Qantas Group Flight Training Centre
297 King Street Mascot

Fire Safety Strategy for SSD Submission

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FOR QANTAS AIRWAYS LIMITED

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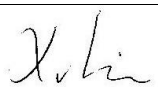
Document Control

Revision	Date	Purpose	Author	
1	March 1, 2019	For stakeholder review	Xijuan Liu	
2	April 12, 2019	Replaced by Rev 2a		
2a	April 15, 2019	For SSD submission	Xijuan Liu	

1 INTRODUCTION

XEL Consulting has been commissioned by Qantas Airways Ltd (Qantas) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the SSD 10154 for the development of a new flight training centre at 297 King Street, Mascot. The Project seeks consent for the construction and operation of a new flight training centre, and associated ancillary uses including a multi-deck car park. This report provides a high-level solution for the flight training centre building only and will be further developed in the detailed design stage. The fire safety strategy for the multi-deck carpark is presented in a separate report.

Glossary and abbreviations used in this report are explained in Appendix A.

Information considered in preparing the strategy includes:

a) Architectural drawings prepared by Noxon Giffen Architecture listed in Appendix B; and
b) BCA Assessment Report by Steve Waston & Partners, Report 2019/0208 R1.2, April 2019.

2 SITE DESCRIPTION

The site is located at 297 King Street, Mascot and comprises land known as Lots 2 & 4 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 DP 659434. The site is identified in Figure 1.

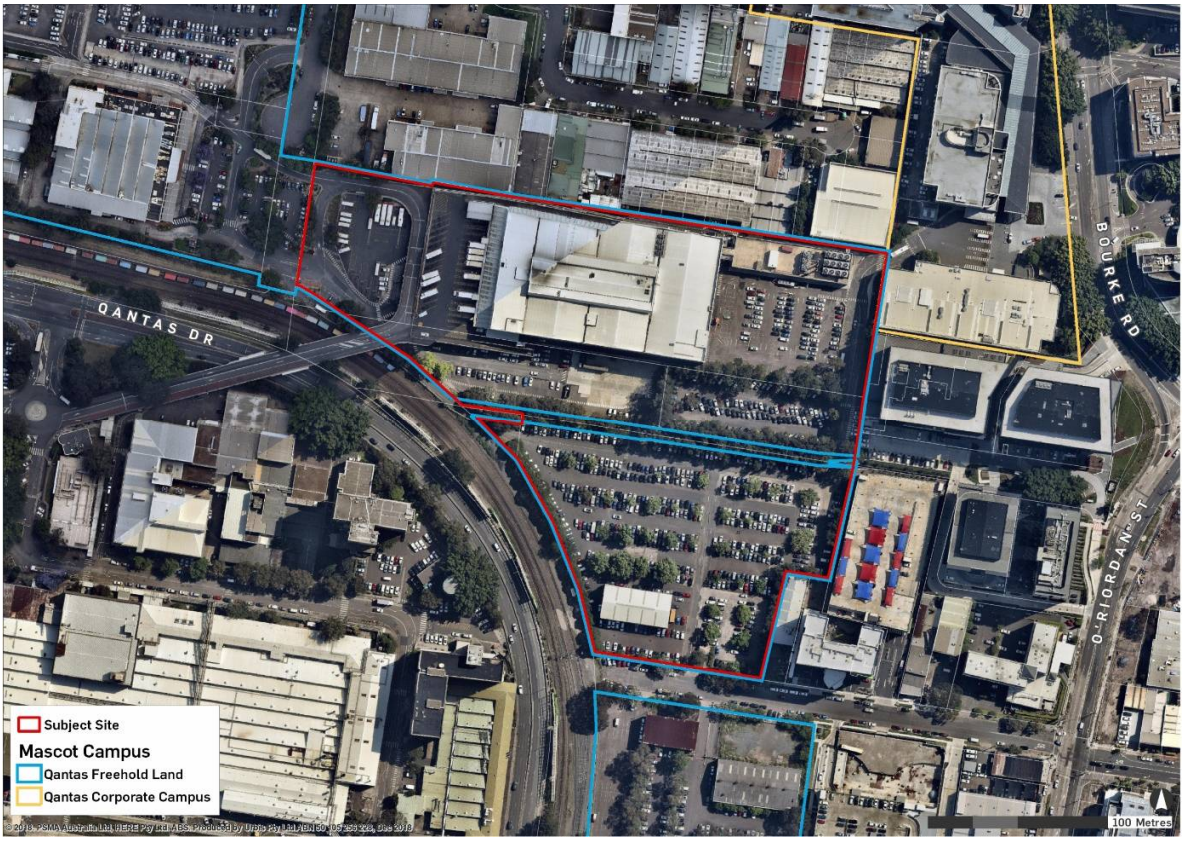


Figure 1 - The Site

Key features of the site are as follows:

