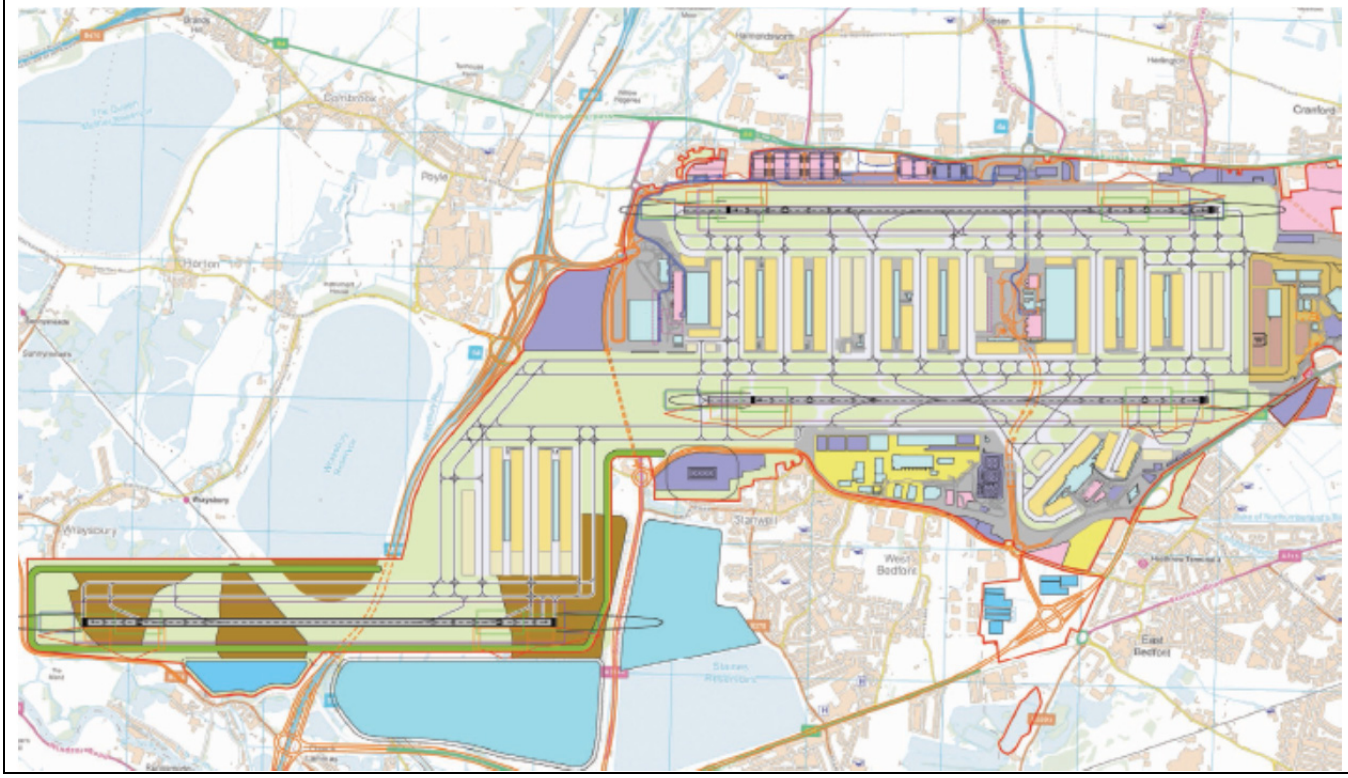
PROPOSAL TITLE:	South-West Runway	Group:	LHR
SUBMITTED BY:	Heathrow Airport Limited	Reference No.:	63

PROPOSAL

New 3,500m runway constructed to the south-west of the existing airport with linking taxiways to the west of the current south runway. The new runway could operate independently from the existing runways. Includes expansion of existing terminals plus new Terminal 6 immediately west of Terminal 5 serving new satellites and aprons located between the new and current southern runways. Requires tunnelling of the M25 under the new development, plus construction over the existing reservoirs. The new runway is located as far west as possible to reduce noise impact over London.



ASSESSMENT SUMMARY

STRATEGIC FIT / ECONOMY / OPERATIONS

Runways (net increase)	Passengers (net mppa)	ATMs (net)	London Airports Impact
	62	370,000	LHR
2	60	317,000	LGW
	53	268,000	
▶ 1 ◀	46	▶ 260,000 ◀	STN
	▶ 40 ◀	250,000	LTN
	34	222,500	
	30	190,000	LCY

ENVIRONMENT

57 dBA Leq 2030 pop'n with scheme	Listed Bldgs Grades I&II*, SM, CA, RP&G	Heritage & Designations Affected
1,400	▶ 0 ◀	SPA
2,500	3	Ramsar
6,300		SSSI
13,500	4	Grade I
142,600	5	Grade II*
144,000	8	Sched. Mon.
▶ 144,600 ◀		
180,900	14	

