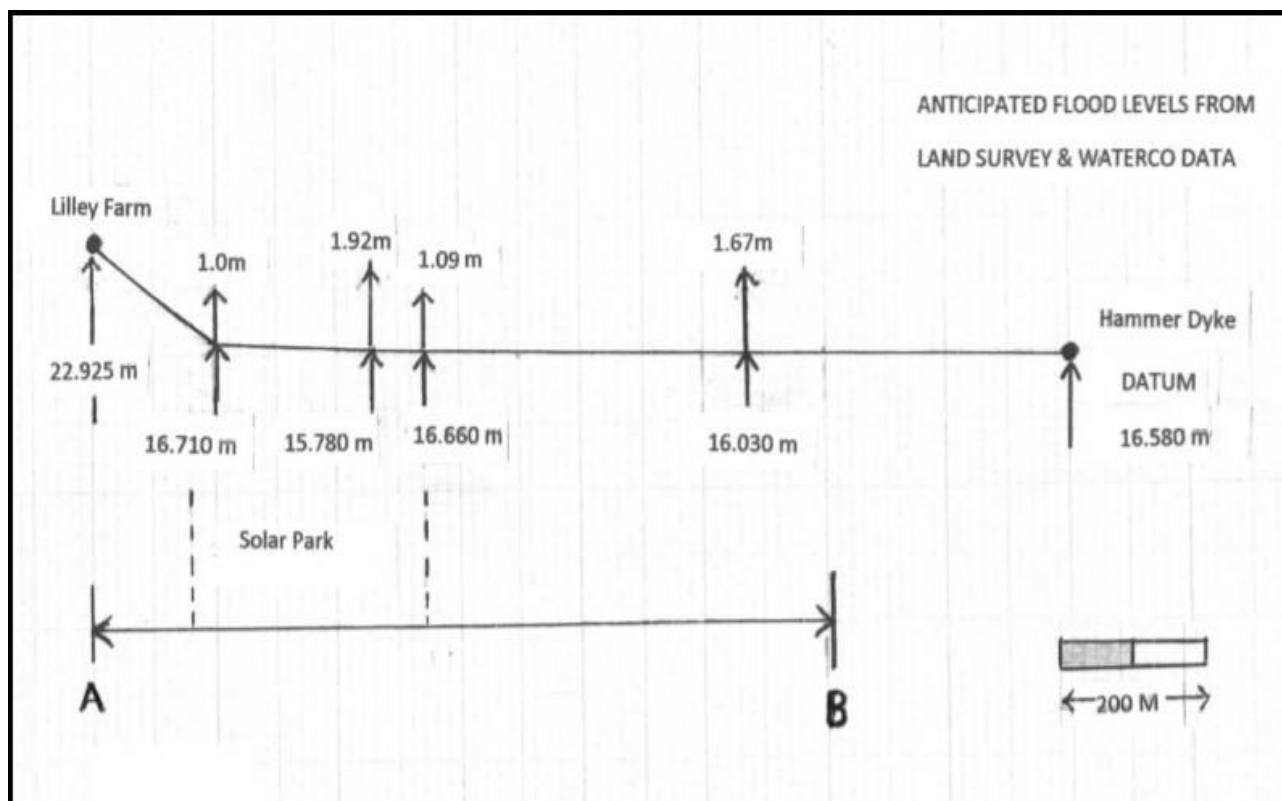


Figure 4 - Graph of Anticipated Flood Levels at CA1 North

- 2.18 The Datum is taken from the Waterco data and deduced land levels at 16.030m 16.660m 15.780m 16.710m and 22.925m ending at Lilley Farm are shown below the horizontal line. The figures of 1.67m 1.09m 1.92m and 1.0m above the horizontal line are approximate levels to which flood water could reach based on the Waterco [data](#)¹.
- 2.19 These levels do not include the assessment of climate change over the 'lifetime' of the proposed residential development (>100 years) and therefore understate the potential flood risk (see section 10).
- 2.20 Assessment of the data and levels indicates flooding to a depth of approximately 1.12 metres in fields around the Hammer Dyke.
- 2.21 The Flood Group's levelling survey revealed fields to be reasonably level from the Hammer Dyke to Sherenden Farm, but then dropping significantly by up to 0.8 metres giving a potential flood depth of considerably more than 1.12 metres up to the Solar Park from where the land starts to rise at the southern end.
- 2.22 Land to the east of CA1 Tudeley running to Capel East, from available data, generally appears lower.
- 2.23 These maps and figures demonstrate that there are three areas to note:
- Firstly, that there is so little variation in levels that flood water is likely to spread across a significant proportion of the entire area. Over much of the northern area of CA1 and the majority of PW1, there is less than 1m variation in levels above Mean Sea Level.
 - Secondly, that the Environment Agency's flood risk model has obvious shortcomings in this area. For example, it shows areas that are lower, in terms of level above Mean Sea Level, than immediately adjacent higher areas not flooding, while those higher areas do flood.
 - Thirdly, given the small variations in level over the entire PW1 area and the northern section of the CA1 area, there will be a much higher risk of flooding as the effects of climate change continue to develop. This is further explained in section 10.
- 2.24 Essential flood protection systems, such as bunds, flood storage and so on, are less likely to remain feasible options; there is a limit to the size these can be built to, without impacting on the development's viability.

¹ Flood Risk Assessment for Site M13: Stonecastle Quarry

Waterco consultants 13-July-2018 Online: consult.kent.gov.uk/file/5165135

3 : FLOOD HISTORY

3.1 Tunbridge Wells Borough has a well-documented history of flood events; the main sources of which are from fluvial (river/watercourse) and pluvial (surface water) sources. The events of 1960, 1963, 1968, 1985, 2000 and 2009 caused widespread flooding within the north of the borough e.g. at Paddock Wood and Five Oak Green, and areas along the River Teise, due to heavy rainfall over a prolonged period of time:

- **November 1960:** The heavy and prolonged rainfall caused widespread flooding across much of Kent as the Rivers Medway, Teise and Beult exceeded their channel capacities. The areas surrounding Five Oak Green, Lamberhurst, Buckhurst, Ashurst and Ashour Wood are recorded to have flooded during this event.
- **November 1963:** The Rivers Medway, Teise and Beult exceeded their channel capacities. However, the flood event was not as extensive as that during November 1960 as records only show the area north of Tudeley Hale and Whetsted to have flooded within Tunbridge Wells Borough.
- **September 1968:** Prolonged heavy rainfall associated with a slow-moving depression and thunderstorms caused severe flooding across the south east of England. Between the 14th and 15th of September, 150mm-200mm of rainfall was recorded across Kent and consequently the river flow on the Medway was recorded at 225 cubic metres per second. As a result, the River Medway exceeded its channel capacity and caused extensive flooding in many areas of the borough including Tudeley Hale, Five Oak Green and Paddock Wood.
- **Christmas 1999:** Floods in Five Oak Green, the playing field and the road leading down to it. The centre of the village was flooded with water entering a number of homes and the village shop. Residents erected barriers at each end of the village to prevent vehicles passing through the village causing problems with their bow waves. The Alder Stream overtopped its banks and the path beside it became impassable due to the rate of flow and depth of water. One end of Nortons Way and all of Willow Crescent flooded. The small lane leading down to the hop processing plant flooded along with all the land at the end of it down to the railway. Fire Engines were brought in to pump out the Village, Nortons Way and Willow Crescent. Fifty properties in Five Oak Green flooded including the village shop. The Alder stream overtopped its banks, surface and ground water inundated the foul water system, and gullies and culverts failed. Half of the village lost power.
- **May 2000:** The Alder Stream overtopped. Areas of Five Oak Green were flooded.
- **October 2000:** The wet weather in the autumn of 2000 resulted in many river catchments being subjected to multiple flood events. Large areas of Kent and Sussex were left under water as several rivers burst their banks. The river flow on the Medway exceeded that of 1968 at 260 cubic metres per second. Consequently the reservoir behind the Leigh barrier rose by 3cm per minute on an area of 278 hectares. The barrier had to be released gradually which helped protect Tonbridge but the flooding in Five Oak Green, Yalding and other villages downstream made national news.

The police were forced to close the Five Oak Green Road after residents erected barriers at each end of the village to prevent vehicles causing further problems with their bow waves. Parts of the road had water up to 2 feet deep. At least one house on that road was flooded to the depth of 3 feet, others in the village reported depths inside properties of 18 inches. Properties affected included parts of Nortons Way Willow Crescent, around the village green - The Forge, Whetsted Road and Falmouth Place. Householders in the village renewed their call for better drainage systems after they had been evacuated from their flooded homes for the third time in 10 months.

Paddock Wood also recorded flooding at Mascalls Court Farm and at the Hop Farm livestock drowned. In total, around fifty properties were flooded from the Gravelly Way Stream and Tudeley Brook.

- **January 2002:** Firefighters spent four hours pumping out flood water from the King's Head Pub and neighbouring cottages, Badsell Road, and Five Oak Green Village.
- **2008/2009:** Southern Water recorded sewer flooding for Five Oak Green. The EA also describes issues of hydraulic overload from foul sewers and surface water in Five Oak Green.
- **2011:** Five Oak Green Rd / Tudeley Lane flooded.
- **2012:** Roads flooded - Colts Hill, Willow Crescent, Church Lane, Alders Road, and Badsell Road.
- **March 2013:** Flooding in Alders Road, Capel, to a depth of 30cm - the worst in living memory.
- **December 2013:** During the winter of 2013-14, a series of Atlantic depressions brought heavy rainfall and stormy conditions to much of England and Wales when Kent received 242% of the long-term average rainfall causing widespread flooding.

Of particular note is the storms of 19th-24th December when 110mm of rain fell on already saturated catchments which caused river, surface water and foul water flooding across the area affecting hundreds of homes and businesses, including in Five Oak Green and Paddock Wood.



Five Oak Green village 2013

The Army were put on standby for evacuation assistance when the whole of the Medway valley was flooded upstream and downstream. The Leigh Barrier had to be released to relieve the water volume upstream and failed to stop Tonbridge from flooding. This was close to a national emergency.

Five Oak Green suffered a power cut and the pumping station failed. As a consequence roads and properties were flooded to such an extent that some families had to vacate their homes for several months.

Since this time, significant flooding occurred within the borough during August 2015, July 2017, and July 2018.

- 3.2 Flooding incidents have been reported historically in Paddock Wood, with the corner of Church Road, The Cedars and The Ridings being subjected to floods every year. The area to the north of the railway is reported to have been affected by flooding from the rivers Teise and Medway (flood events occurred in 1960, 1968, 2000/2001, and 2013/14). Flooding south of the railway is noted to generally be associated with heavy rainfall, resulting in flooding from surface water and watercourses that flow south to north through and adjacent to Paddock Wood.
- 3.3 Hartlake Road also has a history of regular flooding. Last winter it was closed for a complete 4 week period!
- 3.4 At Crockhurst Street, the south west part of the CA1 Tudeley proposed development, which is one of the highest points of the area, flash flooding often occurs (left and centre below):

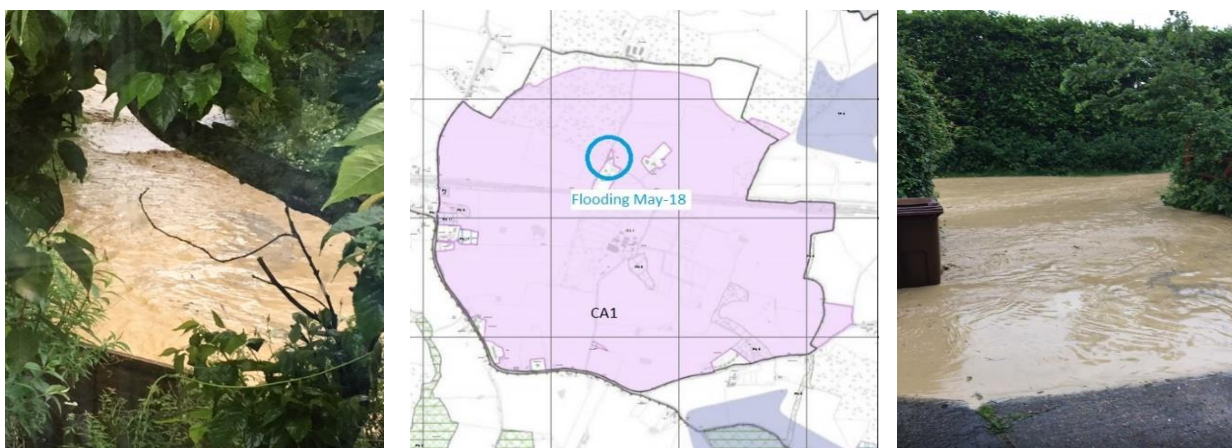


- 3.5 Surface water flooding at the site of the Solar Farm in June 2014 is shown in the above picture (right). This is immediately adjacent to the eastern boundary of CA1 north of the railway.

- 3.6 Sherenden Road has a history of flooding - with flooding of the Roads and adjacent fields up to 3 feet deep in places. The road was closed three times in two weeks in 2014:



- 3.7 CA1 Tudeley north side of railway floods up to Lilley farm and at the lower section of the south of the site adjacent to the railway embankment. In May 2018, not a notable flood event for the borough, surface water flooding was severe along Sherenden Road at Lilley Farm:



- 3.8 Rail tracks that dissect the CA1 plan have flooded in the past.
- 3.9 **Historical points of interest:**
- 3.10 The accounts records at Tatlingbury, in the 1700's, record the costs of drainage and the failed attempts at improvement. The new method was to dig ditches in the direction of the river and then backfill them with brushwood. This failed because the flood plain covered the same area as it does today. The water table is 450mm, in the wet season, in between the industrial estate and Badsell Roundabout. There will be no improvement until the water table and the depth of the river are sustainably lowered. This could then interfere with bore holes and aquifers affecting water quality.
- 3.11 The John Bowra surveying map of Stone Castle c 1760 shows: Great Mead, Footway Mead, Bridge Mead, The Marsh Orchard, Little Huntley Mead, and Great Huntley Mead. Other names: Whetsted, Hart Lake, Poors Mead, Ottershaw, Moat Farm. Lilly Hoo. Tudeley Brook farm. Gold Hill Mill, Little Mill. Oak Wear.
- 3.12 KCC Heritage maps 1871 – 1890 show that: Whetsted was also known as Washlingstone. The Hop Farm was Wateringbury.
- 3.13 In 1545 King Henry III was assembling an army and navy in Portsmouth to meet the threat of a French invasion. Tonbridge was described as being a small town on the Medway much subject to flooding and poor ground hampering the efforts to get men and materials from London and the North down to Portsmouth.

4 : REGULATORY POLICY & GUIDANCE

4.1 PLAN NEEDS TO MEET NPPF:

- Section 149: Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk.
- Section 155: Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

- Section 157: All plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future impacts of climate change - so as to avoid, where possible, flood risk to people and property..... seeking opportunities to relocate development, including housing, to more sustainable locations.
- Section 158: Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding (such sites are available).

4.2 FLOOD RISK AND CLIMATE CHANGE - GUIDANCE FOR PLANNERS:

Inogen Environmental Alliance Inc. (June 2019): The NPPF sets out how the planning system should help minimize vulnerability and provide resilience to the impacts of climate change, and alongside planning policy guidance demonstrates how flood risk should be managed now and over the lifetime of the development, taking into account climate change. Consequently, the Environment Agency (EA) has recently updated their climate change guidance in 2016, providing climate change allowances to support the NPPF which is now split by river basin district rather than a blanket percentage increase in river flow. See photo of River Medway, Tonbridge 2013 below.

If the Site is within a floodplain then the proposed development is typically raised above the flood level. The exact level of land raising is dependent on the predicted flood levels and the EA allowance for climate change. However, the displaced floodwaters will need to be compensated for through flood compensatory water storage. This impacts development as the location of the storage will undoubtedly impact the masterplan as it needs to be located within or on the edge of the floodplain and demonstrated on a level for level basis. This could also potentially affect the developable area, building design and access. If climate change is not considered, the modelled water levels are likely to be deemed too low and the planning application objected by the EA on flood risk grounds.

The EA's Flood Zones do not take into account climate change so if not formally provided by the EA, hydraulic modelling may be needed to be conducted which can be time and cost prohibitive.



Aside from river flooding, surface water is a key risk as demonstrated in the Pitt Review- the Government's response to the 2007 summer floods. The EA climate change guidance applies climate change allowances to peak rainfall to determine runoff rates. This may mean you need larger attenuation storage to protect the proposed development for its lifetime. As per the risk from rivers, the location of surface water attenuation storage or other forms of Sustainable Drainage Systems

(SuDS) will impact the masterplan in terms of developable area, building design and access. In addition to the statutory planning requirements, building occupiers are increasingly aware of the potential for flooding to impact their operations. As a result, some major occupiers are imposing their own flood risk standards which are more stringent than the planning requirements. Where an investor is considering an asset that satisfies the statutory requirements, this may not be sufficient to truly consider the potential for re-letting, with some occupiers being unwilling to compromise their own demanding flood standards.

4.3 RECOMMENDATIONS FROM OTHER AGENCIES:

- 4.4 Environment Agency document – Lessons learned from autumn 2000 Floods - Ground water from hidden springs brought misery to many. Despite flows being held back on the river Medway by the Leigh barrier the swollen rivers of the Medway, Teise, and Beult converged on Yalding leading to extensive flooding. Five Oak Green and East Peckham flooded up to 5 times in 2000. The policy statement 6 from this EA document states *“when developing in the floodplain prevention is better than cure”*.
- 4.5 In 2000, the United Nations Economic Commission for Europe listed points to note: *“2. Human interferences with natural processes has increased the threat of flooding and should where possible be reversed and in future prevented”*.
- 4.6 From KCC select committee report 2007 - *“flooding can happen at any time in any season and with enough severity to overwhelm defences”* - as we know, we have no formal defences.

