
Report of Roger Howkins

Concerning the lifts at

Grenfell Tower

For the Grenfell Tower Inquiry

Phase 2

September 2020

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Report of Roger Hawkins

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A. Introduction

1. I have been instructed by the Grenfell Tower Inquiry to report on the following issues:
 - 1.1. Relevant legislation, regulation and guidance for fire lifts and firefighting lifts in the 1970s (original design and construction), 2005 (first lift refurbishment) and 2012-2016 (second lift refurbishment) (“the Relevant Standards”).
 - 1.2. Did the lifts as installed/refurbished in 1972, 2005 and 2012-2016 comply with the Relevant Standards?
 - 1.3. Did the Tenant Management Organisation’s policy on firefighting lifts comply with the Relevant Standards?
 - 1.4. If they did not, to what extent did they fail to comply and what impact would this have had on their functionality, particularly with regard to fire safety and their ability to function in a fire?
 - 1.5. Were the lifts maintained to an appropriate standard and in compliance with the Relevant Standards and industry practice?
 - 1.6. How did the lifts perform on the night of the fire? What were the reasons for any failure to perform?
2. Throughout this report, I will refer to the work carried out on the lifts at Grenfell Tower in 2004-2006 as ‘Project 1’ and the work carried out on the lifts in 2014-2015 as ‘Project 2’.

B. Executive Summary

3. In **Section C**, I explain any abbreviations used, introduce the key people I will discuss in my report, set out any key documents referred to and provide a diagram of the Tower. In **Section D** I provide a brief chronology of the history of the lifts at Grenfell Tower from 1972-4 (the date of its original construction) to 14 June 2017 (the date of the fire).
4. In **Section E** I set out the relevant legislation, codes and guidance. I conclude that:
 - 4.1. When Grenfell Tower was originally built, there was a requirement for a fireman's lift in tall buildings.
 - 4.2. By 2002-6, the period of the first lift works (Project 1), there was a requirement in tall buildings for firefighting lifts. Firefighting lifts are different from fireman's lifts. Firefighting lifts are, in summary, lifts with additional protection which can be used by firefighters during a fire.
 - 4.3. By 2014-5, when the second lift works, Project 2, happened, there was still a requirement for a firefighting lift in tall buildings, but it had not changed significantly since 2005.
5. In **Section F**, I look at the original lift installation and say that there is not enough information for me to reach a conclusion about whether the original lift installation met the relevant standards in 1972-4.
6. In **Section G** I look at all the main parties who were involved in the lifts: Butler & Young Lift Consultants Ltd, Apex, calfordseaden, TMO, Otis/PDERS, Bureau Veritas, Gerald Honey Partnership and Rydon.
7. In **Section H**, I consider the requirement for a firefighting lift in existing buildings. I conclude that the published guidance in 2005 did not clearly state that lifts in existing tall buildings should be upgraded to firefighting lifts when works are done. However, in my opinion, when a significant amount of work was done to the lifts in 2003-6, Butler & Young should have considered whether the lifts could be upgraded to firefighting lifts. In **Section I**, I look in more detail at Butler & Young's involvement at Grenfell Tower. They designed the lifts in 2003-6 (Project 1). I conclude that in 2003-6 they could have done more to upgrade the lifts at Grenfell Tower to firefighting lifts.
8. In **Section J**, I look at Apex. They did the construction work on the lifts between 2004-6 and did further work in 2014-5. I think that, particularly in 2004-6, Apex should have done more to inform Butler & Young and the TMO that the lifts at Grenfell Tower were not firefighting lifts. I consider a range of other bodies at **Sections K, M, N, O** and **P**. I identify some criticisms of these bodies.
9. In **Section L**, I look at the role of the TMO. In their Project Brief to Butler & Young in 2002 for Project 1, they asked Butler & Young to consider the firefighting capabilities of the lifts, but I don't think they ever followed this up. Later, they adopted their own definition of a

firefighting lift which did not reflect the relevant standards at the time. I think this was confusing. I think they should have done more to ensure the lifts at Grenfell Tower met the definition of a firefighting lift.

10. In **Section Q** I look at the fire control switch in detail. In my opinion, there is insufficient evidence for me to be able to conclude with any certainty which key was used in the fire control switch on the night of the fire. I therefore cannot safely conclude why the fire control switch did not operate on the night of the fire.
11. In **Section R** I consider the evidence about what happened to the lifts on the night of the fire. In my opinion, the lifts did not operate as they should have done. The main issues were that the fire control switch did not work and that residents were still able to use the lifts as normal. If the fire control functions of the lifts had worked properly, the firefighters would have been able to take control of the lifts and use them. If the lifts had been firefighting lifts, they would have had additional protection and functions which the firefighters may have been able to use on the night.
12. In **Section S** I explain the limitations of the report. These are mainly that I was unable to visit the Tower and that I could not see some documents but that I do not think this has made an important difference to my conclusions.
13. In **Section T**, I summarise my answers to the key questions which I have been asked by the Inquiry.
14. In **Appendix 1** I summarise the main firefighting lift guidance set out in Section E. In **Appendices 2 to 10** I append eight professional reports which have informed my conclusions. In **Appendix 11** I include a number of photographs of the lifts taken after the fire which I have considered. In **Appendices 12 and 13** I include two important drawings, the first from 1971 by Hammond & Champness and the second from 2003 by Apex. In **Appendix 14** I include my CV.

C. Reference information

C.1. Abbreviations used in this report

ADB	Approved Document B
BS	British Standard
B&Y or BYLCL	Butler & Young Lift Consultants Limited
BS EN	European Standard
CM	Crew Manager
FF	Fire Fighter
FSAL	Fire service access level
GHP	Gerald Honey Partnership
GT	Grenfell Tower
LFB	London Fire Brigade
Lift H090	The left hand electric passenger lift at Grenfell Tower.
Lift H091	The right hand electric passenger lift at Grenfell Tower.
Lift H092	The hydraulic lift (not considered for reasons explained in the report)
TMO or KCTMO	Kensington & Chelsea Tenant Management Organisation
RBKC	Royal Borough of Kensington and Chelsea

C.2. List of key individuals

Organisation	Name	Brief description of role	Date of statement	URN of witness statement
Apex	Gary Ager	Construction Project Manager – Project 2	30/10/2019	{APX00008762}
	Roger Anthony	Project Manager – Project 1	29/10/2019	{APX00008780}
	Warren Jenchner	Director	29/10/2019	{APX00008774}

	Ray Murray	Sales Consultant – Project 2	29/10/2019	{APX00008773}
	Gary Poynter	Construction Director – Project 1, limited involvement in Project 2	30/10/2019	{APX00008766}
Bureau Veritas	Michael Arnold	Completed Thorough Examination of lifts at GT in April 2017		Awaiting statement
	Isiaka Lasisi	Engineer Surveyor/Regional senior engineer – completed Thorough Examination of lifts at GT in November 2016.	08/11/2019	{BVL00000015}
	Kyle Veitch	Technical, Quality and Risk Director	08/11/2019	{BVL00000006}
Butler & Young Associates	Jim Bryce	Structural Engineer		No statement obtained
Butler & Young Lift Consultants Ltd	Stephen Ellis	Associate Engineer	23/09/2019	{BUT00000040}
	Ian Moorhouse	Director – until May 2005	23/09/2019	{BUT00000023}
calfordseaden	Michael Burke	Senior Lift Engineer – Project 2	23/09/2019	{CAL00000048}
Carl Stokes Associates	Carl Stokes	Fire Risk Assessor	28/09/2018	{CST00003063}
			13/03/2020	{CST00030186}
Gerald Honey Partnership	Mike Sapsford			No statement obtained
Kensington and Chelsea Tenant Management Organisation	Robin Cahalarn	Lift Engineer	07/01/2020	{TMO00866023}
			Unsigned	{TMO00873798}
	Siobhan Rumble	Estate Services Manager	31/08/2019	{TMO10050001}
	Paul Steadman	Caretaker/Estate Services Assistant	17/07/2019	{TMO10049875}
			12/05/2020	{TMO00870944}

	David Steppel	Engineering Manager		No statement obtained
	Claire Williams	Project Manager – Project 2	15/02/2019	{TMO00840364}
			02/09/2019	{TMO00842312}
	Janice Wray	Health and Safety Facilities Manager	07/02/2019	{TMO00000890}
			01/11/2019	{TMO00847305}
London Fire Brigade	Mark Atkinson	Head of Procurement at LFB	16/12/2019	{LFB00083885}
	Ben Gallagher	Firefighter (Crew Manager)	11/01/2018	{MET00010083}
			12/06/2019	{MET00040215}
	Andrew Mobbs	Head of Business Intelligence in the Information Management Team	07/02/2020	{LFB00089149}
	Ricky Nuttall	Firefighter	07/08/2019	{MET00056991}
	Christopher Secrett	Firefighter (Crew Manager)	06/02/2018	{MET00010105}
			22/11/2018	{MET00039598}
			07/08/2019	{MET00056990}
			13/02/2020	{LFB00091726}
PDERS	Sarah Dixon	Former Managing Director of Express Lift Co and Subsidiaries division of Otis Ltd.	23/10/2018	{MET00024030}
	Philip Edwards	Operations Manager	04/04/2018	{PDR00000012}
	Michael Fallis-Taylor	Current Managing Director of Express Lift Co and Subsidiaries division of Otis Ltd.	18/11/2019	{PDR00000050}
	Mark Scott Wallis	Lifts Maintenance Engineer	28/10/2019	{PDR00000036}
	David Smalley	Lifts Maintenance Engineer	01/10/2019	{PDR00000029}

	Anthony Smart	Lifts Maintenance Engineer	30/09/2019	{PDR00000027}
Rydon	Simon Lawrence	Contracts Manager	25/09/2018	{RYD00094220}
	Simon O'Connor	Project Manager	28/09/2018	{RYD00094221}

C.3. Other key documents

15. In this report I refer to some other key reports and documents. To help the reader, I have set out the most important in this list:

Name of report	Date	URN	Appendix to report
BRE Global Client Report – On Site Investigation Interim Report	9 March 2018	{MET00012525}	2
WSP Operation Northleigh Site Investigation Report	August 2018	{MET00019973}	3
BRE Global Client Report – On Site Investigation Report (lift related extracts only)	20 February 2019	{MET00039807}	4
Commentary on inspection of fire control switch at BRE	1 March 2019	{RHO00000001}	5
Commentary on testing of fire control switch – University of Northampton	27 October 2019	{RHO00000002}	6
Forensic report by Andre Horne on fire control switch and drop key	12 November 2019	{MET00056700}	7
BRE Client Report – On Site	10 February 2020	{MET00065879}	8
Forensic report by Andre Horne on fire control panel key supplied by the fire services	15 May 2020	{MET00070846}	9
Forensic report by Andre Horne	28 August 2020	{MET00071006}	10

C.4. Diagram of Grenfell Tower

Level	Function	Project 1	Project 2
25	Floor 20	Accommodation – served by lifts	Accommodation – served by lifts
24	Floor 19		
23	Floor 18		
22	Floor 17		
21	Floor 16		
20	Floor 15		
19	Floor 14		
18	Floor 13		
17	Floor 12		
16	Floor 11		
15	Floor 10		
14	Floor 9		
13	Floor 8		
12	Floor 7		
11	Floor 6		
10	Floor 5		
9	Floor 4		
8	Floor 3		
7	Floor 2		
6	Floor 1		
5	Walkway+1	No lift service	New flats added – lift service extended to this floor
4	Walkway	No accommodation – served by lifts	No accommodation – served by lifts. Pedestrian access during works.
3	Mezzanine	No lift service	New flats added – lift service extended to this floor
2	Ground floor	Served by lifts Fire Service Access Level (FSAL)	Served by lifts Fire Service Access Level (FSAL)
1	Basement		

D. Lifts Chronology

16. I have prepared a brief chronology of the history of the lifts at Grenfell Tower from 1972-4 (the date of its original construction) to 14 June 2017 (the date of the fire).
17. The chronology is focused on the period between 2004 and 2017. It does not focus on the period between 1972 and 2004 because, as part of Project 1, extensive works were carried out to the lifts. The design and condition of the lifts prior to 2004 are, in my view, of limited relevance to my analysis of the lifts' design/performance as at 14 June 2017.
18. Also, there is little documentation available for the period between 1972 and 2004.