SURFACE ACCESS

45 min Population (millions)	1hr Population (millions)	2hr Population (millions)
17	18	38
▶ 14 ◀	▶ 16 ◀	▶ 36 ◀
10	14	27
9	13	25
6	12	20

COST / DELIVERY

2030 Risk-Adjusted Total (£bn)	Aero Yield (relative to LHR Q6)
9-13	1.3x
10-13	1.5x
13-18	
▶ 16-22 ◀	▶ 1.6x ◀
50-67	2.4x
82-112	3.4x

PEOPLE

Houses Demolished	IMD (Average within5km
200	26
260	21
720	20
800	▶ 19 ◀
▶ 1,300 ◀	14
1,500	8
1,600	7

PROPOSAL TITLE:	South-West Runway	Group:	LHR
SUBMITTED BY:	Heathrow Airport Limited	Reference No.:	63

OVERVIEW

Approach

Enabling legislation 2015-2019 with construction commencing in 2019 with opening in 2029 following established regulated mechanism. Earlier opening may be possible should relocation of the impacted reservoirs be resolved more quickly than anticipated.

Opening Year: 2029

Operational Viability

Capacity	Airport	Net	Forecast Use of Maximum Capacity 2030	2050
Runways	3	1		
ATM	740,000	260,000	80%	100%
pax	130	40	75%	98%

Cost

£b	Airport	Access	Other	Total	Risk	OB	Risk Adjusted Total	Promoter Estimate
2030	5-7	1-2	1-2	8-10	3-4	5-7	16-22	17.6
2050	8-10	1-2	1-2	10-14	4-5	7-10	21–29	

Surface Access

- Based on a public transport mode share of 50% for pax (41% currently) and a 'sustainable modes' share of 40% for employees (30% currently). Primarily achieved by additional rail services. Rail provision includes current HEX; Crossrail; improved Piccadilly line; and Western Rail Access Line (all committed); and the currently un-committed Southern Rail Access Line and HS2 spur schemes. These rail services have sufficient capacity to cope with the predicted airport-related demand.
- Local capacity improvements to M4 spur, J4A and airport tunnel.
- Some additional airport related traffic on M4 J4-J7 and M25 J10-J15; analysis suggests background demand contributes to need for enhancement.

Isochrone	Pop^{n} (million)
45 min	14
1 hr	16
2 hr	36
London centre	15 miles

Economic

Borough	Hillingdon	Hounslow	Ealing	Slough	Spelthorne	Runnymede	Windsor
Unemp^{nt} (%)	7.9	7.5	10.7	8.2	4.4	4.3	4.2
Ave. Salary (£/yr)	31,086	29,323	29,427	26,837	31,569	30,930	37,705

County	Bucks	Greater London	Berkshire	Surrey
GVA (£/cap)	22,125	34,779	31,057	25,432

Environment

- Slightly more people within 57dBA noise contour compared to north-west option but fewer than affected by Heathrow Hub and Heathrow 4 runway options.
- Cultural heritage impacts much less than for north-west Heathrow option.
- Significant impacts to internationally designated reservoirs (for nature conservation). Need to demonstrate no alternative, overriding public interest, and also likely to require large area of compensatory habitat provision that could be difficult to deliver locally.
- Large loss of river corridor and flood plain area requiring river diversion and flood compensation storage and conveyance accommodation within design.
- Fewer residential properties lost compared to north-west runway but more than for the Heathrow Hub option.

57 dBA L_{eq}	
2030 promoter impact	183,000
2012 local	239,600
2030 local - with scheme	144,600
2030 Net Local Impact	(6,100)
2030 system - with scheme	239,600
2030 Net System Impact	(6,100)
55 L_{DEN}	
2030 promoter impact	359,000
2030	385,500
50 L_{night} 2030	166,700
N70 2030	110,500

SAC[1]	SPA[1]	Ramsar	CA[1]	AONB[1]	SSSI[1]	Listed Buildings	SM[1]
-	1	1	-	-	3	7	-

People

IMD	Houses Lost
19	1,300

Delivery

Aero Yield Increase	Airport Only	Including Access
Indexation	~15%	~20%
No indexation	~50%	~60%

[1] SAC: Special Areas of Conservation; SPA: Special Protection Areas; CA: Conservation Area; AONB: Area of Outstanding Natural Beauty; SSSI: Site of Special Scientific Interest; SM: Scheduled Monument.