- 4.7 I D Oliver, of the Romney Marsh area Internal Drainage Board, wrote - *"Few if any surface water systems would have coped with the intensity or duration of rainfall experienced in other parts of the country, we in Kent were very fortunate to have escaped"*
- 4.8 Mr Older, Flood Risk manager of EA quoted *"Flash flooding and water run-off was a key contributor to flooding in 2007"*.
- 4.9 Historically, a point of reference for heights above sea level has been provided by reference to benchmarks, which were located, in times gone by, at intervals all around the country. Given the flooding disasters in recent times, and bearing in mind the Somerset Levels as a particular case in point, perhaps we should remind ourselves of a statement made at the time. *"If you build on an area that floods, you will flood."*
- 4.10 Let us also remind ourselves of the statements made by the Government and others after recent flooding events, such as the Somerset Levels, that *"lessons would be learned about building in areas at risk of flooding"*.

5 : PLANNING PRECEDENT

- 5.1 **MAIDSTONE LOCAL PLAN – REGULATION 19 REJECTION DUE TO FLOOD RISK:** Neighbouring Parish site located at Yalding, downstream from Capel, has been rejected by the Inspector:

Former Syngenta Works, Hampstead Lane, Yalding. Extract from Inspector's report: *"The former Syngenta site at Yalding is a large flat brownfield site that was previously used for agro-chemical production. The site has been mainly cleared of buildings and remediated for land contamination. It was identified in the submitted Local Plan for 8,600 sq m of business space and 200 dwellings. However the site is wholly within Flood Zone 3a and is at high risk of flooding. The national policy aims for Flood Zone 3a in the NPPF are to relocate development to areas with a lower probability of flooding. The Environment Agency therefore objects to residential development on the site. The deletion of a housing allocation is necessary for reasons of flood risk. However as the housing was needed to assist development viability of the mixed use scheme the site is also unlikely to be developed for the proposed business use"*.

- 5.2 **GARDEN SUBURB REJECTED FOR FLOOD RISK:** A large urban extension to the town of Maldon in Essex has been refused against officer advice over flood concerns:

- The 'garden suburb' proposal submitted by developer Countryside Properties would have seen the creation of 1,138 new homes to the north of Heybridge covering 76 hectares. However, members of the Maldon District Council North West Area planning committee voted to refuse the application, going against the Planning Officer's recommendation of approval.
- Within the Officer's Report for the application, it said *"Delivery of the site will assist the Council in achieving its five year housing land supply requirements"*. The site is one of three strategic locations contained within the Council's local plan for the creation of a garden suburb in the area, guided by a strategic masterplan framework.
- Despite the apparent policy compliance, Councillors voted to refuse the application due to concerns with flooding issues. Citing the Council's formal reason for refusal, it said *"Insufficient evidence has been submitted with the application to demonstrate that the proposed development would be able to incorporate adequate surface water drainage infrastructure and that the infrastructure that would be proposed would be maintained in a manner that would ensure that the development would not cause increased flooding risk within the vicinity of the site and the catchment areas of the watercourses that are within the site"*.
- Maldon Council released a statement which said that the potential impact on flood risk from the development was unacceptable and contrary to both local and national planning policies.

- 5.3 **TUDELEY PUBLIC HOUSE EXTENSION REJECTED:** Proposals for the extension of the Poacher & Partridge PH, Hartlake Road have been rejected by TWBC for the following reasons:

(1) The proposal would constitute inappropriate development within the Metropolitan Green Belt, which by definition is harmful to its openness. There is insufficient evidence of the necessary 'very special circumstances' to overcome this harm.

(2) The proposal, by virtue of creating new buildings with associated domestic paraphernalia, works to alter the land levels and potential additional impacts from further parking and works in close proximity to the trees at the rear would have more than a minimal impact on the landscape character of the locality. It would not conserve and enhance the rural landscape, nor would it protect the countryside for its own sake, nor preserve the interrelationship between the natural and built features of the landscape. The overall impact is harmful to the rural character of the area.

(3) It has not been demonstrated that the occupiers of the development would not be at risk from flooding or that the development would not increase flood risk elsewhere. Therefore the development is likely to result in a risk to human life from flooding.

The application was considered to be fundamentally contrary to the provisions of the Development Plan and the NPPF, and there were not considered to be any solutions to resolve this conflict. This decision directly contradicts the promotion of the adjacent development of 2,800 homes (CA1) by the same TWBC Planning department.

5.4 OTHER PROPOSED DEVELOPMENTS REJECTED FOR FLOOD RISK:

- South Stanley: Plans to build 290 homes in South Stanley were unanimously rejected by council bosses. The application for land south of Hustle Down road and Middies Road was thrown out due to concerns about traffic congestion, road safety and flooding as well as harm to the character of the local landscape. It was felt the application represented a significant encroachment into the countryside.
- Cannon Bridge: Plans for 27 houses in Cannon Bridge rejected by the Highland Council planning officers after flood risk fears raised by the Scottish Environment Protection Agency (SEPA) and the councils flood risk management team.
- Yatton: Plans for a new estate in Yatton near Bristol were rejected. A risk of flooding was one of the chief concerns expressed about the proposed development by members of the North Somerset Council planning committee.
- Dublin: Plans for 900 new homes in South Dublin have been refused due to concerns about flooding and traffic impact. The board said it was not satisfied that the developer had provided adequate information around how it would manage storm waters on an area at risk of flooding. It had serious concerns in relation to the effectiveness of the proposed solution including plans for a water storage area, and overall calculations of the surface water run-off rates. Furthermore the board was not satisfied that the storm water outflow could be limited or that the site when developed would no result in flooding in the Ballyogon Stream and related catchment downstream of the development site. It said that the proposed development would therefore lead to a risk of flooding lands outside the subject site and be contrary to the proper planning and sustainable development of the area.
- Kings Lynn: Housing development in Clenchwarton near Kings Lynn rejected for fears regarding flooding.
- Stockton-on-Tees: The appeal site lay partly within flood zone 2. The developers had produced a flood risk assessment that demonstrated a reduced risk of flooding and the Environment Agency withdrew its objection. However, the appeal Inspector found no evidence that alternative sites had been considered. Notwithstanding the absence of an objection from the Environment Agency or the local planning authority on this issue, the Inspector considered that the proposal did not meet the requirements of national guidance and refused planning permission.

6 : CURRENT HYDROLOGY & FLOOD RISK

6.1 Flooding from reservoirs

6.2 Reservoir flooding is very different from other forms of flooding. It will happen with little or no warning and evacuation will need to happen immediately. The likelihood of such flooding is difficult to estimate, but it is less likely than flooding from rivers or surface water. It may not be possible to seek refuge upstairs from floodwater and buildings could be unsafe or unstable due to the force of the water from the reservoir breach or failure.

6.3 Reservoirs with an impounded volume greater than 25,000 cubic metres in England are governed by the Reservoir Act 1975, as amended by the Flood and Water Management Act, 2010 and are listed on a register held by the Environment Agency. Recent changes to legislation under the Flood and Water Management Act require the Environment Agency to designate the risk of flooding from these reservoirs.

6.4 The only such reservoir in our area is at Leigh (see section 8). Flooding as a result of a breach/failure (or deliberate release) of this reservoir structure would impact allocation parcels in the north of the Paddock Wood (SFRA prepared for the DLP). This may be up to 2 metres high in some cases, and perhaps 1 to 1.5 metres in the CA1 Tudeley area and Five Oak Green, when levels are fully assessed.

6.5 Fluvial flood risk

6.6 The principle watercourses flowing through Tunbridge Wells Borough are the River Medway and its tributaries, which include the Alder Stream, Paddock Wood Stream, River Beult, and the River Teise, the longest watercourse within the borough. The main source of fluvial flood risk is associated with the Rivers Medway, Teise and Beult, caused by run-off and catchment inflows across the borough.

- 6.7 In addition to these watercourses, flooding within the borough has also been associated with Alder Stream, which flows through Five Oak Green, and Paddock Wood Stream, which flows through Paddock Wood. The Alder Stream catchment is described as particularly flashy, resulting in regular flooding from the Stream. Railway embankments act as a dam, which consequently worsens the flooding in this area of the borough with roads and property having been affected in the past. In some instances, high water levels in the Alder Stream have affected highway drains, gullies, and local sewer networks.
- 6.8 A number of ordinary watercourses flow through the Paddock Wood area including the Alder Stream, Paddock Wood Stream and Tudeley Brook. In the east, a number of unnamed smaller ordinary watercourses flow off the hills to the south of Paddock Wood and through a number of allocated sites before flowing into Paddock Wood Stream. Paddock Wood Stream flows through the central area in a northerly direction towards the River Medway. Tudeley Brook flows in a northerly direction through the west of the area before joining Alder Stream which flows in a north easterly direction.

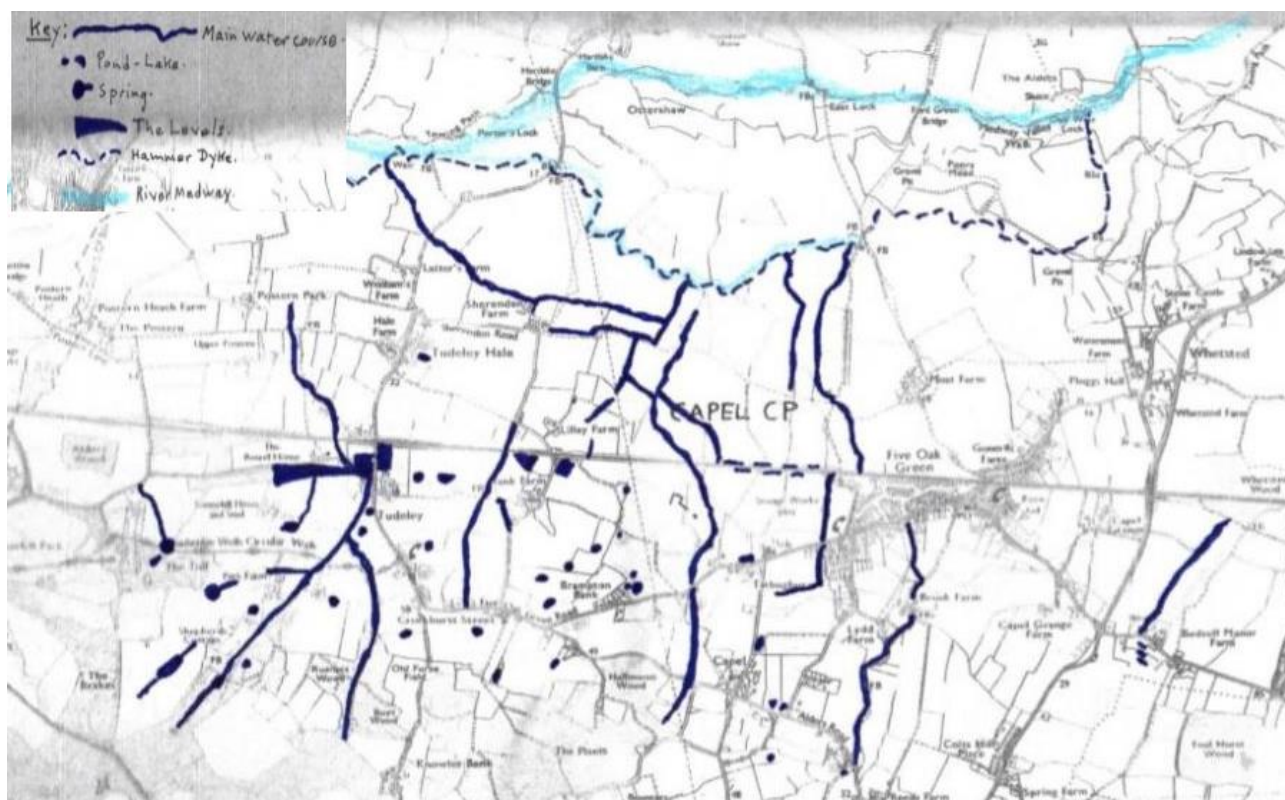


Figure 5 - Survey of watercourses in Capel

- 6.9 Numerous water courses are marked on the above map at CA1 and the Tudeley Brook at Capel East. By the very nature of such watercourses a myriad of underground branches are likely to exist beneath the slopes at CA1 and possibly at the site Capel East. Water also runs under and over the southern sloping areas. Much of southern CA1 slopes in more than one direction.
- 6.10 The southern section of CA1 floods and ponds with flooding at the railway line down from the church, the ground from the church level being uneven, and sloping in different directions in wave patterns. Tudeley levels floods, bringing water to Tudeley Road, this being water from springs and watercourses on higher ground. The lions head spring passes down through Somerhill and can often be seen flooding across the road into the fields at Postern.
- 6.11 There are noticeable run-offs from spring points, e.g. southern section of CA1. Springs are present to the rear of All Saint's Church, Tudeley and behind Crockhurst Street, another spring can be seen opposite Park Farm on the higher ground to the south west.
- 6.12 **Groundwater Flooding**
- 6.13 The groundwater (water table) is stated as being naturally high in the Capel area by the National Soil Resources Institute.
- 6.14 Current understanding of the risks posed by groundwater flooding is limited and mapping of flood risk from groundwater sources is in its infancy. Groundwater level monitoring records are available for areas on major Aquifers. However, for low lying valley areas, which can be susceptible to groundwater flooding caused by a high-water table in mudstones, clays and superficial alluvial deposits, very few records are available.

- 6.15 Mapping suggests that susceptibility to groundwater flooding is greatest in the north-east of the borough, specifically in the areas of Whetsted, Tudeley Hale and Five Oak Green. This groundwater flood potential is consistent with the location of more permeable strata and superficial deposits to the north of the borough.
- 6.16 Additionally, there is increased risk of groundwater flooding where long reaches of watercourses are culverted as a result of elevated groundwater levels not being able to naturally pass into watercourses and be conveyed to less susceptible areas. Mapping for the Local Plan has shown that more than 75% of the area within the 1km grid squares surrounding the Whetsted and Tudeley Hale, as well as the area north of Five Oak Green, are susceptible to groundwater flooding.
- 6.17 The playing field in Five Oak Green regularly floods to a greater or lesser extent a few times every winter. Significantly when this happens the water remains in place for days or even weeks due to the underlying nature of the soil and/or the high water table.
- 6.18 **Pluvial flooding**
- 6.19 Flooding from surface water runoff (or 'pluvial' flooding) is usually caused by intense rainfall that may only last a few hours and usually occurs in lower lying areas, often where the natural (or artificial) drainage system is unable to cope with the volume of water. Abnormally heavy rainfall can also occur for an extended period of time.
- 6.20 Surface water flooding problems are inextricably linked to issues of poor drainage, or drainage blockage by debris, and sewer flooding.
- 6.21 The risk of flooding from surface water predominantly follows the topographical flow paths of existing watercourses or dry valleys with some isolated ponding located in low lying areas.
- 6.22 For the most part, surface water flooding could be attributed to heavy rainfall overloading carriageways, drains and gullies. However, there are other instances where the source of flooding is perceived to be from blocked drains and gullies, or due to high water levels within receiving watercourses impeding free discharge from surface water drains and gullies. It is noted that roads within the borough are regularly flooded due to run-off from adjacent agricultural land discharging into watercourses that do not have sufficient capacity to convey the flows.
- 6.23 Paddock Wood has experienced several incidents of surface water flooding associated with small watercourses, sewerage and private drainage systems, often occurring relatively rapidly from the onset of heavy rainfall.
- 6.24 Thanks to the Parish Council Flood Committee and the Five Oak Green Flood Action Group, with the aid of various agencies, especially the environment agency, the regularity of incidence and severity of flooding in Five Oak Green has been greatly reduced. Despite this the centre of the village does still flood on a regular basis. Much of the improvement has been due to extra measures taken to get the water through the village and away. Maintenance of the stream leading to the culvert, keeping the screen at the start of the culvert clear, unblocking and lining the culvert, clearing the exit of obstructions, and the regular maintenance of the ditches all the way down to the Medway have brought about dramatic improvements. Anything such as the proposed development which impeded this would inevitably increase the frequency and severity of flooding in Five Oak Green/Capel.
- 6.25 The surface water drainage system has not been increased and upgraded in terms of layout, positioning, and capacity to keep pace with the continued and continuing construction of new houses, extensions to existing houses, conservatories, and other buildings in and around the village.
- 6.26 Development of two new dwellings at Pendore, Five Oak Green. The previous building and hardstanding areas had a gross area of approximately 276 m². The two new dwellings have a footprint of 267 m² with a total impermeable area of 697 m². EA prescribed a total of 28 m³ of attenuation (swales etc.) with restricted discharge via a hydrbrake of 2 l/s to the adopted sewer in Five Oak Green Road. This demonstrates the large size of storage that is required by the EA under each dwelling and curtilage to attenuate the flood risk.
- 6.27 Three houses have recently been built on Five Oak Green Road near the centre of the village, three more houses are being constructed opposite the allotments, and two more recent builds are now on Sychem Lane, one of them newly completed. A Planning Application has recently been approved for five new houses on Sychem Lane. To the north of the railway, more new houses are being completed on Whetsted Road. All in this small village. And the former Kings Head site awaits development!
- 6.28 It is also noted that much of the drainage infrastructure has been in place for well over a century and was not designed and built for the current and future demands. Further, the current water company has made clear that not all of the layout of the system is known to them or mapped by them.
- 6.29 Over the two sites, just 50mm of rain falling would amount to 26.4million gallons of water, equivalent to 40 Olympic size swimming pools. All in addition to that resulting from developments in Paddock Wood and Tonbridge.

6.30 Flood defences

- 6.31 There is presently only one (modest) flood defence in the local vicinity. A small raised embankment (<40 metres long) is located along the banks of the Alder Stream near Brook Farm, approximately 0.2km south of Five Oak Green Road. This is accompanied by concrete bank protection works and is owned and maintained by the Local Authority.
- 6.32 The condition grade of the defence is 'Fair', meaning that defects may be present that could affect the overall performance of the defence lining the Alder Stream. The defence has been designed to provide a standard of protection of 20% AEP and thus only protect the surrounding properties from a 1 in 5-year flood event.
- 6.33 A Five Oak Green flood alleviation scheme has been proposed to reduce fluvial flood risk from the Alder Stream which has been discussed over many years. Options are being assessed by the EA which include additional flood defences around the Alders Road area behind Colts Hill. This may include a reservoir but no decision has been taken.
- 6.34 The Policy AL/PW1 includes reference to Five Oak Green (FOG) but only states specifically Paddock Wood (see strategic storage in section 11). It is now understood that the Alder stream project would not be progressed and the 'betterment' for FOG would be through CA1 Tudeley, as confirmed by TWBC Head of Planning (12-Nov-2019).