- The site is approximately 5.417ha and is an irregular shape. It is approximately 240m in length and maintains a variable width of between approximately 321m in the northern portion of the site and approximately 93m along the King Street frontage (refer to Figure 1).
- The site possesses a relatively level slope across the site. An open Sydney Water drainage channel bisects the northern portion of the site in an east-west direction. There are some isolated changes in level immediately adjacent to this channel. A Site Survey Plan accompanies the application which details the topographic characteristics of the site.
- Multiple mature Plane Trees are scattered throughout the site. A variety of native and exotic tress and vegetation also exist around the perimeter of the site which help screen the site from surrounding uses.
- Site improvements include at-grade car parking for Qantas staff, an industrial shed to store spare aviation parts, a substation, a disused gatehouse, a Sydney Water Asset with two driveways over it, the Qantas catering facility and Qantas tri-generation plant.
- The site forms part of a larger land holding under the ownership of Qantas that generally extends between Qantas Drive to the west, Ewan Street to the south, Coward Street to the north, with the Qantas "Corporate Campus" fronting Bourke Road.
- Vehicular access to the site from the local road network is available from King Street. The site has intra-campus connections along the northern boundary in the form of two connecting driveways in the north-eastern and north-western corner of the site along the northern boundary which link it to the broader Mascot Campus.
- The site is located within the Bayside LGA.

Key features of the locality are:

- **North:** The site is bounded to the north low scale industrial development, beyond which is Coward Street. Further north of the site is the Mascot Town Centre which is characterised by transport-oriented development including high density mixed-use development focussed around the Mascot Train Station.
- **East:** The site is bordered to the east by commercial development including a newly completed Travelodge hotel which includes a commercial car park. Additional commercial development to the east includes the Ibis Hotel and Pullman Sydney Airport fronting O'Riordan Street.
- **South:** The site is bounded to the south by King Street, beyond which is Qantas owned at-grade car parking and other industrial uses. Further south is the Botany Freight Rail Line and Qantas Drive beyond which is the Domestic Terminal at Sydney Airport.
- **West:** The site is bordered to the west by the Botany Freight Rail Line and Qantas Drive, beyond which lies Sydney Kingsford Smith Airport and the Qantas Jetbase (location of the current Flight Training Centre).

3 BUILDING DESCRIPTION

3.1 Building usage

The proposed flight training centre will occupy the southern portion of the site. It is a building that comprises 4 core elements as follows:

- An emergency procedures hall that contains;
  - cabin evacuation emergency trainers,
  - an evacuation training pool,
  - door trainers,
  - fire trainers
  - slide descent towers,
  - security room,
  - aviation medicine training and equipment rooms.
- A flight training centre that contains:
  - flight training halls with 14 bays that will house aircraft simulators,
  - integrated procedures training rooms, computer rooms, a maintenance workshop, storerooms, multiple de-briefing and briefing rooms, pilot's lounge and a shared lounge.
- Teaching Space that contains
  - training rooms,
  - classrooms and two computer-based exam rooms.
- Office Space
  - Office space for staff and associated shared amenities including multiple small, medium and large meeting rooms, think tank rooms, informal meeting spaces, a video room and lunch/tea room.
- Ancillary spaces including the reception area at the ground floor, toilets, roof plant and vertical circulation. The external ground floor layout will include a loading dock, at-grade car parking for approximately 39 spaces and a bus drop-off zone at the northern site boundary.

3.2 BCA parameters

The Flight Training Centre will contain four levels, with the aircraft simulator (SIM) bays connecting the lower three levels. The top level is separated from the lower levels and will be used as offices. The Emergency Procedure (EP) hall will contain 2 levels. The two parts are joined via the entry and EP Raft Hall in the middle. Figure 2 shows the Ground Floor plan of the building.

Key building characteristics in the context of the BCA that are based on to determine BCA *deemed-to-satisfy* provisions are summarized in Table 1 in accordance with the BCA report.