ECONOMY

Borough	Hillingdon	Hounslow	Ealing	Slough	Spelthorne	Windsor	Runnymede
Unemployment (%)	7.9	7.5	10.7	8.2	4.4	4.2	4.3
Ave. Salary (£/yr)	31,086	29,323	29,427	26,837	31,569	37,705	30,930
County	Greater London	Surrey	Berkshire	Bucks			
GVA (£/capita)	34,779	25,432	31,057	22,125			

Impact on Industry

Adding a third runway at Heathrow would provide sufficient capacity for the airport to meet expected medium term forecast demand through to the late 2030's, allowing more services with reduced delays due to improved resilience. This would support growth of aviation, tourism, logistics and related support businesses, and contribute to the agglomeration impacts of industry clustered in the Thames Valley/M4 corridor. It would allow significant expansion of airlines based at Heathrow, and a significant improvement in connectivity to a wide range of long haul destinations, Europe and in connecting other parts of the UK to long haul destinations. It is likely to help increase the share of airline traffic carried by UK based network carriers.

Airports	Adding a third runway at Heathrow would provide a capacity increase of 260,000 to the existing 480,000 ATM fully segregated operation at Heathrow. The competition dynamic in the London airport system would change. Heathrow could be expected to attract a proportion of traffic from Gatwick. A fourth runway option could be preserved by building to the North of the airport.
Airlines	Airlines currently using Heathrow and others seeking to use it would benefit from the increase in capacity to offer more services, with reduced delays due to greater resilience. Airlines would continue to have the same choices of airports as at present. Some network traffic may transfer from Gatwick because of the greater interlining opportunities, freeing capacity at Gatwick potentially increasing airport choice for LCCs and charter airlines. Competition among carriers is likely to increase at the airport and UK airline operations (British Airways and Virgin Atlantic in particular) would be much less constrained in their ability to compete with major network carriers at airports with more capacity (e.g. Air France/KLM at Charles De Gaulle and Schiphol, Lufthansa at Frankfurt and Munich, and Emirates and Etihad at Dubai and Abu Dhabi respectively).
Passengers	Passengers would benefit from increased capacity due to delay reductions and a greater choice of destinations/enhanced frequencies and increased competition, reducing travel times and fares.

Local & Regional Economic Impacts

The new expanded airport would facilitate growth of new and existing industries in airport and aviation support services and travel, tourism, logistics and other related sectors, to service growth in passenger and freight demand. Almost all would be able to continue serving customers of the airport from their existing position on the M4 corridor. This proposal would support agglomeration in the Thames Valley/M4 corridor, given its proximity to existing commercial developments supported by Heathrow. The scale of direct and indirect employment would be in proportion to the numbers of additional passengers. Direct, indirect and induced employment effects would be in the immediate vicinity and along key corridors to Heathrow.

National Economic Impacts

The main national economic impacts come from the provision of new capacity, enabling more flights and connectivity, and the increase in business and leisure trips, and trade in goods and services, and indirect effects on inward investment. Increased choices of flights and airlines, reducing air travel time and possibly fares, should generate significant consumer/welfare benefits.

Time/Distance to Central London	Isochrone pop[n] (million)		Key required upgrade schemes (above those already committed)
Paddington 15 mins (by rail)	45 min	14	▪ Southern rail access line. ▪ M4/M4A junction improvements. ▪ M25 tunnelling under the new development.
Docklands 40 mins (by rail)			
15 miles			
Journey times to other population centre	60 min	16	
Birmingham 50 mins	120 min	36	
Manchester 70 mins			

Modal Split Assumptions

Currently 41% of passengers use public transport modes to access Heathrow: 18% using the underground, 13% bus/coach and 10% rail. The surface access strategy is based on increasing the public transport mode share of passengers to 50% in 2031. This is a realistic assumption, given the significant planned improvements in rail services. The schemes should increase the current combined rail/underground mode split from 28% to around 35%, and further improvements to bus services for areas not well served by rail should increase the bus/coach rail share from 13% to around 15%. Furthermore, changes to road traffic unrelated to the airport would increase congestion and make access by road less attractive. Currently, 35% of employees use "sustainable modes" to access the airport. The target is to increase this to 40%, building on the continuous reduction in the car driver mode share for airport staff, (dropped from 79% in 1991 to 59% in 2011). This target to be achieved by public transport service improvements and staff incentives in line with suggestions from HAL (e.g. 75% off Heathrow Connect), and reduced staff car parking supply, with greater priority given to car sharers in the issuing of staff parking permits.

Rail Infrastructure Capacity Analysis

Peak hour one-directional rail flows to/from LHR on a 'busy day' in 2031 estimated to be ~3,500 passengers per hour in the peak direction (pphpd). Based on the current geographic distribution of airport-related rail trips estimated one-way peak hour airport-related demand (pphpd), as follows: HEX (900), Crossrail (1,100), Piccadilly Line (600), Western Rail Access Link (300); and Southern Rail Access Link (500). Estimated volume/capacity (v/c) ratios for airport-related demand on the services as follows: Overall (0.15); HEX (0.30); Crossrail (0.35); Piccadilly Line (0.05); Western Rail Access Link (0.20) and Southern Rail Access Link (0.70). Whereas HEX would only be used by airport-related demand, the other services would be used by both airport-related and other (commuter and leisure) demand. Appears reasonable that the level of overall demand taken up by airport-related trips (30%) provides sufficient capacity for other commuter and leisure trips and thus we conclude that the provision of rail lines and services as specified is sufficient to accommodate LHR surface access demand in 2030.