D.1. Original Design and Construction

1972-4	Grenfell Tower built. Lift installation by Hammond & Champness Ltd.	{TMO10023897} {BUT00000002}
10 April 1984	Letter from Peter Jones to Messrs Dunbar and Boardman Partnership confirming that the lift doors at Grenfell Tower must have a fire rating of not less than 30 minutes.	{RBK00029795}
1985	Refurbishment of lifts by original installer – relay based form of control was replaced with Thames Valley microprocessor controller. Original traction drive machines were replaced with Holroyd gears. Lift cars and entrances replaced.	{BUT00000002}
15 April 1991	Review of the alarms at Grenfell Tower by Buckle and Partners.	{RBK00013175}
24 January 1992	Meeting minutes referring to lift car refurbishment involving Buckle and Partners and Floyd Slaski Partnership. Notes: <i>"Floyd Slaski Partnership proposal for car refurbishment issued to lift suppliers."</i>	{RBK00050455}
18 December 1992	Tender document for lift refurbishment submitted by Leonard Lifts.	{RBK00050493}
27 January 1993	Meeting minutes noting that tenders for the Grenfell Tower lift refurbishment had been returned. Also notes that Kier London have taken over the Grenfell Tower lift.	{RBK00050497}
24 June 1993	Architects instruction for lift refurbishment.	{RBK00050522}

25 August 1993	Meeting minutes which refer to Grenfell Tower lift refurbishment, in particular that the fabrication drawings had been instructed and extent to works finalised.	{RBK00050542}
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D.2. First lift works - Project 1

August 2002	<p>TMO produced a project brief for lift consultants for lift works at Grenfell Tower.</p> <p>The Brief noted:</p> <p>Appendix A, 1.1: <i>"The report shall address the clients concerns in respect to the immediate and medium term maintenance viability of the existing installations given the current levels of failures, availability of replacement parts, compliance to latest British Standards and energy conservation."</i></p> <p>Appendix A, 4.10(c): <i>"Given the height of Grenfell Tower together with the existing physical building constraints, the report shall address the issues of Fire Fighting and Evacuation lift requirements and how they affect the proposed works."</i></p>	{TMO00853783}
7 April 2003	B&Y were appointed by RBKC "as consultants for the lift refurbishment" at Grenfell Tower.	{BUT00000005}
8 May 2003	<p>A Lift Refurbishment Project Briefing Meeting took place between RBKC, B&Y and the GT Residents' Representative.</p> <p>The objective was defined as having B&Y undertake a feasibility study to evaluate options for a complete refurbishment of the duplex passenger lifts and for a single hydraulic lift in the Social Services Offices.</p>	{BUT00000010}
July 2003	<p>B&Y Feasibility Study for the Refurbishment of Two Electric Passenger Lifts at Grenfell Tower.</p> <p>Study presented three different options for the works to the lifts addressing technical aspects, budget costs and programme length.</p>	{BUT00000002}
9 July 2003	<p>A Lift Refurbishment Meeting took place between RBKC, B&Y and the GT Residents' Representative.</p> <p>The options presented by B&Y for the lift works were discussed.</p>	{BUT00000006}

16 December 2003	TMO memorandum sent by John Rogers to Paul MacAinsh re: charging cost of lift refurbishment to leaseholders. Notes that neither option of lift refurbishment would bring lifts up to current standards.	{TMO00869720}
16 March 2004	Project Start Meeting between RBKC TMO, B&Y and GT Residents' Representative. Option 3A from the B&Y feasibility study was agreed.	{BUT00000007}
28 April 2004	A Lift Refurbishment Meeting took place between RBKC, B&Y and the GT Residents' Representative.	{APX00005422}
April 2004	B&Y produced a specification for " <i>The refurbishment of two passenger lifts and replacement of one hydraulic passenger lift at Grenfell Tower at Grenfell Tower, Lancaster West Estate, London W11, for the Royal Borough of Kensington & Chelsea</i> ". The specification reference is L2508.	{BUT00000044}
20 May 2004	Pre-tender meeting between RBKC TMO and B&Y. Final tender list agreed as Apex, Bardeck, Guideline, Jackson and Temple.	{BUT00000029}
16 July 2004	Return of tenders by contractors and B&Y tender analysis which concluded by recommending Apex.	{BUT00000036}
18 October 2004	Property Management Committee Meeting - report of Chief Executive - selection of Apex tender.	{TMO00869714}
22 October 2004	Apex received instruction to proceed with the modernisation works.	{APX00000001}
October 2004	Date of contract documentation between Apex and B&Y.	{APX00005619}
30 November 2004	Pre-start meeting held between RBKC TMO, Apex and B&Y. Noted that Apex had undertaken all detailed surveys and drawings had been prepared by Apex and commented on by B&Y, who were awaiting amended drawings.	{APX00008294}
10 January 2005	Apex started work.	{BUT00000001}
26 January 2005	Progress meeting re: lift refurbishment.	{BUT00000024}
22 February 2005	Progress meeting re: lift refurbishment.	{APX00005590}

23 March 2005	Progress meeting re: lift refurbishment.	{APX00008295}
27 April 2005	Progress meeting re: lift refurbishment.	{APX00005640}
13 May 2005	Letter from Steve Ellis to Roger Anthony confirming a revised programme for the lift refurbishment.	{APX00005591}
24 May 2005	Progress meeting re: lift refurbishment.	{APX00005520}
22 June 2005	Progress meeting re: lift refurbishment.	{APX00005531}
20 July 2005	Progress meeting re: lift refurbishment.	{APX00005510}
3 August 2005	Completion of works on the first lift – Lift H091.	{APX00000093}
9 August 2005	Date of Apex Certificate of Test and Examination for Electric Passenger and Goods Lifts for Lift H091.	{APX00008690}
18 August 2005	Progress meeting re: lift refurbishment. Notes that Janice Wray will advise further on fire alarm requirements.	{APX00008296}
13 September 2005	Email from Janice Wray (TMO) to Sarah Everson (Brodie Plant Goddard) and Steve Ellis (B&Y) confirming that it was agreed that costings should be obtained for installation of a fire recall feature whereby the lifts return to the ground floor when the alarm is activated.	{TMO00863276}
22 September 2005	Progress meeting re: lift refurbishment. Notes that Apex are to cost fire alarm recall facilities.	{APX00008297}
26 October 2005	Progress meeting re: lift refurbishment.	{APX00008298}
23 November 2005	Progress meeting re: lift refurbishment. Notes Roger Green of TMO would contact Roger Anthony or Steve Ellis in respect of fire alarm recall requirements.	{APX00008299}
19 December 2005	Progress meeting re: lift refurbishment. Notes Roger Green of TMO would contact Steve Ellis re Fire Alarm Recall details.	{APX00008300}
23 December 2005	Issue of Certificate of Non-Completion by B&Y and an accompanying letter sent to Apex.	{APX00008455} {APX00005627}
13 January 2006	Letter from Apex to B&Y setting out costs for variations to lifts, including cost of fire alarm recall.	{APX00001066}

13 January 2006	Further letter explaining reasons for delays in lift refurbishment works.	{APX00000093}
January 2006	Letter from BYLCL to Apex confirming additional works, including fire alarm recall. Signed by Steve Ellis. Date is not clear but it is after 13 Jan 2006.	{APX00005425}
18 January 2006	Progress meeting re: lift refurbishment. Notes Apex FA recall works had been costed.	{APX00005428}
3 February 2006	Date of Apex Certificate of Test and Examination for Electric Passenger and Goods Lifts for Lift H090.	{APX00008692}
6 February 2006	Certificate of Practical Completion of lift works.	{APX00005420}
23 February 2006	Progress meeting re: lift refurbishment. Notes <i>"Fire alarm works had been partially undertaken. Would be completed by 3rd March. Apex to complete connections and test non live. SBE to speak to Roger Green at TMO."</i>	{APX00008302}
27 February 2006	Certificate of notification of an extension of time for completion of works.	{APX00005588}
24 March 2006	Emails between Robin Cahalarn and Roger Green at TMO regarding testing of fire alarm recall system.	{TMO00863273}
11 April 2006	Email from Roger Green to Robin Cahalarn and Janice Jones stating that he had tested the new fire alarm and the operation of bringing the lifts down to ground floor in the event of a fire alarm, and it all worked as required.	{TMO00863333}
4 May 2006	Letter from Gary Poynter to Steve Ellis sending four copies of the Operations and Maintenance Manual.	{APX00000079}
24 October 2006	Letter from Gary Poynter to Steve Ellis sending two copies of documentation requested by Ellis for the Operation and Maintenance Manual and stating a further copy has been sent to site.	{APX00000080}
February 2007	Final account – lift refurbishment	{TMO00838558}
2 February 2007	Letter from B&Y to Apex listing snagging jobs for the lifts.	{TMO00863296}
5 February 2007	End of defects liability period.	{APX00005420}

14 March 2007	Certificate of completion of making good defects from B&Y to Apex.	{APX00005430}
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D.3. Period between Project 1 and Project 2

23 February 2010	Minutes of meeting between Janice Wray and Salvus Consulting (inc. Carl Stokes) regarding fire risk assessments and firefighting lifts. Discussion between Janice Wray and Robin Cahalarn regarding the definitions of fireman's lift, firefighting lift and evacuation lift. Conclusion that TMO lifts meet the majority, but not all, of the criteria for firefighting lifts. Plan - to document the criteria that the TMO lifts do meet and advise Salvus so this can be included in future Action Plans.	{RBK00053579}
3 March 2010	Emails between Janice Wray and Salvus Consulting discussing TMO's criteria for firefighting lift.	{CST00001269}
30 April 2010	LFB Notifiable Fire Report <i>"Called to fire at a 20 storey block of flats with basement. A Community Centre used the ground floor to the fourth floor, with residential flats on all other floors. Fire was at Flat 64 on the 6th floor....</i> <i>2. Crews also found that there was an issue with the fire lift not responding when requested. This slowed their response to the fire floor."</i>	{LFB00010934}
5 May 2010	Correspondence between Janice Wray and Collette O'Hara at LFB re fire at Grenfell Tower on 30 April 2010. States: <i>"You mentioned that there may have been a problem with the lifts at the time of the fire and that specifically they may not have returned to ground level when called by the FB. ILS our lift maintenance contractors tested the fire fighters override switches etc. on both lifts yesterday and confirmed that both were operating perfectly and lifts had both returned to ground when called as required. Therefore, there does not appear to have been a problem but if further information</i>	{SEA00000060}

	<i>comes to light then I would be grateful if you could please advise."</i>	
8 July 2010	Email from Janice Wray to John Calvert and Brian Deans at LFB concerning TMO's criteria for firefighting lifts.	{CST00002922}
26 August 2010	<p>TMO Asset Investment and Engineering Health & Safety Group Meeting Minutes. States:</p> <p>P2/5: Agenda Item 6 - Fire Fighting TMO Lifts – (JW E mail sent 8/7/10) <i>"In discussion with the Borough Commander JW suggested that TMO H&S Section arrange a meeting to brief the new officer on the TMO's approach to fire safety, fire fighting lifts, efforts to reduce the number of lift trap-ins and particularly the LFB's attendance at these etc. JW hopeful that this meeting can be arranged for Sept 2010."</i></p>	{TMO10000725}
28 February 2011	<p>Email from Robin Cahalan to Janice Wray stating:</p> <p><i>"As recently discussed ,standards on fire fighting /evacuation lifts ,which are not retrospect have become a lot clearer over the last year ,none of the TMO lifts are fire fighting or evacuation lifts .</i></p> <p><i>The tmo stock do have some of the requirements ,but the cost to meet the recommended standards would prevent us upgrading our lifts ."</i></p> <p>The email was forwarded by Wray to Carl Stokes. Stokes responded:</p> <p><i>"Hi Janice</i></p> <p><i>As far as I know the requirements for a fire fighting lift/evacuation lift did not change in the March 2010 edition of Building Regs, next time I am in the Hub could we sit down with Robin as he might have different information than me. Does he have copies of the information he is taking about he could forward to me?"</i></p>	{CST00001781}

	Response from Wray stated that she would ask Cahalarn. No further responses have been identified.	
30 March 2011	Fire Risk Assessment meeting including Carl Stokes and Janice Wray. Meeting minutes noted: <i>"2.2 JW to raise with R Cahalarn the issue of the different FB drop keys – to ensure that our locks are consistent and only the appropriate key is issued to staff and contractors alike."</i>	{TMO10000871}
23 April 2012	Tender documentation for comprehensive maintenance, inspection and repair of lifts contract, 2012-2017.	{TMO10001661}
29 May 2012	Email from Janice Wray at TMO to Nick Comery at LFB re TMO's criteria for firefighting lift. Janice Wray stated: <i>"3. In discussions with your predecessors we clarified that many of our lifts meet the majority, but not all, of the criteria for fire fighting lifts. (For example we do not install a trap door / hatch in the roof of the car etc.) It was agreed that we would clarify the criteria that our "fire fighting lifts" do meet and I have attached an e-mail to the then Borough Commander, Brian Deans, setting out these criteria. Additionally, I attached a list of the blocks where these lifts are located and you will see this includes Trellick Tower."</i>	{CST00002920}
10 August 2012	Email from Bruce Sounes at Studio E to Cate Cooney at Exova stating that there is no firefighting lift at Grenfell Tower. Paul Dunkerton at the TMO was copied in, as were A McQuatt and M Smith at Max Fordham.	{SEA00000039}
September 2012	TMO Fire Safety Strategy. Sets out TMO definition of firefighting lift.	{TMO10001578}
	A different version of the TMO Fire Safety Strategy. Also sets out TMO definition of firefighting lift.	{TMO10001582}
October 2012	TMO Fire Safety Strategy. The date of this document is somewhat unclear but it appears to be dated October 2012.	{TMO10001577}

5 November 2012	Memorandum to John Allen from Dave Gammon entitled <i>"B1 - Means of Escape Observations"</i> provided in the context of the Grenfell Tower refurbishment works. States: <i>"The new lift located within the common stair enclosure should be designed as a fire fighting lift"</i>	{SEA00006504}
6 November 2012	Meeting between John Allen and Dave Gammon at Building Control, Adrian Jess from Studio E and Terry Ashton at Exova. <i>"DG's comment was that new lift in reception area should be a fire-fighting lift. AJ explained that existing fire-fighting lift extended to ground floor level. DG expressed concern that existing fire-fighting lift did not serve new mezzanine level."</i>	{EXO00001371}
7 November 2012	Email from Adrian Jess at Studio E to Terry Ashton at Exova, A McQuatt and Chweecheen Lim at Max Fordham, David Hale at Appleyards and Colin Chiles at Leadbitter noting meeting with RBKC building control re fire strategy. States: <i>"BC Submission should clarify that existing lifts are 'fire fighting' from Ground Floor and that new lift only travels within the three story entrance lobby."</i>	{SEA00006526}

