

APP/L2250/V/10/2131934 & APP/L2250/V/10/2131936

SECTION 77 TOWN AND COUNTRY PLANNING ACT 1990 – REFERENCE
OF APPLICATIONS TO THE SECRETARY OF STATE FOR COMMUNITIES
AND LOCAL GOVERNMENT

TOWN AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND)
RULES 2000

**PROOF OF EVIDENCE OF CHRISTOPHER MEAD CEng
MICE MCIWEM MIHT**

FLOOD RISK

In respect of:

Planning Application Reference: Y06/1647/SH (New Terminal
Building)

Planning Application Reference: Y06/1648/SH (Runway
Extension)

relating to land at London Ashford Airport, Lydd, Romney Marsh,
Kent, TN29 9QL

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1 Introduction and Experience

1.1 INTRODUCTION & EXPERIENCE

- 1.1.1 My name is Christopher John Mead, CEng MICE MIHT MCIWEM BSc (Hons) and I am a Director of WSP UK's Development and Transportation division based in Mountbatten House, Basing View, Basingstoke, Hampshire, RG21 4HJ. As Head of Development Infrastructure for the UK and Water Sector Director I have technical responsibility for the output of all our design teams including our London team.
- 1.1.2 I have worked for more than 25 years in the private development sector where my work has included both design and implementation of residential and commercial schemes requiring flood mitigation and prevention works.
- 1.1.3 I hold a Bachelor of Science degree in Civil Engineering and I am a Chartered Civil Engineer being a member of the Institution of Civil Engineers. I am also a member of the Institution of Highways and Transportation and the Chartered Institution of Water and Environmental Management.
- 1.1.4 I am familiar with the London Ashford Airport (the "Airport") site having prepared Flood Risk Assessments for several sites in Kent and East Sussex, and having visited the Airport to view the existing drainage system and nearby coastal defences.
- 1.1.5 My experience in successfully delivering a variety of major developments where flood risk needs to be embraced and mitigated within the design are numerous and include Site 6 at Bognor Regis, a major residential development within the defended tidal floodplain. My work has included significant stakeholder and public consultation which has expanded to community forum and media appearances.
- 1.1.6 My experience of public inquiries and examinations in public dates from 1998 and includes many appearances on flood related matters among which is the PPS25 Practice Guide Heybridge example case which went through 3 Inquiries and 2 High Court Challenges.
- 1.1.7 Although I was not involved in the preparation of the original Flood Risk Assessment (FRA) for the Airport, I have undertaken my own assessment of the likely Flood Risk and am satisfied that my own findings concur with and develop those of the original FRA.

2 Scope of Evidence

2.1 BACKGROUND

- 2.1.1 My evidence relates to the drainage and flooding aspects only of the proposed new terminal building and runway extension at the Airport pursuant to the Applications.
- 2.1.2 The Applications are the two made by the Applicant to the Council in December 2006, namely:
- i) an application for the construction of a 294m runway extension and a 150m starter extension (council reference Y06/1648/SH); and
 - ii) an application for a new terminal building capable of processing up to 500,000 passengers per annum (Y06/1647/SH).
- 2.1.3 The first application relates to the extension of the existing runway at the Airport. This extension is required to enable the Airport to handle a wider range of commercial aircraft. This application does not propose any changes to the terminal buildings, which are considered to have a capacity to handle up to 300,000 passenger movements per year.
- 2.1.4 The second planning application relates to the construction of a new terminal building to the north west of the existing buildings. This new facility would allow the Airport to accommodate 500,000 passenger movements per year and provide all facilities required of a small-regional airport.
- 2.1.5 Specifically, my evidence will address the question of tidal flood risk both now and in the future in the context of latest local and national policy on flood risk and the predicted impact of climate change.
- 2.1.6 WSP were originally appointed in March 2009 by London Ashford Airport Limited (the "Applicant") to prepare a Drainage Strategy for the proposed runway extension in line with the recommendations of the approved Flood Risk Assessment (FRA) (CD1.12a and CD1.12b) submitted as part of the Applications.

2.1.7 This Proof of Evidence does not seek to duplicate unnecessarily the information contained in the FRA, rather it refers to the technical analysis to demonstrate and prove that there are no flood reasons why development at the Airport cannot be permitted and that development proposals pursuant to the Applications are compliant with PPS25.

2.1.8 If there are any detailed or additional comments raised by Rule 6 Parties, these will be dealt with in rebuttal evidence as required.

2.2 AIRPORT LOCATION AND DESCRIPTION

2.2.1 The site is located on the Dungeness peninsular on the south-east coast of Kent, less than 2km east of Lydd. To the east and south-east are the villages of Greatstone-on-Sea and Lydd-on-Sea respectively, with Ministry of Defence maintained firing ranges to the south (the Lydd Ranges). In-between Lydd-on-Sea and the Lydd Ranges is Dungeness Nuclear Power Station.

2.2.2 The site sits within an area of marsh land known as the Denge Marsh, which is an area of reclaimed marsh land that runs between the coast and old sea cliffs to the north and west. The eastern boundaries overlap with the shingle formations of Denge Beach. The nature of the land upon which the site is located is low lying flat land with the site as a whole being approximately 3.0 to 3.5m above datum (AD). The coast is approximately 1.5km away at its closest point (Greatstone-on-Sea).

2.2.3 Broadly speaking the Airport is connected to Rye in the west, and New Romney to the north-east, via the A259, with onward connections to Folkestone and Ashford and subsequently the M20 and Greater London area.