Highways Capacity Analysis

The air passenger road-based mode share is predicted to reduce from 59% in 2011 to 50% in 2031, and the proportion of employees driving (single occupancy) is predicted to reduce from 61% in 2011 to less than 50% in2031 (due to the measures discussed in the section below). We conclude that the increase in air passengers more than outweighs the reduction in car-based mode shares, and that there would be some additional airport-related traffic on the road network in 2031. This conflicts with the analysis of the promoter who stated that it is possible to deliver a third runway without airport-related traffic on the roads, partly as they assumed significant reductions in 'kiss and fly' and taxi surface access movements that we are unable to validate. As above, based on the current geographic distribution of airport-related car trips and estimated v/c ratios on each motorway link, capacity improvements are required at the central terminal area end of the airport tunnel to dissipate the traffic, and on junction 4A of the motorway spur. Peak hour, peak direction (phpd) airport-related flows to the airport of around 400 vehicles are predicted on the M4 between junctions 7 and 4 and on the M25 between junctions 10 and 15. However, our initial analysis suggests that on the M4 the total flows on this section would be below capacity and on the M25 the over capacity section (junctions 10-12) would be over capacity due to background traffic and not airport-related traffic. Over a wider area, airport-related traffic dissipates quickly to less than 200 vehicles phpd on any link. Therefore, it seems that beyond the local M4 access roads, the local motorway network could cope with the additional airport-related car demand, or is over capacity even without it.

Accessibility to Population & Business centres

Heathrow is well located in relation to the strategic highway network, with direct access from the M25 and M4, as well as being within 10 miles of the M3 and M40. 6 of the 16 million people within a 60 minute journey time have a public transport option. Reasonable, albeit regularly congested highway connections exist towards west and central London and towards north London. Heathrow is currently connected to Central London by the Heathrow Express (taking 15 minutes), Heathrow Connect (25 minutes) and the Piccadilly Line (45-60 minutes). Crossrail and the Piccadilly Line upgrade would considerably improve access to central London, as well as Canary Wharf and other locations to the east and north-east. The Western Rail Link would improve rail connections to Reading, the wider Thames Valley, Bristol and Wales, whilst the proposed Southern Rail Access would improve connectivity to south, south-west London, Surrey and the South Coast.

Accessibility to Transport Interchanges

Key transport interchanges directly served by existing and proposed rail services include: Paddington; Bond Street: Tottenham Court Road; Canary Wharf; Stratford; Old Oak Common and Reading. A HS2 Heathrow Spur would enable direct services to Birmingham, Leeds, Manchester, Nottingham, Edinburgh and Glasgow, with rail journey time savings of between 80 and 120 minutes, compared to today's journey times (partly by removing the need for a trip into central London). The Piccadilly line connects Heathrow to Kings Cross and St Pancras Stations.

Accessibility to Workforce

Currently most of the workforce is located locally, with Hounslow, Hillingdon and Ealing, and the District of Slough having the highest numbers of workers. The catchment area is expected to increase, with improvements to rail and bus services.

Demand Management Assumptions

The following demand management measures are proposed by HAL to influence travel behaviour to meet the mode choice targets: new and improved bus/coach routes, doubling the frequency of existing services and targeting new routes to key catchment areas such as Portsmouth, Southampton, Brighton, Luton and high Wycombe; real time information and journey planning tools to raise awareness of travel choices to passengers and influence travel behaviour; systems and incentives to encourage more efficient taxi use; improvements to the cycle network and further development of the Heathrow Cycle Hub to offer incentives and support to cyclists using the airport; and collaboration with freight operators to deliver further consolidation of freight movements.

Overall noise impact

HAL state that 183,000 people would be within airport 57 LA_{eq} contour 21% less than currently affected (2011).

By 2030, of 144,600 people within the 57 dBA L_{eq} contour, 36,800 people would be newly affected.

*Net reduction in noise exposure from 2012 is largely due to improved aircraft technology, and under 2 runway operations without the south-west runway development the affected population would have reduced to 150,700; the south-west option thus offers a further reduction of 6,100 people exposed at the 57dBA level primarily by spreading the impacts across three runway paths.