20 November 2012	<p>Carl Stokes' Fire Risk Assessment for Grenfell Tower</p> <p>Page 14 states: <i>"Both lifts are fire fighting/evacuation lifts with their own independent dedicated power supply and fire fighters control switches. The lift motor room is accessed from the protected staircase of the building having first passed through a security gate and two security doors."</i></p> <p>Page 18 states: <i>"The lifts in this building are evacuation lifts so they could be used as a means of escape route but the protected staircase is the main means of escape route in an emergency. This staircase is fire protected for its full height and has an independent final exit at the walkway level."</i></p> <p>Page 20: <i>"Both of the lifts in this building are firefighter/evacuation lifts and could be used as part of the evacuation strategy for disabled persons but this would be under the control of the fire service."</i></p> <p>Page 25: <i>"Both the lifts in the building are evacuation/ fire fighting lifts, the lifts have the standard fire fighter over ride controls fitted so that the Fire and Rescue Service can take control of these lifts and use them as they see fit to do so in the event of an emergency. The power supply's to each lift are as required for a fire fighter/evacuation lift along with all the other requirements for weight and size etc but there is no roof hatch in the lifts. TMO use a third party contractor to maintain and service the lifts and dry riser and they are responsible for their operation and effective working. The evacuation/ fire fighting lift could be used as part of a person's PEEP's if needed."</i></p> <p>Page 28: <i>"Monthly inspections of switches and annual testing of the fire fighting/evacuation lifts, with records kept? [YES]"</i></p>	{CST00000471}
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1 January 2013	Bureau Veritas enter into Tri-Borough Inspection contract with RBKC, Westminster Council and Hammersmith and Fulham Borough Council.	{BVL00000015}
25 June 2013	<p>Email chain including Janice Wray discussing a recent LFB Fire Safety exercise:</p> <p><i>Further to Alasdair's e-mail below, in relation to the LFB's Fire Safety exercise at Grenfell Tower on Friday I would advise that the North Kensington Station Manager was very pleased with the exercise, expressed his appreciation for the cooperation of the staff and the residents and confirmed that he felt it was a good learning event for the crews. This was also helpful for the TMO as two very minor issues were highlighted and we are now able to address these. Specifically, these were in relation to -...</i></p> <p><i>2. clarification on the operation of the override switch which puts the lifts under firefighters control - lift engineers have now been asked to provide a copy of the manufacturers instructions."</i></p>	{TMO00855528}
17 July 2013	<p>Email from Richard Bourke at ELA Lifts to TMO staff with instructions on how to operate the fire control switch, and details of the fire control switch at Grenfell Tower:</p> <p><i>"Further to your emails below we can confirm that the lifts at Grenfell Tower have a single fire recall switch fitted at the ground floor lobby...</i></p> <p><i>The lifts are a standard KCTMO specified duplex pair with a single riser of landing pushes.</i></p> <p><i>The fire recall switch when operated, removes the landing push feed from the circuit and bring both lifts to the ground floor (subject to the lifts being operational at the time) the doors will open and remain open, the lifts will remain stationary, until operated from within the lift car using the car operating panel push buttons.</i></p> <p><i>This ensures that landing calls are not activated or responded to by either lift.</i></p>	{TMO00855611}

	<p><i>This is to prevent the lifts being in service for use by the residents, as should a second lift be in service during a fire situation the lift travelling in the lift shaft would cause suction in the lift shaft, which would potentially increase the spread of fire.</i></p> <p><i>The fire recall switch does not have a facility to activate individual lifts only as a duplex pair.</i></p> <p><i>The fire recall function was checked by our engineer today and was found to be fully operational.”</i></p>	
19 July 2013	Email from Richard Bourke ELA Lifts to Janice Wray explaining how to operate the firefighter override switch.	{TMO00855611}
19 July 2013	Correspondence between Janice Wray and Carl Stokes re writing instructions for LFB on how to use the firefighter's override switch. Janice Wray confirms she received information from ILS on how to use the switch.	{CST00002037}
19 July 2013	TMO instructions for operation of lifts fire control switch.	{CST00002038}
November 2013	TMO Fire Safety Strategy. Sets out TMO definition of firefighting lift.	{TMO00830598}

24 January 2014	<p>Correspondence between Matt Smith at Max Fordham and Carl Stokes.</p> <p>Matt Smith wrote: <i>"Both lifts within Grenfell are FF/Evac lifts. These are not up to current standards due to the lack of an escape hatch."</i></p> <p>Carl Stokes responded: <i>"CORRECT, both lifts are fully functional FF/Evac lifts, the hatch item is not relevant see information below as well."</i></p> <p>Further, Matt Smith wrote: <i>"Also, if the lifts are 'Fire Fighting' lifts, then there should be secure, dual supplies to them. This is not shown on the schematics."</i></p> <p>Carl Stokes responded: <i>"Sorry I cannot answer any of the above questions, but below is the information from the TMO lift register... As these are newly refurbished/installed lifts I can only assume that they comply with all the electrical requirements of a FF/Evac lift, otherwise the maintenance/installation company would have raised this item at the time of the work being undertaken."</i></p>	{CST00000013}
3 February 2014	<p>PDERS contract no. ACG0128 to maintain lifts commenced.</p>	{PDR00000012}
20 February 2014	<p>Internal LFB email showing a letter sent to social housing landlords regarding lifts:</p> <p><i>"As previously advised by email dated 18/2/2014, the Assistant Commissioner recently issued the attached letter to the London Borough Housing Departments, social housing landlords, and related associations in regards to lifts for fire service use and smoke ventilation provisions in residential blocks of flats.</i></p> <p><i>Within it you will note the following paragraph relating to lifts for fire service use:</i></p> <p><i>"Where it has been identified that a "fireman's" lift (as opposed to a fire fighting lift) is installed within a building then we would request that the responsible person liaises with the relevant London Fire Brigade local Fire Safety Regulation Team to advise them of the premises address and style of lift present (in</i></p>	{LFB00040516}

	<p><i>accordance with sharing of information detailed in Article 13(3)(c) of the Regulatory Reform (Fire Safety) Order 2005). This allows any necessary pre-planning to be undertaken and consideration of a familiarisation visit to the premises by our crews.”</i></p> <p><i>Fire Engineering Group advise that where information relating to “fireman’s” lifts at a specific premises is received by Area Fire Safety Teams, there is an expectation that this information is recorded and shared for both Fire Safety Regulation and Operational purposes. Therefore in order to clarify how to handle and process this information when received, they advise that the following course of action is taken.</i></p> <p><i>A formal Fire Safety Station Notification form (SFS_A020_a2a) should be fully completed and issued to the local Fire Station in accordance with FSIGN 113, with all relevant details concerning the premises and the “fireman’s” lift being included. The “fireman’s” lift should be highlighted as being a fixed fire fighting installation that does not meet modern standards, which may have implications for operational personnel attending incidents.</i></p> <p><i>Once the completed Fire Safety Station Notification form has been issued, a copy should be uploaded to the eFSF/ Fire Safety Portal system, as per FSIGN 113.</i></p> <p><i>If the information received by the Area Fire Safety Team relates to an ‘unknown’ premises, consideration should be given to programming an FS01 audit of the premises.</i></p> <p><i>For existing and future FS01 audits issued for blocks of flats, Inspecting Officers should ensure that they research the electronic premises file (as per FSIGN 201), to check whether any correspondences have been received or Fire Safety Notification forms issued in relation to the standard of lifts for fire service use or other relevant features at the premises. Such information should be used to help inform the fire safety audit process.</i></p> <p><i>Fire service access arrangements, and the standard and maintenance of all facilities for fire service use</i></p>	
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	<p><i>(including lifts) should be accounted for as part of the premises fire risk assessment.</i></p> <p><i>Could you please forward this email to all Inspecting Officers in your team. Should Inspecting Officers require any further technical assistance in relation to lifts for fire service use, please contact Fire Engineering Group."</i></p>	
25 February 2014	<p>Letter from Artelia to Rydon re tender qualifications, confirmation that following qualification is accepted:</p> <p><i>"The Employers Requirements do not contain a requirement for a sprinkler system, pressurised systems or firefighting lifts. Please note that the lifts are currently firefighting lifts and need to retain this capacity."</i></p>	{TMO10005328}
12 March 2014	<p>Email from Carl Stokes responding to Claire Williams' email re site visit:</p> <p><i>"Good afternoon to you both, ref point 4 Claire you are correct both are the same and both lifts in Grenfell Tower are fire fighting lifts.</i></p> <p><i>By the way</i></p> <p><i>A firemans lift is</i></p> <p><i>Definitions</i></p> <p><i>noun</i></p> <p><i>1. a method of carrying a person, in which you put one shoulder into the person's midriff, lift them and carry them with their head arms and upper torso hanging down your back while you grip their legs with one hand (leaving your other hand free to hold the ladder as you climb down)</i></p> <p><i>A firefighting lift is</i></p> <p><i>A lift that must be installed in buildings over 18metres in high or where the basement level is more than 10 m below the ground floor level. Today it will conform to the requirements of EN81-72: Fire fighting lifts,</i></p> <p><i>I think he is getting confused with fireman controls and the fireman's switches etc which are fitted to a fire fighting lift.</i></p>	{TMO10005454}

	<i>There are slight differences between a fire fighting lift and an evacuation lift though."</i>	
18 March 2014	<p>Carl Stokes' report following 12 March LFB site visit. States:</p> <p>Page 3: <i>"Lifts in this tower</i></p> <p><i>Both of the lifts in this premises are Fire fighter evacuation lifts, this lifts are numbered HO 90 and HOM 91, please see appendix C for the last Express lifts service reports, the last service was undertaken on both lifts on the 26th February 2014. During a recent fire service exercise in this building the local fire crews were given instruction on the use of these fire fighting lifts and there are instructions on how to use them as fire fighting lifts in the ground floor level office and in the lift motor room. Copies on these instructions were also e mailed to the commander of the LFB local fire station..."</i></p>	{CST00001093}
27 June 2014	<p>Minutes of TMO and Rydon liaison meeting. Notes:</p> <p><i>"SOC noted that he had spoken to the Fire Brigade about the fire man's switches to the lift and also the dry riser access, and their H&S team attend site w/c 30 June to review. SOC to update at next meeting."</i></p>	{RYD00010678}

D.4. Second lift works – Project 2

9 July 2014	Email from Simon O'Connor at Rydon to Apex stating that he requires alterations and adaptations to be priced on a set of existing Apex lifts.	{APX00006306}
24 July 2014	Apex quote for 4 complete landings with push & indicators	{APX00005983}
1 August 2014	Apex quote for supply and installation of new landing entrances for the new walkway and mezzanine floors.	{APX00000035}

17 October 2014	<p>Carl Stokes' Fire Risk Assessment for Grenfell Tower. Reiterates (pg 14) that: <i>"both lifts installed in this building are fire fighting/evacuation lifts according to the TMO's documentation, these fighting/evacuation lifts have their own independent dedicated power supply and fire fighters control switch."</i></p> <p>On page 21, the report states: <i>"The power supply's to each lift are as required for a fire fighter/evacuation lift along with all the other requirements for weight and size etc but there is no roof hatch in the lifts. These evacuation/ fire fighting lifts could be used as part of a person's PEEP's if needed, if these fire fighting/evacuation lifts are used by the fire service during an operational incident then these lifts are under the total and full control of the fire service."</i></p>	{CST00000712}
17 October 2014	<p>Carl Stokes' Record of Significant Findings and Action Plan. Notes:</p> <p>Identified Risk or Hazard: <i>"The lifts in this building are fire fighter/evacuation lifts, the entrance to this building is now from the walkway level. It is not known if the fire service override controls for these lifts have been moved?"</i></p> <p>Actions to be Taken: <i>"Have these two lifts been reprogrammed so that the fire service can control them from the walkway level? Have the fire service control switches been relocated to the walkway level from the ground/ street level? If so can the service documents and certificates from the lift contractors please be forwarded so that there is evidence if required that the lifts are in full working order as fire fighter/evacuation lifts."</i></p>	{CST00001734}
12 November 2014	Apex agree to offer MCD discount of 2.5% against their quote of August 2014 of £43,205.	{APX00006624}
17 November 2014	Contract guarantee certificate signed - Apex	{RYD00031772}
26 January 2015	Sub-contractor Pre-Qualification Questionnaire completed by Apex for Rydon	{APX00000041}
4 February 2015	Subcontractor Pre-Contract Interview between Rydon and Apex	{APX00000012}
5 February 2015	Apex quote to carry out pre-condition survey	{APX00006629}

5 February 2015	Apex quote to attend site and make lift safe for builders to work in lift shaft (engineer standby)	{APX00006628}
17 February 2015	Contract signed between Rydon and Apex for supply and installation of four lift entrances, pre-condition survey to 2 lifts, and engineer stand-by	{APX00007916}
18 February 2015	Email from Rydon accepting handwritten amendments to Letter of Intent by Apex	{RYD00031886}
9 March 2015	Minutes of Apex weekly construction meeting.	{APX00008412}
10 March 2015	Email from Anthony Cheney at TMO to Michael Burke at Calfordseaden asking if Calfordseaden can carry out a pre-condition survey prior to the lift regeneration works. Response from Michael Burke stating it would be £1,020.	{CAL00000030}
17 March 2015	<p>Emails between Anthony Cheney at TMO and Michael Burke at Calfordseaden re lifts pre-condition survey. Michael Burke stated that survey will be done in their normal way unless Anthony Cheney wanted something specific. Anthony Cheney's response:</p> <p><i>"We want to know as one will be out of action for around 20 days while works happen then switch to the other – is there any works we can do to improve the reliability in this period, condition before they start works or anything we should be concerned about."</i></p>	{CAL00000042}
18 March 2015	Emails from TMO and Rydon to Calfordseaden setting out a comprehensive list of works.	{CAL00000006}
23 March 2015	Minutes of Apex weekly construction meeting.	{APX00008448}
25 March 2015	Calfordseaden report on Lifts H090 and H091. At 3.1 states: <i>"The lifts comply with the current British Standards and Health & Safety requirements applicable at the time of the installation/refurbishment."</i>	{CAL00000001}
7 April 2015	Minutes of Apex weekly construction meeting – 'starting today'.	{APX00006536}

15 April 2015	Email from Claire Williams to Mike Sapsford at GHP: <i>"Mike ...Service I am asking Gerald Honey to quote for As discussed, what I would like to do is to get an inspection of the works on 23/24 April when Apex hand the first lift back to us. It seems that the specification has no detail that would give the TMO reassurance. What I would like, and I understand your consultancy specialises in lift works, is advice on: · Any appropriate certification · Inspection post works/handover This will also inform on any issues that we may need to cover when the second lift is taken out of action, and the same services would apply. The completion date for this we are hoping will be just before the bank holiday, rather than after – so perhaps 30 April/1 May 2015. If you have any comment or queries, please let me know. Otherwise, I look forward to receiving your fee quote. Thank you for your help. Claire Williams"</i>	{GHP00000007}
20 April 2015	Minutes of Apex weekly construction meeting – <i>'Starting today. Process ok, COP will have to be removed. KV to layout COP sit with GA. COP back at workshop being modified. COP, pushes, Indicators & arcs being sent Thursday.'</i>	{APX00006708}
22 April 2015	Emails between Gerald Honey Partnership and KCTMO in which GHP provide a quote for carrying out a pre-condition survey and KCTMO accept the quote.	{GHP00000002}
27 April 2015	Minutes of Apex weekly construction meeting – <i>'Process ok, pushes, Indicators on site this week.'</i>	{APX00007433}
10 May 2015	Letter from Gerald Honey Partnership to KCTMO providing an invoice for a full condition survey	{GHP00000003}
11 May 2015	Minutes of Apex weekly construction meeting – <i>"1st lift in service. On 2nd lift now. Cop and arcs done."</i>	{APX00007689}
14 May 2015	Email from Gary Ager to Jason North at Rydon: <i>"We would like to bring to your attention a few items we have found on lift H091 whilst we have carried out our works</i> <i>1. The over speed governor appears to be more noisy than usual</i> <i>2. strange noise from machine on normal. Could be lack of oil , both machines have been leaking a fair bit.</i>	{RYD00041677}