2.2.4 The Airport currently consists of two main buildings (the existing Terminal Building and aircraft hangar) and smaller outbuildings (workshops, control tower, fuel store and fire station). The Airport has an operational runway running north-east to south-west. There is also a car parking area behind the existing Terminal Building.

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- 2.2.5 The drainage across the area is characterised by a network of land drainage ditches, which are under the control of the Romney Marsh Area Internal Drainage Board (RMAIDB), and private land drains. Although there are no main rivers in close proximity to the site, the Environment Agency (EA) does control the Denge Marsh Sewer.
- 2.2.6 The Airport lies within Shoreline Management Cell 4c (Beachy Head to South Shoreland) in an area defined by the Folkestone to Cliff End Flood & Erosion Management Strategy (FEMS) (CD12.10) as within the Dungeness Peninsular. The Airport benefits from the tidal defences of 7 discrete frontages. For a full description of the Airport and its locale refer to Chapter 2 of the FRA in Annex 1 and a location plan in as Figure 1.

3 Policy Background

3.1 NATIONAL POLICY

PPS25 Development and Flood Risk, 2010 (CD6.14)

- 3.1.1 Planning Policy Statement 25 ‘Development and Flood Risk’ (PPS25, updated 2010) is the current national planning policy with respect to flood risk, and seeks to ensure that flood risk is taken into account at all steps of the planning process. This sets out the process to be undertaken when assessing the risk to, and measures to be taken, for the Airport. This includes production of Flood Risk Assessments for new development, which incorporate an assessment of risk and mitigation measures proposed to reduce this risk.
- 3.1.2 PPS25 explains the key planning objectives of the policy statement in para 5: *“[t]he aims of planning policy on development and flood risk are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.”*
- 3.1.3 In paragraph 7, PPS25 confirms that Regional Spatial Strategies should “... be consistent with RFRAs and SFRAs, the policies in this PPS and Shoreline Management Plans, Catchment Flood Management Plans and River Basin Management Plans prepared by the Environment Agency under the Water Framework Directive;”
- 3.1.4 The 2006 South Foreland to Beachy Head Shoreline Management Plan (SMP) (CD12.12) is the relevant document to which I refer later in my evidence.
- 3.1.5 Similarly, the 2008 FEMS (CD12.10) is the relevant strategy to which I refer to later.
- 3.1.6 Both the SMP and FEMS confirm that the overall, strategic management policy for tidal defences to the coastal cell containing the Airport are to provide a standard of protection which meets the 0.5% probability standard required by PPS25 for the next 100 years. On this basis any assessment of flood risk should assume that the defences provide adequate defence.

Sequential Test

- 3.1.7 Paragraphs 16 and 17 of PPS25 introduce a flood Sequential Test and they refer to Annex D to ensure that land use appropriate to flood risk is located on available sites.
- 3.1.8 The Sequential Test gives preference to the location of new development in Flood Zone 1 and, where there is no reasonable site in Flood Zone 1 says *“the flood vulnerability of the proposed development can be taken into account in locating development in Flood Zone 2 and then Flood Zone 3.”*
- 3.1.9 PPS25 Annex D further explains the Sequential Test advising firstly that the Strategic Flood Risk Assessment will form the basis for applying the Sequential Test and then explaining how each of the Flood Zones are identified on the basis of the percentage probability of flooding today.
- 3.1.10 Following the guidance of PPS25 and using the Shepway District Council Strategic Flood Risk Assessment (SFRA) flood maps as reference, parts of the Airport would be described as being located in Flood Zone 3a. However, I discuss later (paragraph 5.2.1) with reference to the bespoke Airport breach plans which have been updated (in line with the EA’s recommended assessment of residual flood risk via a breach in coastal defences) by the Council’s consultant (who carried out the SFRA) that the runway extension lies within Flood Zone 1.
- 3.1.11 Table D1 of Annex D to PPS25 lists appropriate land uses in each of the Flood Zones with Table D2 of Annex D to PPS25 providing Flood Risk Vulnerability Classifications for different land uses.
- 3.1.12 Consultation with the EA has confirmed the original FRAs (Annex 2) were approved due to the Airport being classified as a commercial and less vulnerable use. As the operational use of the Airport is commercial then Table D2 classes this as a ‘less vulnerable use’ and Table D3 confirms that as a less vulnerable category the Airport can be located in either of Flood Zones 1, 2, or 3a.

Exception Test

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- 3.1.13 PPS25 in paragraph 18 goes on to describe the Exception Test as a means to facilitate development in areas of flood risk for other, wider sustainability reasons.
- 3.1.14 Even if the Airport were to be classified as a form of “Essential infrastructure” for the purposes of Table D2 of PPS25 (which I do not believe to be the case, as the Airport is classed as commercial land use by the EA) then the development proposals would still be acceptable in consequence of the application of the Exceptions Test in PPS25 for that part of the development that falls within Flood Zone 3a as defined by the SFRA maps.
- 3.1.15 If the Exception Test were to be applied to the Airport then PPS25 paragraph 19 advises *“[t]he Exception Test is only appropriate for use when there are large areas in Flood Zones 2 and 3, where the Sequential Test alone cannot deliver acceptable sites, but where some continuing development is necessary for wider sustainable development reasons, taking into account the need to avoid social or economic blight and the need for essential civil infrastructure to remain operational during floods.”*
- 3.1.16 Dungeness Peninsular is an area widely covered by Flood Zones 2 and 3, hence the approach in the statements and management policies in the SMP and FEMS. As such, if it were necessary, then the Exception Test is appropriate for use in the Dungeness Peninsular area of Shepway district.
- 3.1.17 PPS25 Annex D goes on to explain the policy guidance that applies to specific areas. I refer first to paragraph D9 which details the 3 parts of the Exception Test that would be applied to the Airport if it were classed as essential infrastructure:
- a) *it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared.*
 - b) *the development should be on developable previously-developed land or, if it is not on previously developed land, that there are no reasonable alternative sites on developable previously-developed land; and*
 - c) *a FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*