57 dBA L_{eq}	2030 promoter stated impact	183,000
	2012 local	239,600
	2030 local - without scheme	150,700
	2030 local - with scheme	144,600
	2012-2030 Local Impact with scheme	(95,000)
	2030 Net Local Impact	**(6,100)**
	2012 system	269,250
	2030 system - without scheme	245,700
	2030 system - with scheme	239,600
	2012-2030 system impact with scheme	(29,650)
	2030 Net System* Impact	**(6,100)**
	2030 population within 2012 and 2030 57dB contour	107,800
	2030 additional population within 2030 57dB contour	36,800
55 L_{DEN}	2030 promoter stated impact	359,000
	2030	385,500
50 L_{night}	2030	166,700
N70	2030	110,500

SAC	SPA	Ramsar	CA	AONB	SSSI	Listed Buildings	SM
-	1	1	-	-	3	7	-

Air Quality

Heathrow located in the southern part of Hillingdon AQMA with exceedences for NO_2 predominantly at residential properties close to heavily trafficked roads. Promoter proposes in mitigation to maximise public transport use and restrict access to Low emission vehicles only and to work with partners in surrounding areas to ensure air quality limits are not breached. HAL also states that additional capacity can be delivered at Heathrow whilst meeting air quality standards. HAL's analysis is based on modelled results and assumptions for:

- 2030 with 570,000 ATMs and for 2040 with 740,000 ATMs and expected improved standards and aircraft fleet for 2030
- Improvements in road vehicle emissions and assuming an increased use of passenger public transport use to 50%. Airside emission assumptions include increased use of low emission vehicles.

These assumptions are considered not unreasonable but it should be noted that transport analysis indicates an overall increase in airport related traffic on the road network even accounting for reduction in car-based mode share. No significant difference between Heathrow runway options for meeting air quality standards. Heathrow options are located in 3 AQMAs Hillingdon, Hounslow and Spelthorne.

Noise

Proposer sets out mitigation of noise:

- Current restrictions on night flights to continue.
- Potential for further operational mitigation in use of runways. Full packages for compensation/mitigation for new and increased noise exposure.
- With same restrictions on night flights and use of just one runway for small number of night flights - could operate to provide respite to residents through runway alternation. (NB Respite achievable with three runways generally averages to 33% of the time, compared with 50% of the time now)

Proposer suggests that population within 57 dB L_{eq} will be reduced by 21% compared to 231,000 people affected currently (2011). Reduction due to the change in aircraft emissions as the fleet complies with higher standards outweighing the increased ATMs, and the shifting of a significant proportion of arrivals and departures further west. Although there is an overall reduction in the number of people affected in 2030 compared to 2012, the population affected would change including communities not currently experiencing noise nuisance, whilst some would experience an increase and others a reduction in noise.

2030 Forecast: Independent noise modelling for comparison provided the following results based on 2030 forecast population distribution (adjusted for housing demolished), forecast aircraft mix appropriate for the number of aircraft movements, passenger load and reflecting respite potential in the proposal:

- 57 dBA L_{eq}: 144,600 people affected of which 107,800 are currently affected at this level and 36,800 would be brought into this noise contour compared to 34,800 for the north-west option and 37, 500 for the Heathrow Hub option.
- 55 L_{DEN}: 385,500 people affected – 4,600 more than the north-west option and 28,400 more than the Heathrow Hub option.

- 50 L_{night}: 166,700 people affected – 3,800 fewer than the north-west option but 33,100 more than the Heathrow Hub option (133,600).
- N70: 110,500 people affected at the 50 event contour, ~10% more than the north-west 3rd runway option, and significantly more than Gatwick +1 (5,100 people) and Stansted +1 (4,000 people) but less than the Heathrow Hub option (112,900).

The difference between the promoter's figures and the independent analysis is due to a combination of different assumptions for aircraft mix and flight paths and population data.

2050 Forecast: From 2030 to 2050 ATMs are expected to increase by around 25% potentially leading to an increase of about 1.2dB. Assuming no change to the aircraft mix, it is considered likely that improvements in aircraft technology would result in quieter aircraft which would off-set this increase. Even without a change to measured noise levels however there is potential for increased nuisance to residents from the greater numbers of flights passing overhead.

Net Noise: The net reduction in noise exposure with 144,600 people within the 57 L_{eq} contour in 2030 compared to 239,600 affected in 2012 is largely due to improved aircraft technology. With continued Heathrow 2 runway operations, by 2030 the affected population would have reduced to 150,700; the south-west option therefore offers a further reduction of 6,100 people exposed at the 57dBA level whilst increasing capacity.

Designations

Ecology:

- Direct loss to Wraysbury reservoir, King George VI reservoir, Staines Moor, and the Wraysbury and Hythe End Gravel Pits. All are part of South West London Water Bodies SPA/Ramsar designation (all are also individual SSSIs) and are therefore of European/international and national importance.
- These sites are partly designated for their importance for birds.
- The extent of impact related to bird strike control on the surrounding sites such as the adjacent Staines reservoir is not clear.

