

LAAG/4/M

**TOWN AND COUNTRY PLANNING ACT 1990 - SECTION 77 AND TOWN
AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND)
RULES 2000**

**APPLICATIONS BY LONDON ASHFORD AIRPORT LTD
SITE AT LONDON ASHFORD AIRPORT LIMITED, LYDD, ROMNEY
MARSH, TN29 9QL**

FURTHER EXAMPLES OF THE APPLICATION OF SITE ISSUES TO PLANNING CONTROLS AND RESTRICTIONS NEARBY NUCLEAR LICENSED SITES

Client: LYDD AIRPORT ACTION GROUP (LAAG)

Supplementary Statement of JOHN H LARGE

PLANNING INSPECTORATE REFERENCE: APP/L2250/V/10/2131934

LPA REFERENCES: Y06/1647/SH and Y06/1648/SH

INQUIRY DOCUMENT REFERENCE: LAAG/4/M

I ST ISSUE	REVISION N ^O	APPROVED	CURRENT ISSUE DATE
25 FEBRUARY 2010	LAAG-4-M-R8		3 MAY 2011

This pdf version of [LAAG-4-O](#) contains hyperlinks to other documents shown thus [M3136-A1](#) will display the whole of the paper, report, etc., referred to providing the host computer is internet connected. The printed hard copy of this document does not contain these links or full citation of the source references - access to the [Large & Associates](#) web page displaying the linked documents is direct by entering the Secure Passcode [CZ3136](#) on the [Client Zones](#) tab.

**FURTHER EXAMPLES OF THE APPLICATION OF SITE ISSUES TO PLANNING
CONTROLS AND RESTRICTIONS NEARBY NUCLEAR LICENSED SITES**

1 **QUALIFICATIONS AND EXPERIENCE**

2 I am John H Large of the Gatehouse, 1 Repository Road, Ha Ha Road, London SE18
3 4BQ.

3 I have given my qualification and experience in [LAAG/4/A](#) [¶4 to 7].

4 **INSTRUCTIONS**

5 On 25 February 2011 Ms Louise Barton, of the Lydd Airport Action Group (LAAG),
6 asked me to provide further examples of how future built and commercial
7 development might be restricted near to the Dungeness nuclear power stations
8 (NPPs).

6 **A) CONSULTATION ZONES – DUNGENESS A & B**

7 In [LAAG/4/K](#) [¶16 p3] I referred to the ‘[consultation zones](#)’ drawn up by the Health
8 and Safety Executive (HSE) around the Dungeness NPP sites, these being the
9 consultation zones referred to in the Government Circular [04/00](#) [¶A18 p47]
10 (APPENDIX 1).

8 However, Shepway DC provided the wrong map so following further requests to the
9 HSE ([M3136-A28](#) – APPENDIX 2), the correct consultation zones for [Dungeness A](#)
10 and [Dungeness B](#) (APPENDICES 3 and 4 respectively) were made available on 31
11 March 2011.

9 This error, entirely on the part of Shepway DC, requires correction of [LAAG/4/K](#)
10 text [¶16 and 17 p3] and APPENDICES 7 and 8 of LAAG/4/L relating to the location of
11 LAIA.

10 Referring to the correct consultation zones, LAIA is located in the OUTER zone for
11 [Dungeness A](#) so its development should have been notified by Shepway DC to the
12 HSE in accord with Government Circular [04/00](#) [¶A12].

11 There is no OUTER zone for [Dungeness B](#) and its Circular [04/00](#) consultation zones comprises just INNER and MIDDLE zones, with the latter zone extending out to a 3km radius from the NPP.