6.35 EA Flood Map

- 6.36 The mapping of current flood risk from fluvial flooding in Capel is shown below (Figure 6) which confirms that the majority of PW1 Capel East is in Flood Zone 3. In addition, there is a significant area of the northern part of CA1 Tudeley that is within the flood mapping.
- 6.37 It is important to note that this mapping does not include an allowance for climate change nor the additional effects of surface water flooding. There is also no consideration of the run-off from the proposed development and the replacement of agricultural land with hard surfaces.
- 6.38 The Environment Agency's current flood model is based on assumptions that are 25 years old, which is reflected on its inability to cope with such small variations in HSL. It is also clear that, in some key areas, the underlying data may be out of date – newer land use mapping would have shown that the surface roughness in these areas had decreased as agricultural use has moved away from hedge-bound orchard systems to open-field cereal and root-vegetable crops.

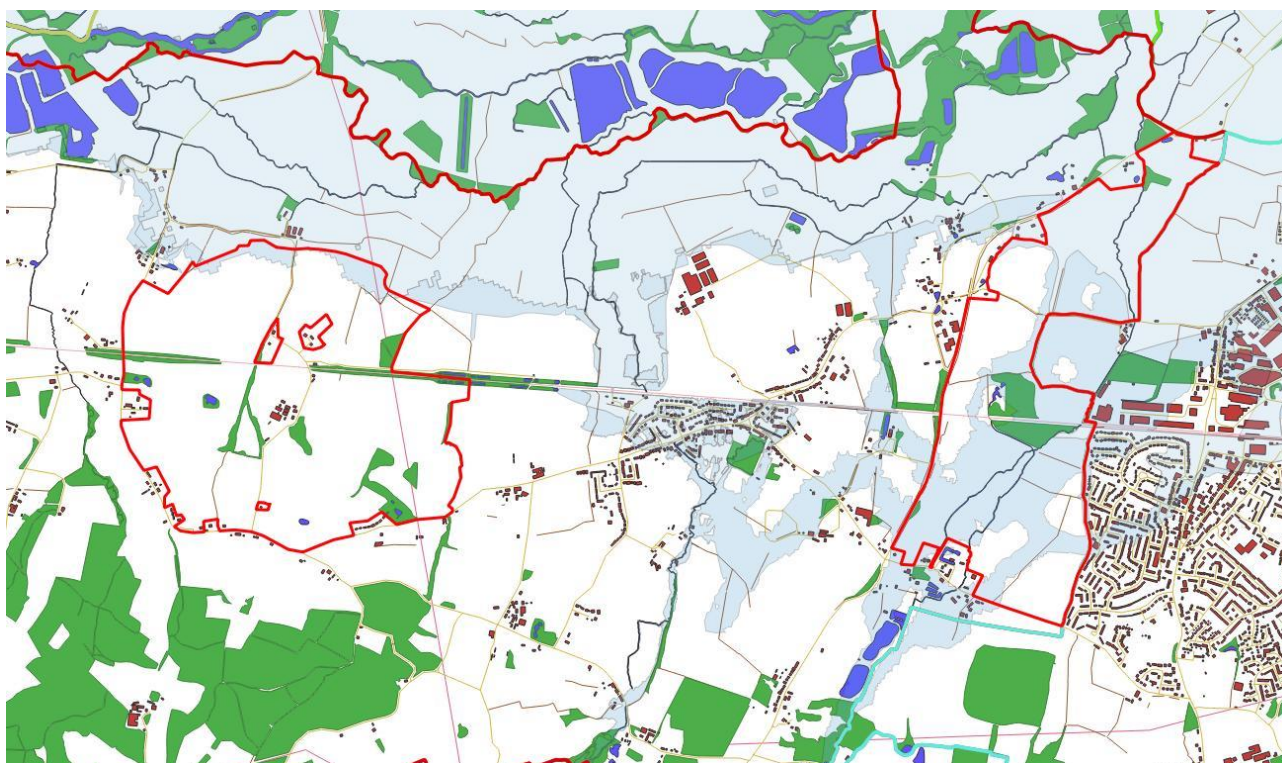


Figure 6 - EA Flood Map of Capel

- 6.39 This area regularly floods throughout the year to a greater or lesser degree. In addition those areas that don't flood become very muddy. With global warming and building on the site matters can only get worse. Whilst it is possible to protect properties by building up its a bit pointless if the roads flood - damaging vehicles – and making access to the houses difficult and potentially dangerous.

7 : STONECASTLE QUARRY

- 7.1 The map below (Figure 7) shows clearly how the area of the proposed allocations in Capel, the historic landfill parcels, and adjacent land proposed for mineral extraction are closely linked.
- 7.2 The Draft Local plan has stated in its policies that the strategy must “have regard to Kent County Council minerals allocations in the vicinity” and therefore the cumulative effect of any quarry expansion and new housing plans needs full assessment.



Figure 7 - Proposed Local Plan & Quarry developments in Capel

- 7.3 **Historic Landfill**
- 7.4 The Mineral Planning Authority (MPA) permitted the importation of various waste materials to Stonecastle Quarry under condition (xii) of the planning permission TW/79/753 and subsequent other conditional consents. We understand that this continued through the 1980s and 1990s.
- 7.5 The landfill areas comprise of two large parcels of land which were backfilled with these waste materials following the completion of mineral extraction. These areas are located to the north & south-west of the previous processing area and we understand that the southern parcel was backfilled first (see map above).
- 7.6 Condition (iii) (h) of the planning permission TW/79/753 states “measures to minimise the accumulation of groundwater and generation of leachate within each cell being backfilled, and for removing such groundwater and leachate as does arise from the site for appropriate treatment and disposal”.
- 7.7 Our research and the limited monitoring information obtained from the Environment Agency has raised the following initial concerns:
- The southern site is bordered by the Hammer Dyke and is dissected by the Alder Stream (Main River).
 - The levels of highly toxic leachate in the segregated cells that make up the northern parcel have consistently been around 4.5 metres higher than the level prescribed in the Waste Disposal Licence.
 - Excess leachate has seemingly not been removed from these sites, with the licence stating that this should have been done within four weeks of a monitoring level exceeding the permitted level.
 - The northern parcel appears to have contaminated the adjacent Primary Silt Lagoon (immediately west and north) as there appears to be an absence of wildlife in contrast to the other lagoons.

- The leachate may have escaped into the surrounding water courses/aquifers especially during the severe flood events in 2000 and 2013. Volatile readings and elevated substances have been found in the groundwater.
- Volatile and apparently high levels of methane gas and carbon dioxide have been recorded.
- Numerous readings have not been made due to bore holes/wells being flooded, damaged or inaccessible.
- The waste materials in the cells are banded/contained by clay overburden and silt remnants from aggregate washing and any ground movement could severely compromise the security of the leachate.

7.8 There is extreme concern in our community, especially as the area has historically flooded, and numerous people are asking for a comprehensive independent report that provides full analysis of the contamination risks of these landfills and whether our health has been affected by evidently uncontrolled methane gas emissions.

7.9 This matter is relevant to the Draft Local Plan because of the contamination risks on the water courses and aquifers (see section 14), and also due to the connectivity of numerous water courses in the immediate area, especially Alder Stream and Tudeley Brook (within PW1).

7.10 KCC Minerals Plan

7.11 The Kent Minerals and Waste Local Plan 2013-30 is currently being assessed by the inspectorate under Regulation 19 and members of the Flood Group participated at the hearings in October 2019. The Inspector's report will only be available after the end of this Regulation 18 consultation on the Draft Local Plan.

7.12 TWBC was not represented at the hearings for sites M10 Moat Farm and M13 Stonecastle and no Statement of Common Ground between KCC and TWBC was provided to the Inspector. This raises serious concerns about the fulfilment of "Duty to Co-operate" requirements and whether either of these plans meet the test of soundness.

7.13 **M10 Moat Farm:** The map above highlights that the eastern boundary of the proposed site M10 Moat Farm envelopes the historic southern landfill and the north-east section is adjacent to the northern landfill area. Any disturbance of the contaminants, the elevation of these landfill areas and substantial contamination risks of leachate, Methane gas, and other toxic substances on the water courses is of significant concern.

7.14 In addition, the proposed mineral site borders the Hammer Dyke and is dissected by the Alder Stream which raises significant further concerns as to the effect of this proposed extraction on the flood risk and water courses/aquifers.

7.15 The Draft Local Plan is proposing a new road link from the new town CA1 at Tudeley to the A228 (orange arrows in Figure 7) that would follow a route across M10 Moat Farm and the southern parcel of the historic landfill. Whilst this new road link is not included in the Transport Assessment Review prepared in support of the Draft Local Plan, the Strategic Sites Map released for the consultation still includes it.

M10 Moat Farm is expected to produce the extraction of 1.5 million tonnes of sand and aggregate (combined) over a period of 15 years. The restriction on Stonecastle Quarry activity because of the road access at the A228/Whetsted Road junction means that the various mineral sites must be worked consecutively (not concurrently).

Tarmac have stated that M10 Moat Farm would be scheduled for extraction after the completion of the Stonecastle extensions. By implication, this proposed mineral extraction could run from the late 2020s to the mid-2040s.

The Draft Local Plan covers the period 2016 to 2036 and it is therefore inconceivable how both the Mineral Plan and the new road link can be achievable during this period.

7.16 **M13 Stonecastle extension:** This proposed site is expected to produce the extraction of one million tonnes of sand and aggregate (combined) over a period of 7 years. As with the above site M10, the restriction on Stonecastle Quarry activity means that the various mineral sites must be worked consecutively.

7.17 This site is the centre of the catchment area of the EA designated Groundwater Protection Zone (GSPZ) related to the aquifers at Hartlake (see section 14). These aquifers have historically been an environmental concern. In 2002 KCC refused planning permission for the proposed extension of Stonecastle Farm Quarry phases 3 & 6 (now M13) on the grounds of potential pollution and contamination. Further quarry working was deemed to be a public health risk as the Hartlake aquifers are a source of public and commercial water supply.

7.18 The Flood Risk Assessment (FRA) prepared by Waterco in support of the Mineral Plan states that the site M13 is an important setting for local water supply and extensions to this quarry may impact water supply. Questions remain as to whether the full extent of these extensions are acceptable on this functional floodplain.

7.19 There is also uncertainty about the sustainability of the restoration plan and how the integrity of the watercourses will be maintained. Groundwater maps show the northern parcel has a 25-50% susceptibility to ground water flooding and the southern parcel 75%. Any effect on further waterbodies adjacent to the river Medway may result in the risk of further flooding.

- 7.20 Given the proximity and land levels of CA1 Tudeley, the resulting rainfall run-off and drainage, together with potential contamination and increased flood risks, needs to be fully assessed in relation to the proposed mineral extraction in this area.
- 7.21 **Mineral Processing**
- 7.22 Tarmac have applied to the MPA for new processing facilities (KCC/TW/0093/2019) and this is currently under consideration by KCC.
- 7.23 The proposal is that silt laden waters resulting from the mineral washing process will be discharged to the Primary Silt Lagoon which is adjacent to the northern landfill parcel. Given the close proximity of the proposed operation to the landfill and the interaction with the lagoons, the contamination risks need to be fully assessed.
- 7.24 It is important to note that KCC and the Environment Agency have been asked to provide a comprehensive review of the contamination risks from the historic landfill before determining this planning application. Although originally scheduled for consideration at the November 2019 Planning Committee, this has been deferred.
- 7.25 In addition, KCC Highways are reviewing the level of traffic entering/leaving the quarry site at the junction with Whetsted Road/A228. Given the potential vast increase, which could continue for up to 30 years, the cumulative effect of the proposed development of PW1 Capel East and resulting traffic needs to be fully assessed.
- 7.26 **KCC Policy DM7 - Safeguarding Mineral Assets**
- Planning permission will only be granted for non-mineral development that is incompatible with minerals safeguarding where it is demonstrated that either:
1. the mineral is not of economic value or does not exist; or
 2. that extraction of the mineral would not be viable or practicable; or
 3. the mineral can be extracted satisfactorily, having regard to Policy DM9, prior to the non-minerals development taking place without adversely affecting the viability or deliverability of the non-minerals development; or
 4. the incompatible development is of a temporary nature that can be completed and the site returned to a condition that does not prevent mineral extraction within the timescale that the mineral is likely to be needed; or
 5. material considerations indicate that the need for the development overrides the presumption for mineral safeguarding such that sterilisation of the mineral can be permitted following the exploration of opportunities for prior extraction; or
 6. it constitutes development that is exempt from mineral safeguarding policy, namely householder applications, infill development of a minor nature in existing built up areas, advertisement applications, reserved matters applications, minor extensions and changes of use of buildings, minor works, non-material amendments to current planning permissions; or
 7. it constitutes development on a site allocated in the adopted development plan where consideration of the above factors (1-6) concluded that mineral resources will not be needlessly sterilised.
- 7.27 The TWBC Draft Local Plan states *“The Kent Minerals and Waste Local Plan is part of the Development Plan. Issues including minerals safeguarding are important considerations during decision taking on planning applications. Given the strong relationship between minerals and the delivery of new building, it is important that decisions do not put at risk the delivery of both Plans”*.
- 7.28 KCC have specified that the criterion ‘adopted development plan’ should be interpreted literally, such that provided there is an adopted development plan with allocations, regardless of whether the development is incompatible with the mineral safeguarding principles, development in those areas is, in all cases, exempt from the need to consider safeguarding.
- 7.29 Clearly, although we understand that TWBC will have consulted with KCC, the Draft Local Plan by definition is not “adopted” and no further details have been provided to explain how the policy DM7 has been applied. This raises further serious concerns about the fulfilment of “Duty to Co-operate” requirements and whether either of these plans meet the test of soundness.
- 7.30 It is also relevant to explain that the substrates of the area are mainly alluvial deposits under a clay cap which extend over the CA1 Tudeley site. Indeed, this site was included in the early KCC Draft Minerals Plan and there now appears to be a contradiction between the safeguarding of these minerals and the proposed development of CA1 Tudeley.

8 : LEIGH RESERVOIR

8.1 The Leigh flood storage area (FSA) was built in 1982 following the devastating 1968 floods and is formed by a 1.3 kilometre-long, five-metre-high earth embankment across the Medway valley.

8.2 The River Medway passes through a reinforced concrete control structure built into the embankment. The 3 steel radial gates can be moved to either let the river flow normally, or to restrict the flow and hold water in the FSA, to control the amount of water flowing downstream.



8.3 The Environment Agency operates it at the peak of a flood event, when river levels passing through the structure are at their highest. However, at times of exceptional rainfall there will still be some flooding downstream.

8.4 It currently has a capacity to store 5.5 million cubic metres of water and plans to increase this have been approved. This will allow the Environment Agency to increase the flood reservoir water level from 28.05 metres to 29 metres at Leigh, upgrade an existing embankment near Hawden Farm in Hildenborough, and install a new control structure and pumping station to prevent water from the Medway backing up into the village.

8.5 The total cost of the project is estimated at £15.5million, with contributions expected to come from the South East Local Enterprise Partnership (£2.3m); the Environment Agency Flood Defence Grant (£10.1m); Kent County Council (£2.5m); and Tonbridge and Malling Borough Council (£0.5m).

8.6 The expected construction of the additional storage capacity is scheduled to commence in 2020, with anticipated completion in 2023, providing up to 30% additional river storage upstream.

8.7 The barrier was released in October 2000 and December 2013.

8.8 If we were to face another December 2013, namely that the barrier would be compromised or breached again, with the additional flood storage capacity, the velocity of the release would be greater than the 2013 release. This is likely to cause extreme damage to properties and a serious risk to human life.

8.9 There should be a requirement that that suitable assurances and mitigation are implemented to protect the communities that were flooded in 2013 by the barrier breach.

8.10 Photos of the December 2013 major flooding event when the Leigh barrier was released, Tonbridge Park:



8.11 There are proposals for two further Reservoirs to be constructed to the south of Paddock Wood. These would have a maximum storage capacity of 220,000m³ (see section 11) and there is concern on the implications, e.g. flooding levels from the 2013 Leigh event exceeded 2.14m at Hartlake Bridge. This proposal would present a further significant risk to human life.