Impacts on the SPA/Ramsar sites would require Appropriate Assessment under the Habitats Regulations. The direct impact on the Natura 2000 network would probably mean that provisions of Article 6(4) of the Habitats Directive would be required. The risk to making the alternatives test is high due to the potential for other locations to meet the objectives for the expansion which would not have such an adverse effect (as per Secretary of State's decision not to grant permission for the Southampton Dibden Bay container terminal). The proposal would also need to demonstrate the project is necessary in relation to overriding public interest and they would require compensatory measures which can demonstrably maintain the integrity of the Natura 2000 sites affected. Although as a habitat type open water is not difficult technically to replace, it may be difficult to both demonstrate that each qualifying species would be accommodated and find new locations to replace habitat lost/affected by bird strike control measures. Note that Water Companies have identified possible locations for reservoirs in some cases but have not been able to take forward preferred options through the planning process. However, previously investigated options could be revisited. There may be some opportunity for compensation through non reservoir wetland creation. All the Heathrow runway options are within an area of influence for the SPA/RAMSAR site but this south-west option has a much greater direct impact. In this context it may be difficult to show no alternative and also to deliver the compensatory measures likely to be required. If the no alternative argument and overriding public interest can be demonstrated, delivery of replacements for very large areas of effective habitat loss would be difficult to achieve. There is likely to be potential to link with compensatory water storage reservoir(s) and flood storage provision depending on location and design.

Cultural Heritage: 7 Grade II buildings would be lost and ~6 Grade II listed buildings located around the perimeter of the footprint may also be at risk but no Grade I or II* affected. Impacts on the setting of surrounding designated cultural heritage sites likely.

Landscape and Townscape: No national landscape designations affected.

Climate Change

Operation: The Proposer claims a third runway is consistent with meeting UK's legally binding climate change targets. This is the same for all Heathrow runway options and all hub options. Increased efficiency of aircraft movements (in air, on ground) would improve carbon efficiency per ATM / PAX than current operations.

Construction and demolition: South-west option includes M25 tunnel diversion. Construction related carbon emissions are indicated as 0.80Mt in a central estimate based on runway, taxiway and terminal build, but excluding estimates for reservoir reconstruction and significant highways works. On its own, this is considerably lower than new hub construction, and is slightly higher than one new runway at Gatwick but lower than one new runway at Stansted. The south-west option is in reality likely to have a larger footprint than other options due to the reservoir reconstruction, habitat and flood storage and water supply storage compensation and additional M25 tunnelling.

Other Issues

Water Resources and Flood Risk:

- Flood plain loss (Flood zone 2 and 3) totalling 37% of airport area (a loss of 670ha).
- Runway crosses the River Colne and part of the River Thames corridor s with loss of river/riverside habitat and 1,416,000 m^2 of flood zone 3 storage. This would require compensatory storage in addition to run-off attenuation.