12 As a consultee the HSE, through its Nuclear Installations Inspectorate (NII), advises the Local Authority, here Shepway DC, on the hazards arising from ionising radiations at and from the Dungeness NPPs. The HSE also advises on the factors that should be taken into account by Shepway DC when considering developments to be located within any of the consultation zones in order to protect the public from radiation hazards posed by the Dungeness NPPs.¹

13 The HSE provides non-site specific guidance on the ‘*Consultation Criteria*’ for each of the consultation zones. Essentially, these consultation criteria trigger a requirement for the Local Authority to consult with the HSE whenever certain developments are proposed within the consultation zone, including recommended limitations on future developments that could lead to an increase in residential accommodation, and/or lead to an influx of non-residential population. The HSE consultation criteria are set out for the combination of [PADHI+Nuclear Installations](#),^{2,3} (APPENDIX 5) being

14 **TABLE 1 HSE CONSULTATION CRITERIA²**

Inner Zone	Any development leading to an increase in residential accommodation, or likely to cause an influx of non-residential population.
Middle Zone	Development providing residential accommodation, permanent or temporary, for more than 50 people or likely to cause an influx of non-residential population exceeding 50 people.
Outer Zone	Development likely to lead to an increase of 500 people in the population at any place.

15 The INNER, MIDDLE and OUTER zones identified on the Dungeness A and INNER and MIDDLE zones for Dungeness B correspond to the same zones of **TABLE 1**.

1 The HSE may also advise on other hazards (that exceed the ‘*controlled quantity*’) pertaining to the NPPs under the *Control of Major Accident Hazard (COMAH) Regulations* for which the Competent Authority comprises three organisations: the Health Safety Executive (HSE), the Environment Agency (EA - for England and Wales) and the Scottish Environmental Protection Agency (SEPA).

2 [PADHI+ Nuclear Installations](#), HSE Guidance, undated (c2006).

3 PADHI - [Planning Advice for Developments near Hazardous Installations](#) - the name given to the methodology and software decision support tool developed and used in HSE. It is used to give LUP advice on proposed developments near hazardous installations. During 2006/2007, the software decision support tool, known as PADHI+, was provided to PAs to enable them to consult HSE for advice on-line.

16 I have searched the Shepway DC web site for the *consultation criteria* adopted for the Dungeness consultation zones, and I specifically asked Shepway DC to provide a copy of any such criteria ([M3136-A27](#) – APPENDIX 6). From my searches and inquiries to date, it seems that Shepway DC has not established (ie published) any site-specific criteria on the type and size of development that might take place in each of the consultation zones radiating from the Dungeness NPP sites.

17 Example of where the HSE has given advice on the development around a licensed nuclear site, and where planning policy has been amended accordingly, is given by Reading Borough Council⁴ and, separately, Basingstoke and Deane Borough Councils.⁵

18 In the first example, Reading BC has, in agreement with the HSE, set out the general limits (ie consultation criteria) of the types and size of development that would be suited to development nearby the Atomic Weapons Establishment (AWE) plant at Burghfield.⁶

19 AWE Burghfield provides the centre of three, radial consultation zones (see [[9.1.9 p68](#) -APPENDIX 7 extract of Footnote 4) with the *INNER*, *MIDDLE* and *OUTER* zones, again corresponding to the respective zones designated for the Dungeness NPPs respectively.

20 In the second example, Basingstoke and Deane there is similar agreement with HSE relating to potential developments nearby the second AWE at Aldermaston.⁷

21 The radial distances defining the consultation zones from Burghfield, Aldermaston and Dungeness are as follows:

4 Reading Borough Council, [Sites and Detailed Policies Document, Revised Pre-Submission Draft](#), February 2011.

5 Basingstoke and Deane Borough Council, [Development Near to AWE Aldermaston](#) undated (c February 2011) (APPENDIX 8).

6 AWE Burghfield handles the UK nuclear weapons, including final assembly, maintenance and decommissioning of nuclear warheads.

7 AWE Aldermaston is the design, research and development centre of the UK nuclear weapons programme and it processes fissile materials such as highly enriched and depleted uranium, plutonium and maintains small stockpiles of other radioactive materials utilised in the weapon. There are no nuclear power reactors operational on either Aldermaston or the Burghfield sites.