9 : TMBC LOCAL PLAN

- 9.1 Tonbridge & Malling Borough Council has prepared a new borough wide Local Plan focussed on the period up to 2031, which has been consulted upon and has reached the examination stage. The Inspector has raised several issues that are now subject to a further public consultation process that ends on 16-Dec-2019.
- 9.2 The T&M Borough covers a total area of 240 km² (70% Metropolitan Green Belt) which compares with a total area of 326 km² in the Tunbridge Wells Borough.
- 9.3 The plan is proposing a housing requirement within the Local Plan of an additional 6,834 dwellings to meet the projected population growth:
- 121,900 (2012)
 - 133,000 (2021)
 - 145,000 (2031)
- 9.4 **Flood risk:** The River Medway runs through the Borough, flowing from the upper reaches through the town of Tonbridge to the downstream section through and beyond Aylesford. The Medway is fluvial between the outer north-western limits of Hildenborough down to Allington Lock (in Maidstone). Downstream from the Lock, including Aylesford, the Medway is tidal, eventually feeding into the Thames Estuary.
- 9.5 Flood mapping shows that a significant section of the central area of the principal town in the Borough, Tonbridge, is at high risk from flooding. In addition, the Rural Service Centre of East Peckham is at high risk whilst parts of Aylesford, in the north-eastern parts, are at medium and high risk from flooding.
- 9.6 Significant rainfall fell during the days leading up to Christmas 2013 making it the wettest December in 79 years. During the Christmas period the flow in the Upper Medway was the highest ever recorded at 300+m³/sec. To put this into context, a figure of 220 m³/sec. was recorded in the year 2000 and 250 m³/sec. in 1968, the last two severe rain events.
- 9.7 High flows in the River Medway are controlled by sluice gates and a flood storage area at Leigh. Within the town itself there are flood walls which are built along the banks of the Medway. Even with the presence of flood defences, the town of Tonbridge is not completely protected from flooding.
- 9.8 **Flood Policy:** The Council has responded to the issue of flood risk during the preparation of the Local Plan by pursuing a development strategy that avoids areas at high risk of flooding, particularly for residential development. This assessment took account of an allowance for climate change over the plan period and the likely effect this will have on the flows of watercourses.
- 9.9 The increased likelihood of flooding is widely recognised as one of the key consequences of climate change in the UK. Severe flooding has, from time to time, been a key concern in Tonbridge & Malling causing distress to many local communities and damage to properties and infrastructure. The Council with its partners have striven to bring forward capital proposals to address issues and is working in partnership with other agencies to mitigate flood risk through other means.
- 9.10 In determining planning applications the Council will apply the requirements of the Government's policy in the NPPF and the PPG on flood risk. If a development proposal is in conflict with the relevant national policy then it will be in conflict with this Policy.
- 9.11 **Implications on TWBC Plan:** The proposed development of housing, commercial, and associated infrastructure in T&M Borough will already lead to considerable additional water flows to the Medway and the floodplain. The cumulative effect on flooding implications, when added to by the TWBC plan, has not been fully assessed.
- 9.12 TMBC appears to have followed NPPF flood risk policy guidelines closely which highlights its efforts to discourage development within vulnerable flooding areas, where as TWBC have taken the opposite approach. TWBC are challenging current Green Belt Policy, requesting the removal of 100's of hectares of MGB, and keen to promote many sites that are situated within Flood Zones 2 and 3.
- 9.13 TMBC have elected to promote a combination of small and larger developments widely across the borough, with the largest development a garden village at Borough Green. This will have a maximum of 1,700 dwellings, compared to TWBC's largest two developments that propose around 8,000 dwellings within a 3 mile radius of each other and parts of these developments will be situated within Flood Zone 3 areas.
- 9.14 At a recent Extraordinary General Meeting of the TMBC Cabinet Advisory Board that discussed the TWBC Draft Local Plan, several members of TMBC raised serious concerns about the increased flood risk that could arise from the proposed developments in Capel. There is also concern that the TWBC plan does not demonstrate how the flood risk to several residential areas in Tonbridge Borough will be mitigated.

10 : CLIMATE CHANGE

- 10.1 The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. The Environment Agency published updated climate change guidance on 19 February 2016, which supports the NPPF and must now be considered in all new development plans and how allowances for climate change should be included.
- 10.2 The guidance presented in the Strategic Flood Risk Assessment (SFRA) prepared by JBA for the Paddock Wood area is based on UKCP09, but it should be noted that following the publication of UKCP18, updated Environment Agency guidance on climate change is expected to be issued in 2019, after the publication of this SFRA.
- 10.3 The 2016 climate change guidance includes climate change predictions of anticipated change for peak river flow and peak rainfall intensity. The guidance also covers sea level rise and water height. These allowances are based on climate change projections and different scenarios of carbon dioxide emissions to the atmosphere. Due to the complexity of projecting climate change effects, there are uncertainties attributed to climate change allowances related to the confidence in the prediction. As a result, the guidance presents a range of possibilities to reflect the potential variation in climate change impacts over the three periods that reflect the differing levels of confidence in the predictions.
- 10.4 **Peak river flows:** Climate change is expected to increase the frequency, extent and impact of flooding, resulting from an increase in the magnitude of peak river flows. Wetter winters and more intense rainfall may increase fluvial flooding and surface water run-off and there may be increased storm intensity in summer. Rising river levels may also increase flood risk. The peak river flow allowances provided in the guidance show the anticipated changes to peak flow for the river basin district within which the subject watercourse is located.

Once the river basin district has been identified, guidance on uplift in peak flows are provided for three allowance categories, Central, Higher Central and Upper End which are based on the 50th (Central), 70th (Higher Central) and 90th (Upper End) percentiles respectively. The 'percentile' is a measure of the confidence in the prediction of the magnitude of the allowance, i.e. lower uplift values (50th percentile – 'Central') are statistically more likely and thus attributed with greater confidence compared with higher uplift values (e.g. 90th percentile – 'Upper End') which allow for future conditions that accept a greater level of uncertainty.

The allowance category to be used is based on the vulnerability classification of the proposed development and the flood zones within which it is to be located. These allowances are provided, in the form of figures for the total potential change anticipated, for three climate change periods:

- The '2020s' (2015 to 2039)
- The '2050s' (2040 to 2069)
- The '2080s' (2070 to 2115)

The time period used in the assessment depends upon the expected lifetime of the proposed development.

- 10.5 **Time frame:** Residential development should be considered for a minimum of 100 years.
- 10.6 **Fluvial flooding:** Climate change does not just affect the extent of flooding. Even where flood extents do not significantly change; flooding is likely to become more frequent under a climate change scenario. The impact of an event with a given probability is also likely to become more severe. For example, as water depths, velocities, and flood hazard increase, so will the risk to people and property. Although qualitative statements can be made as to whether extreme events are likely to increase or decrease over the UK in the future, there is still considerable uncertainty regarding the magnitude of localised impact of these changes.
- 10.7 The map below (Figure 8) shows the fluvial flood projections that have been included in the SFRA using the following methodology:
- Some climate change modelling was available from the Environment Agency for Alder Stream and part of the River Teise (downstream of Goudhurst Road) for the Flood Zone 3a event in the 2080s epoch for the Higher central and Upper end estimates. This information has been used to inform the predicted climate change extents presented in the mapping.
 - Additionally, modelling prepared as part of the SFRA for Paddock Wood also simulated these events, and this information has also been used to inform the mapping.
 - Where no climate change modelling and mapping is available, a precautionary approach has been adopted for the SFRA, in which the present day Flood Zone 2 extent has been used as a conservative indicator of the potential changes to Flood Zone 3a in the future. This does not directly relate to published guidance on potential changes to fluvial flood flows but used as an indication for the SFRA. Note that future modelling that does use the published values may produce outlines that differ from the mapping presented in the SFRA.

- The modelling and mapping completed focused on predicted flood risk at the 2080s epoch (2070-2115) under increased flow rates of +30% and +70% for the undefended case 1% AEP event (Flood Zone 3a). The fluvial flow allowances represent the Higher Central and Upper End allowances under the latest guidance for the Thames River Basin District in which the River Medway catchment is located.

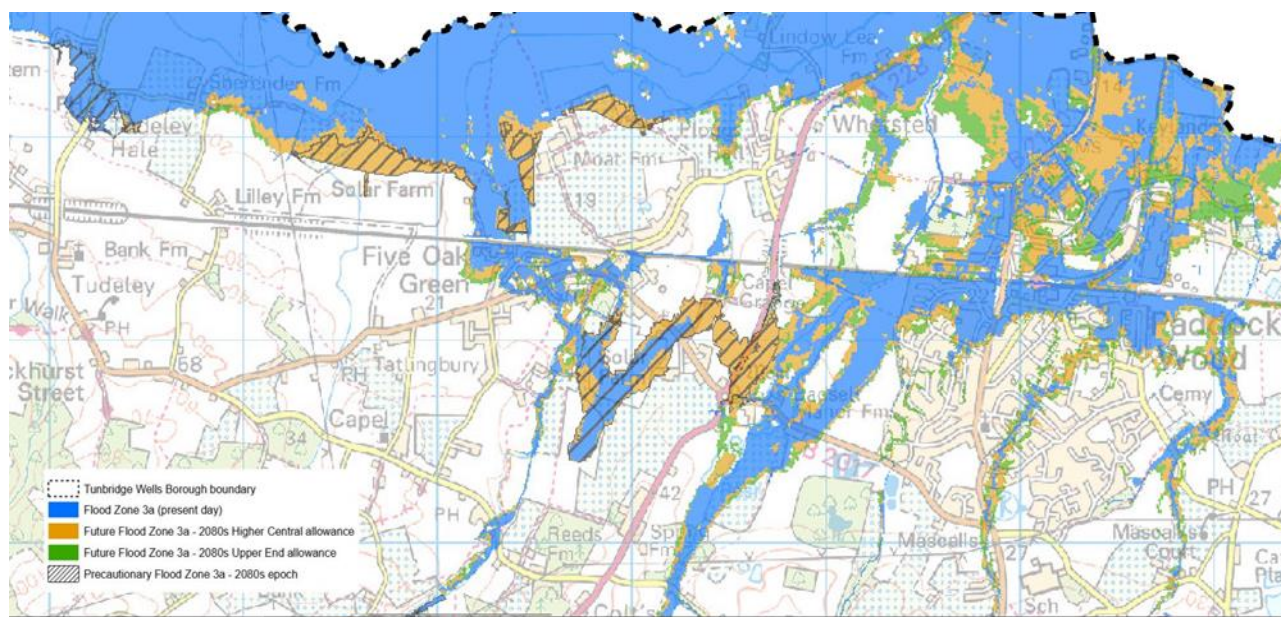


Figure 8 - SFRA Flood Map Projection

- 10.8 This map is un-defendable as it appears to show no detailed modelling. All that it appears to have happened is that the lower risk areas have been “upgraded” to higher risk areas in certain areas. That is not modelling.
- 10.9 It also does not take into account the cumulative effects of surface run-off and groundwater flooding (see below).
- 10.10 All current climate change models strongly indicate that, while summer droughts will be more prevalent, storm events will be more common and stronger, as well as winters being milder and wetter. Both of these factors will mean that flooding events are likely to be more frequent and have a greater magnitude. At the moment, it is not entirely clear what new flood water levels will be: modelling a specific drainage basin's response to an increase in supply is difficult, as there are often too many variables. However, it is clear that even the conservative estimates of between 35% (by 2030) and 70% (by 2080) show increases in precipitation that are likely to be under estimations. This will have an impact on the long term sustainability of both of the Capel development sites.
- 10.11 **Surface Water flooding:** Climate change is predicted to increase rainfall intensity in the future by up to 40% (for the Upper End estimate to the 2080s epoch (2070 to 2115)) under the new range of allowances published by the Environment Agency. This will increase the likelihood and frequency of surface water flooding, particularly in impermeable urban areas, and areas that are already susceptible. Changes to predicted rainfall should be incorporated into flood risk assessments and drainage and surface water attenuation schemes associated with developments.
- 10.12 **Groundwater flooding:** The effect on groundwater flooding problems, and those watercourses where groundwater has a large influence on winter flood flows, is more uncertain. The updated climate change guidance released in February 2016 does not provide information on expected changes to groundwater flooding under future climate change. However, milder wetter winters may increase the frequency of groundwater flooding incidents in areas that are already susceptible. Where groundwater flooding is expected to influence a development site, it will be expected that consideration of groundwater flooding under a changing climate is assessed and measures taken to mitigate any change in risk.
- 10.13 **Guidance:** The NPPG contains information and guidance for how to identify suitable mitigation and adaptation measures in the planning process to address the impacts of climate change. In addition, assessments are required to demonstrate future implications of climate change have been considered, and risks managed where possible, for the lifetime of the proposed development:
- Considering future climate risks when allocating development sites to ensure risks are understood over the development's lifetime

- Considering the impact of and promoting design responses to flood risk and coastal change for the lifetime of the development
- Considering availability of water and water infrastructure for the lifetime of the development and design responses to promote water efficiency and protect water quality
- Promoting adaptation approaches in design policies for developments and the public realm, for example, by building in flexibility to allow future adaptation if needed, such as setting new development back from watercourses
- Identifying no or low cost responses to climate risks that also deliver other benefits, such as green infrastructure that improves adaptation, biodiversity and amenity, for example by leaving areas shown to be at risk of flooding as public open space.
- Consideration of the vulnerability of the proposed development types or land use allocations to flooding and directing the more vulnerable away from areas at higher risk due to climate change.
- Use of 'built in' resilience measures. For example, raised floor levels.
- Capacity or space in the development to include additional resilience measures in the future, using a 'managed adaptive' approach.

The last consideration acknowledges that there may be instances where some flood risk management measures are not necessarily needed now but may be in the future. This 'managed adaptive' approach may include, for example, setting a development away from a river so it is easier to improve flood defences in the future.

- 10.14 **Sea levels:** BBC News (25-Sep-19) highlighted a scientist's prediction of sea level increases of up to 1.1 metres by the mid 2000's.

It is also very clear (from someone who has worked on climate change models), that the SFRA models and the long-term models in this report are very seriously underplaying the impact of climate change - especially as the ice-cap data from the North-Atlantic Ice reservoir indicates that we are almost certainly looking at something a lot more severe.

In a recent study on Greenland ice-caps (sadly, at the moment, unpublished), a figure of an 8 metre rise in sea-level was considered to be conservative.



- 10.15 **Planning:** Climate change is a serious worldwide problem, with far reaching consequences, and the Draft Local Plan fails to demonstrate that it has fully addressed the current understanding of the impact of climate change:

- The Local Plan policies, e.g. Policy EN 5, lack any detail or clarity and should be far more robust.
- NPPF 14 Meeting the challenge of climate change, flooding and coastal change:

The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

- Planning for climate change:

Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long- term implications for flood risk and coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure.

- 10.16 So far, the local plan demonstrates the complete reverse of the NPPF Climate Change Policies;

- 10.17 Greenhouse gas and Carbon emissions will increase substantially over the development period, with the large number of HGV's, and various construction machinery accessing the sites, as well as the local road network.

- 10.18 In addition, the proposed quarry extension at Stonecastle Farm, and additional quarries at the adjoining Moat Farm, will all have a detrimental effect on local air quality and increased carbon emissions.

11 : PW1 CAPEL EAST DEVELOPMENT

11.1 Draft Local Plan: The proposed development of Paddock Wood in the Draft Local Plan is listed as *Policy AL/PW1 Land at Capel and Paddock Wood*. Land to be allocated under this policy falls within both the parishes of Capel and Paddock Wood. Sites which lie outside the allocation(s) at present may be included in the Regulation 19 Pre-submission version of the Local Plan.

11.2 This site, as defined on the Policy Map, is allocated for:

1. The provision of approximately 4,000 new dwellings and a three pitch (one mobile home and one touring caravan per pitch) gypsy/traveller site on this land and in Paddock Wood Town Centre (AL/PW2);
2. Additional employment provision, including expansion of Key Employment Areas (B1/B2/B8 uses);
3. The provision of an enlarged Mascalls Secondary School and additional primary schools;
4. The provision of a new medical centre;
5. The provision of open space, youth and children's play and sports facilities (including a new outdoor sports hub) and recreational facilities as well as areas of natural and semi-natural green space and allotments/food growing.

11.3 Flood Policy Statement AL/PW1 Land at Capel and Paddock Wood: The development on the site should demonstrate that it will not exacerbate flooding elsewhere in the vicinity and through the provision of flood storage, attenuation/mitigation areas (including those outside the allocations) to substantially reduce the flood risk to particular existing residential areas in Paddock Wood, and potentially at Five Oak Green. This is one of the key justifications for the release of Green Belt land.

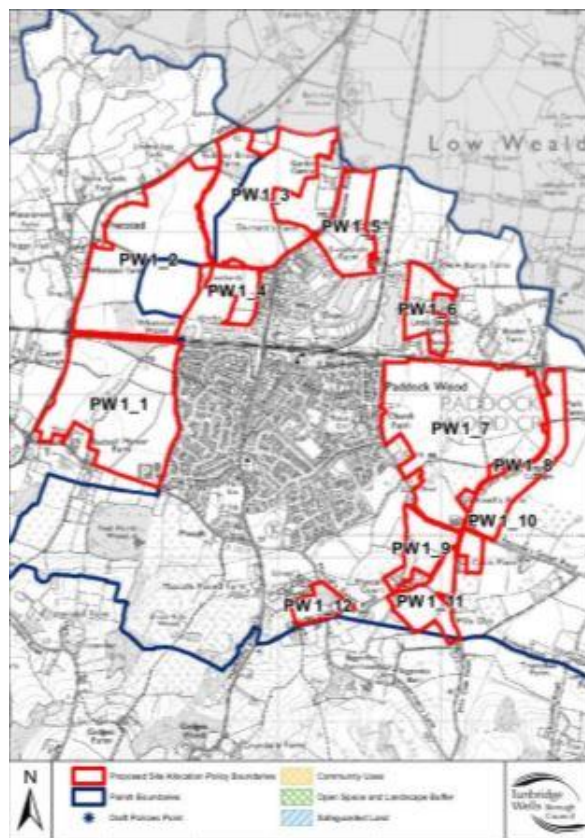


Figure 9 - Map 40 Policy AL/PW1

11.4 Focus: This report is focussed on the allocations within Capel Parish (sites PW 1-1 and PW 1-2 on the above map) and the effect on existing local communities and surrounding areas. Herein referred to as PW1 Capel East.

11.5 Strategic Flood Risk Assessment (SFRA)

11.6 The SFRA prepared by JBA for the Paddock Wood area has established that a large section of the proposed allocations are within Flood Zone 3. Development in Flood Zone 3a is significantly constrained by flood risk. Highly Vulnerable development is not permitted within this zone and More Vulnerable development and Essential Infrastructure are only permitted if the Exception Test can be passed.

11.7 Exception Test: Local Authorities are guided to adopt a precautionary approach to the issue of flood risk, avoiding such risk and managing it elsewhere. An Exception test is applied when it is not possible to locate development in zones with a lower risk of flooding.

The Draft Local Plan appears to fail the test as it does NOT steer new development to areas with a lower risk of flooding, and has not put forward obvious safer sites.