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- 3.1.18 The first part relates to the sustainability of the development. For the reasons given by others, the development proposed at the Airport is sustainable and will provide wider sustainability benefits to the community that would outweigh the flood risk and I therefore consider that this part of the Exception Test is passed.
- 3.1.19 For part b) of the Exception Test, the proposals for the Airport that fall within Flood Zone 3a are for expansion on developable previously developed land. It is only the proposed Terminal Building development that is located within Flood Zone 3a. I therefore consider that those parts of the Applications within Flood Zone 3a are all on 'developed' land. In any event, to the extent that the developments do involve development of any non-previously developed land within Flood Zone 3a, there is no reasonably available alternative land as part of this existing operational airport within the boundary of the planning authority and therefore part b) would be met anyway.
- 3.1.20 In response to the part c) of the Exception Test the original FRAs provided for the developments proposed have been approved by the EA as confirmed in their letter dated 20th April 2009 (refer to Annex 5).
- 3.1.21 The updated FRA that I have produced in Annex 1 outlines the actual flood risk, the residual flood risk and flood mitigation measures for extreme events that manage flood risk to acceptable levels both today and for the year 2115.
- 3.1.22 As a defended, remote area at risk of tidal flooding, development of the Airport will not increase flood risk elsewhere and can mitigate flood risk for others by providing safe refuge.
- 3.1.23 For the reasons I have given above, I do not consider that it is necessary to apply the Exception Test to the proposed development because as a commercial operation the Airport is a less vulnerable use which is a permitted land use in Flood Zone 3a. However, even if one were to apply it, I consider that the Airport passes each of the three Parts of the Exception Test.

Climate Change

- 3.1.24 PPS25 Annex B provides guidance on climate change with paragraph B2 discussing the Government established UK Climate Impacts Programme (UKCIP).

Scenarios of future climate change in the UK were first issued by UKCIP in 2002 (UKCIP02).

- 3.1.25 Paragraph B14 refers to what was the then anticipated date for the next issue of climate change data in 2008.
- 3.1.26 My analysis of flood risk in Chapter 5 compares flood risk based on the UKCIP02 forecasts used in PPS25 and the SFRA (CD7.9) with the revised, fifth generation UK Climate Projections issued in 2009 (UKCP09) climate information designed to help those needing to plan how they will adapt to a changing climate.
- 3.1.27 The UKCP09 projections demonstrate a reduction in the predicted impact of approximately 18cm in predicted sea level rise to the year 2115 for the medium emissions scenario in comparison to UKCIP02 as explained in Chapter 4 of the updated FRA in Annex 1.

The Assessment of Flood Risk

- 3.1.28 Annex E of PPS 25 gives guidance on the assessment of flood risk confirming again that appraisals in a hierarchy (from Regional Flood Risk Appraisals through to Flood Risk Assessment) should be informed by, amongst other sources, CFMPs and SMPs.
- 3.1.29 On this basis it is clear that the policies within the SMP and FEMS, and the findings of the SFRA, should be taken into account when preparing a site specific flood risk assessment as I have done in the updated FRA.

Managing Residual Flood Risk

- 3.1.30 Annex G of PPS25 covers residual flood risk and it is clear from paragraphs G1 and G2 that the risk of breach and overtopping of defences is a residual risk and should be treated as such in a FRA: *“G2.Low-lying tidal and coastal areas are particularly vulnerable, due to **the residual risk of defences being over-topped or breached**, resulting in fast flowing and deep water flooding.... ”. [bold my emphasis]*

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- 3.1.31 As the coastal flood defences on the Dungeness Peninsular currently provide a standard of protection of a standard of at least 0.5%, and will be maintained to continue to provide that standard, the only flood risk is a residual flood risk.
- 3.1.32 Annex G of PPS25 also introduces the concept of flood resilience and resistance to which the original FRA in support of the new terminal building commits.
- 3.1.33 Annex G goes on to describe the need for Flood Warning and Evacuation Plans to deal with residual flood risks as follows: *“G12 The receipt of and response to warnings of floods is an essential element in the management of the residual risk of flooding.”*
- 3.1.34 A full Flood Warning and Evacuation Plan for the Airport are provided as part of the FRA and are attached in Annex 1.

PPS25 Development and Flood Risk – Practice Guide, 2009 (CD6.1)

- 3.1.35 PPS25, in replacing PPG25, was a shorter, more concise document. In order to assist planners in their interpretation and application of PPS25 a Practice Guide was first published in June 2008 and updated in December 2009 with clarification and examples on how to implement the policy in practice. The guidance draws on best practice as illustrated through case studies and examples.
- 3.1.36 My analysis of PPS25 is reflected in the Practice Guide in paragraphs 3.95 to 3.97 where acknowledgement of the new UKCP09 climate change projections is made. For the sake of completeness, I note, however, that the Practice Guide is inaccurate when stating that the 2 sets of climate change data are ‘broadly similar’ (see paragraph 3.97). As my evidence in chapter 5 demonstrates there is a significant difference in sea level rise projections over the lifetime of the development which requires assessment. This point is further reinforced in paragraph 6.41 of the Practice Guide which calls for UKCP09 projections to be borne in mind in considering climate change.
- 3.1.37 Para 6.23 of the Practice Guide discusses development behind floodwalls and embankments. The Airport is remote from the existing defences so not at risk of rapid inundation but the proposals are, in any event, *“...compatible with the long-*

term plans for general flood risk management in the area”, as outlined in the SMP and FEMS.