22 **TABLE 2 COMPARISON OF CONSULTATION ZONE RADIAL ~DISTANCES & WIDTHS - km**

	INNER	MIDDLE	OUTER	COMMENTS
READING BURGHFIELD	0 - 1.5 (1.5)	1.5 - 3.5 (2)	3.5 - 5.5 (2)	All three zones defined by circular arcs of the struck radii
BASINGSTOKE ALDERMASTON	0 - 3.0 (3.0)	3.0 - 5.0 (2)	5.0 - 8.0 (3)	All three zones defined by circular arcs of the struck radii – see ND Consultation Zones ND01 (APPENDIX 9)
SHEPWAY DUNGENESS A	0 - 2.0 (2.0)	2.0 – 4.0 (2.0)	4.0 - 8.0 (4.0)	All three zones defined by circular arcs of the struck radii
SHEPWAY DUNGENESS B	0 - 1.0 (1.0)	1.0 – 3.0 (2.0)	NO OUTER ZONE DEFINED	Inner and Outer zones defined by circular arcs of the struck radii

23 The consultation criteria for the AWE Burghfield and Aldermaston are:

24 **TABLE 3 CONSULTATION CRITERIA FOR BURGHFIELD AND ALDERMASTON SITES**

ZONE	AGREED CONSULTATION CRITERIA	
	BURGHFIELD - READING	ALDERMASTON - BASINGSTOKE & DEANE
INNER	Any development leading to an increase in residential accommodation, or likely to cause an influx of non-residential population.	All residential or non residential. Where one or more additional person may live. Work, shop (all applications save listed buildings, conservation area consent, house extensions, shop fronts, prior notifications and telecommunications
MIDDLE	Development providing residential accommodation, permanent or temporary, for more than 50 people or likely to cause an influx of non-residential population exceeding 50 people.	Residential accommodation or non residential accommodation exceeding 50 people. <ul style="list-style-type: none"> · 20 or more dwellings; · 1,000m² B1[†] · 2,400m² B8
OUTER	Development likely to lead to an increase of 500 people in the population at any place	Residential accommodation and non residential exceeding 500 people <ul style="list-style-type: none"> · 200 or more dwellings; · 11,000m² B1 · 24,000m² B8

† B1 – Offices, research and development, light industry appropriate in a residential area

B8 - Storage or Distribution Centres, Wholesale, Warehouses, Distribution Centres and Repositories.

25 The limits or consultation criteria adopted by Reading BC are taken, word for word, from the HSE's guidance [PADHI+Nuclear Installations](#). The Basingstoke consultation criteria are in the same vein as the HSE guidance but are a little more detailed.

26 A number of issues arise when comparing the established zones and limits adopted by Reading BC and Basingstoke and Deane BC to the established zones but, in my opinion, uncertain limits applied to the Dungeness NPPs:

27 **Nature of the Nuclear Activities – Aldermaston -v- Dungeness B**

28 The activities at Aldermaston and Burghfield involve the handling of highly fissile materials such as highly enriched uranium and ‘*weapons-grade*’ plutonium. The main risk associated with these materials is that of neutron criticality⁸ so, to minimise this risk, the quantities and, particularly, the spatial geometry during all stages of the process are rigorously limited – under these constraints, a deviation into a critical situation is limited that the maximum explosive energy is not greater than a detonation from 4 lbs (~1.8kg) of TNT equivalent (about 0.0075E+9 J). It follows that the fission product (ie radioactivity) production is similarly restrained, as is the energy available to loft the radioactive release thereby providing a more efficacious airborne dispersion.

29 By comparison, an operating nuclear reactor core (such as Dungeness B) the fuel contains a considerable amount of thermal energy (about 1.8E+9 J/) which has to be immediately dissipated if the reactor SCRAMS (shuts down) and the turbine-alternator trips. Once that the nuclear fission processes have been shut down, the reactor fuel will continue to emit heat by virtue of its radioactive decay which, for the first hour or so of post shut down is equivalent 6 to 8% of the full power output of the reactor (about 0.1E+9 J/s).

30 Obviously, an accident originating in the fuel core of a nuclear reactor will, depending on the nature and severity of the event, release considerably more energy than an accidental fission at a nuclear weapons plant such as at Aldermaston or Burghfield. Also, because the irradiated fuel in the nuclear reactor continues to emit heat, the heat dissipation from the reactor core continues for days, weeks and months. This energy is available to degrade the fuel and its containment, thereby facilitating the release of a significant fraction of the 100 or so tonnes of nuclear fuel loaded into the core of each of the Dungeness B NPPs.

31 Illustration of the energy levels available in the [reactor](#) and [spent fuel storage pond](#) is given by the catastrophic events at the [Fukushima Dai-ichi](#) NPPs in Japan.