11.8 It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and:

- a) A site-specific Flood Risk Assessment must demonstrate that the development will be safe for its lifetime, taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall
- b) It should be demonstrated that flood defences provide an acceptable standard of protection, including an allowance for climate change for the lifetime of the development.
- c) Residual risks should be assessed, and the Environment Agency consulted regarding whether there is a need for a breach analysis to map a rapid inundation zone.

- d) The layout of buildings and access routes should adopt a sequential approach, steering buildings towards areas of lowest risk within the site. Where rapid inundation zones have been identified, development should be avoided in these areas.
 - e) Development should not impede flow routes, reduce floodplain storage or consume flood storage in a 'flood cell' within a defended area. If the development does result in a loss of storage, compensatory floodplain storage should be provided on a 'level for level' and 'volume for volume' basis.
 - f) If existing defences are to be upgraded as part of the development, an assessment should be undertaken to ensure it does not result in an increase in flood risk elsewhere.
 - g) Development design should incorporate mitigation measures, to manage any flood risk to the development, including residual risk for the lifetime of the development. FFLs should be above the 1 in 100-year (1% AEP) flood level, plus an allowance for climate change.
 - h) It is recommended that all types of new development behind flood defences is avoided, where possible, due to the residual risks of breach and overtopping
 - i) Consideration should be given to the type of building that will be permitted, for example single-storey buildings and basements should be avoided.
- 11.9 The plan does not demonstrate that the proposed development at Capel East will provide wider sustainable benefits that outweigh flood risk, nor that it will be "safe for its lifetime". The sustainability of any residential development should be considered over a minimum of 100 years. Therefore, the plan does not justify that this site, in such a location that requires measures to mitigate its flooding risk on a floodplain, will not flood in its lifetime, especially with the climate change uncertainties that must be taken into account (see section 10).
- 11.10 TWBC have not demonstrated how the proposed mitigation measures will ensure that the development will not cause flooding in the vicinity or further down river. The loss of flood water storage in the agricultural terrain and run-off/drainage from the buildings and hard surfaces will certainly increase the flood risk to all surrounding areas.
- 11.11 **Development Parcels:** Parcels within PW1 Capel East (1a-1b; 2a-2d) are separated by the railway line and comprise of a total of 114.5 hectares (280 acres) of undeveloped agricultural land. There are no formal drainage systems or any formal flood defences within or upstream of the parcels. See map below (Figure 10).
- 11.12 Ground levels slope from south/southwest to north/northeast. The largest watercourse through parcel 1 is Tudeley Brook, which enters the parcel in the south, before bifurcating into two streams that exit the parcel through separate culverts under the railway line. There is a smaller overland flow route in the southwest of the parcel that joins Tudeley Brook at the bifurcation, as well as an easterly overland flow path that joins a channel running along the east of the parcel.
- 11.13 An unnamed ordinary watercourse flows along the western boundary of parcel 2. This bifurcates and a branch of the watercourse flows through to the centre of the parcel before then flowing in a northerly direction. A further unnamed tributary flows into this watercourse from the south to the west of Whetsted Wood. Tudeley Brook flows along the eastern boundary of the parcel in a northerly direction.
- 11.14 **Flood risk (present day):** There are localised areas within Flood Zone 3b (functional floodplain), predominantly adjacent to Tudeley Brook and other minor watercourses, and in the east of Parcel 2.
- 11.15 Larger areas of land are designated Flood Zone 3a and these occupy much of the north of parcel 1, which appears to be exacerbated by flood water accumulating behind the railway embankment, as well as surrounding the easterly overland flow route and west of Tudeley Brook. Also, large areas of Parcel 2 are Flood Zone 3a, most notably in the north and east with localised areas to the west near the watercourses.
- 11.16 Fluvial flood risk is associated with the network of drains and ordinary watercourses as well as Tudeley Brook. These watercourses convey water from the hills to the south of the parcel and ultimately onward into the River Medway.
- 11.17 Surface water flood pathways generally align with the fluvial network, although rain falling directly on the parcel causes localised ponding of flood water.
- 11.18 Large areas of the north/north-west of parcel 2, and southern parts of Parcel 1, are susceptible to groundwater flooding.
- 11.19 **Flood risk (climate change):** The following mapping (Figure 10) displays the change in peak flood depths for the 1% AEP (+70% flows) event when the flood depths for the 'with development' model simulation are subtracted from the 'SFRA baseline' (no development at the parcel).

11.20 49% of the proposed area PW1 Capel East is at risk of fluvial flooding (67% of Parcel 1 and 33% of Parcel 2).

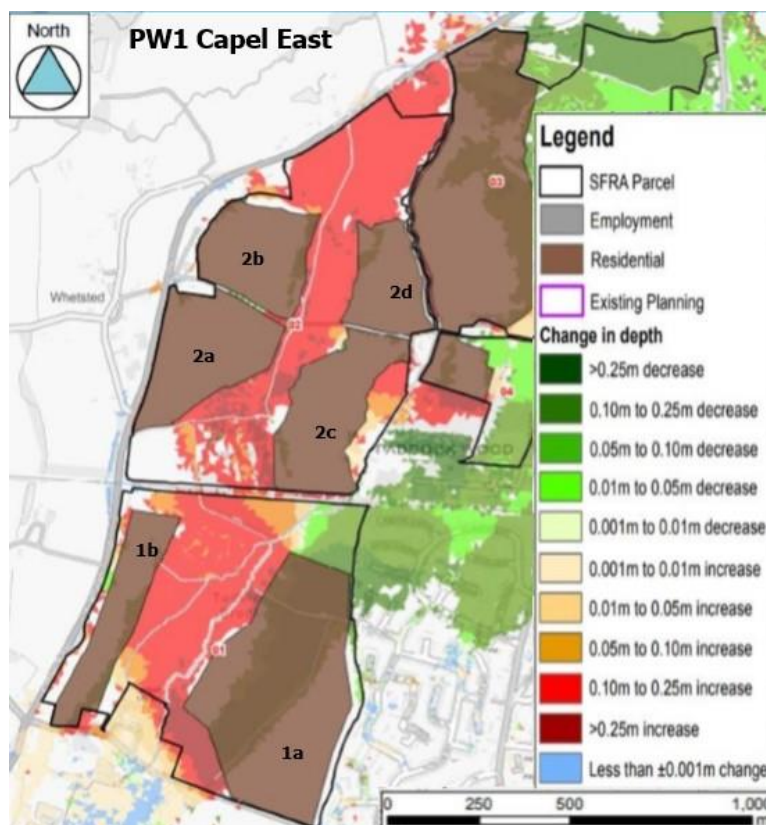
11.21 Flood risk increases, with changes in flood depth of up to +0.25m are typically predicted through the open space areas, although a portion of Parcel 1 has changes in peak flood depths greater than this predicted.

11.22 Flood depths across the railway line are predicted to increase. Flood depths and extents to the north of the railway line also increase, with some areas increasing by >0.25m.

11.23 The most influential factor predicted to change flood risk is residential area 1a and the impact this has on flood flow pathways.

11.24 This residential area potentially impedes the north-easterly flow of flood water, resulting in the deflection of water westward through the centre of the parcel and northward beyond the railway line.

11.25 The position of proposed development 2c is also influential, deflecting water eastward into Paddock Wood.



11.26 Flood Risk Management

Figure 10 - PW1 Parcels Map

11.27 Measures recommended by the SFRA to mitigate the impact of development and manage flood risk in the Capel and Paddock Wood area include:

11.28 **Floodplain:** The SFRA states “Compared to flood defences and flood storage, floodplain restoration represents the most sustainable form of strategic flood risk solution, by allowing watercourses to return to a more naturalised state, and by creating space for naturally functioning floodplains working with natural processes”.

11.29 This strategy has been understood in environmental science for years. However, the proposed development of PW1 on the floodplain is in direct contrast with the policy of using the Sequential approach of locating development away from watercourses. The opportunity to restore floodplain in previously developed areas is extremely limited.

11.30 Even re-wilding the flood plain would not protect the areas from surface water, drainage, and groundwater flooding together with the risks of sewage system failures and reservoir breaches.

11.31 **Flood defences:** There is a proposed defence that would extend from residential area 1a to the railway line, and aims to reduce the risk of flood water from Tudeley Brook along this eastward flow route. This would need to be considered in combination with other measures to help manage changes in flood risk.

11.32 When the defence is assessed, flood risk increases notably within Parcel 2, given the increase in flows across the railway line onto the north of the parcel. Flood risk also increases to the north of the parcel and in the area immediately east of proposed development 2c.

11.33 It is difficult to see how any effective further flood defences could be put in place within PW1 Capel East given that most of the flooding is simply caused by rain falling on the site faster than it is able to be absorbed due to the nature of the soil. Some water may flow onto the site from adjacent areas but to block this would result in unacceptable problems for those areas.

11.34 **Increased conveyance:** When the conveyance measures are assessed there remains increased flood depths predicted within Parcel 1 and to north of the railway line. Increased channel conveyance/new channels are predicted to provide only marginal flood risk benefits at a more localised scale rather than strategic benefits.

11.35 There also remains increased flood depths predicted across the majority of Parcel 2 and to the north.

11.36 **Sustainable drainage systems (SuDS):** These systems aim to alleviate surface water flooding by storing or re-using surface water at source. As surface water flows through the system, flow velocity to watercourses is controlled and pollutants are removed.

11.37 The SFRA states *“Investigations will be required to evaluate whether infiltration SuDS are a feasible option. Drainage can utilise the existing watercourses within the parcel, and ditches and surface water sewers that may be present around existing development”*. This statement of “feasibility” directly contradicts regulatory guidance and extensive SuDS initiatives must be considered in relation to the raised floor level requirements:

- Planners should be aware of the conditions set by the LLFA (KCC) for surface water management and ensure development proposals and applications are compliant with the policy.
- SuDS should be promoted (and implemented) on all new developments to ensure the quantity and quality of surface water is dealt with sustainably to reduce flood risk. On substantial development sites consideration should be given to the integration of sustainable water management with the provisions for green infrastructure within urban areas.

11.38 The raised levels (see below) facilitate the construction of containment tanks and other SuDS initiatives that should be included in the masterplanning. Comprehensive SuDS are required to mitigate the flood risk of the development on this fully functional floodplain and to ensure pre-treatment of contamination risk prior to infiltration.

11.39 **Strategic Storage:** The potential strategic storage parcels considered as part of the SFRA are positioned upstream of Parcel 1 on land within Capel Parish (see Figure 11) on Tudeley Brook - in order to reduce peak flow of flood events by reducing flood depths within Paddock Wood.

11.40 Location 1 provides most opportunity for meeting the storage volume requirements (max storage 680,000m³). However, the area identified and maximum storage level/volumes would mean that development would not be possible at the Parcel 1 site and the PW1 plan would not be deliverable.

11.41 Location 2 (max 130,000m³) provides slightly greater other potential for flood storage and therefore reduction in flows. It is also further downstream so would capture greater volumes of run-off compared with location 3.

11.42 At location 3 (max 90,000m³), it is identified that greater storage volumes may be possible if the maximum storage could be increased.

11.43 It was agreed with the council that locations 2 and 3 should be considered in combination for model testing as part of the SFRA. However, there remains a localised increase in flood risk at the southern end of the parcel 1 due to reflection of flood water.

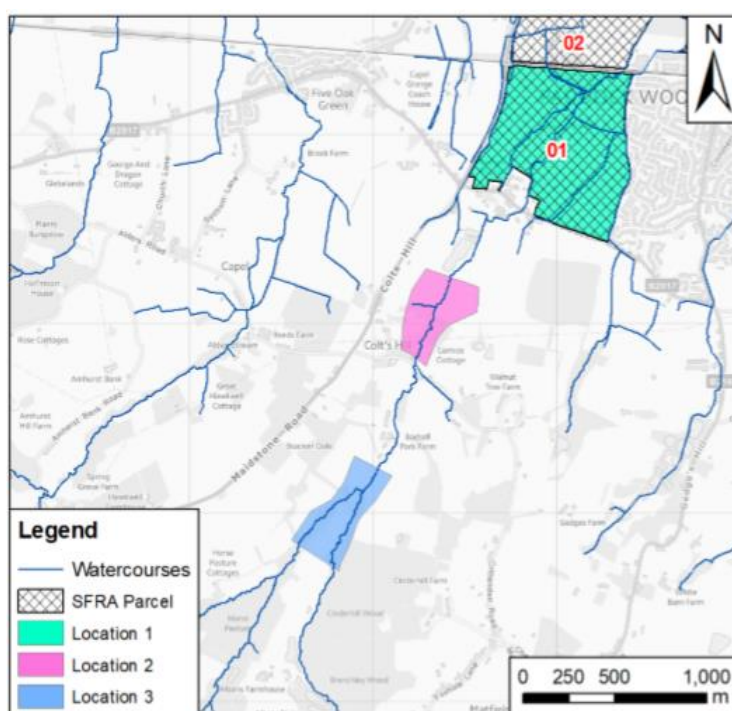


Figure 11 - PW Strategic Storage Sites

11.44 These proposed measures would probably be categorised as Reservoirs under the 1975 Act and Flood and Water Management Act, so would need to be designed, constructed and maintained accordingly. The required land parcels for this storage have not yet been safeguarded, as confirmed by TWBC Head of Planning (12-Nov-2019).

11.45 **Raising levels:** The raising of occupied floors of buildings above ground level so that a relatively unobstructed flow route under buildings may substantially reduce flood depths. The raising of floor levels within a development also avoids damage occurring to the interior, furnishings and electrics in times of flood:

11.46 • Finished Floor Levels (FFLs) should be set to the higher of a minimum of 600mm above the 1 in 100-year (1% AEP) plus climate change peak flood level, or 300mm above the general ground level of the site. This additional height is referred to as the “freeboard”. Additional freeboard may be required to account for risks such as blockages to the channel, culvert or bridge, reservoir breaches, and the uncertainty in the predictions.

11.47 The SFRA states *“This measure was not implemented as it was agreed with the council that it would be unlikely to be deliverable given the scale and type of development being proposed”*.

11.48 There have been several relevant developments recently in Capel where the EA has insisted on raised floor levels and containment (tanks, swales, etc.) with restricted discharge. In some cases, the EA have specified the inclusion of voids below the raised ground floor level to allow flood water to run and lay below the ground floor accommodation, including bedrooms.

11.49 Given the nature and likely EA requirement of these being compulsory measures within the development, it follows that the PW1 plan is not likely to be deliverable as stated by TWBC. Several points are relevant to the need for raising the levels of the developments:

- The SFRA understates the impact of climate change over the >100 year horizon for residential development
- The dwellings would need to be protected from a potential breach of the new reservoirs
- These parcels are most affected by surface water and groundwater flooding
- The wealth of guidance on flood risk and climate change (see sections 4 and 10)
- Occupiers (and insurers) are imposing more stringent measures than the basic statutory requirements
- The existing agricultural ditches and watercourses have been in place for centuries and are not designed to accommodate the run-off and drainage from this proposed level of development
- Flooding risk resulting from the construction of buildings, roads, driveways, and other impermeable areas would not be materially affected by the raising of these levels. The EA are likely to prefer these measures.
- The raising of the levels would facilitate the incorporation of storage tanks and other SuDS (see above)
- Strategic drainage flows and watercourses can be accommodated within the freeboard

11.50 Therefore, the plan is not sound as it has not properly addressed the measures necessary to mitigate the flood risk from the PW1 Capel East development.

11.51 Increased Flood Risk

11.52 Our principle objections to the Policies STR/PW1 & AL/PW1 CAPEL EAST are that the proposed development will increase the flood risk both within the development and to the existing communities in Paddock Wood, Five Oak Green, and the surrounding areas.

11.53 The SFRA prepared in support of these policies is not fit for purpose because it does not adequately quantify the flooding risk, does not include comprehensive flood mitigation measures, and does not provide detailed specifications of those measures that have been included:

- These development proposals are very reliant on additional storage capacity at Leigh and do not provide any contingency plans should there be a repeated breach. The planned further storage capacity upriver at Leigh will increase river flows down river when under stress causing significant risk to human life.
- The impact of climate change has not been adequately assessed over the >100 year horizon and appropriate cautionary allowances have not been made.
- The parcels are not currently protected by formal flood defences and the SFRA admits that the development will cause increased flood risk. Given that the proposals remove so much floodplain storage by building on it, then the contradiction should be fairly obvious. There is also an admission that other areas 2 - 12 can only be seen as "not influencing flooding" if they are considered in isolation. That is a seriously weak fudge.
- Given that, for the majority of the sites, flooding from the Medway is mostly irrelevant, the Leigh Barrier should be discounted as effective mitigation for these sites - as are widening the Medway, etc.
- Loss of floodplain connectivity within rural upper reaches of tributaries which flow through/around the development site is likely to increase flooding.

The SFRA does not conclude that the limited mitigation will eliminate future flood risk or provide evidence of 'betterment' to the existing residential areas.

11.54 The above policies are inconsistent with Policy EN 1 : Water/Flooding:

1. *Ensure there is adequate drainage provision. This will ensure that the surface water is appropriately controlled within the development site, flood risk is managed on-site and off-site, and any existing flood risk, in the locality is not exacerbated: and*
2. *Avoid inappropriate new development within areas at risk from flooding, or mitigate any potential impacts of new development within such areas whereby mitigation measures are integral to the design of the buildings.*

Development/removal of this part of one of the UK's largest floodplains is not appropriate and the presented plan does not provide the necessary justifications for the release of Green Belt land.

11.55 It is extremely concerning that TWBC have not provided sufficient evidence and assurances that the identified sites, situated in a well-documented flood vulnerable area, will be protected and are prepared to ignore NPPF guidelines, and local community concerns, in pursuit of achieving their housing targets.