	<p>3. Ropes appear to be more level with outside of sheave (looks different to other machine.) Was brought to my attention because when we buffered car in pit, machine still drives without tripping drive in panel. Lifting cwt higher and higher possible to drive cwt into slab.</p> <p>4. Noisy right hand roller ontop of car sounds worn.</p> <p>5. Set up of door gear wrong was having a problem seeing open limit causing loads of faults on lift.</p> <p>6. Set up of landing pick up rollers wrong most floors about 15 to 20mm gap between front roller and leading edge of clutch on car. Leading to losing couple of landing doors also the moving part of clutch not retracting at correct time so more lock faults.</p> <p>7. Some pick up rollers on the landing doors have been renewed however other require changing</p> <p>8. Lift scraps a few times up and down the shaft.</p> <p>9. Car hanger rollers are in a terrible state & require changing.</p> <p>10. Windcrest top of car doesnt work.</p> <p>11. The general running of lift is bad and requires attention.</p> <p>12. Brake needs setting up as it lifts to late causing a very sharp take off.</p> <p>These are just observation and by no way is meant as defamatory comments to your incumbent lift provider</p> <p>Best regards</p> <p>Gary”</p>	
20 May 2015	Report on lifts by Gerald Honey Partnership. Confirms that installation of the new landing entrances of the passenger lifts has been completed satisfactorily but lists a number of snagging items.	{GHP00000004}
May 2015	TMO Fire Safety Policy setting out TMO definition of a fire fighting lift.	{TMO00858525}
1 June 2015	Minutes of weekly construction meeting.	{APX00008104}
17 June 2015	Email chain - email from Simon O'Connor at Rydon to Gary Ager stating that lift gongs are going off 3 levels	{APX00006324}

	below where the lift is arriving - asks for costs of correcting this.	
25 June 2015	Completion of lift alteration works.	{APX00000001}
29 June 2015	Email from Ray Murray at Apex to Simon O'Connor at Rydon re: lift gongs. States that he has emailed the manufacturer to see if it is a software problem.	{APX00006349}
13 July 2015	Email from Claire Williams to Neil Reed forwarding an extract from Gerald Honey report on Grenfell lifts - issue with landing indicator displays	{RYD00046208}
10 September 2015	Email from Peter Maddison re actions from Grenfell Residents Meeting. Noted that: <i>"Lift A resident reported that when the Fire Alarm is activated, the lift goes to ground floor and opens. As there is no egress at ground floor outside of Rydon's working hours, this setting needs to be adjusted so the lift goes to the Walkway level where there is an exit from the building."</i>	{TMO00859101}
10 September 2015	Email from Claire Williams to Simon Lawrence (Rydon) and others at Artelia stating: <i>"Further to our telecon of today, can you please confirm that your contractors have adjusted the current 2 lifts to both stop at 'walkway'/level 2 (rather than the ground/street level) in case of fire."</i> Response from Simon Lawrence states: <i>"During early fire brigade meetings with Simon O we were told that the lifts have to be brought down to ground in case of emergency. Which what they still do. On the phone you said that there was a fire alarm which brought the lifts down to ground. I can't understand how that is possible because you do not have any audible fire alarms in the communal areas. In addition to this I don't believe that the existing panel by the walkway entrance door is working anyway. So I'm not sure what has happened. Do you have anymore information? Is it possible that the lift alarm button was pressed by the resident in error which brought the lift down?"</i>	{RYD00051659}

<p>11 September 2015</p>	<p>Email from Claire Williams to Simon Lawrence stating:</p> <p><i>"After our conversation I have asked about audible alarms, and will check with Alex Bosman/Chubb on the fire panels.</i></p> <p><i>I have asked Peter Maddison to let me know which flat reported this so we can get some feedback.</i></p> <p><i>Meantime, there is an issue if the lift goes to ground – as residents cannot escape from within your cordon. I am mindful that you are away next week, so can you please pick up with H&S/CDM and Artelia how this needs to work to ensure safety for residents and any visitors."</i></p> <p>Email from Simon Lawrence to Claire Williams stating:</p> <p><i>"I understand your concern but I don't believe you have any working systems within Grenfell that will send the lifts to ground in case of a fire. In any case there certainly aren't any audible alarms apart from the smoke detectors within the residents own flats and a lift button that residents press if they are stuck in a broken lift.</i></p> <p><i>I believe that you only have an existing visual fire alarm panel on walkway level inside the front door which flashes a light if a smoke detector in the communal is tripped. It can't be connected to the lifts because over the past year there has been some flashing lights when smoke heads have been tripped or faulty but the lifts still work fine.</i></p> <p><i>If you remember this fire panel was originally located behind the old concierge desk on the ground floor. At that time your strategy involved the Concierge or Security guard seeing the light flashing then calling either the fire brigade or your emergency callout team. Over a year ago this was moved to walkway when the concierge got stripped out. Since then I don't believe you have anyone monitoring the panel because there is no longer a concierge. So effectively it is redundant.</i></p> <p><i>I can only think that maybe your lifts either reset themselves because of a fault or someone was working on the lifts at the time and one of the residents happened to be in the lift at the same time. It may be worth you talking to your lift maintenance engineers. Alternatively it could just be one of the residents group taking the lift down to the lower floors where we are working and realising that they cannot get out because of our hoarding. Then asking the question what happens in a fire.</i></p>	<p>{RYD00051659}</p>
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	<i>I've consulted my H&S manager this morning and reviewed the situation. Our thoughts are that we could put temporary signs in the lifts advising that residents should go to Floor 2 (Walkway level) in the event of an emergency. Other than that your fire strategy will stay the same, which is a stay put policy. The main entrance/exit is only at walkway level and your existing emergency staircase also ends at walkway level. We have a process in place with the Fire Brigade that they can access the ground floor to get to the dry riser, etc."</i>	
11 September 2015	Email from Claire Williams to Neil Reed and Andrew Malcolm at Artelia re: Simon Lawrence's email at ART00004693: <i>"Can you please give me a ring with your views on this, and where we go with it? There seems to be a couple of anomalies."</i>	{ART00004694}
11 September 2015	Email from Neil Reed to Simon Cash and Malcolm Andrew at Artelia re: Claire Williams' email at ART00004694: <i>"I'll call you after lunch to discuss: 1. the challenges go on Re lack of design coordination and foresight 2. Claire is emailing us and seeking to draw us in on conversations about 1.! I remain concerned about time we are spending along with the very fact these things ae coming up at this stage in the project. Also to speak about the meeting on Wednesday."</i>	{ART00004696}
11 September 2015	Email from Neil Reed to Matt Smith at Max Fordham with others copied in re Claire Williams' email at ART00004694: <i>"Matt, Does the below matter fall within the scope of your services please? If not, do you know with whom it does? I am working form the assumption that there must have been a coherent strategy for the MEPH design encompassing all the implications to lifts and fire safety, etc. and that the Scope of Contract Works provides for all that is required to deliver a safe and working building. fit for its intended purpose. I'd be grateful for your earliest response as Artelia is not best placed to provide advise to TMO in this regard: design coordination, scoping and resolution do not form part of our brief."</i>	{ART00004697}

14 September 2015	Email from Matt Smith to Neil Reed re email at ART00004697 stating: <i>"As mentioned previously, the lift package does not form part of our scope. Exova may be best placed to advise on any fire requirements."</i>	{ART00004709}
29 September 2015	Email from Claire Williams to Simon Lawrence with others copied in: <i>"Can you please confirm you have put up the notices in the lifts to say in case of emergency go to the second/walkway level? This is as your H&S team recommendation as below email. Also I asked last week that you replace the ground floor notice with all the various floor levels on it. I appreciate this was removed from your noticeboard, but it does need to be replaced. I asked that you also replace the A4 laminated signs on each floor, until the signage is agreed/installed – could you do this too just to make sure we will have no H&S issues? Our Fire Risk Assessor had asked the below. You mention in the email below that you had talked this over with the fire brigade. Did they confirm anything in writing, specifically in relation to the extract below? The lifts in this building are fire fighter/evacuation lifts, have they been reprogrammed so that the fire service can control them from the walkway level? If so can the service documents and certificates from the lift contractors please be forwarded so that there is evidence if required that the lifts are in full working order as fire fighter/evacuation lifts. Thanks"</i>	{ART00004794}
2 October 2015	Email from Claire Williams to Simon Lawrence stating: <i>"1 Testing the fire alarm panel - Is it possible you can get to a smoke detector and see if by setting the alarm off that it makes the lifts go to the ground floor – or not? Can you do this today please? We are concerned that the fire panel may have some connection to the lifts that we are not aware of. Please advise if there are any problems with this, I will be on site probably after 3pm."</i>	{TMO00859251}
5 October 2015	Email from Claire Williams to Janice Wray: <i>"Janice Can you please look at this ? I know that Peter Maddison has told you about this situation with the lift</i>	{TMO00859283}

	<p><i>(which does not go to ground floor in case of fire, as it is not attached to any system). The concern is that at first and ground you end up in a contractor's enclosure maybe 2m w x 4m long – with a digital lock on to prevent residents wandering onto site.</i></p> <p><i>I will book you with Alex asap.</i></p> <p><i>Ta”</i></p>	
5 October 2015	Correspondence between Anthony Cheney (TMO) and ELA Lifts confirming that the lifts do not automatically return to the ground floor in case of fire.	{TMO00859277}
6 October 2015	<p>Email from Claire Williams to Simon Lawrence (Rydon):</p> <p><i>4 Lift and protection of residents/site: is it possible to isolate working floors in some way – put a cover over the buttons so residents cannot use them or similar? Our FRA was done when you said the gf hoarding around the lift was temporary, and the alleged incident of the resident trapped at ground floor (which we don't understand) has escalated this issue.</i></p>	{TMO00859294}
7 October 2015	<p>Response from Simon Lawrence (Rydon) to Claire Williams (TMO):</p> <p><i>4 Lift and protection of residents/site: is it possible to isolate working floors in some way – put a cover over the buttons so residents cannot use them or similar? Our FRA was done when you said the gf hoarding around the lift was temporary, and the alleged incident of the resident trapped at ground floor (which we don't understand) has escalated this issue.</i></p> <p><i>There is no practical way of blocking off the numbers to the lower floors because our trades need to use them.</i></p> <p><i>Floor 3 (Walkway+1) has the new flat FED's locked when not in use and we are currently working in the communal area so the risk to residents is no more than working on any other existing communal floor. At night barriers and signage is outside the lifts to restrict access. However should a resident remove these then they can only walk around the communal floor and out into the escape staircase via our door.</i></p> <p><i>Floor 2 is the Walkway so currently the main residents access anyway.</i></p> <p><i>Floor 1 (Mezzanine) the lifts can stop on this level but no one can get out of the lift because we have fixed</i></p>	{TMO00859300}

	<p><i>boards across the lift opening to prevent access into site.</i></p> <p><i>Ground floor has a small waiting area outside the lift before you get to our hoarding. The hoarding is still temporary but needs to be in place to prevent unauthorised access into our site.</i></p> <p><i>There is no way of preventing the residents coming to ground floor in the lift unless you change how your lift operates. But bearing in mind we need to use the lift from the ground floor every day to get materials up the building, I can't see that you can do this. Unless your lifts can change throughout the working day i.e. once we close site the lifts default to the 2nd floor only. You will obviously need to consult your Fire Brigade as well.</i></p>	
8 October 2015	<p>Email from Claire Williams (TMO) to Peter Maddison and others at TMO:</p> <p><i>"Peter</i></p> <p><i>There was a meeting about Grenfell today and we talked about the lifts, and Simon Lawrence had responded yesterday (as below in blue) to my enquiries.</i></p> <p><i>Alex had established that the lifts were not linked to any alarm system, and so are not programmed to go to the ground floor in case of emergency.</i></p> <p><i>Floor 3 (Walkway+1) has the new flat FED's locked when not in use and we are currently working in the communal area so the risk to residents is no more than working on any other existing communal floor. At night barriers and signage is outside the lifts to restrict access. However should a resident remove these then they can only walk around the communal floor and out into the escape staircase via our door.</i></p> <p><i>Floor 2 is the Walkway so currently the main residents' access anyway.</i></p> <p><i>Floor 1 (Mezzanine) the lifts can stop on this level but no one can get out of the lift because we have fixed boards across the lift opening to prevent access into site.</i></p> <p><i>Ground floor has a small waiting area outside the lift before you get to our hoarding. The hoarding is still temporary but needs to be in place to prevent unauthorised access into our site. If the fire brigade were called this is where they would come, and be able to 'release' anyone in the site enclosure.</i></p>	{TMO00852582}

	<i>I hope this gives everyone reassurance.</i> <i>Claire Williams"</i>	
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D.5. From the end of Project 2 to 14 June 2017