8 ‘*Criticality*’ is a nuclear process whereby an abundance of neutrons is produced by fission.

32 **HSE Consultation Criteria Applied to the Dungeness NPPS**

33 For Dungeness A NPP HSE’s OUTER zone [TABLE 1 p3] criterion required
 Shepway DC to have consulted with HSE if the proposed development exceeded:

Outer Zone	Development likely to lead to an increase of 500 people in the population at any place.
-------------------	---

34 In [LAAD/4/D](#) I estimated the numbers of persons that could accumulate within the terminal building and its immediate environs of the London Ashford International Airport (LAIA).

35 For example, under normal operating conditions (no log jamming) at a projected 500,000 passengers per annum about 770 persons (staff and passengers, etc) [TABLE 2 p16] would present ‘an influx of non-residential population exceeding 500 people’.⁹

36 In a log jammed situation [¶95-97 p16] and again for 500,000 ppa, about 1,650 people might be expected to be stranded at LAIA [TABLE 2 p16], that is an influx of non-residential population that exceeds both the HSE consultation criteria for the OUTER zone [TABLE 3].

37 As I noted in [LAAG/4/A](#) [¶30 p5], so long as a radiological hazard exists on the Dungeness A site, that is the combined radwastes of a) and b), then the management and use of the site has to comply with the conditions of the prevailing nuclear site licence. In [¶31 p5] I noted that even when all of the spent fuel has been removed from the Dungeness A reactor cores and the on-site storage ponds, there remains a sufficiently large amount of (radio)activated and radioactively contaminated materials for regulatory controls to stay in place for so long as the nuclear island, or its remnants, remain in situ (that is about 100 or more years).

38 In other words, a significant radiological hazard is scheduled to remain on the Dungeness A site for decades into the future and, because of this, I can foresee no

9 The footprint area of the proposed LAIA terminal building at ~7,380m² also exceeds the 1,000m² limit of B1 adopted by Basingstoke and Dean [TABLE 4] if, that is, this aspect of the consultation criteria applied at Dungeness.

reason why the present HSE consultation zones would be relaxed in the reasonably foreseeable future.

39 For Dungeness B NPP LAIA falls outside the limit of the consultation zones therefore, following the HSE's reasoning, there is no intolerable hazard presented to the public in occupancy beyond 3km from the NPP.

40 I do not agree with the HSE assessment that there is no intolerable hazard to the public beyond the 3km MIDDLE zone (ie the basis of consultation). To illustrate this, I refer to three nuclear incidents involving operational nuclear power plants where evacuation has been necessary to protect the immediate, interim and longer term health of the general public.

41 The day following the triggering event at the **Three Mile Island** (TMI) NPP incident of 1979,¹⁰ a 5 mile (~8km) evacuation zone for pregnant women and pre-school age children was ordered. At two days into the incident aftermath (30 March 1979), the evacuation zone was extended to 20 miles (~32km) for about 50% of the residential population. There is some disagreement about the extent of radiation dose (and the radiological consequences) received by members of public in the aftermath of the TMI incident, although the individual dose levels are generally accepted to be modest.¹¹

42 The **Chernobyl** incident involved a graphite moderated, water cooled reactor (RBMK) released a very significant quantity of radioactive fission product into the atmosphere over a ten day period commencing on 26 April 1986.¹² Radioactive contamination was registered Europe-wide, with immediate evacuation being required in what is now East Belarus, the Russian Federation and mainly north-west Ukraine.¹³ Within 2 days the nearby town of Pripyat¹⁴ was evacuated (and remains

10 The Three Mile Island accident was a core meltdown in Unit 2 PWR (a pressurized water reactor) in Dauphin County, Pennsylvania near Harrisburg, United States in late March 1979. The incident involved loss of cooling, a partial melt down of the reactor core fuel, release into the secondary containment dome, and a relatively modest bypass release from the containment into the public domain.

11 It is estimated that within days 140,000 individual members of public self-evacuated with most returning over the following three weeks – the maximum dose to any one exposed individual was reckoned to be no more than 1mSv (about one-third of the exposure from natural sources over a 12 month period).