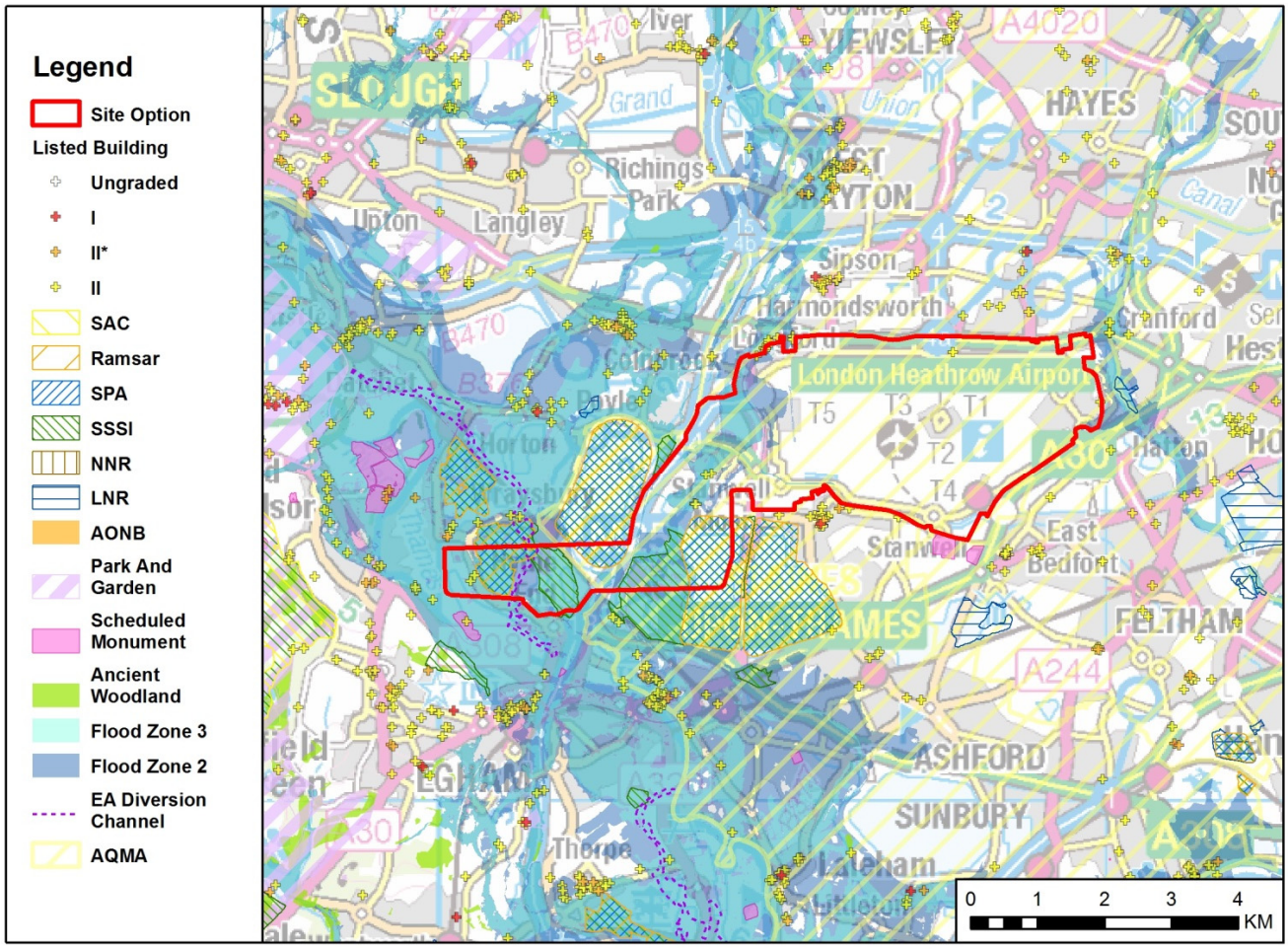
- Around 80% of the width of the floodplain would be obstructed by the proposed runway. Additional channels/culverts would therefore be required to pass the water forward.
- In addition, the Environment Agency intends to construct a new flood diversion channel in the Lower Thames between Datchet and Chertsey as set out in their flood risk management strategy. The proposed runway crosses this new channel. Typically the channel is around 80m wide by 5m deep.
- Mitigation would require 1km long sections of culverted channel and would conflict with Environment Agency /Water Framework Directive objectives to improve river ecological status.
- Water supply storage impact through loss of King George VI reservoir and reduction to Wraysbury Reservoirs both operated by Thames Water. Alternative storage capacity of around 22Mm3 to be found. Locations for new reservoirs in the region have been studied by Thames Water and other water companies and options could be revisited. New reservoir options have generally met considerable local resistance.

Land Use and Development:

- Land lost includes Greenbelt land, open space and recreational amenity.
- Approximately 250 ha of greenfield land would be lost; a smaller area of undeveloped land compared to all the other options except for the Heathrow Hub. This may include loss of some local landscape and cultural heritage features, hedgerows, protected species habitat, footpaths and archaeological interest.
- Loss of approximately 70 ha of grade 1 and 2 (best and most versatile land).
- Landfill sites within runway footprint (may require relocation).

Surface Access Improvements:

Potential impacts related to all access improvements including Southern Rail access, M4/M4A junction improvements and M25 tunnelling under the new development.



PEOPLE

Housing

- Fewer residential properties lost for the south-west option compared to the north-west (1,500) but more than for the Heathrow Hub option (720)
- Along with the increase in employment opportunities, all options at Heathrow are likely to add to housing pressure in the region.

Demolished
1,300

Vulnerable Groups

- The Index of Multiple Deprivation (IMD), averaged within 5km of the airport, is 19.1: a greater proportion of the population around Heathrow is affected by deprivation compared to areas around Stansted (7.5) and Gatwick (14.4), but a smaller proportion than around the Isle of Grain (IMD 26.1). The south-west option is marginally lower than the north-west (20.8), but marginally higher than the Heathrow Hub (18.7) option.
- The area around Heathrow is more densely populated than the area around Gatwick, Stansted or the Isle of Grain and the numbers of people within more vulnerable groups such as elderly and children are likely correspondingly greater. There are no schools located within the footprint area.
- Vulnerable groups may be more sensitive to the negative effects of aircraft noise. However, some vulnerable groups may also benefit from economic opportunities from airport expansion.
- This option would result in the loss of Stanwell Moor as a community.