3.2 ENVIRONMENT AGENCY POLICY

South Foreland to Beachy Head Shoreline Management Plan, 2006 (CD12.12)

3.2.1 South Foreland to Beachy Head SMP is the over-arching policy document for the shoreline from South Foreland (to the east of Dover) to Beachy Head (to the west of Eastbourne) and provides a non-statutory policy document intended to inform wider strategic planning.

3.2.2 Of particular relevance to the assessment of flood risk to the Airport is paragraph 4.1.2 describing the preferred plan for the Sandgate to Cliff End (Dungeness Peninsular) which states that: *“[g]iven the extent of assets at risk, it is considered imperative that flood defence continues to be provided for the whole of the peninsular over the next 100 years. The SMP plan provides a strategic approach to the management of this potential risk, identifying how and where defences should be provided.”*

3.2.3 The SMP goes on to provide commentary for the various elements of the coastal defences. I will not dwell on these as I examine below the Flood and Coastal Erosion Strategy which has refined and upgraded the strategy for each defence element whilst following the overriding objective of the SMP as stated in the preceding paragraph.

Folkestone to Cliff End Flood & Erosion Management Strategy, 2008 (CD12.10)

3.2.4 The FEMS sits below the SMP and details the strategies to be undertaken between Folkestone and Cliff End. The FEMS combines the previous studies of Folkestone to Rye Strategy (1999) and the Cliff End to Scots Floats Sluice Strategy (2002). The strategy for each defence frontage is explained in summary in the updated FRA section 2.6 in Annex 1 to my evidence and within the FEMS but I comment on the points of note below.

3.2.5 Chapter 5 of the FEMS provides a useful summary of proposed strategic options. For the frontages which afford protection to the Airport, namely Broomhill Sands

through to Greatstone Dunes, the minimum standard of protection to be provided for a 99 year horizon is 0.5% at the end of that period – 0.5% being the one in 200 chance of flooding in any given year, in this case in a 100 years' time. Further scrutiny of FEMS Tables 3-4 to 3-6 and accompanying text and footnotes confirms this in the selection of 'Case 11' when it says "*sustain 0.5% plus MR (managed realignment)*" which is the economically preferred maintenance strategy for Coastal Cell 2 when evaluated in accordance with the Defra/EA Flood and Coastal Defence Project Appraisal Guidance note. The footnote to Table 3-5 confirms that maintaining the defences to a minimum 0.5% standard of protection would be economically viable even if the Dungeness Power Station defences were to be included.

- 3.2.6 On the basis of the SMP and FEMS it can be confidently concluded that the strategic coastal flood defences will be maintained to provide, at worst, the minimum 0.5% standard of protection for the area of the Airport taking account of climate changes. Therefore, the only tidal flood risk to the Airport is a residual flood risk caused either by an extreme flood event or the failure of the defences.

3.3 LOCAL POLICY

Shepway District Local Plan, 2006 (CD7.5)

- 3.3.1 The Shepway District Local Plan (adopted in 2006) is a district wide local plan that outlines planning policy until 2011. The policy on flooding is covered in Chapter 9. Saved Policy U6 states: "*Development, including proposals involving the raising of land, will not be permitted in areas at risk from flooding, as shown on the Proposals Map, if it would materially increase the risk of flooding elsewhere, unless appropriate flood protection and mitigation measures are proposed and will be carried out, to prevent this occurring*".
- 3.3.2 Both my evidence and the FRAs that were prepared in support of the Airport applications demonstrate full compliance with Policy U6.
- 3.3.3 In particular, as part of a defended area it is clear that the minimal land-raising proposed for the new Terminal will not materially increase the risk of flooding. In addition, the flood protection and mitigation measures proposed include raised new

Terminal floor levels, flood resilient construction and a Flood Warning and Evacuation Plan.

Shepway District Council Strategic Flood Risk Assessment, 2009 (CD7.9)

- 3.3.4 The SFRA was published in June 2009 and outlines the flood risk to the area. This is dominated by coastal flooding and is summarised in more detail in the FRA in Annex 1.
- 3.3.5 The first paragraph of the SFRA executive summary and paragraph 2.1 confirms that *“Much of the district is low-lying with approximately 195km² (55%) lying within the Environment Agency’s zone 3a flood risk area.”*
- 3.3.6 On page 18 of the SFRA the programmed improvement works to Lydd Ranges are confirmed as ‘Hold the line’, and they comprise raising and reinforcing the green wall, shingle recharge and groyne construction. This is a departure from the SMP proposed managed realignment due to MOD activity on the ranges, but it is consistent with the objective to maintain a minimum standard of protection of 0.5%.
- 3.3.7 With respect to groundwater, the SFRA at paragraph 6.4 on page 29 confirms that *“...the whole of the Shepway district is located within a low risk area.”*
- 3.3.8 Chapter 9 of the SFRA explains the modelling approach to breaches and overtopping. It is entitled ‘Residual Risk’ and confirms my own assessment that there is no primary tidal flood risk to the Airport due to the standard of protection afforded by the existing defences.
- 3.3.9 In the conclusions of the SFRA, the final bullet point raises the question as to whether new guidance on climate change predictions has been issued. This can be answered in the affirmative in light of UKCP09.
- 3.3.10 In summary with respect to the SFRA, I reiterate that the SFRA models multiple scenarios using PPS25/UKCIP02 climate change projections. The outputs are therefore robust and form a conservative planning tool that can then be applied by way of refinement for individual flood risk assessments.