12 [*Chernobyl – A Nuclear Catastrophe 20 Years On, A Review of the Present Situation in the Ukraine*](#), Large & Associates, May 2006

13 Directly attributable fatalities were 31, later analysis of the actual interim and longer term fatalities vary enormously from 64 (UNSCEAR), 4,000 (WHO), 200,000 (Greenpeace) – about 985,000 people were evacuated from the region in the days and weeks following the release.

abandoned to this day) and 30km exclusion zone established, parts of which form the so called *Alienation Zone* that extends up to 150km from the Chernobyl nuclear complex in west Ukraine.¹⁵

43 The nuclear incident at the **Fukushima Dai-ichi** nuclear complex in Japan commenced on 10 March 2011 and at the date of finalising this evidence (23 April 2011) remains ongoing.^{16,17} A number of countermeasure and evacuation zones have been established as the incident progressed: initially about 6,000, 30,000 and, then, 180,000 inhabitants were completely evacuated from the 3, 10 and 20km areas as these were put in place (10, 11 and 12 March respectively), populations were advised to shelter further afield (30km 15 March), and in the tear-shaped zone extending to Fukushima City (about 60km) the maximum annual radiation dose exposure for inhabitants remaining (including children) is presently not to exceed 100mSv, with the aim of maximising the annual dose to at or below 20mSv.¹⁸ On 21 April 2011 unaccompanied entry into the 20km zone was prohibited, this being akin to the 30km exclusion zone imposed at Chernobyl.

44 Also, it is of interest to note that all of these nuclear plants were contained within a form of structural secondary containment: TMI with the reactor and its primary circuit within a secondary containment dome; the Chernobyl reactor within a series of reinforced concrete cell-like structures forming the outer containment; and all of the Fukushima Dai-ichi Units 1, 2 and 3 reactors within the so called *light bulb-and-doughnut* containment suppression system.

14 The centre of Pripjat is about 4km from the stricken Chernobyl No 4 reactor, The total population of 49,500 was evacuated within two days of the reactor explosion. In total upwards of 3 million persons were evacuated from the *Alienation Zones* which have remained largely uninhabited, although the situation in Belarus remains unknown to this day.

15 The radioactive fall-out from Chernobyl was Europe-wide with restrictions remaining today on the pasturing of 359 farms and holdings in North Wales with about 180,000 sheep remaining in restricted areas - <http://www.food.gov.uk/wales/safetyhygienewales/chernobylmonwales>.

16 Following the *Tohoku-Taiheiyou-Oki* earthquake-tsunami, when the Fukushima Dai-ichi site lost all off- and on-site power and went into electrical *blackout*, it is believed that the loss of cooling to the reactors of Units 1, 2 and 3 resulted in each nuclear fuel core being exposed, overheating that led to explosion. For Units 1 and 3 the secondary containment structure was devastated by hydrogen accumulating in the charge hall as it was vented from the reactor pressure vessels. Unit 4, which was defueled at the time, underwent a violent explosion in the spent fuel pond area as a result, so it is believed, of the storage pond water boiling away. The incident at Fukushima Dai-ichi was, like Chernobyl, declared a Level 7 incident on the International Nuclear Incident Scale (INES), that is an incident involving a major release of radioactive material with widespread health and environment effects requiring implementation of planned and extended countermeasures.

17 *Incidents, Developing Situation and Possible Eventual Outcome at the Fukushima Dai-ichi Nuclear Power Plants*, Large J H, R2186-A1, 10 April 2011 – a copy of this report is available on request.

18 The annual (non radiological incident) exposure limit for members of the public is 1mSv from all artificial sources of radiation exposure, excluding that from medical treatment and diagnostic means.