7 January 2016	Bureau Veritas Thorough Examination of Lifting Equipment	{MET00036488} {MET00036489}
26 April 2016	<p>Carl Stokes' Record of Significant Findings and Action Plan. Notes:</p> <p>Identified Risk of Hazard: <i>"It is not known if the fire service controls for the lifts been moved back down to the street level?"</i></p> <p>Actions to be Taken: <i>"Can it be confirmed that the fire service controls for the lifts been moved back down to the street level? If not then this must be undertaken immediately."</i></p>	{CST00002206}
27 April 2016	Emails between Claire Williams and David Hughes at Rydon confirming that if the smoke detection system is activated the lifts are not brought down to the ground floor.	{TMO10021326}
3 June 2016	Bureau Veritas - Thorough Examination of Lifting Equipment	{MET00035852} {MET00035853}
20 June 2016	<p>Carl Stokes' Fire Risk Assessment.</p> <p>Page 5: <i>"The two lifts in this building service all the residential floor levels including the new floor levels, both are evacuation/fire-fighting lifts so can be used for disabled evacuation if needed."</i></p> <p>Page 17: <i>"Both lifts installed in this building are fire fighting/evacuation lifts according to the TMO's documentation, these fighting/evacuation lifts have their own independent dedicated power supply and fire fighters control switch."</i></p> <p>Page 24: <i>"Both of the lifts in this building are firefighter/evacuation lifts and could be used as part of the evacuation strategy for disabled persons but if these lifts were used this would be under the control of the fire service, if they were in attendance. Before the fire service arrive at this building these lifts could be</i></p>	{CST00000719}

	<p><i>used by the residents or perhaps TMO/RBKC staff. This policy is in accordance with guidance given in the H M Government risk assessment document Sleeping Accommodation. I would recommend that the staff are trained on how to use these firefighter/evacuation lifts and that any keys needed are kept really available."</i></p> <p>Page 32: <i>"Monthly inspections of switches and annual testing of the fire fighting/evacuation lifts, with records kept?"</i> [YES]</p>	
20 June 2016	<p>Carl Stokes' Record of Significant Findings and Action Plan. Item 19f:</p> <p><i>"Identified Risk or Hazard: It is not known if the fire service controls for the lifts been moved back down to the street level?</i></p> <p><i>Actions to be Taken: Can it be confirmed that the fire service controls for the lifts been moved back down to the street level? If not then this must be undertaken immediately."</i></p>	{CST00000101}
25 June 2016	End of Apex defects liability period	{APX00000017}
10 August 2016	<p>Grenfell fire risk assessment actions log. Notes: Risk <i>"It is not known if the fire service controls for the lifts been moved back down to the street level?"</i> Action: <i>"Can it be confirmed that the fire service controls for the lifts been moved back down to the street level? If not then this must be undertaken immediately."</i> COMPLETED</p>	{CST00000196}
2 November 2016	Visit by Bureau Veritas engineer Isiaka Lasisi to Grenfell Tower to carry out Thorough Examination of Lifting Equipment	<p>{MET00035907}</p> <p>{MET00036572}</p>
April 2016	TMO Fire Safety Policy setting out TMO definition of a fire fighting lift.	{TMO10045571}
5 January 2017	PDERS Service Visit	<p>{PDR00000004}</p> <p>{PDR00000003}</p>
18 January 2017	PDERS Service Visit	<p>{PDR00000004}</p> <p>{PDR00000003}</p>
4 February 2017	PDERS Service Visit	{MET00035769}

11 February 2017	PDERS Service Visit	{PDR00000004} {PDR00000003}
23 February 2017	PDERS Service Visit	{MET00036598} {MET00036599}
8 March 2017	PDERS Service Visit	{PDR00000004} {PDR00000003}
1 April 2017	Contract renewal proposal from Bureau Veritas provided to RBKC - for statutory engineering inspections.	{BVL00000004}
10 April 2017	Bureau Veritas - Thorough Examination of Lifting Equipment reports	{TMO00834794} {RBK00035444} {RBK00035440} {RBK00035441}
12 April 2017	PDERS Service Visit	{PDR00000004} {PDR00000003}
9 May 2017	PDERS Service Visit	{PDR00000004} {PDR00000003}
June 2017	TMO Fire Safety Strategy setting out TMO definition of a firefighting lift.	{TMO00832724}
14 June 2017	Grenfell Tower fire	

E. Relevant Codes, Standards and Codes of Practice

19. In this section, I will set out the relevant legislation, standards and codes of practice applicable to the lifts at Grenfell Tower between 1972 and June 2017. I will particularly focus on the relevant legislation, standards and codes applicable at the time of Project 1 and Project 2. In **Appendix 1** I have also set out the relevant requirements in a table.
20. I refer in detail throughout this section and the report generally to a number of British Standards ('BS') and European Codes ('EN'). **British Standards** are national standards published by the British Standards Institution ('BSI'). They contain recommendations for good industry practice. The recommendations set out in British Standards are not mandatory but they do represent good industry practice.
21. **European Norms** (or Codes) are drawn up by the European Committee for Standardization ('CEN'). European Norms represent efforts to harmonize standards across the European Union. Each country in the European Union has a national 'version' of the European harmonized standard. The British version of a European harmonised standard is designated by the abbreviation 'BS' followed by 'EN' which means European Norm. Therefore, BS EN basically means 'British version of a European Norm'. There is no difference in substance between the different national versions of European Codes. The requirements set out in BS EN are mandatory.
22. Therefore, there is a difference between the status of British Standards and European Codes. British Standards represent good industry practice only but European Codes are mandatory.
23. I will refer in my report to **guidance documents** produced by the Lift and Escalator Industry Association (LEIA). These documents contain guidance about lifts and are generally safety related. The guidance in these documents is not mandatory but represents recommendations and good industry practice.
24. I refer throughout this report to "**good practice**" or "**good industry practice**". I use the terms interchangeably. I base my knowledge of good industry practice on my experience in the lift industry as well as published guidance, as referred to in the paragraph above. I have worked in the lift industry for over 40 years, working on a large variety of projects within the UK and abroad, including Europe. My experience includes working on installations where firefighting lifts were required. I have also written papers on the use of lifts in fire conditions, which are set out in my CV.
25. Throughout this report I consider the involvement of the main parties and their respective duties and responsibilities. I base these conclusions on my review of the evidence, particularly contractual documentation, as well as my experience of good practice in the lifts industry.

E.1. Original Design and Construction – 1972-1974

E.1.1. Legislation

26. I have not identified any legislation at the time of the construction of the building, within my expertise, which is relevant. It is outside the scope of my expertise to analyse the Building Regulations.

E.1.2. Standards

BS 2655-1: 1970 Specification for Lifts, escalators, passenger conveyors and paternosters - Part 1: General requirements for electric, hydraulic and hand-powered lifts {BSI00001718}

27. BS 2655-1: 1970 was published in February 1970. It would have applied to the original lift installation. As I set out in Section F, there is very little information about the initial lift installation. However, I have set out the important parts of the Standard to explain what should have been installed.
28. Section 4 sets out the recommendations for 'Firemen's lifts'. The relevant parts are:

"4.1 Location

Firemen's lifts may be required by the Fire Authority and their positioning is the subject of agreement between this Authority and the architect.

4.2 Capacity

The lift shall have an effective platform area not less than 1.45m² or 15 ½ ft² and be capable of carrying a load not less than 550kg or 1200 lb.

4.3 Doors

The lift shall have power operated doors giving a minimum clear opening width of 0.80m or 2 ft 9 in and arranged to remain open whilst the lift car is at a floor when under 'fire control' conditions.

4.4 Speed

The speed of the lift shall be such that it will run its full travel in not more than one minute.

4.5 Fire switch

4.5.1 Location. *A switch, in a box clearly marked 'FIRE CONTROL' shall be sited adjacent to the lift opening at fire control level so that firemen can obtain immediate control of the fire lift without interference from the ordinary call points. Where two or more lifts are installed together the position selected for the switch should, if possible, be such that there is no doubt which lift it controls.*

Otherwise a suitable notice or directing arrow shall be provided adjacent to the switch to indicate which lift it controls. Where two adjacent lifts are adapted as fire lifts a notice, "FIRE CONTROL FOR BOTH LIFTS" shall be provided. In blocks of dwellings where the fire switch may be subjected to unauthorised interference the switch and box shall be fitted at high level.

4.5.2 Type. *Only one fire switch shall be provided. The switch shall be of a type which does not require a key for operation e.g. a switch with two press buttons, or a tumbler switch marked "FIRE CONTROL", "ON" and "OFF". Where a two button switch is used the operated button shall remain depressed to indicate which button is in operation.*

4.5.3 Operation. *The operation of the fire switch shall be such that all safety devices remain operative, including maintenance switches. Arrangements shall be made for the operation of the fire switch to bring the firemen's lift car to the fire control level without delay and with doors parked open.*

A service switch, as defined in Part 9, shall not override the fire control switch.

Whilst under 'fire control' all landing call-points and control switches shall be rendered inoperative and sole control vested in the car control station, ensuring that any collective control becomes inoperative.

4.6 Electricity supply

The electrical supply to the lift shall be connected to a sub-main circuit exclusive to the lift and independent of any other main or sub-main circuit. The cables supplying current to the lift installations should be located on a route of negligible fire risk and where possible within the lift well.

When a fire lift is one of a battery of lifts the other lifts may be fed from the same supply, provided it is adequate for this purpose and that arrangements are such that a fault occurring in any other lift of the battery will not affect in any way the operation of the fire lift.

E.1.3. Codes of Practice

British Standard Code of Practice CP3: Chapter IV: Part 1: 1971 {BSI00001729}

29. The British Standard Code of Practice, CP3 1971 is also relevant. Particularly Chapter IV: Part 1: 1971. Chapter IV which is called '*Precautions Against Fire*'. Part 1 concerns flats and maisonettes (in blocks over two storeys). Detailed consideration of the requirements of CP3 is outside the scope of my expertise.
30. However, I have considered Section 4 of Dr Barbara Lane's Phase 1 report. In this section she explains the evidence which suggests that it is likely that CP3 1971 was the basis for the design of Grenfell Tower. I have read this and agree with her conclusions.

31. I have also considered Appendix D of Dr Barbara Lane's Phase 1 report, in which she explains the formal status of CP3 in some detail in section D9.2.11. She explains that: *"This document provides guidance on how to arrange high-rise blocks of flats in terms of internal layout of individual flats and the arrangement of means of escape."* She goes on to explain that: *"As I have described in the preceding section CP3 1971 was permitted for use in London to satisfy Section 34 of the London Building Acts (Amendment) Act 1939."*
32. Given the above, I set out the relevant parts of CP3 1971 which relate to lifts. As I say later in the report, in Section F, I cannot be sure if Grenfell Tower complied with the guidance set out in CP3 1971 relating to lifts at the time of its construction (1972-1974) because of the very limited information from that period.
33. Clause 7.6 concerns fire lifts and says:

"7.6.1 Where passenger lifts are installed in a building, one or more should be arranged so as to be available for the exclusive use of firemen in an emergency by providing at entrance level a switch in a glass-fronted box marked 'FIRE SWITCH' which operates a control whereby firemen can obtain the use of a lift without interference from the landing call points. Alternatively the fireswitch may be in a box protected by a metal cover and which can be unlocked by a key which would pass the dry riser box and any other locks which would require to be opened by the fire brigade. The design and type of switch for use with fire lifts should confirm to the requirements of the local Fire Authority."

7.6.2 A sufficient number of lifts should be arranged as fire lifts to ensure that in flats every floor (except under the circumstances described below, the top floor) and in maisonettes every entrance floor, has direct access to at least one such lift."

The location of a fire lift on plan is dependent upon the method of smoke control used."

...

7.6.4 Where smoke dispersal is the method of smoke control adopted for a building a fire lift should not be more than about 10m (approximately 33ft) from a main stairway, if that is the only stairway to which there is access. However, there is no travel distance restriction between a fire lift and a main stairway where access is available from the fire lift in two directions to one or more main stairways."

In order to ease the difficulty of accommodation the space necessary for over-run at the top of the shaft for a high speed lift, it is considered that a fire lift need not serve the top floor of a building provided the lift is not more than 10m (approximately 33ft) from a main stairway (if that is the only stairway) on the floor below and the hydrant outlet on the top floor is within the stairway enclosure or a special ventilated lobby provided for the purpose, and provided the number of flats on the top floor does not exceed eight."

7.6.5 A fire lift should have a platform area of not less than 1.5m² (approximately 15 ft²) and be capable of carrying a load of 550 kg (approximately 1200 lb). Its speed should be such that it can reach the top floor from ground level within one minute. The electric supply to any fire lift should be provided by a sub-main circuit exclusive to the lift, except that where the fire lift is one of a battery of not more than ix lifts (whether fire lifts or not) the other lifts may be fed from the same supply. The cables supplying current to the lift motor should pass through routes of negligible fire risk. Reference should also be made to BS 2655, Part 1.