3.4 CLIMATE CHANGE GUIDANCE

Planning Policy Statement 1 ‘Delivering Sustainable Development’ (PPS1, 2005) (CD6.1)

- 3.4.1 Planning Policy Statement 1 ‘Delivering Sustainable Development’ (PPS1, 2005) sets out the Government's overarching planning policies on the delivery of sustainable development through the planning system.
- 3.4.2 In the most recent consultation – Planning for a Low Carbon Future in a Changing Climate, March 2010 - the UKCP09 climate forecasts were referred to for future projects at paragraph LCF1.2 dealing with Evidence Base for Plan Making. It is there stated: *“For impacts not covered by this derived material, such as changes in temperature or extreme weather events, the assessments can be informed directly by the latest set of UK Climate Projections and the latest UK Climate Change Risk Assessment.”*

Adapting to Climate Change: Helping key sectors to adapt to climate change – Statutory Guidance to Reporting Authorities, 2009 (CD12.14)

- 3.4.3 Defra issued Statutory Guidance to Reporting Authorities in 2009 which made reference at paragraph 2.8 to the UKCP09 project as the evidence base for assessing the risk and impact of climate change.

Investing for the future – Flood and Coastal Risk Management in England, 2009 (CD12.13)

- 3.4.4 The EA has set out their long term investment strategy in ‘Investing for the future – Flood and Coastal Risk Management in England’ (EA 2009). In reviewing 5 investment scenarios the EA identify their ‘Investment 4 scenario’ as the most favourable outcome (it proposing £800 million of investment from 2010-2011 with year-on-year increases, along with specific targeting of at risk properties). In the section *‘The need to adapt to climate change’* (page 7) the EA states that the predicted investment is based on UKCP09 information.
- 3.4.5 This approach does not reflect PPS25 and the accompanying Practice Guide which still refers to UKCIP02. This difference of approach supports my analysis that both

scenarios should be reviewed in assessing the flood risk to the Airport with the most latest climate change taking precedent.

4 Drainage Strategy

4.1 SURFACE WATER DRAINAGE STRATEGY

- 4.1.1 The construction of the new terminal building pursuant to the Applications on existing impermeable surface within the curtilage of the Airport means there will be no increase in surface water run-off as a result of development.
- 4.1.2 The agreed surface water drainage strategy for the terminal building is therefore focused on pollution control, as outlined in the Flood Risk Assessment dated 28 September 2006 produced by BSF (CD1.12a). This FRA has the approval of the RMAIDB and EA as confirmed in their correspondence to WSP dated 20th April 2009 and 22nd September 2010 (Annex 5).
- 4.1.3 For the proposed runway extension pursuant to the Applications there is an increase in impermeable area of 17,455m² as a result of the works. There is also the need to divert 801m of ditch and extend existing ditches by 1300m to avoid overbuilding (an overall increase of 501m of ditch).
- 4.1.4 In order to provide a sustainable drainage solution it has been agreed with RMAIDB that the existing ditch diversion and extension will be used to create a linear attenuation feature to accept the increased run-off from the runway. The drainage strategy undertaken by WSP in 2009 (CD1.42a) was approved by the RMAIDB and EA as reconfirmed in their correspondence to WSP dated 22nd September 2010 (Annex 5). Full details of the outline drainage strategy for the runway and terminal building are contained in the updated FRA and 2006 FRAs contained in Annex 1 and Annex 2 respectively.
- 4.1.5 The new approved drainage strategy for the runway extension at the Airport provides more storage than required and more new length of ditch than lost.

5 Flooding and Mitigation

5.1 BASELINE FLOOD RISK

- 5.1.1 As detailed in the FRA in Annex 1, the primary source of flood risk to the Airport site is tidal. Fluvial flood risk is managed by the RMAIDB] through management of the land drainage system. Groundwater is also controlled by the RMAIDB managed land drainage system and the RMAIDB has no record of flooding at the Airport within their records from either source.
- 5.1.2 The SFRA provides a reference point for the level of tidal flood risk in the area. However, as my evidence demonstrates below, that level is overly robust for use in site specific flood risk assessment for this site due to the strategic nature of the reference point.
- 5.1.3 Firstly, the SFRA assessment of tidal flood risk ignores the policy objectives for maintenance of strategic flood defences as outlined in the FEMS. The policy for the defences which protect the Airport all include activity which will either maintain or raise the Standard of Protection (SoP) to a 0.5% probability (1 in 200 year) level including allowance for climate change.
- 5.1.4 This means that the assessment of tidal flood risk and hazard rating in the SFRA assumes that the maintenance policy for the strategic defences is not followed and that overtopping will occur both today and in the future 2115 assessment year. 2115 is the upper limit of climate change prediction as outlined in PPS25.
- 5.1.5 Secondly the SFRA hazard maps for the district in which the Airport is situated apply a cumulative breach at 12 locations to assess the tidal flood risk and hazard mapping for the 2009 and 2115 assessments. Although understandable for strategic spatial planning purposes, this is contrary to the EA's own guidance for site specific FRAs which states that a single breach of 100m for hard and shingle defences, and 200m for soft defences should be applied (see the updated FRA at Annex 1 of my evidence).
- 5.1.6 The cumulative breach width applied in the SFRA is 850m and not the 100m which would be appropriate for an assessment of flood risk from a breach in the defences to the east and south of the Airport on the surrounding dunes.