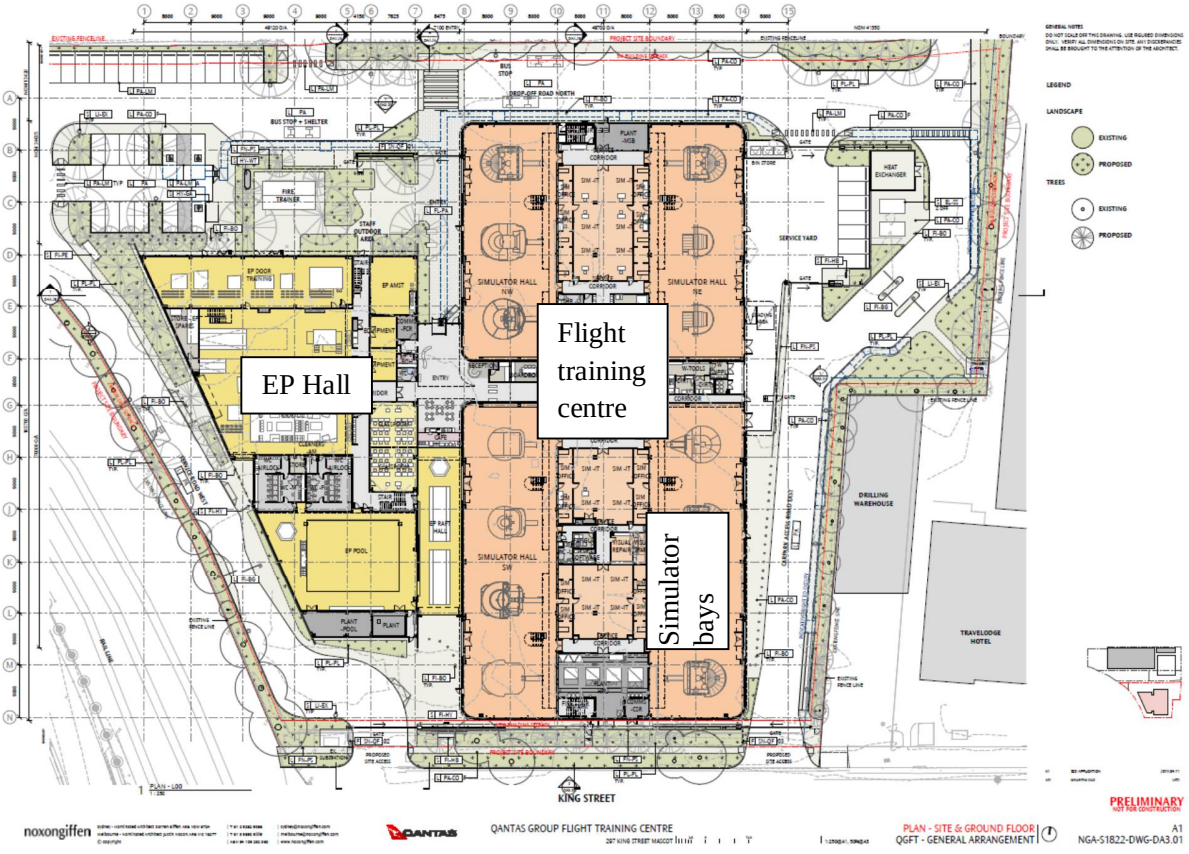


Figure 2 – Site & Ground Floor Plan of the QGFTC building

Table 1 Key determinants for BCA *deemed-to-satisfy* provisions

Classification	Class 5 - offices Class 9b - education
Rise in storey	4
Type of Construction	Type A – flight training centre Type B – emergency procedures (EP) hall
Effective height	12.55 m

4 FIRE RESISTANCE AND SEPARATION

The building will be divided into fire compartments within the limits of Clause C2.2 of the BCA. The four fire compartments are:

- the EP Hall;
- SIM Hall South, including Level 1 and Level 2 and the entry hall;
- SIM Hall North; and
- Admin on Level 3.

Due to fire compartmentation different types of construction are applied to the EP Hall (Type B) and the SIM Hall (Type A), determined from rise in storey and classification.

Fire separation between fire compartments are by fire walls and floors of the same FRL in lieu of a fire wall extending through all levels as per BCA Clause C2.7, which will be subject to Performance Solution.

Protection of openings in external walls of different fire compartments at various junctions will be subject to Performance Solution which permits fire rating external wall of one of the fire compartments on both sides of the wall to prevent fire spread in both directions between the two fire compartments, instead of protecting openings in both fire compartments under Clause C3.3. The methods of protection may not be those in Clause C3.4. The deviations from Clause C3.3 and C3.4 are subject to Performance Solution.