Quality of Life and Health

- Approximately 118,300 and 490,000 people are located within 2km and 5k respectively, of the airport.
- Negative impacts on communities close to the new runway, e.g. Wraysbury, Old Windsor, Hythe End and north Staines, include new noise exposure, over flight, and access changes.
- Smaller population affected by night time noise compared to the north-west option but provides much less night time respite than the Heathrow Hub option. This south-west option affects a greater new population within by 57 L_{eq} than the north-west option but less than the Heathrow Hub option.
- Impacts on open space loss including the river corridor and setting for local open space e.g. Colne Valley Regional Park, are the greatest for this option compared to other Heathrow options.
- All the Heathrow options cause a smaller loss of open space/greenfield than the Stansted and Isle of Grain options.

Wider Social Impacts

Maintains and adds to employment opportunities in the region with related opportunity and access benefits.

COST

Capital Cost

2050 airport cost includes construction of additional terminal and airfield infrastructure to accommodate increase in demand.

Environmental cost more than north-west runway option and four runway option due mainly to reservoir costs.

Promoter estimates £17.6bn.

£ bn	2030	2050
Airport	5 - 7	8 - 10
Access	1 - 2	1 - 2
Other	1 - 2	1 - 2
Total	8 - 10	10 - 14
Risk	3 - 4	4 - 5
Optimism Bias	5 - 7	7 - 10
Risk Adjusted Total	16 - 22	21 - 29

Key Risks

- Construction in area currently occupied by reservoirs.
- Identification of a suitable, alternative location for the relocated reservoirs and obtaining planning permission.
- Construction over the M25 and realignment
- Construction adjacent to and in line with the existing southern runway.
- Tunnelling for rail and road links.

Risk and Contingency Allowances

40% contingency adopted for all costs. 50% optimism bias applied.

Surface Access Costs

Assumes that a new rail connection to the north of the airport, upgrade of the Piccadilly underground line and HS2 high speed rail connection are schemes that would be funded by others. Based upon modifying motorway layouts, capacity improvements of motorway junctions, capacity upgrades to existing central terminal area tunnel and new rail link to the south-west of the airport at Staines. Infrastructure investment to 2030 along with wider transport infrastructure upgrades, currently unknown, is expected to accommodate the increase in passenger demand at the airport to 2050.

Other Off-Airport Costs

Significant levels of mitigation and/or compensation required to ensure Water Framework Directive and flood risk storage requirements are met. This includes mitigation measures for compensatory habitat provision including replacement reservoir. These costs have been incorporated into the 'other costs'. Allowance of approximately £0.4bn has been made for the decommissioning of existing reservoirs and their re-provision at a new site.

OPERATIONAL VIABILITY

Capacity

Increase to existing airport capacity and enabling operations to be conducted in a more resilient manner.

	Net	Airport	Net	Forecast Usage of Maximum Capacity	
				2030	2050
Runways	3	1			
ATM	740,000	260,000		80%	100%
pax	130	40		75%	98%

Resilience, Reliability and Efficiency

The proposal supports independent parallel approaches; however, capacity has been constrained to limit noise impacts. This reduction in capacity would also improve resilience over current operations.

Transfer between terminal zones may exceed times acceptable to airlines; however, we would anticipate that airlines alliances would co-locate within a terminal zone reducing the impact of lengthier inter-terminal zone transfer times.

Safety

The proposal could be designed to comply with safety requirements. The proposal increases the number of flights over central London.

Scalability

This proposal only allows for development of a fourth runway by adopting either the north-west or north runway options and scaling up would require some changes to airport facilities to enable additional build out. However, either of these fourth runway options would establish a third operational centre remote from the two that would exist at that time.

Airspace

The proposal would not require significant airspace redesign. The boundaries of the London terminal manoeuvring area (LTMA) would be amended and Heathrow's SIDs, STARS and interfaces with en route airspace would be amended to include the additional runway. However, given the long-term nature of the options and the likely airspace and air traffic management developments under SESAR, restructuring could be achieved as part of the on-going development process. There would not need to be any change of international boundaries.

DELIVERY

Timescale

Proposer's timeline suggests the airport would open in 2029, with public policy in place 2015 to 2019. Earlier opening may be possible should relocation of the impacted reservoirs be resolved more quickly than anticipated.

Commercial Deliverability

Independent high level assessment suggests that, to meet the full debt requirement, aero yield may have to be increased by between ~15% and ~20% and indexed at 2.5% per annum thereafter, depending upon the level of contribution to surface access costs. Alternatively, without indexation, an increase of between ~50% and 60% would be required.

Aeronautical yield index relative to Heathrow Q6 to breakeven: 1.6.

The borrowing requirement is large and above precedent for finance to be raised in the context of a wholly privately funded, single transaction. Bond issuance under a RAB model might be possible for the on-airport-only works, although there might be investor concerns about investment concentration in a single asset. Likely therefore that there would need to be an element of Government support.