34. Dr Barbara Lane's Phase 1 report¹ contains a helpful diagram summarising the requirements of CP3 1971 which I reproduce below:

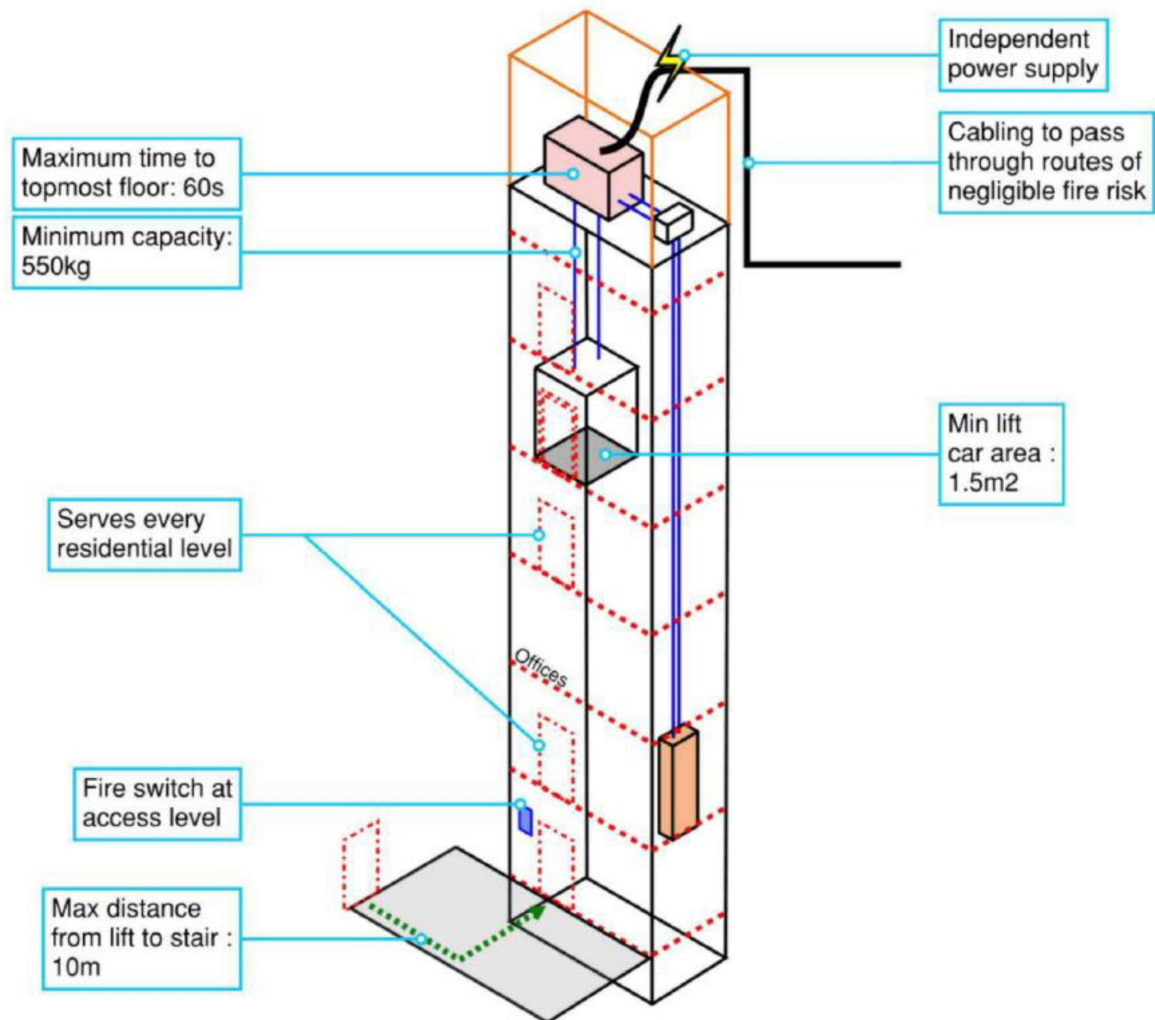


Figure L.2: 'Fire lift' requirements as per CP3 1971

¹ Figure L.2 in Appendix L: *Lift installations - fire safety requirements and provisions*, dated 24 October 2018, page 10.

GLC Code of Practice 1970

35. As noted in Dr Barbara Lane's Phase 1 report in Appendix L, the GLC Section 20 Code of Practice contains almost identical recommendations for a fire lift. There is one small difference between the two codes relating to the type of box protecting the fire switch - GLC Section 20 requires the switch to be in a glass fronted box whereas CP3 refers to either a glass fronted box or a box protected by a metal cover. This is also in Colin Todd's report at paragraph 4.2.19.²

E.2. First lift works - Project 1 – 2003-2006

E.2.1. Legislation

Lift Regulations 1997

36. The Lift Regulations 1997 were in force at the time of Project 1. In my opinion they would have applied to the lifts installed as part of Project 1 and also to any safety components which were installed as part of Project 2. They set out requirements, i.e. what is set out in the Regulations is mandatory and must be complied with. The requirements are in Schedule 1 to the Regulations and are as follows:

“Essential Health and Safety Requirements Relating to the Design and Construction of Lifts and Safety Components

1. Obligations under essential health and safety requirements apply only where the lift or safety component is subject to the hazard in question when used as intended by the installer of the lift or the manufacturer of the safety components.

2. The essential health and safety requirements contained in the Directive are imperatives. However, given the present state of the art, the objectives which they lay down may not be attainable. In such cases, and to the greatest extent possible, the lift or safety components must be designed and built in such a way as to approximate to those objectives.

3. The safety-component manufacturer and the installer of the lift are under an obligation to assess the hazards in order to identify all those which apply to their products; they must then design and construct them taking account of the assessment.

4. In accordance with Article 14, the essential requirements laid down in Directive 89/106/EEC1 not included in this Directive, apply to lifts.

² Paragraph 4.2.19, report of Colin Todd, 'Legislation, Guidance and Enforcing Authorities relevant to Fire Safety Measures at Grenfell Tower' dated March 2018 on the Inquiry website at <https://www.grenfelltowerinquiry.org.uk/evidence/colin-todds-expert-report>.

1. GENERAL

1.1. Application of Directive 89/392/EEC, as amended by Directives 91/368/EEC, 93/44/EEC and 93/68/EEC

Where the relevant hazard exists and is not dealt with in this Annex, the essential health and safety requirement of Annex I to Directive 89/392/EEC apply. The essential requirement of Section 1.1.2 of Annex 1 to Directive 89/392/EEC must apply in any event.

1.2. Car

The car must be designed and constructed to offer the space and strength corresponding to the maximum number of persons and the rated load of the lift set by the installer.

In the case of lifts intended for the transport of persons, and where its dimensions permit, the car must be designed and constructed in such a way that its structural features do not obstruct or impede access and use by disabled persons and so as to allow any appropriate adjustments intended to facilitate its use by them.

1.3. Means of suspension and means of support

The means of suspension and/or support of the car, its attachments and any terminal parts thereof must be selected and designed so as to ensure an adequate level of overall safety and to minimise the risk of the car falling, taking into account the conditions of use, the materials used and the conditions of manufacture.

Where ropes or chains are used to suspend the car, there must be at least two independent cables or chains, each with its own anchorage system. Such ropes and chains must have no joins or splices except where necessary for fixing or forming a loop.

1.4. Control of loading (including overspeed)

1.4.1. Lifts must be so designed, constructed and installed as to prevent normal starting if the rated load is exceeded.

1.4.2. Lifts must be equipped with an overspeed limitation device

These requirements do not apply to lifts in which the design of the drive system prevents overspeed.

1.4.3. Fast lifts must be equipped with a speed-monitoring and speed-limiting device.

1.4.4. Lifts driven by friction pulleys must be designed so as to ensure stability of the traction cables on the pulley.

1.5. Machinery

1.5.1. All passenger lifts must have their own individual lift machinery. This requirement does not apply to lifts in which the counterweights are replaced by a second car.
1.5.2. The installer of the lift must ensure that the lift machinery and the associated devices of a lift are not accessible except for maintenance and in emergencies.

1.6. Controls

1.6.1. The controls of lifts intended for use by unaccompanied disabled persons must be designed and located accordingly.

1.6.2. The function of the controls must be clearly indicated.
1.6.3. The call circuits of a group of lifts may be shared or interconnected.

1.6.4. Electrical equipment must be so installed and connected that:

- there can be no possible confusion with circuits which do not have any direct connection with the lift,*
- the power supply can be switched while on load,*
- movements of the lift are dependent on electrical safety devices in a separate electrical safety circuit,*
- a fault in the electrical installation does not give rise to a dangerous situation.*

2. HAZARDS TO PERSONS OUTSIDE THE CAR

2.1 The lift must be designed and constructed to ensure that the space in which the car travels is inaccessible except for maintenance or in emergencies. Before a person enters that space, normal use of the lift must be made impossible.

2.2. The lift must be designed and constructed to prevent the risk of crushing when the car is in one of its extreme positions.

The objective will be achieved by means of free space or refuge beyond the extreme positions. However, in specific cases, in affording Member States the

possibility of giving prior approval, particularly in existing buildings, where this solution is impossible to fulfil, other appropriate means may be provided to avoid this risk.

2.3. The landings at the entrance and exit of the car must be equipped with landing doors of adequate mechanical resistance for the conditions of use envisaged.

An interlocking device must prevent during normal operation:

- starting movement of the car, whether or not deliberately activated, unless all landing doors are shut and locked,*
- the opening of a landing door when the car is still moving and outside a prescribed landing zone.*

However, all landing movements with the doors open shall be allowed in specified zones on condition that the levelling speed is controlled.

3. HAZARDS TO PERSONS IN THE CAR

3.1. Lift cars must be completely enclosed by full-length walls, fitted floors and ceilings included, with the exception of ventilation apertures, and with full-length doors. These doors must be so designed and installed that the car cannot move, except for the landing movements referred to in the third sub-paragraph of Section 2.3, unless the doors are closed, and comes to a halt if the doors are opened.

The doors of the car must remain closed and interlocked if the lift stops between two levels where there is a risk of a fall between the car and the shaft or if there is no shaft.

3.2. In the event of a power cut or failure of components the lift must have devices to prevent free fall or uncontrolled upward movements of the car.

The device preventing the free fall of the car must be independent of the means of suspension of the car.

This device must be able to stop the car at its rated load and at the maximum speed anticipated by the installer of the lift. Any stop occasioned by this device must not cause deceleration harmful to the occupants whatever the load conditions.

3.3. Buffers must be installed between the bottom of the shaft and the floor of the car.

In this case, the free space referred to in Section 2.2 must be measured with the buffers totally compressed.

This requirement does not apply to lifts in which the car cannot enter the free space referred to in Section 2.2 by reason of the design of the drive system.

3.4. Lifts must be so designed and constructed as to make it impossible for them to be set in motion if the device provided for in Section 3.2 is not in an operational position.

4. OTHER HAZARDS

4.1. The landing doors and car doors or the two doors together, where motorised, must be fitted with a device to prevent the risk of crushing when they are moving.

4.2. Landing doors, where they have to contribute to the protection of the building against fire, including those with glass parts, must be suitably resistant to fire in terms of their integrity and their properties with regard to insulation (containment of flames) and the transmission of heat (thermal radiation).

4.3. Counterweights must be so installed as to avoid any risk of colliding with or falling on to the car.

4.4. Lifts must be equipped with means enabling people trapped in the car to be released and evacuated.

4.5. Cars must be fitted with two-way means of communication allowing permanent contact with a rescue service.

4.6. Lifts must be so designed and constructed that, in the event of the temperature in the lift machine room exceeding the maximum set by the installer of the lift, they can complete movements in progress but refuse new commands

4.7. Cars must be designed and constructed to ensure sufficient ventilation for passengers, even in the event of a prolonged stoppage.

4.8. The car should be adequately lit whenever in use or whenever a door is opened; there must also be emergency lighting.

4.9. The means of communication referred to in Section 4.5 and the emergency lighting referred to in Section 4.8 must be designed and constructed so as to function even without the normal power supply. Their period of operation should be long enough to allow normal operation of the rescue procedure.

4.10. The control circuits of lifts which may be used in the event of fire must be designed and manufactured so that lifts may be prevented from stopping at certain levels and allow for priority control of the lift by rescue teams.

5. MARKING

5.1. In addition to the minimum particulars required for any machine pursuant to Section 1.7.3 of Annex I to Directive 89/392/EEC, each car must bear an easily visible plate clearly showing the rated load in kilograms and the maximum number of passengers which may be carried.

5.2. If the lift is designed to allow people trapped in the car to escape without outside help, the relevant instructions must be clear and visible in the car.

6. INSTRUCTIONS FOR USE

6.1. *The safety components referred to in Annex IV must be accompanied by an instruction manual drawn up in an official language of the Member State of the lift installer or another Community language acceptable to him, so that:*

- assembly,*
- connection,*
- adjustment, and*
- maintenance,*

can be carried out effectively and without danger.

6.2. *Each lift must be accompanied by documentation drawn up in the official language(s) of the Community, which may be determined in accordance with the Treaty by the Member State in which the lift is installed. The documentation shall contain at least:*

- an instruction manual containing the plans and diagrams necessary for normal use and relating to maintenance, inspection, repair, periodic checks and the rescue operations referred to in Section 4.4.*
- a logbook in which repairs and, where appropriate, periodic checks can be noted.”*

Lifting Operations and Lifting Equipment Regulations 1998 (“LOLER 1998”)

37. Analysis of the relevant provisions of LOLER 1998 is outside my expertise, but they state:

“9.— Thorough examination and inspection

(3) Subject to paragraph (6), every employer shall ensure that lifting equipment which is exposed to conditions causing deterioration which is liable to result in dangerous situations is—

(a) thoroughly examined—

- (i) in the case of lifting equipment for lifting persons or an accessory for lifting, at least every 6 months;*
- (ii) in the case of other lifting equipment, at least every 12 months; or*
- (iii) in either case, in accordance with an examination scheme; and*

(iv) each time that exceptional circumstances which are liable to jeopardise the safety of the lifting equipment have occurred; and

(b) if appropriate for the purpose, is inspected by a competent person at suitable intervals between thorough examinations,

to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time."

10.— Reports and defects

(1) A person making a thorough examination for an employer under regulation 9 shall—

(a) notify the employer forthwith of any defect in the lifting equipment which in his opinion is or could become a danger to persons;

(b) as soon as is practicable make a report of the thorough examination in writing authenticated by him or on his behalf by signature or equally secure means and containing the information specified in Schedule 1 to—

(i) the employer; and

(ii) any person from whom the lifting equipment has been hired or leased;

(c) where there is in his opinion a defect in the lifting equipment involving an existing or imminent risk of serious personal injury send a copy of the report as soon as is practicable to the relevant enforcing authority.

...

(3) Every employer who has been notified under paragraph (1) shall ensure that the lifting equipment is not used—

(a) before the defect is rectified; or

(b) in a case to which sub-paragraph (c) of paragraph 8 of Schedule 1 applies, after a time specified under that sub-paragraph and before the defect is rectified.

(4) In this regulation "relevant enforcing authority" means—

(a) where the defective lifting equipment has been hired or leased by the employer, the Executive; and

(b) otherwise, the enforcing authority for the premises in which the defective lifting equipment was thoroughly examined."

38. Schedule 1 of LOLER 1998 sets out the information to be contained in a report of Thorough Examination:

“Para 1 - The name and address of the employer for whom the thorough examination was made.

Para 2 - The address of the premises at which the thorough examination was made.

Para 3 - Particulars sufficient to identify the lifting equipment including where known its date of manufacture.

Para 4 - The date of the last thorough examination.

Para 5 - The safe working load of the lifting equipment or (where its safe working load depends on the configuration of the lifting equipment) its safe working load for the last configuration in which it was thoroughly examined.

Para 6 - In relation to the first thorough examination of lifting equipment after installation or after assembly at a new site or in a new location—

(a) that it is such thorough examination;

(b) (if such be the case) that it has been installed correctly and would be safe to operate.