45 By comparison, both Dungeness A and B NPPs have no secondary containment
 whatsoever.

46 The actual and declared emergency planning and countermeasure zones for the TMI,
 Chernobyl, Fukushima Dai-ichi and Dungeness NPPs are summarised as follows:

47 **TABLE 4 DECLARED AND ACTUAL EMERGENCY PLANNING ZONES**

NPP	DETAILED EMERGENCY PLANNING ZONE RADIAL km	IMPOSED IN EMERGENCY SITUATION RADIAL km
Three Mile Island	32	i) 8 ii) 32
Chernobyl	(as required by circumstances)	ii) 4 ii) 30 iii) >100
Fukushima Dai-ichi	3 to 10	i) 3 ii) 10 iii) 20 iv) 30 v) >60
Dungeness A	2.4	
Dungeness B	2.4	

48 The detailed emergency planning zones (DEPZ) distances shown on TABLE 4 are as
 specified in the [Kent Emergency Plan](#)¹⁹ [¶1.5.9], although these are required to be
 ‘extendable’ [¶1.1.5],²⁰ usually out to 10km.

49 **HSE CONSULTATION CRITERION**

50 In [LAAG-4-K](#) [¶18 p4], I noted that contrary to government policy no re-evaluation
 of the demographic site characteristics was undertaken by the HSE in account of the
 subject planning applications. It follows that Shepway DC could not have taken
 account any potential change in the demographic site characteristics in considering
 whether or not to approve the subject planning applications.

51 For Dungeness A, the HSE has made no formal statement that the hazard and risk of
 accidental or otherwise release of radioactive material has been nullified since the
 cessation of generation, nor that some form of demographic control would not
 remain in force during the prolonged period of decommissioning and dismantling,
 which is generally taken to be 100 years of more following shut down of the reactors.

19 [Kent Off-Site Emergency Plan](#) as required by the [Radiation \(Emergency Preparedness and Public Information\) Regulations 2001](#) (REPPiR).

20 As recommended by the Nuclear Emergencies Planning Liaison Group (Civil Nuclear Emergency Planning – Consolidated Guidance issued October 2001) – the range of ‘extendibility’ of the off-site plan is not specified for Dungeness although other comparable NPP specify 0km.

52 Similarly, although Shepway DC has not published its version of the HSE consultation criteria specifying the type and scale of development in each of the zones that requires involvement of the HSE, it seems reasonable that the HSE consultative criteria [[TABLE 1](#)] be assumed to apply in the consultation zones radiating from the Dungeness NPP sites.

53 So far as I can ascertain, the only notification from Shepway DC to the HSE seems to have been the *consultation criteria* In [LAAG/4/D](#) [¶110 to 114 p22] I summarised my opinion on the outcome of Shepway DC's failure to ask for and/or receive advice from the HSE on the juxtaposition of the London Ashford International Airport (LAIA) and the Dungeness NPPs.

54 All of the involved parties seem to have ignored to risk presented to the public by the loading of spent fuel at the remote railhead and the subsequent movement of the train loaded with spent fuel as passes through (and stops at) Lydd town.

55 **In conclusion:** Relating to the proposed development of LAIA, I am of the opinion that the information placed before this Planning Inquiry is incomplete in the following respects:

56 a) There is no evidence that Shepway DC properly informed and consulted with the HSE as set out in [PADHI+Nuclear Installations](#) and Circular [04/00](#); and

57 b) the failure to inform the HSE, and to receive advice from the HSE, on the hazards arising from ionising radiations at and from the Dungeness NPPs, and the associated spent fuel operations at the remote railhead, meant that Shepway DC could not have taken account any potential change in the demographic site characteristics in considering whether or not to approve the subject planning applications.

58 The HSE has been inconsistent in its advice on the radiological risk associated with nuclear plants and activities because:

59 a) it has advised the planning authorities at Aldermaston and Burghfield that residential development should be severely curtailed by imposing quite

onerous restrictions on any increase in population numbers nearby these plants;

60 b) but is has done so when it is generally accepted that accidents at these plants would be less energy dissipative than the potential radioactive release and radiological significance from the Dungeness B NPP, for which it is relaxed about the significant development of LAIA; and

61 c) even though its own consultants ([ESR Technology](#)) have advised the HSE that aircraft crash could *'lead to a significant radiological release'*(LAAG/4/I ¶25-26 p4).

62 I state here that I confirm that I have made clear which facts and matters referred to in this Statement that are within my own knowledge and which are not. Those that are within my own knowledge I confirm to be true. The opinions I have expressed represent my true and complete professional opinions on the matters to which they refer.



JOHN H LARGE
LARGE & ASSOCIATES
CONSULTING ENGINEERS, LONDON