5 EGRESS PROVISIONS

The EP Hall will be provided with three open stairs connecting the two levels. On the Ground Level exits will be provided to open space on the north and south sides and through horizontal exit to the entry space. The four-level flight training centre will have three fire isolated stairs, at both northern and southern ends and in the middle. Exits on the Ground Level are from the perimeter of the SIM bays and the entry space. The number of exits and fire isolation where required will comply with the BCA DtS provisions.

Travel distances are subject to Performance Solution, including over 20m to Point of Choice (PoC), over 40m to the nearest exit and over 60m between alternative exits via PoC. The extents of additional travel distances are shown in Table 2 which are subject to further design development and fire engineering assessment.

Aggregate exit width from each level will be no less than that required for the number of occupants. Widths of paths of travel to exits within the SIM bays at various locations may be less than 1m if the simulator(s) happen to be in the most stretched position of the full motion envelopes (i.e. the maximum space of possible movement) and fail to restore to the original stationary position at the time of emergency. The potentially reduced widths of paths of travel due to encroachment by the simulators are subject to Performance Solution.

The open stair in the flight training centre part is not required for egress. It connects four levels, contrary to BCA Clause D1.12 which permits only two levels be connected in buildings not protected by sprinklers. The connection of four levels will be subject to Performance Solution involving fire separation of Level 3 and smoke separation on Level 2.

6 FIRE SERVICES

6.1 Fire Fighting Equipment

Fire hydrant system, fire hose reels and fire extinguishers are to generally comply with Part E1 of the BCA and relevant Australian Standards, except that the location of fire brigade booster assembly will be located at the rear of the building which faces the main public road (King Street) for site access after consultation with Fire & Rescue NSW, instead of being in the front of the building within sight of the main entrance as per AS2419.1-2005.

6.2 Smoke Hazard Management

An automatic fire detection and alarm system complying with Clause 4 of Specification E2.2a and AS1670.1-2015 is to be installed throughout. The type of detectors is being selected to detect fire at reasonably earlier stage as well as to prevent false alarms caused by theatrical smoke used for simulation. The details are being worked out with the fire services engineer.

The provision of smoke exhaust system required due to Class 9b fire compartments exceeding 2000m^2 is subject to Performance Solution. It is proposed to install smoke exhaust in the EP Hall only to maintain tenable conditions for occupants on both levels. Smoke exhaust is not proposed in the SIM halls due to smoke separation of Level 2 and low population on Ground Level and Level 1.

6.3 Part G3 Provisions

The SIM halls connect three levels, thus are technically atria and triggers Part G3 requirements under DtS provisions. It is proposed on performance basis that Part G3 is not applied; it is proposed to smoke separate Level 2 from the SIM bays and the lower levels so that in evacuation stage only two levels are connected by the SIM bays.

6.4 Visibility in an Emergency, Exit Signs and Warning Systems

Visibility in an emergency (emergency lighting) and exit signs are to comply with BCA Part E4 and AS2293.1- 2005.
Occupant warning is to be provided as part of the smoke detection system as per Clause 7 of Specification E2.2a and AS1670.1.

7 SUMMARY OF ITEMS TO COMPLY VIA PERFORMANCE SOLUTION

Table 2 below presents the items to comply with the BCA Performance Requirements via Performance Solution. These are items identified to date; the items and details of deviation are subject to further design development, BCA assessment and fire engineering assessment.

Table 2 Items subject to Performance Solution

Item No.	DtS Clause	Description	Proposed under Performance Solution	Performance Requirements
1.	**C2.7**	Fire compartment separation	Fire separation between fire compartments in generally is not by a fire wall extending through all levels; fire walls and floor slabs together form fire barriers to prevent fire spread between fire compartments. Fire separation of Level 3 involves fire curtains at the open stair.	CP2
2.	**C3.3 & C3.4**	Protection of openings in external walls	Fire resistance levels to be provided to external walls of one of the adjacent fire compartments from both side of the wall, so that fire spread	CP2