5.1.7 The final element of robustness in the SFRA is due to the timing of its publication in June 2009 which predates the publication of the latest climate change guidance, UKCP09 in August 2009.

5.1.8 The SFRA follows the guidance of PPS25 and applies the allowances for sea level rise as recommended in UKCIP02. The new FRA in Annex 1 highlights how this means that the sea level rise is in fact overestimated for the 95th percentile medium emissions scenario by 179mm.

5.2 FLOOD HAZARD

5.2.1 As I have previously stated, subject to the points set out above, the SFRA does provide a useful reference document. For this purpose we have obtained from the Council's consultant, Herrington, outputs from the original modelling for the two closest, single breach scenarios 3 and 5 to the Airport.

5.2.2 The 2009 and 2115 results of scenario 3, with a 100m breach at Galloways to the south of the Airport on the Lydd Ranges, are summarised below in terms of their effects on the runway extension and terminal building:

Terminal Building:

Max water level 3.25 mAD and 4.24 mAD

Peak Velocity 0.1m/s and 0.25 m/s

Runway extension:

Max water level 3.25 mAD and 4.24 mAD

Peak Velocity 0.1m/s and 0.25 m/s

5.2.3 Similarly, the results of scenario 5, with a 100m breach at Greatstone Dunes to the east of the Airport at Greatstone on Sea would be as follows:

Terminal Building:

Max water level 0 mAD and 0 mAD

Peak Velocity 0 m/s and 0 m/s

Runway extension:

Max water level 0 mAD and 3.63 mAD

Peak Velocity 0 m/s and 0.25 m/s

- 5.2.4 Comparison of these 2 scenarios reveals that although further away from the Airport, the breach to the south at Galloways would provide a greater flood risk than a closer breach at Greatstone Dunes to the east.
- 5.2.5 Inspection of the maps in Annex 4 produced for these 2 scenarios indicate that the proposed new Terminal is on the periphery of flood risk for scenario 3 only, which the floor level of the building mitigates against anyway, and the runway extension would remain unaffected.
- 5.2.6 If the Airport's actual, surveyed ground levels are applied to these results then the average ground depth as stated in the 2006 approved FRA's (CD1.12) would be 3.5mAD for the runway and 3.0m for the terminal building. On this basis the minimum terminal floor level would need to be 3.3mAD, in accordance with the EA advice of adding 300mm to existing ground level.
- 5.2.7 The predicted maximum water levels in the year 2115 should also be reduced to take account of the latest climate change data which postdates publication of the SFRA. This lowers the predicted tidal flood level by 179mm from 4.24mAD to 4.061mAD for scenario 3 and from 3.63mAD to 3.451mAD for scenario 5.
- 5.2.8 I therefore conclude that it is only a single breach to the south at Galloways which poses a low probability residual flood risk threat to the Airport. For the UKCP09 climate change predictions, a detailed hydraulic analysis would show that the maximum velocity and depth of flooding would reduce by a greater amount. This is because the duration of the high tide peak would reduce and therefore there would be a reduced volume of water that passed through the breach locations.

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- 5.2.9 However, for the purposes of my evidence, I have used the site specific outputs from the original SFRA modelling for the Airport with the results of the breach assessment scenarios 3 and 5. These provide an accurate indication of the flood risk and hazard that would occur using the UKCP09 projections for 2115.
- 5.2.10 Specifically by applying the EA FD2320 guidance formula Hazard Risk $HR = ((v + 0.5) * d) + DF$ the following residual, climate change flood hazards can prudently be calculated as:
- 5.2.11 For scenario 5, a 100m breach at Greatstones Dunes would create a low flood hazard to the runway and no flood hazard to the new terminal.
- 5.2.12 For scenario 3, a 100m breach at Galloways the flood hazard to the runway would be low and to the new terminal it would be significant.
- 5.2.13 By setting the minimum slab level for the new terminal building at 3.5mAD, however, there will be no climate change flood risk in the year 2115 for a 0.5% probability flood event for the breach in scenario 5 which is the nearest source of potential tidal flood risk. Indeed, for the bespoke Airport assessment of flood risk the Council's consultant has advised in their email dated 20 December 2010 in Annex 5 that from the time of breach it would take 4 hours for water to reach the Airport and a total of 18 hours for the maximum breach depth to be realised from the initial breach.
- 5.2.14 For the more remote, potential breach source of flooding, scenario 3, some 4.7km from the Airport, it is not appropriate to raise the new Terminal building further. It is acceptable to have a low probability, residual flood risk in these circumstances. This can be more than adequately mitigated by a combination of the Flood Warning and Evacuation Plan, and flood resilient construction.
- 5.2.15 It is my clear assessment that the residual tidal flood risk in the event that the strategic defences are not maintained in accordance with current policy, and assuming a single breach of 100m to the east of the Airport, would lead to no flood risk for a terminal built with a minimum floor level of 3.5mAD.
- 5.2.16 For the residual risk of a breach to the south in these circumstances, the new Terminal will provide safe refuge either on the ground or first floor depending on the

actual magnitude of the breach and the response of emergency services to breach repair. Given the presence of the town of Lydd between this potential source of future flooding, I anticipate that there would be a rapid response to breach repair in any event.