12 : CA1 TUDELEY DEVELOPMENT

12.1 **Draft Local Plan:** The proposed development of Tudeley in the Draft Local Plan is listed as *Policy STR/CA1* with the following requirements:

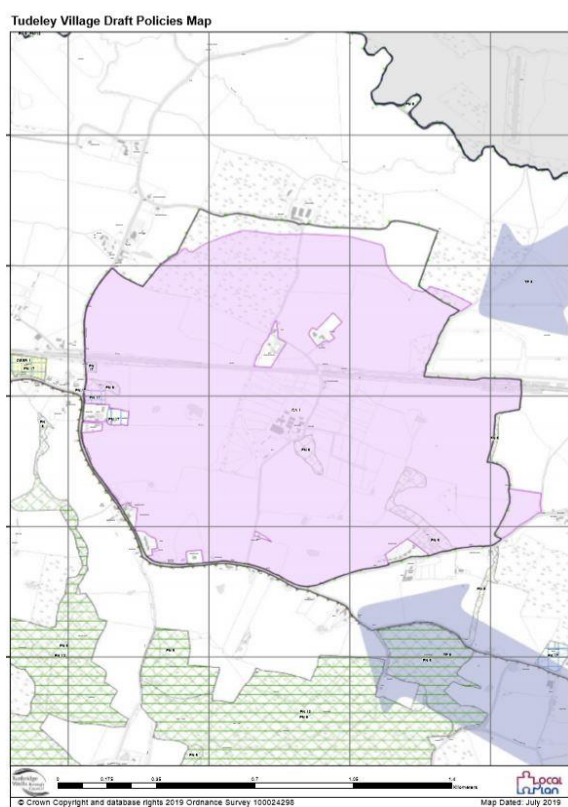


Figure 12 - CA1 Tudeley Policies Map

1. The provision of a standalone garden settlement (referred to as Tudeley Village) of 2,500-2,800 dwellings, together with appropriate employment, including retail provision, within the settlement. This shall be developed using a comprehensive masterplanning approach;

2. The delivery of a new secondary school to the west of Tudeley Village (and to the east of Tonbridge);

3. The provision of a new primary school within Tudeley Village and the expansion of Capel primary school;

4. Together with land outside of Capel parish on the northern, eastern, and southern sides of Paddock Wood, and within the town centre, a proportion of approximately 4,000 new dwellings and associated education, leisure, and health facilities to be delivered (on the wider allocations);

5. The provision of flood storage/attenuation/mitigation areas to reduce the flood risk to particular existing residential areas in Five Oak Green and Paddock Wood;

6. Strategic transport links shall be provided between Tonbridge, Tudeley Village, the A228, Five Oak Green, Royal Tunbridge Wells/Southborough, and land at Capel and Paddock Wood and Paddock Wood Town Centre. To include the provision of an offline A228 strategic link. Links from Tudeley Village to the east should minimise the impact on the road network in the settlement of Five Oak Green and have

regard to Kent County Council minerals allocations in the vicinity. The exact location of such a link has not been determined;

7. Strong green infrastructure must be provided to tie in new development with the surrounding landscape. Multi-functional green infrastructure (green wedges) to be integrated with drainage and flood defence measures;

8. Additional housing may be delivered through the redevelopment of appropriate sites and other windfall development inside the defined Limits to Build Development of Five Oak Green;

9. Tudeley Village and land at Capel and Paddock Wood will both require the release of Green Belt land.;

10. Furthermore, the northern part of the site allocation for employment at Land adjacent to Longfield Road (Policy AL/RTW12) (which predominantly comprises land indicated as Open Space and Buffer and will not include built development on it and therefore will not be released from the Green Belt), also lies within Capel parish;

11. Zero and low carbon energy production to be considered during early design stages and incorporated to provide an exemplar scheme;

12. Where a site is within the AONB, it should be demonstrated that the proposal will make a positive contribution towards achieving the objectives of the most recent AONB Management Plan and show how relevant guidance from the AONB Joint Advisory Committee has been considered to meet the high standards required of the other policies in this Plan for the High Weald AONB landscape;

13. Sites outside the AONB but within the High Weald National Character Area, or close to the boundary of the designated AONB landscape, will have similar characteristics and are likely to contribute to the setting of the designated landscape. The AONB Management Plan and any supporting guidance will be a material consideration for these sites.

12.2 **Flood Policy Statement AL/CA1 Tudeley:** The provision of flood storage/attenuation/mitigation areas to reduce the flood risk to particular existing residential areas in Five Oak Green and Paddock Wood;

- Contributions will be required for flood storage/attenuation/mitigation;

- the masterplanning for this site be linked with the strategic delivery of infrastructure, including in relation to surface water, multiple benefit Sustainable Urban Drainage Systems, foul water, etc.;
- the development on the site should demonstrate that it will not exacerbate flooding elsewhere in the vicinity, particularly from the Alder Stream at Five Oak Green, and that as part of the wider delivery the development delivers storage/attenuation/mitigation, to reduce the flood risk to particular existing residential areas in Five Oak Green. This is also one of the justifications for the release of Green Belt land;
- regard should be given to the Groundwater Source Protection Zone which falls within the north of the site and the Environment Agency should be consulted on any planning applications coming forward.

12.3 Strategic Flood Risk

12.4 Whilst we acknowledge the SFRA report on Paddock Wood, there is no such assessment for CA1 Tudeley. This is despite the Policy Overview stating *"Flood Zones 2 and 3 in northern part of Tudeley"*. It is well known that many parts of this site are regularly subjected to flooding, as demonstrated in this report.

12.5 Given the absence of information regarding the development parcels within the allocation, unlike PW1 Capel East, the consideration of Policies EN26-EN29 covering Water Resources, Drainage and Flood Risk cannot be adequately made. A full SFRA, with parcel analysis, for the proposed site CA1 is required for several reasons, including:

- The northern section of the proposed development CA1 includes areas within the floodplain as shown in the EA current flood risk map (Figure 6) even before any adjustment for climate change.
- There is no assessment of the effects of this proposed development on the surrounding communities located along this flood plain.
- The increased risk of flash flooding from surface water given the vast amount of lost agricultural land.
- Run-off from developments, including roofed and paved surfaces.
- The specification of adequate SuDS to mitigate the flows and filter contaminated run-offs.
- The site is already at risk from extensive surface water flooding (Figure 13 below).
- The assessment of the impact of climate change on local and wider areas.

12.6 The EA map below shows the likelihood of surface water flooding, and is a general indicator of an area's flood risk but does not include flood risk from sources such as blocked drains and burst pipes.

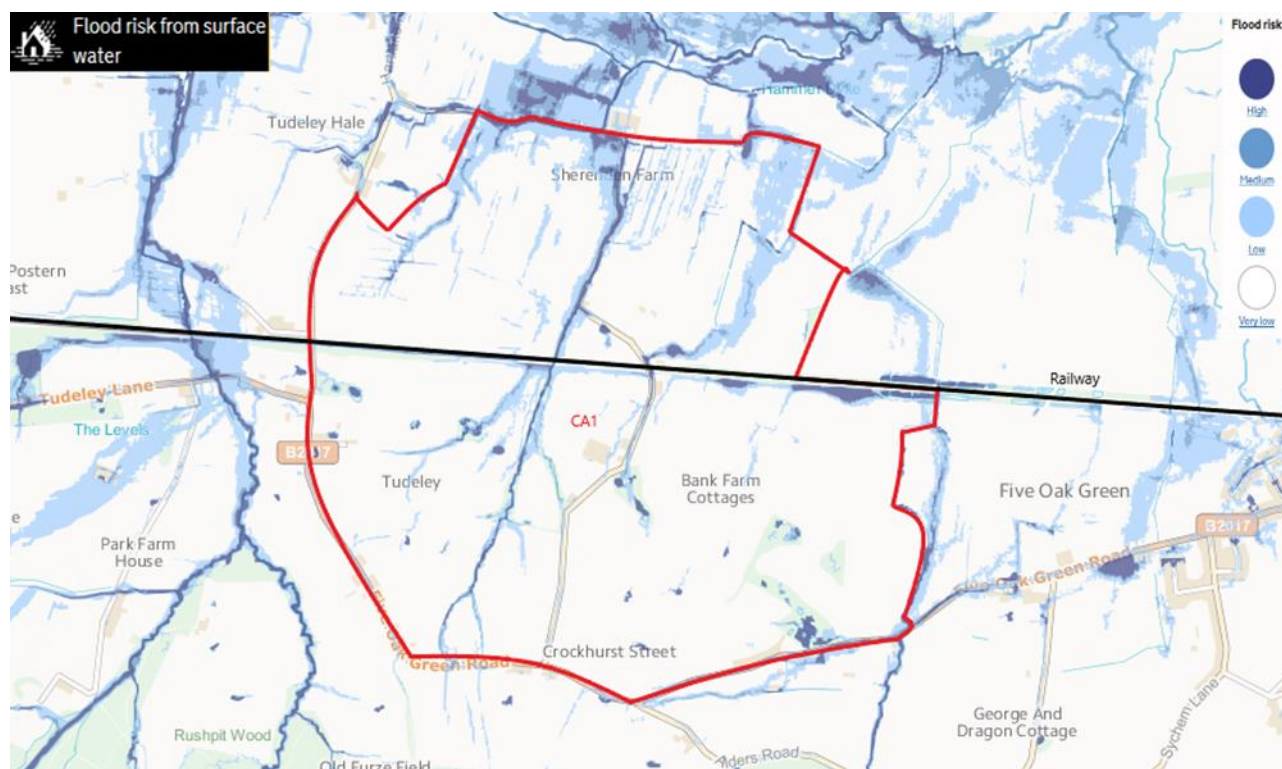


Figure 13 - EA Surface Water Map

12.7 The area proposed for removal from the Green Belt designation is shown in red outline. This surface water map confirms the existence of several flow routes that dissect the site, particularly in the northern parcel, and is supported by extensive flood history (see section 3).

12.8 **Railway**

12.9 The site is divided by the South Eastern Main Line and both the CA1 Policies and Infrastructure Plan do not include any explanation of how the two main parts of the “garden village” will be connected. The location of these developments would lead to significant noise and other pollution problems. Also, a bridge(s) over the line will need to be built to connect the two halves of the proposed village. The specification would undoubtedly be required to be high enough to allow for possible future conversion of the line to overhead power cables.

12.10 There is currently only one small bridge under the line to allow access for farm vehicles and the small number of 14 dwellings along Sherenden Road in the central portion. However, this is frequently flooded in the winter months and regularly throughout the year. The possibility of solving the problem with a level crossing is almost certainly to be rejected given how busy the rail line is and how much road and pedestrian traffic there would be using it. A new station at Tudeley has been refused by Network Rail.

12.11 There are a number of existing culverts running under the Railway line. These would need to be regularly maintained to prevent flooding. It is likely that additional culverts will be necessary but these will need to consider flood risk and water flows on to the northern section in particular.

12.12 **Increased Flood Risk**

12.13 The geology, topography, and hydrology of the CA1 Tudeley site has been explained earlier in this report (sections 1, 2 and 6). The area to the north of the railway is much lower and the water flows are broadly south to north. The railway embankment provides some restriction and banking of water, particularly at the eastern section.

12.14 This area of approximately 375 acres of substantially undeveloped agricultural land already sends vast amounts of water northwards to the fully functional floodplain and aquifers. The scale of the proposed development would mean that extensive flood mitigation measures are needed due to the substantial increase in flood risk (see below):

- Substantial run-off from the construction of buildings, roads, driveways, and other impermeable areas
- Restriction of the existing agricultural ditches and watercourses that have been in place for centuries which are not designed to accommodate the run-off and drainage from this proposed level of development
- Loss of floodplain connectivity within rural upper reaches of tributaries which flow through/around the development site
- A large proportion of existing vegetation would be destroyed - trees, wooded areas, hedges, surface vegetation and crops. This vegetation absorbs large quantities of water during active growing periods significantly reducing the ground water level ahead of the winter. Water volume and flood height will increase, e.g. a single mature Oak tree can absorb 100,000 gallons of water from the ground each year (Building Research Establishment).
- Contamination risk from pollutants in run-off flows to the GSPZ aquifers at Hartlake and other watercourses.

12.15 **Flood Risk Management**

12.16 The Policies STR/CA1 & AL/CA1 TUDELEY do not provide any detail on how the proposed development will provide mitigation and merely state that this will be determined in masterplanning. This means that this plan cannot demonstrate that it is sound or deliverable. The flood policy statement is also unsound as it only includes Five Oak Green and Paddock Wood and does not consider the more immediate impacts on Tudeley residents nor the effects on East Peckham and further downstream from the barrier.

12.17 **Strategic Storage:** Many of the development proposals throughout the Draft Local Plan are very reliant on additional storage capacity at Leigh to provide flood mitigation and do not provide any contingency plans should there be a repeated breach. The planned further storage capacity upriver at Leigh will increase river flows down river when under stress causing significant risk to human life.

12.18 The masterplanning will likely include the construction of additional strategic storage facilities/reservoir(s) to restrict the water flows from the development. Whilst the location is unidentified, there are several relevant issues that need to be considered:

- The southern parcel (south of the railway) of the CA1 site does not directly benefit from the strategic storage at Leigh, given that the existing flooding here is from run-off from higher ground to the south, surface water, and watercourses that are downstream.

- The southern parcel comprises c. 250 acres of agricultural land (with 9 dwellings) and, given the sloping nature of the terrain (see Figure 14), the development would result in vast amounts of run-off that will descend towards the railway and eastwards across the Sherenden Road area. The railway embankment already acts as a buffer, particularly in the north-east, and this is also shown in the above surface water map.
- The design of strategic storage in the southern parcel would need to take account of the risk of a possible future breach and, in particular, its effect on the northern parcel. This also has implications for the build design and other mitigation measures (see below).

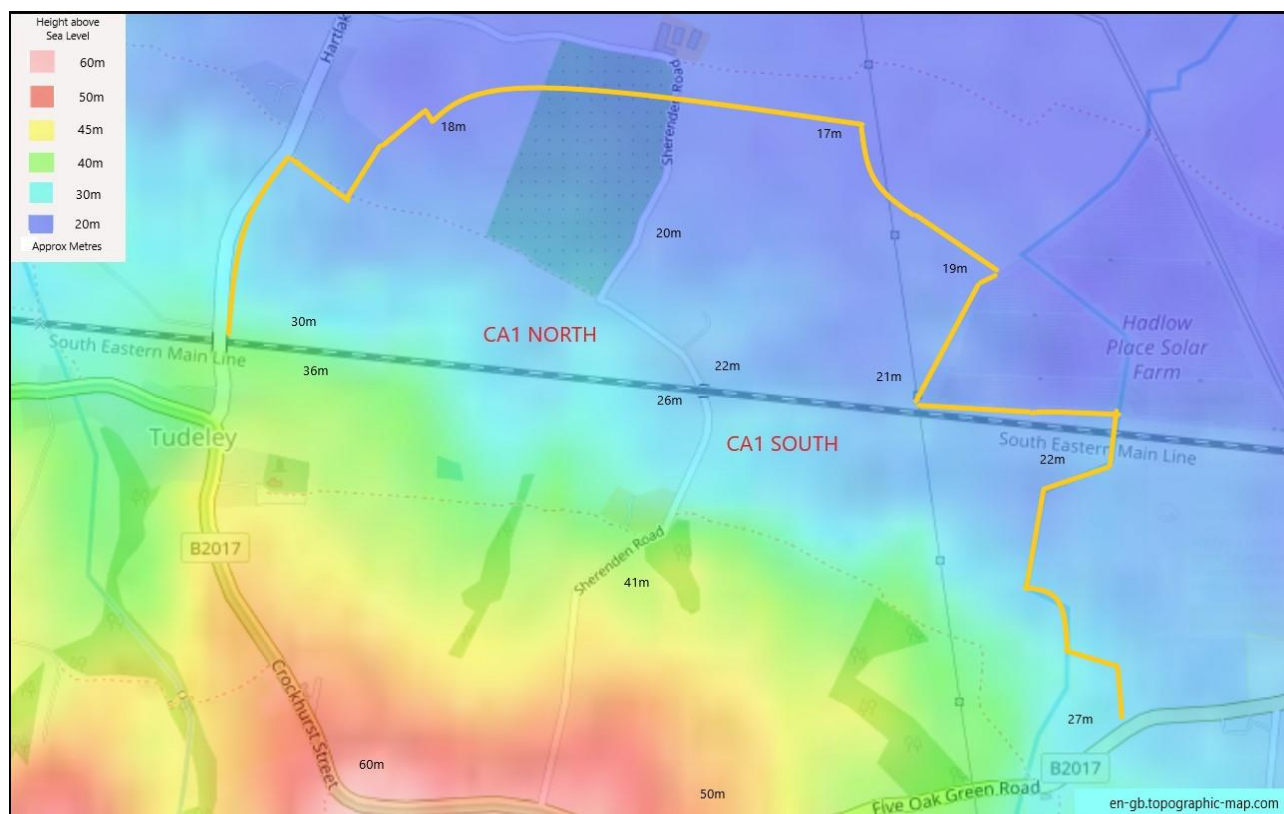


Figure 14 - CA1 Topographic Map

- Large areas of the northern parcel are already subject to risk from fluvial flooding of the Medway and, whilst the increased capacity at Leigh would provide some strategic mitigation, a repeated breach would cause increased flood levels compared to those in 2000 and 2013.
- The northern parcel comprises c. 125 acres of substantially agricultural land (with 5 dwellings) and is closely linked with the Medway floodplain. Given the relatively flat landscape, and closer proximity to the water table, any strategic storage for this parcel would need to be considered along with other extensive mitigation measures (see below).

12.19 Residual risk of any new reservoir(s) and potential flood defences (see below) should be understood and managed and maintenance arrangements (including funding mechanisms) will need to be evidenced for the lifetime of the development (>100 years) including appropriate allowances for climate change.

12.20 **Flood defences:** There are no formal strategic flood defences at these sites and it is important to understand the consequences if the design standard of any new defences is exceeded or if they fail.

12.21 It will need to be demonstrated that the defences will not have a resulting negative impact on flood risk elsewhere and that there is no net loss in floodplain storage that could cause flood water levels on adjacent land to be elevated.