		of different fire compartments	cannot occur in either direction.	
3.	**D1.4**	Exit travel distances to a point of choice between available exits	Travel distances to PoC exceeding 20m: - 25m from the kitchen on Level 2 - 23m from the CBT PT on Level 2 - 26m from Pilot Lounge on Level 1 - 25m from CBT EP on Level 1 - 28m from EP Hall on Ground Level - 27m within SIM halls -	DP4, EP2.2
4.	**D1.4**	Exit travel distances to the nearest available exits	Travel distances to one of two or more exits exceeding 40m: - 48m from northern office area on Level 3 - 50m from plant room on Level 3 (to be resolved by adding door on south end of plant room)	DP4, EP2.2
5.	**D1.5**	Distance between alternative exits	Travel distances between two alternative exits through the point of choice exceed 60m: - 78m between two fire stairs on Level 3 - 69m between EP hall exits north and south (to be resolved by swinging fire door into entry lobby and provide horizontal exit) - 74m between external exits in the SIM bays on Ground Level - 68m between external exit in SIM bay and central fire stair on Ground Level	DP4, EP2.2
6.	**D1.6**	Dimensions of path of travel to an exit	A path of travel to an exit may be encroached and have less than 1m width if simulators stop at position closest to the path at the time of emergency.	DP6
7.	**D1.12**	Open stair connecting four levels	The central, non-required stair connects four levels. It is proposed to smoke separate Level 2 and fire separate Level 3, so that the open stair connects only two levels in fire mode.	CP2, EP2.2
8.	**E1.3, AS2419.1**	Location of fire brigade booster assembly	Fire brigade booster assembly will be located at the rear of the building which faces the main public road (King Street) for site access after consultation with Fire & Rescue NSW.	EP1.3
9.	**E2.2**	Smoke exhaust	Smoke exhaust is to be provided in the EP Hall. Smoke exhaust is not proposed in the SIM Hall, due to smoke separation of Level 2 and low population on Ground Level and Level 1.	EP2.2
10.	**Part G3**	Atrium provisions	Part G3 will not be applied due to unique building design and usage and separation of floor space from the SIM halls.	EP1.4, EP2.2

APPENDIX A GLOSSARY AND ABBREVIATIONS

FIRE ENGINEERING GLOSSARY

Term	Definition
Deemed-to-Satisfy Solution	*A method of satisfying the Deemed-to- Satisfy Provisions.*
Deemed-to- Satisfy Provisions	*Provisions that are deemed to satisfy the Performance Requirements.*
Effective height	*The vertical distance between the floor of the lowest storey included in the calculation of rise in storeys and the floor of the topmost storey (excluding the topmost storey if it contains only heating, ventilating, lift or other equipment, water tanks or similar service units).*
Fire resistance level	*The grading periods in minutes determined in accordance with Schedule 5 of the BCA, for the following criteria –* *(a) Structural adequacy; and* *(b) Integrity; and* *(c) Insulation,* *And expressed in that order.*
Performance Requirement	*A requirement which states the level of performance which a Performance Solution or Deemed-to-Satisfy Solution must meet.*
Performance Solution	*A method of complying with the Performance Requirements other than by a Deemed-to-Satisfy Solution.*
Rise in storey	*The greatest number of storeys calculated in accordance with C1.2 of the BCA.*
Type of Construction	*Type of fire-resisting construction of a building determined in accordance with C1.1 of the BCA. Type A is the most fire-resisting and Type C is the least fire-resisting.*

ABBREVIATIONS

Acronym	Definition
BCA	*National Code of Construction, Volume One, Building Code of Australia 2019*
DtS	*Deemed – to - satisfy*
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
FRL	*Fire resistance level*
F&R NSW	*Fire and Rescue NSW*
NSW	New South Wales
PoC	Point of Choice, a point from which travel in different directions to 2 exits is

Acronym	Definition
	available.
Qantas	Qantas Airways Limited
QGFTC	Qantas Group Flight Training Centre
SIM	Full Motion Flight Simulators
sqm	Square Metres
SSD	State Significant Development

APPENDIX B REFERENCED ARCHITECTURAL DRAWINGS

Drawing No.	Title	Revision	Date
DA3.01	Plan – Site & Ground Floor	A1	2019.04.11
DA3.02	Plan – Level 1	A1	2019.04.11
DA3.03	Plan – Level 2	A1	2019.04.11
DA3.04	Plan – Level 3	A1	2019.04.11
DA3.10	Plan – Roof	A1	2019.04.11
DA3.20	Elevations – North & South	A1	2019.04.11
DA3.21	Elevations – East & West	A1	2019.04.11
DA3.25	Sections	A1	2019.04.11
DA3.26	Sections	A1	2019.04.11