- 5.2.17 My other observation is that the meteorological events required to create a 0.5% probability sea level, both today and in future years, can be accurately forecast and given a lead-in of days the entire area will be on a status of high flood alert.
- 5.2.18 Assuming that the EA follow their own stated policy for maintaining the strategic tidal flood defences, then the actual risk of breach and overtopping causing a residual flood risk will be minimal anyway.
- 5.2.19 On the basis of the developed, updated FRA and extracts from the SFRA model for 2009, the proposed Airport expansion is in Flood Zone 1 (for the runway extension) and Flood Zones 1,2 and 3a (for the terminal building) today, and benefits from existing coastal defences. As a less vulnerable use, the Airport passes the Sequential Test set down in PPS25 as a permitted land use in Flood Zone 3a using the councils SFRA flood map for reference.

5.3 EXCEPTION TEST

- 5.3.1 Even if the Airport were to be classified as “Essential Infrastructure” for the purposes of Table D2 of PPS25, rather than in the class of Less Vulnerable commercial operation that I consider applies, the Exception Test is still passed because a) the developments’ wider sustainability benefits to the community outweigh any flood risk; b) the development within Flood Zone 3a is on brownfield land, and in any event there is no reasonably available alternative land as part of this existing operational airport; and c) the FRA proves that flood risk can be adequately mitigated and there is no increase in off-site flood risk.

5.4 OTHER AIRPORTS WITHIN FLOOD ZONES

- 5.4.1 There are other examples of airports within the UK currently located within a flood risk area. Annex 6 contains copies of the EA and SEPA Flood Maps which are publically available on the internet for London Gatwick Airport, London City Airport, Glasgow Prestwick and Edinburgh Airport.

5.4.2 The reason I highlight these examples of airports operating in a flood risk area are that any recent works requiring planning permission would have been accompanied by an appropriate flood risk assessment which took account of defences, mitigation and emergency plans as is the case for this Airport.

6 Emergency Planning

6.1 FLOOD WARNING AND EVACUATION PLAN

- 6.1.1 Notwithstanding the fact that the Airport will be safe from flooding in the year 2115, based on the current policies for the on-going maintenance of the flood defences for the next 100 years, I have identified an assessment of residual tidal flood risk in the event of either catastrophic failure of the defences or extreme tidal flood events. For this circumstance the FRA includes a Flood Warning and Evacuation Plan (FWEP) which I describe below.
- 6.1.2 As critical transport infrastructure, the Airport will operate its own overarching emergency plan for any civil emergency scenario. A Flood Warning and Evacuation Plan has been produced to cover either the emergency response to a known, forecasted extreme flood event or the emergency response to an unforeseen flood event due to systemic failure of the sea defences.
- 6.1.3 The Airport will benefit from the following:
- The terminal building has been designed in such a way that will provide safe refuge either at ground or first floor level (as can be seen from the updated FRA);
 - The Airport's Management have confirmed that "blue light" services will be available on the Airport site; and
 - The Airport's Management have confirmed that state of the art ICT equipment will be available to emergency services.
- 6.1.4 At the core of the emergency procedures recommended in the FWEP is the monitoring of the publicly available flood risk data in order to anticipate any expected flood risk scenario which could potentially affect the Airport.
- 6.1.5 The EA now provides a 'three day flood risk forecast' which will be used by the Airport's Managers to anticipate expected potential flooding in the area and to put in place the necessary emergency procedures. Managers of the Airport will monitor every day the 'three day flood risk forecast' provided by the EA: they would contact Shepway District Council and discuss with the Emergency Services based at the Airport in case of expected flooding which could potentially affect the Airport area.

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- 6.1.6 Managers of the Airport will also subscribe to Flood Warning Direct in order to receive directly Flood Warnings from the EA in case of the expected flooding.
- 6.1.7 The FWEP describes the emergency measures which will be followed depending on the level of Flood Warning issued by the EA. The measures range from an early closure of the Airport to the move of all the people at the Airport into the terminal building which would act as safe refuge in case time does not allow an evacuation before flooding happens. The FWEP also provides information on the roles of the various authorities involved in the emergency management and provides useful contact numbers.
- 6.1.8 The FWEP will be reviewed annually in order to ensure that it is up to date and reflect the flood risk at the site

DRAFT FOR DISCUSSION ONLY

7 Response 6 Parties Submissions

7.1 CAMPAIGN TO PROTECT RURAL ENGLAND, KENT

- 7.1.1 The Campaign to Protect Rural England (CPRE) Rule 6 submission provides limited data on sea level rise and flood risk and any objection it is pursuing. It is stated: *“We will demonstrate that the LAA site is a particularly poor choice for long term investment in infrastructure because of the long term risk from sea level rise and the current, and growing, risk from coastal flooding”*.
- 7.1.2 However, my evidence has detailed how the historic statutory evaluation of flood risk to the Airport has been overly robust through the use UKCIP02 and multiple breach and overtopping scenarios in the Shepway District Council SFRA.
- 7.1.3 Furthermore, their statement has no regard to the stated policy for maintenance and improvement of the existing tidal defences.
- 7.1.4 Simply put, the Airport is located in an area adequately defended to a high standard where flooding is only a highly unlikely residual risk. As a commercial operation the Airport and its proposed expansion is a permitted use in line with the guidance of PPS25.