Para 7 - In relation to a thorough examination of lifting equipment other than a thorough examination to which paragraph 6 relates—

(a) whether it is a thorough examination—

(i) within an interval of 6 months under regulation 9(3)(a)(i);

(ii) within an interval of 12 months under regulation 9(3)(a)(ii);

(iii) in accordance with an examination scheme under regulation 9(3)(a)(iii); or

(iv) after the occurrence of exceptional circumstances under regulation 9(3)(a)(iv);

(b) (if such be the case) that the lifting equipment would be safe to operate.

Para 8 In relation to every thorough examination of lifting equipment—

(a) identification of any part found to have a defect which is or could become a danger to persons, and a description of the defect;

(b) particulars of any repair, renewal or alteration required to remedy a defect found to be a danger to persons;

(c) in the case of a defect which is not yet but could become a danger to persons—

(i) the time by which it could become such danger;

(ii) particulars of any repair, renewal or alteration required to remedy it;

(d) the latest date by which the next thorough examination must be carried out;

(e) where the thorough examination included testing, particulars of any test;

(f) the date of the thorough examination.

Para 9 - The name, address and qualifications of the person making the report; that he is self-employed or, if employed, the name and address of his employer.

Para 10 - The name and address of a person signing or authenticating the report on behalf of its author."

The Regulatory Reform (Fire Safety) Order 2005

39. It is outside the scope of my expertise to comment on the Regulatory Reform (Fire Safety) Order 2005 ('the Order') and the duties it creates. Other experts have addressed this issue and I refer to their reports which set out the relevant parts of the Order. I note that there is a range of views as to the interpretation of the provisions of the Order. I do not express any view on the correct interpretation of the Order.
40. The Phase 1 report of Colin Todd addresses the Order in section 9. The report explains at paragraph 9.1.15 that: *"The fire safety duties required by the Fire Safety Order are imposed on the "Responsible Person"...In relation to other premises, the Responsible Person is the person who has control of the premises in connection with his trade, business or other undertaking (whether for profit or not)..."*
41. He further explains at paragraph 9.1.16 that: *"Under Article 5(3) of the Fire Safety Order, the fire safety duties imposed on the Responsible Person are also imposed on every person, other than the Responsible Person, who has, to any extent, control of the premises."*
42. This is reinforced by the Phase 1 report of Dr Barbara Lane, in Appendix D at D6.3.14 which states: *"Article 5 of the Order places duties on specific persons that have control over premises to implement and maintain fire precautions. Those persons are referred to as "responsible persons". She further states at D7.2.38: "The responsible person is defined and has duties under the Regulatory Reform (Fire Safety) Order 2005. It is the person who owns and/or controls the building."*
43. Colin Todd's report explains further at paragraph 9.1.24 that: *"The fire safety duties imposed on the Responsible Person are set out in 15 articles (Articles 8-22) within Part 2 of the Fire Safety Order."*
44. Article 13, in his summary: *"Requires, where necessary, appropriate fire alarm systems and fire extinguishers, along with, where necessary, measures for firefighting, nomination*

of competent persons to implement the firefighting measures and arrangements for necessary contacts with external emergency services, particularly as regards fire-fighting.”

E.2.2. Statutory Guidance

Approved Document B 2000

- 45. It is outside the scope of my expertise to analyse or comment on Approved Document B. Other experts have considered its requirements and I find it helpful to set out their comments, where relevant to lifts.
- 46. Dr Barbara Lane’s Phase 1 report states in Appendix L at L.3.3.2: *“The statutory guidance at the time of the lift replacement in 2005 was Approved Document B, 2000 edition. ADB 2000 section 18.11 states that firefighting lift installations should be constructed and installed in accordance with the recommendations of Section 3 of BS 5588-5:1991.”*

E.2.3. Standards

- 47. In summary, the main applicable standards at the time of Project 1 in 2005 were BS 5588 and BS EN 81.
 - 47.1. BS 5588 is a set of standards concerning fire precautions in the design, construction and use of buildings. Part 5, relating to firefighting stairs and lifts is most relevant.
 - 47.2. BS EN 81 is a European set of standards concerning lifts. Part 72, relating to firefighters’ lifts, is the most relevant.
- 48. BS 5588-5: 1991 *Fire precautions in the design, construction and use of buildings, Part 5: Code of practice for firefighting stairs and lifts* is a British standard from 1991 which sets out the key requirements for a firefighting lift {BSI00001721}. It is the standard referenced in Approved Document B.
- 49. This was then followed by BS EN 81-72: 2003 {BSI00001725}. This standard from 2003 sets out the requirements of a firefighters’ lift. It is not explicitly referred to in the 2000 version of Approved Document B however the ‘Use of Guidance’ section in ADB 2000 makes clear that *“there is no obligation to adopt any particular solution contained in an Approved Document if you prefer to meet the relevant requirement in some other way.”*
- 50. BS 5588-5: 2004 is a revision of the 1991 standard {BSI00001723}. This was revised to take into account the introduction of the new European standard. It was published in November 2004. Section 2A.06 ‘Design Standards’ of the B&Y Specification stated:
 - 50.1. *“The equipment and installation shall conform to this specification and to the relevant British Standards including Codes of Practice and, in particular, BS 5655, BS 7255 and EN81-1. Where this specification differs from those standards and codes, the provision of this specification shall prevail.*

50.2. *Reference to British Standards and Codes of Practice shall mean the edition current three months prior to the date for return of tenders.”*

51. Return of tenders for Project 1 occurred in July 2004. Three months prior would therefore have been April 2004, i.e. prior to the publication of BS 5588-5: 2004. I have seen no evidence that B&Y gave active consideration to BS 5588-5: 2004 or its implications for the project. However, in my view, BS 5588-5: 2004 was an important document which concerned fire safety. It would have been good practice, in my view, for B&Y to have considered BS 5588-5:2004 and compared it against the existing Specification. Furthermore, they should have brought it to the attention of the client (TMO) and Apex. However, in any event, as exemplified by the table in Appendix 1 setting out the requirements of the standards side-by-side, I do not think in the present case it would have made much of a practical difference. Much of BS 5588-5:2004 simply adopts BS EN 81-72: 2003 which was already published and should have been the relevant reference point for the B&Y Specification.
52. I set out in detail in Section H how, in my opinion, these standards apply to ‘new’ and ‘modernized’ lifts.
53. There are other standards but they do not set out the requirements for a firefighting lift, and so I do not consider them relevant to my report. BS 5655 covers lifts and service lifts. BS 5655-11: 1989 concerns the recommendation for the installation of new, and the modernization³ of, electric lifts in existing buildings {BSI00001728}. BS 5655-11: 2005 contains a code of practice for the undertaking of modifications to existing electric lifts {BSI00001724}.
54. I do not consider either of these standards to be directly relevant and I explain in Section H in more detail why. In brief, both standards are directed at the engineering and safety features of lifts, not their firefighting features, and are therefore not relevant in the present case.

British Standard 5588-5: 1991 Fire precautions in the design, construction and use of buildings, Part 5: Code of practice for firefighting stairs and lifts {BSI00001721}

55. BS 5588-5: 1991 was published in August 1991.

56. Clause 1 - General | 1 - Scope says:

“This code of practice provides guidance for designers in providing firefighting stairs and lifts to assist the fire service in firefighting operations”.

Definitions

57. Clause 1 includes a definitions clause which says:

³ I have used the American spelling of this word to be consistent with the British Standards, which use the American spelling.

“2.10 Firefighting Lift A lift designated to have additional protection, with controls that enable it to be used under the direct control of the fire service in event of fire.

NOTE The firefighting lift is a development of the type of lift known as a fireman’s lift. Although existing firemen’s lift installations may be replaced, firemen’s lifts should not be used in new installations. Only lifts complying with this code of practice can be designated firefighting lifts.

2.11 Firefighting lobby A protected lobby providing access from a firefighting stair to the accommodation area, and to any associated firefighting lift.

2.12 Firefighting Shaft A protected enclosure containing a firefighting stair, firefighting lobbies and, if provided, a firefighting lift, together with its machine room.

2.22 Lift Well Space in which the lift and the counterweight (if any) move. This space is materially enclosed by the bottom of the pit, the vertical walls and ceiling.

Provision of firefighting shafts

58. Clause 1 - 3.6 - Provision and number of firefighting shafts says that:

“The criteria for the provision and number of firefighting shafts in many building types are given either in building regulations or in the relevant Part of BS 5588. However, where no such guidance is available the provision and number of firefighting shafts should be based on the following:

(a) Buildings or parts of buildings where: 1) the height (see 2.18) of the surface of the floor of the topmost storey (excluding any storey consisting exclusively of plant rooms) exceeds 15m

...Should be provided with firefighting shafts each containing:

i) a firefighting stair

ii) firefighting lobbies provided with a fire main

iii) a firefighting lift installation.”

General - firefighting lift installation

59. Clause 3 - Firefighting lift installation | 10 states:

“...A firefighting lift, unlike a normal passenger lift, is designed to operate so long as is practicable when there is a fire in parts of the building beyond the confines of the firefighting shaft, as it is used to transport firefighters and their equipment to a floor of their choice. The lift may be used in normal times as a passenger lift by the occupants of the building but, in order to prevent the risk of the entrance being obstructed when the lift is required to go into the firefighting mode, it should not be used for moving refuse, nor for moving goods. In buildings provided with a single lift its use for the transport of goods should be avoided unless essential, the lift

lobbies should be kept clear, and when used for moving goods the doors should not be obstructed to ensure that the lift remains at a particular level.

Because of the danger of failure of the electrical control system of the lift, steps need to be taken to reduce the likelihood of water from firefighting operations and from the fire area (from a sprinkler discharge, for instance) flowing into the lift well, and electrical equipment needs to be protected against falling water. Although BS 5655-1 and BS 5655-2 requires a small slope on the lift landing to prevent cleaning water from entering the lift well, water from firefighting has not previously been considered in lift design codes.

It is essential that the lift doors be power operated. Firefighting lifts located in areas subject to, or potentially subject to, vandalism (e.g. local authority housing, shopping precincts, multi-storey car parks) should comply with DD 97 insofar as its recommendations do not conflict with this code.”

Lift car (trap door, materials speed, signage)

60. Subclause 11 - Firefighting lift cars | 11.2 - Recommendations sets out recommendations for the lift car. The relevant parts are:

“a) The lift car should comply with all the relevant requirements of BS 5655. The dimensions of the lift car should comply with Table 4, Table 5 or Table 6 of BS 5655-5:1981.

b) The frame and main structure should be constructed from materials of limited combustibility. Wall and ceiling linings should be constructed from materials which would be classified as class 1 if tested in accordance with BS 476-7. Flooring should follow the recommendations given in 9.6.2.

c) The speed of the lift should be such that it will run its full travel in not more than 1.0 min.

d) An emergency trap door complying with 8.12 of BS 5655-1: 1986 or 8.12 of BS 5655-2: 1988 should be provided...

e) In buildings provided with more than one lift, firefighting lift cars should be clearly and conspicuously marked with a notice complying with BS 5499-1 stating “Firefighting lift: do not use for goods or refuse”...

f) In addition to the normal storey markings, “Fire service access level” or “FSAL” should be marked on or adjacent to the appropriate car controls and indicators.”

Water protection - firefighting lift wells

61. Subclause 12 - Firefighting lift wells | 12.1 - Commentary says:

“There have been several recorded occasions when water from a landing valve, hose lines, etc. has entered the lift well and caused malfunction of the installation

when it reached electrical door interlocks, car controls, etc. It is therefore necessary to minimize the effects of water on lift operations.

The minimum flow rate from a fire main recommended in BS 5306-1 is 25 L/s, and this is considered to be representative of likely flow rates from other sources. The absence of sprinkler heads does not obviate the need for protection from water.

The method chosen ought to be appropriate to the building and might include the provision of drainage channels and drainpipes, and/or laying the lift landing floor to a fall so that any water entering the lobby will not enter the lift well but will drain away down the stairs and/or into a smoke shaft and/or to gargoyles or scuppers on the outside of the building (see Appendix B).

The upper and side surfaces of electrical control equipment within the lift well need to be protected against falling water from seepage under the lift landing doors by, for example, the provision of waterproof covers or diverter canopies: these need to be so arranged that falling water is diverted away from other control equipment.”

62. Subclause 12.2 - Recommendations states:

“...b) Water should be prevented from entering the well of a firefighting lift and interfering with the operation of the electrical equipment of a firefighting lift. Electrical equipment within the lift well located within 1m of any wall separating the lift well from a lift lobby should be provided with enclosures classified as a minimum IPX3₂ in accordance with BS 5490 (see Figure 6).

...

c) Electrical equipment necessary for the operation of the firefighting lift should not be installed within 1m of the bottom of the lift well.”

Machine room

63. Clause 13 contains recommendations on firefighting lift machine rooms. It is recommended that:

“a) The machine room for a firefighting lift should be sited within the firefighting shaft, not directly below the lift well, and should be either:

1) separated from the firefighting stair, firefighting lift lobby and firefighting lift well by fire-resisting construction in accordance with 9.2 and 9.3.2, and accessible only by way of the firefighting lift lobby at that level; or

2) located above the firefighting lift well and accessible by way of the firefighting stair with a fire door between the stair or lobby and machine room.

b) The machine room for the firefighting lift should comply with all the relevant requirements of BS 5655.

c) Water should be prevented from entering the machine room.”

Fire control switch and system

64. Subclause 14 - Firefighting lift control systems | 14.1 - Commentary states:

“A firefighting lift switch is provided to enable the fire service to obtain immediate control of the firefighting lift(s) in that firefighting shaft. Provision should be made to control access to the firefighting switch. If access is key controlled it is better to site the firefighting lift switch behind a lockable access door, rather than provide a key operated switch. This is because a door can be broken open if necessary, whilst it is not unknown for key operated switches to be rendered inoperable by the filling of the keyway with, for example, adhesive.

Lifts in the firefighting shaft operate normally until the firefighting lift switch is operated. This immediately renders inoperative all call buttons both on the lift landings and in the lift cars, and the firefighting lift and other lifts in the firefighting shaft are brought as speedily as possible to the fire service access level. It is not necessary to interconnect separate or multiple groups of lifts with other firefighting lifts as it may be undesirable to disable the whole building.