12.22 **Increased conveyance:** There are a number of well-maintained and regularly dredged streams and ditches that exist on the proposed site. These are important both in allowing water from adjacent areas to pass through and providing water storage capacity. Robust sustainable provision will need to be made to ensure this capacity is sufficient to mitigate the increased flood risk from the proposed developments.

12.23 **Raising levels:** The raising of occupied floors of buildings above ground level so that a relatively unobstructed flow route under buildings may substantially reduce flood depths. The raising of floor levels within a development also reduces the risk of damage occurring to the interior, furnishings and electrics in times of flood.

- 12.24 Given the nature and likely requirement of these being compulsory measures within the northern parcel, and northern/eastern parts of the southern parcel (see Figure 14) in particular, the exact level of land raising is dependent on the predicted flood levels and the EA allowance for climate change. The building design must specify how the flood risk from ALL sources is adequately mitigated.
- 12.25 Finished Floor Levels (FFLs) should be set to the higher of a minimum of 600mm above the 1 in 100-year (1% AEP) plus climate change peak flood level, or 300mm above the general ground level of the site. Additional freeboard may be required to account for risks such as blockages to the channel, culvert or bridge, reservoir breaches, and the uncertainty in the predictions.
- 12.26 The raising of building levels facilitates the construction of containment tanks, and other SuDS initiatives, and strategic drainage flows and watercourses can be accommodated within the freeboard.



- 12.27 **Sustainable drainage systems (SuDS):** These systems aim to alleviate surface water flooding by storing or re-using surface water at source. As surface water flows through the system, flow velocity to watercourses is controlled and pollutants are removed. Regulatory guidance must be considered in relation to the raised floor level requirements:
- Planners should be aware of the conditions set by the LLFA (KCC) for surface water management and ensure development proposals and applications are compliant with the policy. SuDS should be promoted (and implemented) on all new developments to ensure the quantity and quality of surface water is dealt with sustainably to reduce flood risk. On substantial development sites consideration should be given to the integration of sustainable water management with the provisions for green infrastructure within urban areas.
 - The location of surface water attenuation storage or other forms of SuDS will impact the masterplan in terms of developable area, building design and access. In addition to the statutory planning requirements, building occupiers are increasingly aware of the potential for flooding to impact their operations. As a result, some major occupiers are imposing their own flood risk standards which are more stringent than the planning requirements.
 - Where an investor (and insurer) is considering an asset that satisfies the statutory requirements, this may not be sufficient to truly consider the potential for re-letting, with some occupiers being unwilling to compromise their own demanding flood standards.
- 12.28 Comprehensive SuDS are certainly required to mitigate the flood risk within the development and to ensure pre-treatment of contamination risk prior to infiltration to the fully functional floodplain and the aquifers.
- 12.29 Policies STR/CA1 & AL/CA1 have not identified the measures necessary to mitigate the flood risk within the development and the stated 'betterment' of flood risk to the existing residential areas would need to be evidenced with a suitable guarantee that would satisfy insurance underwriters.
- 12.30 This report has highlighted the many inconsistencies within the Draft Local Plan and, considering the evidence, it seems incomprehensible that the Council has not conducted a SFRA for CA1, unlike other identified flood vulnerable sites. The presented Plan is neither sound nor deliverable and does not provide the necessary justifications for the release of Green Belt land.

13 : SEWERAGE

13.1 Flood risk

13.2 Since 1980, the Sewers for Adoption guidelines have meant that most new surface water sewers have been designed to have capacity for a rainfall event with a 1 in 30 chance of occurring in any given year, although until recently this did not apply to smaller private systems. This means that, even where sewers are built to current specification, they are likely to be overwhelmed by larger events of the magnitude often considered when looking at river or surface water flooding (e.g. a 1 in 100 chance of occurring in a given year).

13.3 Existing sewers can also become overloaded as new development adds to the discharge to their catchment, or due to incremental increases in roofed and paved surfaces (urban creep). Sewer flooding is therefore a problem that could occur in many locations across the Tunbridge Wells Borough and more specifically in Paddock Wood.

13.4 In Five Oak Green, we are aware that some surface water finds its way into the foul system at times of elevated stress on the system overall. That is why some houses have had to be fitted with non-return valves under their bathrooms to prevent sewage coming up from the drains.

13.5 In Paddock Wood, the areas susceptible to sewer flooding are generally located from the allocated parcels in the plan which are predominantly in rural locations. One notable exception is the parcel to the west of Maidstone Road which is located adjacent to an area which has experienced at least six instances of sewer flooding.

13.6 Current Infrastructure

13.7 There is a single treatment plant that serves Capel, Paddock Wood, and surrounding areas which is located at Rhoden, Paddock Wood (see drainage map below). The total catchment area is approximately 3,600ha, with an elevation range of 7mAOD to 149mAOD and the sewerage system is primarily separate.

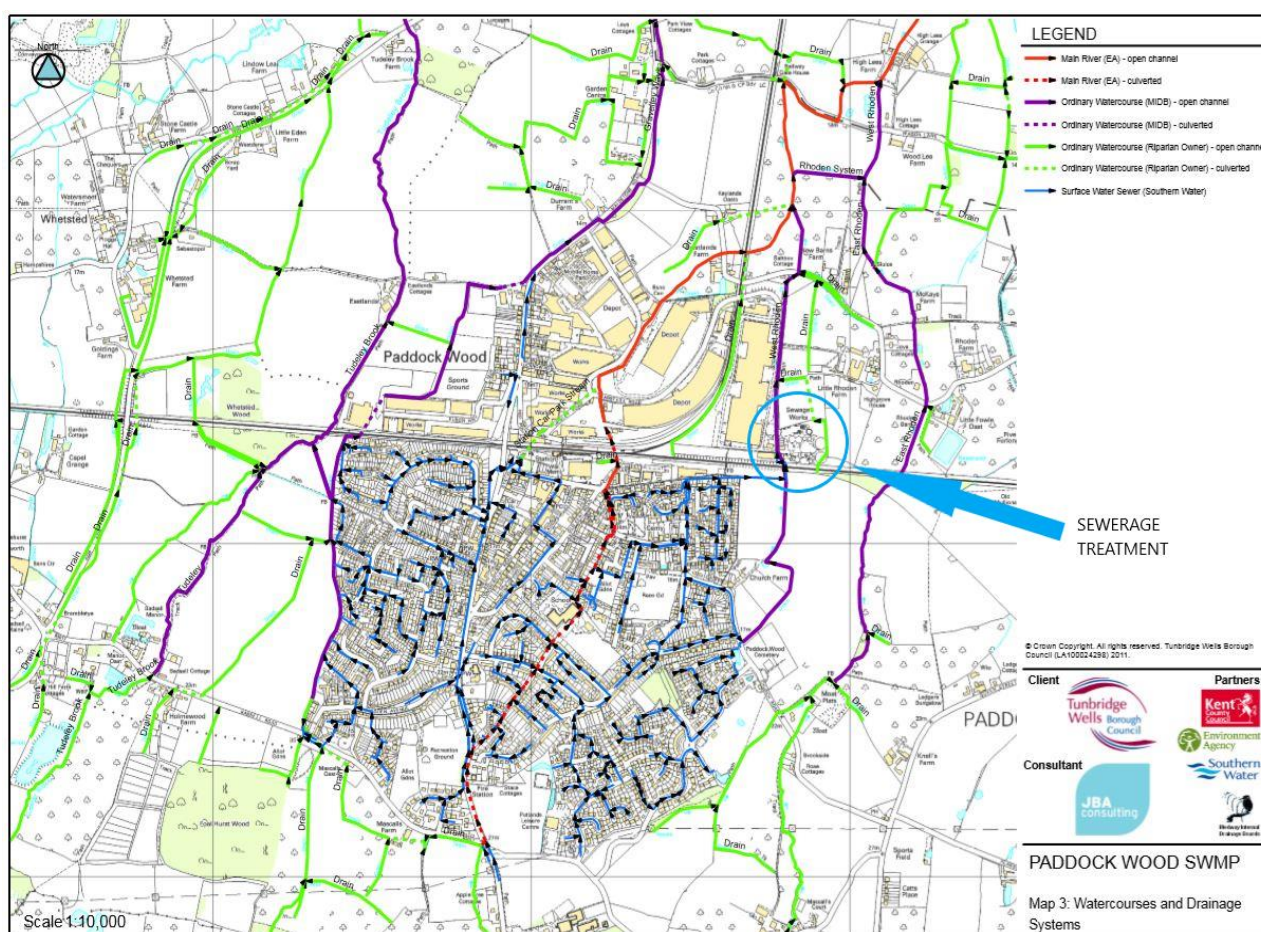


Figure 15 - Paddock Wood Drainage Map

13.8 The Paddock Wood foul drainage system is split into two distinct areas by Tudeley Brook. The western area comprises of the village of Five Oak Green and a number of hamlets and farms to the south, connected to the network by a terminal SPS. In Paddock Wood piped flows drain north east to two terminal SPS discharging to the treatment works.

- 13.9 The surface water drainage network follows the highway layout and discharges at a number of locations to the Rhoden Stream, Gravelley Ways Stream and Paddock Wood Brook. There are also surface water attenuation ponds predominantly located in the south of the town, for which Paddock Wood Town Council are responsible for.
- 13.10 Paddock Wood Brook passes through the urban area and is culverted for the majority of its length. There are two unculverted sections, one off Rowan Close and a section alongside The Cedars. The Gravelley Ways Stream is a narrow water course which borders the western extent of the town into which some of the urban runoff discharges.
- 13.11 Sewerage from Five Oak Green is pumped to the treatment plant at Paddock Wood by a pumping station situated between Oak Road and Larkfield. There is a catchment tank which can hold enough to give time to bring tankers if the station fails. Failure occurs on a regular basis due to plant failure, pipe failure both upstream and downstream or power supply failure (there is no backup generator). Failures mainly last for days or in some cases weeks. In the event of such a failure three large tankers are brought in to remove the sewerage, with one full tanker load being removed every hour. The regular failures that occur are due to the existing system being overloaded and the age of the system.
- 13.12 The current sewer infrastructure is already under excessive strain, there are two very old large pumps, and one has been out of commission. The pumps are so old that parts have to be specially made as the manufacturer no longer exists.
- 13.13 The current house building programme in Paddock Wood has been halted due to inadequate sewerage infrastructure and we believe that one developer (Berkeley Homes) is working on the provision of huge sewerage/water storage holding tanks with Southern Water.
- 13.14 **Flood history**
- 13.15 Historical incidents of flooding are detailed by Southern Water in their DG5 register. This database records incidents of flooding relating to public foul, combined or surface water sewers and displays which properties suffered flooding. The data provided by Southern Water covers all reported incidence as of its export of 3 October 2016.
- 13.16 DG5 records provided by Southern Water indicate that there have been more than twenty reported flood instances in the Paddock Wood area as a result of overloading public sewers.
- 13.17 Town Council committee minutes reveal that many more flood instances occur but residents were unable to get through to Southern Water at the time. There are residents living in bungalows in Paddock Wood that are unable to use their toilets in times of heavy rainfall as they will overflow.
- 13.18 Southern Water recorded sewer flooding in 2008 and 2009. The EA also describes issues of hydraulic overload from foul sewers in Five Oak Green.
- 13.19 **Proposed Development**
- 13.20 Southern Water have confirmed that any projects of a strategic scale that are required to increase the local sewer network capacity, in particular in the Paddock Wood/Capel area, will need to be included in their next AMP. This will cover the period from 2025-2030 and will be agreed by Ofwat.
- 13.21 Where capacity constraints for new development have been identified in the sewer network, occupation of development will need to be phased with the delivery of network reinforcement, in liaison with the service provider and Southern Water has requested that this requirement is set out in the Local Plan.
- 13.22 **Current Development:** Sewer flooding is already a regular problem within Paddock Wood/Five Oak Green and, due to lack of investment over many years, the current system is already at capacity. Recent developments have been delayed/suspended as Southern Water are working with developers on additional storage capacity solutions as any further connectivity to the current infrastructure will seriously compromise existing users.
- 13.23 Existing sewers have become overloaded already as new developments add to the discharge to their catchment, due to incremental increases in roofed and paved surfaces at the individual property scale and sewer flooding is already a major problem. New homes are being built and connected to a sewerage system that is already so inadequate that it results in sewage flowing through the streets and the flooding of existing properties. The overload of the current network has unacceptable, unhealthy and frankly disgusting consequences for residents.
- 13.24 Greg Clark MP met with representatives of Southern Water, members of Paddock Wood Town Council, and officers and members of Tunbridge Wells Borough Council and Kent County Council on 7 September. All those local representatives were dismayed to discover that the previous plans were not even going to be proceeded with, and that the company had in effect gone back to the drawing board to consider what could be done about the capacity in Paddock Wood.

13.25 Mr Clark also raised this matter in a Parliamentary debate in the House of Commons on 28-Oct-2019 and asked three questions of The Under-Secretary of State for Environment, Food and Rural Affairs (Rebecca Pow):

- 1) Will she intervene to insist that Southern Water present comprehensive infrastructure plans without further delay to the community of Paddock Wood and others in my constituency where development is being considered, and that it implement those plans?
- 2) Will she strengthen the powers of local councils to require water companies to make an assessment of the infrastructure needs, and not to approve new development until it is certain that the infrastructure will be provided before or at the same time as the development?
- 3) Will she accept that if we as a nation are to support development, whether it is in the town or the countryside, commercial or residential, the rules should be established and acted upon, and that there is always I before E: infrastructure before expansion?

Ms Pow replied *“Without a doubt, evidence highlights that the performance of Southern Water has left a great deal to be desired. If improvements are not forthcoming, I shall be requesting a meeting with Southern Water. I believe my right hon. Friend asked whether I would step in and take some serious action, and I shall be doing that and asking some serious questions”* and agreed to meet with Mr Clark saying *“Of course I will meet my right hon. Friend. We want water companies that are working effectively and efficiently, and we need to understand the pressures they are under and how to deliver for all new houses. We are committed to building new houses as a Government. We need new houses, but they need to function properly, with the right infrastructure, so of course I will meet him. In conclusion, we want to see a water industry that puts customers at the heart of the business, contributes to communities, and protects and enhances our precious natural environment. I will continue to push the sector and hold water companies, such as Southern Water in this case, to account if necessary”*.

13.26 **Paddock Wood and Capel:** Southern Water note that treatment capacity is currently limited at Paddock Wood, and the levels of development proposed exceed the current catchment forecast. The level of growth outlined at this stage for Paddock Wood will more than double the size of the catchment, triggering the need for investment in network and treatment capacity solutions.

13.27 There will be a need for investment in the Paddock Wood treatment works to deliver increased capacity for the proposed housing growth. Therefore, new development would need to be coordinated with the provision of additional capacity and Southern Water will need clarification on the potential phasing of new development to ensure that this issue is addressed early in the process and to ensure that this investment is delivered alongside the housing growth.

13.28 Whilst land around the existing plant has been safeguarded for necessary expansion, Southern Water do not currently have an allocated budget for any extension, and have not provided any guidance on its expected delivery.

13.29 **Capel (CA1 Tudeley):** Southern Water will be carrying out further capacity assessments at both the existing Paddock Wood and Tonbridge treatment works to assess capacity to meet the future needs of all the proposed developments in Capel parish, including CA1 Tudeley.

13.30 In terms of the sewerage network, this is upgraded in line with the specific requirements of individual development proposals as they come forward. It is likely that some sites will necessitate reinforcement of the sewerage network in order to accommodate additional foul flows. Southern Water aims to provide timely infrastructure in cooperation with developers and the local authority, and therefore early engagement is encouraged.

13.31 Given the above constraints at Paddock Wood and extensive increased demands on the Tonbridge sewerage plant, there is a very real likelihood that a complete new treatment plant will be required at Tudeley. Whilst the provision of sewerage facilities has not been specified, the consequent run-off to the Medway floodplain from new plant would further add to flooding risk and adequate/enhanced mitigation from SuDS and other measures must be incorporated in the build design at CA1 Tudeley (see section 12).

13.32 TWBC has confirmed (12-Nov-2019) that there are no detailed plans for sewerage infrastructure provision at CA1 and this would be ‘determined through infrastructure masterplanning’. They expect to receive further information from Southern Water in their response to this Regulation 18 consultation.

13.33 **Funding sources:** Developer contributions for local sewerage infrastructure will be secured through the New Infrastructure Charge.

13.34 Additional investment in waste water treatment works is funded by Southern Water through the water industry's price review process as agreed by Ofwat. Over the lifetime of the Local Plan, there will be repeated opportunities to fund any future investment as it is needed.

14 : POTABLE WATER SUPPLY

14.1 Current Infrastructure

- 14.2 At present the water supplying the Capel/Paddock Wood area (WRZ7) is taken from Trottiscliffe and the surrounding areas (from groundwater) where it is treated. This supply is then transported via strategic mains to a storage reservoir at Bour Beech (Seven Mile Lane), then onto the Paddock Wood Service reservoir (Geddes Hill) and then out to supply the local areas. Occasionally the water is also taken from Bewl Water (a surface reservoir) and transferred to the area via trunk mains and a storage reservoir.