7.2 FUTURE FLOOD EVIDENCE

- 7.2.1 In the absence of detailed submissions relating to flood risk at the Airport I reserve the right to provide any rebuttal evidence to any further submissions on flooding made by Rule 6 parties as necessary.

8 Summary and Conclusions

8.1 SUMMARY

- 8.1.1 The primary source of flood risk to the Airport is tidal. As to other sources of flood risk – fluvial, groundwater and surface water - there is no record of flooding at the Airport and it can be safely mitigated by the sustainable management of water both within the curtilage of the Airport and the broader Romney Marsh area under the jurisdiction of the RMAIDB.
- 8.1.2 The EA's existing policy for maintenance of the coastal defences on the Romney Marsh peninsular is set out in the SMP and FEMS and, although varying in precise detail for each component, the policy is to maintain them in a manner which provides a 0.5% probability (1 in 200 year) standard of protection taking account of the predicted impact of climate change over the next 100 years.
- 8.1.3 Therefore the Airport will be adequately defended to the standard required by PPS25 from tidal flood risk both today and in the future.
- 8.1.4 There is however an acknowledged residual flood risk from either the breach failure of the tidal flood defences or an extreme flood event.
- 8.1.5 Using the SFRA work as reference, by applying a deduction in predicted 2115 sea levels for the 95th percentile medium scenario UKCP09 climate change projections, and specifically using SFRA modelled outputs for the Airport, the tidal flood risk to the Airport can be quantified for a normal breach of a 100m in line with EA site specific FRA guidance.
- 8.1.6 For a single breach failure of defences protecting the Airport the flood hazard rating is no hazard or zero flood risk to the terminal building, and low to the runway extension, for a breach to the east at Greatstone Dunes.
- 8.1.7 For a single breach to the south at Galloways, there is a low hazard to the terminal building today (and none to the runway extension), but there would be a significant hazard to the terminal and a low hazard to the runway extension in the year 2115. However, should this unlikely breach occur, it is clear that the Airport is some 4.7km away from the flood source, there would be a flood alert in operation, and emergency services would provide a rapid response to repair the breach in order to protect the town of Lydd.

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- 8.1.8 From a PPS25 policy perspective the Airport is located within Flood Zones 2 and 3 based on the EA's Flood Zone Maps currently available (December 2010). Based on the SFRA single breach maps for 2009 the proposed expansion works for the Airport are in Flood Zone 1 (for the runway extension) and Flood Zones 1, 2 and 3a (for the terminal building) today, and benefits from existing coastal defences.
- 8.1.9 As a less vulnerable development the Airport is permitted development in line with Table D.2 of PPS25 in Flood Zones 1, 2 and 3a, and, as such, can be said to pass the Flood Sequential Test.
- 8.1.10 Even if the Airport were to be classed as Essential Infrastructure, which I do not consider it should, it can still be located in Flood Zones 1 and 2, and can also be located in Flood Zone 3a provided the Exception Test is passed.
- 8.1.11 In this instance the proposed development at the Airport would pass the Exceptions Test by virtue of:
- the development's wider sustainability benefits to the community outweighing any flood risk;
 - the existing Brownfield nature on which development in Flood Zone 3a is proposed, and the absence of reasonable alternatives in any event;
 - The presence of existing, maintained, flood defences and the Airport's mitigation proposals comprising a Flood Warning and Evacuation Plan, and flood resilient construction.
- 8.1.12 Proposals for the Airport expansion are therefore in full compliance with national and local policy on flooding.

8.2 CONCLUSION

- 8.2.1 This evidence, based mainly on technical data that has been independently prepared by Shepway District Council's SFRA consultant, clearly demonstrates that, based on national and local flood policy, flood risk does not prejudice expansion at the Airport and there is therefore no reason for expansion not to be permitted.
- 8.2.2 If the EA and Coastal Authorities/MOD maintain the defences in line with their published policy then the safe operational horizon for the Airport will be extended beyond 2115 from a flooding perspective.
- 8.2.3 The Airport can successfully operate all year round safe from a 0.5% probability (1 in 200 year) flood event even if a breach in the flood defences occurred to the east at Greatstones.
- 8.2.4 For a breach to the south at Galloways in the year 2115 there is a low probability, residual flood risk which would need the implementation of the Flood Warning and Evacuation Plan.
- 8.2.5 In line with PPS25 this approach to flood mitigation at the Airport is appropriate for a less vulnerable land use where there is no or low flood risk and hazard today, where the prevailing SMP (and FEMS) policy is to maintain a minimum 0.5% standard of protection for the next 100 years, and the new Terminal can provide safe refuge in an extreme event which creates a residual flood risk as part of a 'live' Flood Warning and Evacuation Plan.
- 8.2.6 The Airport is strategically located in the Dungeness Peninsular where tidal defences are to be maintained to a high standard for the next 100 years. This means that the actual flood risk to the Airport is low and will remain low to the year 2115. On this basis the assessment of residual flood risk and appropriate mitigation measures provides reassurance that the expansion of the Airport can proceed in full compliance with prevailing local and national policy.

**WSP Development and Transportation
WSP House
70 Chancery Lane
London
WC2A 1AF**

**Tel: +44 (0)20 7314 5000
Fax: +44 (0)20 7314 5111
<http://www.wspgroup.com>**

WSP UK Limited | Registered Address WSP House, 70 Chancery Lane, London, WC2A 1AF, UK | Reg No. 01383511 England | WSP Group plc | Offices worldwide