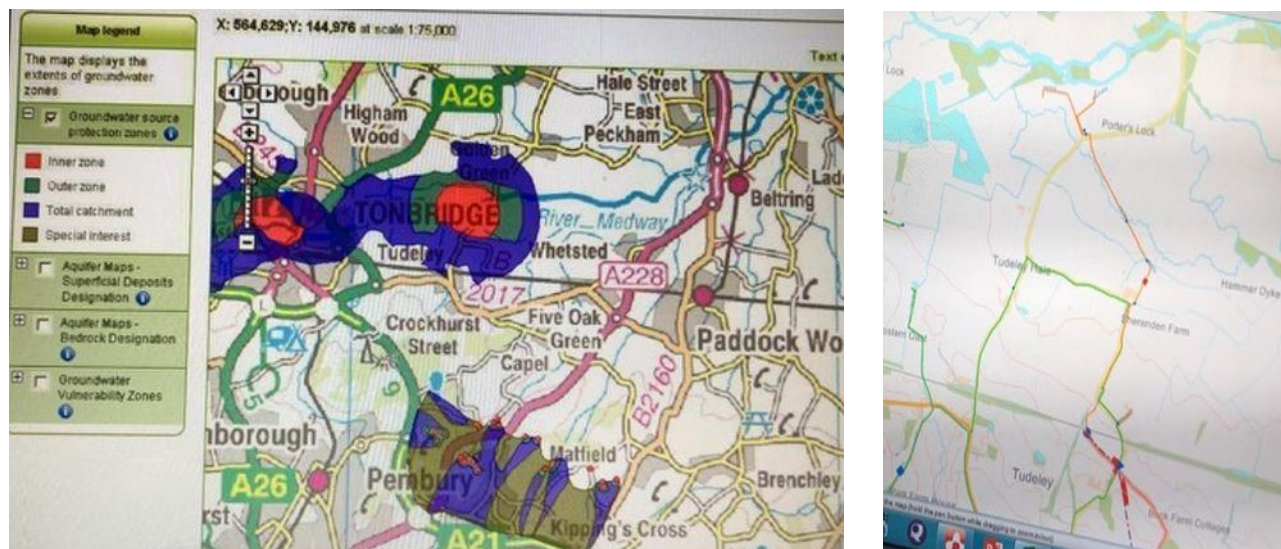


Figure 16 - Groundwater Protection Zones

- 14.3 The EA has applied a Groundwater Protection Zone (GSPZ) related to the aquifers at Hartlake (Figure 16 above) with the route of the supply from the Hartlake Wells shown on the right:

• Hartlake Wells pump → Lilley Farm → Paddock Wood reservoir → Pembury/Tunbridge Wells customers

- 14.4 In 2018 work near Brampton Bank was carried out to replace pipe section being 350mm diameter that feeds from Lilley Farm to the Paddock Wood Reservoir, Pembury.
- 14.5 Out of the five public wells at Porters Lock Hartlake, the old Well route is to the West, and a newer uPVC pipe runs to the East which scales 800m downstream. This indicates that a while ago Hartlake needed to draw more because Tunbridge Wells needed it, so another draw line was drilled and built to tap into the old system being the concrete bases in the middle of the hoppers, now corn field.
- 14.6 A system of private water mains belonging to Hadlow Place Estates exists around the area of the proposed CA1 development which they would like to pass over to South East Water (SEW). Given that SEW also have a mains in Hartlake road this seems unlikely to happen. In any event, the water pressure in both systems is very low and even combined they would have no where the needed capacity to supply the proposed new town. Indeed where any of these pass under the site they may well be required to be capped off to reduce the risk of future leaks causing subsidence.

14.7 Proposed Development

- 14.8 SEW have stated that the same sources will be used in the future and forecasts for WRZ7 show there would be a deficit in the amount of water available to supply the growing demand by 2030.
- 14.9 A number of different options are being investigated to ensure enough water is available including demand management, reducing leakage, metering, recycling water, creating new sources, sharing water with other companies and expanding our current sources and treatment capacity.
- 14.10 **Paddock Wood and Capel:** Whilst SEW have stated that there is sufficient capacity in the existing network to supply the planned developments in East and Central Paddock Wood, there will also be large strategic mains installed to take surplus water from a new source of water at Aylesford towards Beech reservoir by 2023.
- 14.11 This will allow for more water to be transported in and around the WRZ7 area via the large strategic mains and to support the expected growth in consumption at PW1 Capel East. For the new source at Aylesford some of the existing network between Beech and Paddock Wood will need to be reinforced.

- 14.12 For the properties near Tudeley, SEW plan to lay new mains to connect back to a strategic trunk main that transfers water from Beech reservoir to Paddock Wood reservoir as the existing pipes are typically much smaller at around 5" and unable to sustain higher demands. They plan to link in the Capel East development to the same main with a short section of reinforcement main.
- 14.13 **Funding sources:** The Water Act enables South East Water to charge developers for a contribution towards any reinforcement and new mains required as a result of new development to ensure it maintains levels of service for both new and existing customers. The cost of contribution is based upon the cost of both on-site and off-site mains less all the revenue South East Water receives over the first 12 years for the new properties.
- 14.14 **Capel (CA1 Tudeley):** Although there is some capacity already in their plans to serve the proposed Tudeley garden settlement, it is considered that it may require an adaption or expansion of the existing mains. This is in addition to the laying of new mains within the residential area.
- 14.15 SEW have carried out extensive investigations into eight groundwater sources, and within its Water Industry National Environment Programme (WINEP) report it identifies concerns of raw water quality deterioration from significant levels of nitrate and pesticides, metaldehyde and carbendazim.
- 14.16 The Hartlake catchment is already at risk from nitrate and pesticides and the investigation found a significant relationship between groundwater levels in the river terrace gravels at the Hartlake site and River Medway levels and flows. Metaldehyde has been applied to the nearby neighbouring agricultural land surrounding the abstraction and high levels of metaldehyde concentrations have also been found in the River Medway.
- 14.17 The GSPZ catchment area of the significant Aquifer at Hartlake, which is SPZ3, extends under almost all the section of CA1 Tudeley that is north of the railway line. Any further development of this area may impact water supply options that serve SEW customers in Pembury and Tunbridge Wells:
- SEW have stated they intend to use the same sources of Hartlake Wells for future supply but have not anticipated additional provisions for 2,800 new homes, which would result in a deficit in the area by 2030.
 - SEW will be required to increase the current water infrastructure which will require a substantial developer contribution under the water Act, but there are currently no details of these financial obligations required of the developer/landowner. Furthermore, there is very little detail regarding the improvements of supply, treatment facilities, and timing of their provision which the above highlights is critical to the delivery of the development.
 - Polluted run-off from the proposed development in both construction and general pollutants/chemicals will find its way into groundwater and aquifer/rivers without extensive SuDS filtration, and indeed as a result of any breach or failure of these measures.
 - The Council states the protection of ground water resources is particularly important in Tunbridge Wells Borough, since the majority of the public water supply is abstracted from water-bearing strata or aquifers. The quality of ground water is easily polluted, directly and indirectly, and can pose a serious risk to public health.
 - Clearly CA1 is situated within an area where its water resources are already under serious stress, and currently there are a number of issues outstanding with the Environment Agency, KCC and local residents.
 - In 2002, KCC refused planning permission for quarry extensions at M13 Stonecastle Farm (see section 7) on the grounds of potential pollution and contamination to the Aquifers, as well as concerns of public health risk, as the Hartlake Aquifers are a source of public and commercial water supply. Future mineral extraction would involve wet excavation methods, and recharge trenches, which will certainly affect the capacity of the Hartlake drawdown.
 - The draft plan does not identify the neighbouring two historic landfill sites which have had millions of tonnes of household and industrial rubbish deposited there in the 1980's and 1990's. Given the historical issues regarding previous mineral workings, and the major concerns of further pollution to the surrounding aquifers it is very concerning that the Council have not appeared to have considered the potential environmental and health risks prior to the inclusion of CA1 Tudeley in the Draft Local Plan.
- 14.18 The Draft Local Plan has not considered the potential environmental issues around the Hartlake Aquifers and, with rising nitrate and pesticide levels that have already been identified, any penetration to the Aquifers would lead to further significant human health risks.
- 14.19 The Aquifer and natural springs within the CA1 site will seriously hinder excavations for building, sewage, drainage, etc. as suitable mitigation schemes will have to be implemented to avoid puncturing the natural clay membrane that protects the Aquifers.

15 : SUSTAINABILITY APPRAISAL

15.1 There were 13 sites brought forward as proposed Garden Settlement Sites:

- 1) Blantyre House, (Former Prison) Goudhurst Parish,
- 2) Capel,
- 3) Frittenden Area,
- 4) Horsmonden,
- 5) Iden Green,
- 6) Kippings Cross, East of Pembury and adjacent to the northern and southern carriageways of the A21,
- 7) Land Adjacent to Colliers Green Primary School, Colliers Green
- 8) Land at Great Bayhall, East of RTW,
- 9) Land between Cranbrook & Sissinghurst,
- 10) Land between Sandhurst and Iden Green,
- 11) Langton Green, adjoining western edge of existing development
- 12) Paddock Wood, land surrounding the existing settlement
- 13) Walkhurst Farm, Benenden

15.2 Eleven sites were rejected or did not come forward in the final call for sites process.

15.3 The two allocated sites (PW1 and CA1) are within a 3 mile radius and situated on/adjacent to a dedicated floodplain with a well-known flood history, all the other sites are not situated at such flood vulnerable locations. It very much appears that Flooding has a much lower score rating with TWBC within its Sustainability Assessment commentary than other LPAs.

15.4 Given the flood history of the two identified areas and the substantial size of the developments, the overwhelming evidence seems to indicate that the scoring/rating assessment/analysis has not been considered/evaluated equally across the Borough, and has failed to evaluate the potential risk to human health/life should further flooding occur.

15.5 Chapter 4: Methodology (Table 4 pg.24) states “KCC Draft Minerals and Waste Local Plan - Sites at Moat Farm and Stone Castle, Five Oak Green are adjacent to the boundary with Tunbridge Wells Borough (TWB)”.

Since both Moat Farm and the entrance to/large parts of Stone Castle Quarry are within TWB, and adjacent to the proposed CA1 site, this error reinforces our view that the Mineral Assets have not been adequately considered in the Draft Local Plan (see section 7).

15.6 Chapter 6: Spatial Development Strategy (Table 15 pg.42) states “There is also potential for increased flood risk due to cumulative effects. However, significant betterment of flooding issues at Paddock Wood and Five Oak Green, and policies for other smaller sites, will provide significant positive benefits. Overall score is mixed”.

It is now understood that the Alder stream project would not be progressed and the ‘betterment’ for FOG would be through CA1 Tudeley, as confirmed by TWBC Head of Planning (12-Nov-2019).

Given the total absence of any specification of flood mitigation at CA1, this “mixed” score is certainly not sustainable as it cannot be proven to be deliverable.

15.7 Chapter 6: Spatial Development Strategy (Table 16 pg.45) states “A mixed/positive water scores is applied to [CA1] as it would represent a substantial demand for water and wastewater treatment and would provide significant benefits to Five Oak Green in the form of reductions in existing flood risk. The presence of the total catchment of a Groundwater Source Protection Zone north of the railway line also creates a risk that must be carefully managed”.

Here, again the “mixed/positive” score is not proven to be deliverable. Even with extensive storage of increased run-off from the CA1 development, the risk of breach, and/or sewerage/drainage failures, increases the overall flood risk to the existing residential areas. The effect on the Aquifer cannot be determined due to the lack of detail.

15.8 Chapter 6: Spatial Development Strategy (Table 17 pg.48) states “A mixed water scores is applied equally across the options as all would represent a substantial demand for water and wastewater treatment, and all would provide significant benefits to Paddock Wood in the form of reductions in existing flood risk...An improvement to flooding issues for existing residents is one of the key justifications for the proposed release of this Green Belt land on the west side of the settlement”.

The “mixed” score is not sound as the SFRA has not properly addressed the measures necessary to mitigate the flood risk from the PW1 Capel East development (see section 11).

The SFRA does not conclude that the limited mitigation will eliminate future flood risk or provide evidence of ‘betterment’ to the existing residential areas.

16 : OTHER CONSIDERATIONS

16.1 The character of the parish of Capel, situated in the green belt, would be virtually destroyed by the cumulative effect of these developments, together with quarry extensions, with the removal of more than 1,000 acres of agricultural land. The Capel sites comprise of a total of around 650 acres and each acre of wheat can absorb nearly 600,000 gallons of water per crop (USDA & NIFA²). It is estimated that around 60% of annual rainfall could be taken up by the vegetation and crops, when compared with the average annual rainfall of 600mm (MetOffice).

16.2 **Poor sales potential:** House prices, given the increased flood-related building costs resulting in higher selling prices, may well reduce sales potential. This has already become evident with the current development in Paddock Wood, and also it appears at Marden. Two new houses in Five Oak Green, built with elevated ground floors to accommodate surface water storage underneath, have been on the market for well over a year and despite a significant drop in the price have significantly failed to sell.

The required elevation of FFLs, as in the case of Ellis Close in Five Oak Green village, would add additional height to the houses themselves and added costs to the construction. This would also mean that the houses may be more difficult to sell to families with members who have disabilities and/or young children.

Even more important, with the floods that have occurred in many parts of the country and the publicity they have received, potential customers may well avoid purchasing in low lying areas where such flood risk exists. This could have a devastating effect on sales. It may well be that potential developers may decide that it was not even worth the risk of becoming involved with such a development!

16.3 **Setting:** The proposed extension of Stonecastle Farm Quarry and additional Quarry at adjoining Moat Farm, within Kent County Councils Minerals and Waste Local Plan 2013-2030, has not been fully considered within the CA1 development plans. Who will want to buy a house looking into a quarry for possibly the next 20-30 years?

Virtually all the residential development at CA1 will be affected by the noise, air and light pollution from the South Eastern Main Line. This would restrict the market's attraction for the new homes.

Much of the residential development at PW1 will back on to the A228, with a vast increase in traffic resulting from the housing increases and quarry trucks.

16.4 **Affordable housing:** Ground conditions will mean that foundations for buildings will need to be deep and pass through a bed of highly unstable gravel. Foundations for roads etc. will also need to be robust enough to prevent subsidence and Piling may be used but, if deep, will be very expensive. The required extensive installation of SuDS, to mitigate flood risk, would likely wash fines/soil flows under foundations and lead to possible failure. This adds to the costs of strategic storage and other measures; all of the above will make the site expensive to develop.

16.5 The landowners/developers and LPA are blithely promising a high percentage of affordable housing. This is a regular promise made for similar developments which are then almost inevitably ignored. Given the high cost of building at these flood affected sites, it is difficult to see how these targets could be achieved unless such costs are offset by a sizable reduction in the realized values from the development land.

16.6 **Site Access:** Sites will be difficult and potentially dangerous to access, made even more so by clay based mud deposited on the road by construction traffic leaving the site that by its nature would be difficult to remove, presenting a very real skidding hazard to traffic.

16.7 Much of the area becomes very muddy. Access and site roads would need to be established before work could start. Working conditions would, at best, be very difficult and in the winter the whole site could easily turn into a muddy quagmire that could well lead to work having to be suspended. Trenches dug for foundations would fill up with water even while they were being dug, throughout much of the year.

16.8 Even simple matters such as providing parking for cars and vans would need to be addressed. When the nearby Solar Farm was being built, which needed relatively little site traffic, some areas became simply impossible to walk on due to deep glutinous mud!

16.9 **Insurance:** For some properties within these developments insurance cover for flooding is likely to be difficult, expensive or even impossible to obtain. No houses built from 2009 onwards can benefit from the Flood Re. Scheme as, if they are in a flood risk area, they are required to have resilience built in to the development. If new developments cause a greater flood risk to older houses these may have insurance problems, obviously.

16.10 **Mortgages:** There may also be problems obtaining mortgages - we understand that mortgages have been recently been refused on some properties along Maidstone Road in Paddock Wood because of flood risk.

² eXtension.org. Supported by USDA United States Department of Agriculture and NIFA National Institute of Food and Agriculture.

17 : CONCLUSION

- 17.1 The Capel sites in the Draft Local Plan are neither sound nor deliverable. The policies do not demonstrate that planners have considered the full effects of flood risk, they have not specified adequate flood mitigation measures, and have inadequately assessed the impact of climate change. There is an over-reliance on the Leigh barrier, which provides no benefit to much of the area, and the stated 'betterment' is not proven. Therefore, the justification for the removal of Green Belt land is not substantiated at both sites.
- 17.2 In Paddock Wood (PW1), the exclusion of raised levels in the build design, and the necessary SuDS initiatives, demonstrates that planners have not addressed the flood risk on this floodplain and the effects of any breach of the reservoirs. Development/removal of this part of one of the UK's largest floodplains is not appropriate.
- 17.3 In Tudeley (CA1), there is no assessment of the flood risk to existing communities (no SFRA) and the additional costs of railways crossing(s), and necessary extensive flood mitigation, would likely make the development unviable. This, together with the masterplan approach with the landowner, who has no proven development experience, renders the Plan unsound, not sustainable, and an unacceptable risk for the Borough.
- 17.4 We understand the pressure TWBC is under to deliver its housing targets but it should not be at any cost, especially when it involves so many people/communities and the effects will be irreversible. There are numerous precedents where plans have been rejected for flood risk, e.g. at neighbouring Yalding and the Garden Village in Essex, and TWBC should be adopting a robust defence of the Green Belt and floodplain.
- 17.5 There is wide condemnation of the 2014 housing needs assessment and the Council should be defending more appropriate (and current) projections. Given we are in a General Election campaign, and with the ongoing Brexit uncertainties, we urge the Council to reconsider and remove these flood affected sites from the plan now before committing to further costs and taxpayers money.
- 17.6 Existing developments in Paddock Wood have halted due to inadequate sewerage infrastructure and questions were raised in Parliament. After record fines this year, there is no confidence that Southern Water will fulfil the needs of the proposed 4,000 additional houses in Paddock Wood and a possible new sewerage system in Tudeley.
- 17.7 In this final week of the consultation period we have seen the tragic death of the former High Sheriff of Derbyshire after being caught in floodwater. In Doncaster, 1200 properties were evacuated and 1900 people had to be rescued. This adds to an extensive list of major flood incidents, including the Dam breach and bridge collapse earlier this year, which are now occurring ever more frequently. Planners should take careful regard of these warnings.
- 17.8 This reports sets out the Capel landscape, flood history, regulatory guidance, external factors, and effects of the proposed developments. The Flood Group have carried out extensive research from the limited information in the DLP and highlight the many dangers, challenges, risks and extraordinary costs any development would have at these inappropriate locations in Capel. These sites Flood and are widely known as flood vulnerable areas on a floodplain.

We submit that Sites PW1 Capel East and CA1 Tudeley must be removed from the Plan – thus preventing the Council from having to re-learn the mistakes of the past.....building on/near a floodplain with fatal consequences!

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