If, as part of the fire strategy in a particular building, the firefighting lift (and any other lifts within the firefighting shaft) is brought to the fire service access level on operation of the fire alarm system, the lift car and landing controls ought to be disabled until the firefighting lift switch has been operated.

If a lift is travelling away from the fire service access level it will stop (without opening its doors) at the next available floor according to the lift speed and the minimum slow down distance of the drive system; the lift then reverses direction and travels without stopping to the fire service access level.

On arriving at the fire service access level the lift doors open on all lifts in the firefighting shaft to allow any passengers to exit, after which the lift doors will close on all the lifts except the firefighting lift to prevent further operation.

The car controls of the firefighting lift become active only after it has arrived at the fire access level and the firefighting lift switch has been operated. It is stationed at the fire service access level with its doors open and is operated in the following way: fire personnel entering the lift car may register a call to any selected landing in the building by sustained pressure on a car control until the car doors have fully closed. If a car control is released before the doors have fully closed, the doors immediately reopen and the call is cancelled. Once moving, additional calls may be registered on the car controls: the lift travels in the direction of the first call registered, and stops at the first floor encountered for which a call is registered. The doors remain closed and may be opened only by continuous pressure on the ‘door open’ control. Release of the ‘door open’ control before the doors are fully open will cause the doors to automatically re-close: this is to allow fire service personnel to observe the situation immediately outside the lift landing doors in the

firefighting lobby. Once the doors are fully open they remain open until a new call is registered at the car control station.

Heat or smoke sensitive (touch button) controls are not suitable as the heat or smoke from the fire might 'call' the lift to the fire floor prior to the operation of the firefighting lift switch: on reaching the fire floor the lift doors could open and it is possible that the fire could put the lift out of action.

Landing control circuitry needs to be designed so that, whilst the lift is in the firefighting mode, any failure that can occur such as a short circuit induced by heat or moisture does not affect operation of the firefighting lift."

65. Subclause 14.2 gives details of the firefighting control systems. It sets out the following:

a) A firefighting lift switch should be positioned near the firefighting lift landing door at fire service access level and clearly marked "Firefighting lift". The operation positions of the switch should be clearly marked "on" and "off".

Unless some other provision is made to control access to the firefighting lift switch, it should be protected by a cover provided with a lock openable by the standard lift door emergency unlocking key described in Appendix B of BS 5655-1: 1986. The cover should not be transparent, should be positioned not more than 2m from the firefighting lift, and should be marked "FB". If the firefighting lift is located in an area subject to vandalism, the cover should be located not less than 2.5m above floor levels, or immediately below the ceiling if the ceiling height is less than 2.5m.

b) If there are two or more lifts installed together there should be clear indication as to which lift is the firefighting lift.

...

g) Operation of the firefighting lift switch should automatically ensure the following.

1) Landing call buttons and car control stations within the firefighting shaft, with the exception of the car door controls, should be rendered inoperative.

2) Safety devices for all lift landing doors and all lift car doors in the firefighting shaft that may be affected by smoke or heat, so as to prevent door closure, should be rendered inoperative...

3) All lifts within the firefighting shaft should return as soon as practicable to the fire service access level with a "Lift under fire service control" sign illuminated within each lift car. The "Lift under fire service control" sign should remain illuminated until the firefighting lift switch is returned to the "off" position.

NOTE 3 It is important that any lift travelling away from the fire service access level be able to stop and reverse without the car doors opening.

NOTE 4 The firefighting lift (and any other lifts within the firefighting shaft) may be returned to fire service access level at any time by switching the firefighting lift switch from “on” to “off” (for a minimum of 5s) and back to “on”.

On arriving at the fire service access level, all lifts within the firefighting shaft other than the firefighting lift should be retained there with the lobby and car doors kept in the closed position (after opening for the discharge of passengers)....

5) The fire service communications system (see clause 15) should be operative.

...

7) Warnings that the switch has been operated that are both audible and visible at all points within the lift well, motor room and any other area entered for maintenance purposes should be provided.

...

h) After the firefighting lift has parked, with doors open, in response to operation of the firefighting lift switch, sole control should then be vested in the firefighting lift car control station, and the following should be ensured.

1) It should not be possible to register a call to a landing other than landing by sustained pressure on a lift car call control until the car doors have closed fully. If the car call control is released before the doors have fully closed, they should re-open immediately.

2) Registration of a call should cause the lift car to travel to, and stop with the doors remaining closed, at the selected landing.

3) If the car is in motion, it should be possible to register further calls from within the car. The car should stop at the nearest landing in its current direction of travel for which a call is registered. When the car stops, all calls should be automatically cancelled and the car should not depart until a fresh call is registered.

4) If the car is stationary at a landing, it should be possible to control the opening of the doors only by the application of continuous pressure on the “door open” car control. If the control is released before the doors are fully open, the doors should automatically re-close. Once fully open, the doors should remain open until a new call is registered on the car control station.

i) Effective means should be provided:

1) within the lift car to indicate the confirmation of all calls registered on the car control station;

2) to show the position of the car (at any time whilst power is present), both in the car and at the fire service access level, whether the car is in motion or at rest.

j) The lift installer should issue a certificate after installing and testing a firefighting lift which states that the tests and checks listed in appendix C have been satisfactorily completed."

66. Note 1 of clause 1 says that *"The control system described in clause 14 is also suitable for evacuation lifts described in BS 5588-8 and should replace the firemen's switch control described in BS 2655 wherever possible."*

Fire service communications systems

67. Clause 15.1 - Fire service communications level | Commentary says that:

"A separate intercom system should be provided for each firefighting lift installation independent from any other system."

It also says, under Recommendations, that:

"a) As part of the firefighting lift installation an intercom system or similar device should be provided for two-way speech communication between the firefighting lift car and both fire service access level and the firefighting lift machine room whilst the firefighting lift is in the firefighting mode.

b) If the firefighting lift is located in an area subject to vandalism the communication equipment at fire service access level should be a handset on a 2 m long cord located behind a locked cover {see 14.2 a)} located not less than 2.5 m above floor level, or immediately below the ceiling if the ceiling height is less than 2.5 m.

c) The communications equipment within the lift car should be a built-in microphone and speaker, and not a telephone handset.

d) A firefighting lift is now intended to act as an evacuation lift prior to the arrival of the fire service and the recommendations contained in BS 5588-8 should apply."

Power supply

68. Clause 4 - Electrical services | 16 - Electrical services | 16.1 - Commentary says:

"To reduce the risk of loss of electrical supply in a fire a secondary power supply, such as a generator or a supply from a separate substation, is considered essential..."

Both the primary and secondary sources of power to the firefighting shaft need to be sufficiently protected against fire and water damage and also to be separated from each other, so that a failure in cables or equipment, either by mechanical breakdown or damage by fire, in any one system, does not affect the other supply. Protection against fire may be achieved through choice of cable, choice of route

(for example through protected areas, or external to the building) or by the provision of additional protection.”

69. 16.2 - Recommendations says:

“a) The primary electrical supply to the firefighting lift should be obtained from a sub-main circuit exclusive to the lift and independent of any other main or sub-main circuit; other lifts in the firefighting shaft may be fed from the same primary supply, provided that the supply is adequate for this purpose and that arrangements are such that a fault occurring in any other lift in the firefighting shaft or the power supplies thereto will not affect in any way the operation of the firefighting lift.

b) A secondary power supply independent of the primary power supply to the firefighting shaft, e.g. an automatically started generator should be provided which will, independently of the primary supply, be of sufficient capacity to:

1) maintain in operation:

i) the firefighting lift;

ii) normal lighting within the firefighting shaft;

iii) the fire service communications system (see clause 15);

iv) any mechanical ventilation or pressurization system which operates in conjunction with the operational use of the firefighting shaft;

v) any pump(s) required to feed the fire main;

vi) the stair enclosure openable vent.

2) permit the automatic recall to fire service access level of all other lifts in the firefighting shaft, if necessary in sequence and at reduced speed.

The secondary power supply should be capable of providing the power for item b) 1) within 30s of the failure of the primary electrical supply. Where the secondary power source is a generator, it should be capable of providing the power necessary for at least 3h without replenishment of fuel. A supply from another substation should be from a substation which does not normally provide the incoming supply to the building.

...

d) All electrical services should be installed, and periodically inspected and tested (with any necessary maintenance carried out), by suitably qualified engineers in accordance with BS 7671 (IEE Wiring Regulations).

1) should be located in a protected shaft, where possible in the lift well; or

2) should be adequately protected against the action of fire for a period not less than that required for the structural fire protection of the firefighting shaft; or

3) Should be classified as CWZ in accordance with BS 6387.

...

g) Any electrical substation, distribution board, generator, hydraulic pump or other apparatus which supplies or transmits power to the firefighting lift installation, or any equipment associated with the firefighting shaft (e.g. pressurization fans, pumps for fire mains, etc.) should be protected from the action of fire in the building for a period not less than that specified for the enclosing structure of the firefighting shaft (see 9.3) and in accordance with the general principles of structural fire protection for a lift machine room (see BS 5655).

...k) Indication of the status of:

1) which power supply, primary or secondary, is in use;

2) any mechanical ventilation or pressurization systems;

3) any pumps feeding fire mains:

Should be provided adjacent to the firefighting lift switch and should be duplicated in the fire control room (if provided)."

70. Clause 3 | 14.3 - Changeover from primary to secondary supply after operation of the firefighting lift switch | 14.3.1 - Commentary says that:

"On loss of the primary supply the lift, if travelling, will come to an emergency stop and the lights will go out. The emergency lighting will come on immediately. There will then be a delay of up to 30s while the secondary supply (see clause 16) is established: this will be indicated by the restoration of the main lighting in the lift car..."

Maintenance

2. Clause 5 - Routine inspection and maintenance | 17.2 - Recommendations says:

"The following schedule of routine inspection and maintenance should be followed, in addition to any servicing recommended by manufacturers or installers.

...

(b) Weekly, operation of the firefighting lift switch, and operation of any mechanical ventilation or pressurization systems."

...

(d) 6-monthly, inspection of fire mains and associated valves, etc. (see clause 38 of BS 5306-1: 1976) and inspection of the firefighting lift (see BS 5655-10).

(e) Annually, operational testing of the firefighting lift controls as described in C.1, and verification of the minimum pressure differential, maximum door opening forces, and open-door airspeed criteria, in pressure differential smoke systems.”

British Standard EN 81-72: 2003 Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Firefighters lifts

71. BS EN 81-72: 2003 was published in July 2003. It is a European Standard.

Scope

72. Clause 1 - Scope - paragraph 1.2 states:

“This standard is not applicable to:... - lifts installed in existing buildings; - important modification to existing lift installed before the publication of this standard... However, this standard may usefully be used as a basis.

73. It further states at paragraph 1.4 *“This document is applicable to new firefighters lifts in new buildings which are installed after the date of publication of this document by CEN.”* The issue of scope is considered further in Section H.

Definitions

74. Clause 3 - Terms and Definitions contains the following key definitions:

*“3.5 **Firefighters Lift** A lift installed primarily intended for passengers use which has additional protection, controls and signals which enable it to be used under the direct control of the fire service.*

...

*3.7 **Firefighters lift switch** A switch located at the fire service access level, outside of the well, that is intended to be used to give priority service for firefighters.*

*3.8 **Fire service access level** The entry level in the building intended to be used by firefighters to gain access to the firefighters lift.*

Environment/Building Requirements

75. Clause 5.1 provides:

“5.1.2 The lift shall be designed to operate correctly according to the following conditions:

a) the electrical/electronic landing control devices and indicators shall continue to function, so that the firefighters can detect where the car is located for rescue purposes e.g. where the car is blocked when operating in an ambient temperature range of 0 °C to 65 °C, for a period equal to that required for the structure e.g. 2 h;

b) all other electrical/electronic components of the firefighters lift, not in the fire protected lobby shall be designed to function correctly in an ambient temperature range of 0 °C to 40 °C;

c) the correct functioning of the lift control shall be ensured in smoke filled wells and/or machine rooms for a period equal to that required for the structure e.g. 2 h.

5.1.6 The firefighters lift primary and secondary electrical power supply cables shall be fire protected and separated from each other and other power supplies."

Fundamental firefighters lift requirements

76. Clause 5.2 provides:

"5.2.1 The firefighters lift shall be designed in conformity with EN 81-1 and 2 and prEN 81-5, 6 and 7 and provided with additional protection, controls and signals.

NOTE The firefighters lift is to be used under the direct control of the fire service, in the event of fire.

5.2.2 A firefighters lift shall serve every floor of the building.

5.2.3 The size of the firefighters lift shall preferably be selected from ISO 4190-1. At no time shall the size be less than 1 100 mm wide by 1 400 mm deep with a rated load of 630 kg as described in ISO 4190-1, see also 0.5.

The minimum clear entrance width to the car shall be 800 mm.

Where the intended use is to include evacuation, to accommodate such items as a stretcher or bed or designed as a dual entry firefighters lift, then the minimum rated load shall be 1 000 kg and the dimensions of the car 1 100 mm wide by 2 100 mm deep as defined in ISO 4190-1, see also 0.5.

NOTE For firefighters lifts National Regulation may impose greater car dimensions and rated loads following ISO 4190-1.

5.2.4 The firefighters lift shall reach the furthest floor from the fire service access level within 60 s, see also 0.5 from after the closing of the lift doors.

Water protection

77. Clause 5.3 - Protection of electrical equipment against water provides:

"5.3.1 Electrical equipment within the firefighters lift well and on the car, located within 1,0 m of any wall containing a landing door, shall be protected from dripping and splashing water or provided with enclosures classified to at least IPX3 according to EN 60529:1991 (see annex D).

5.3.2 Any electrical equipment which is located less than 1,0 m above the lift pit floor shall be protected to IP67.

Deviating from the requirements of 5.7.3.4 and 5.9 of EN 81-1:1998 and EN 81-2:1998, the socket outlet and lowest lamp of the lighting of the well shall also be located at least 0,5 m above the highest permissible water level in the pit.

5.3.3 Equipment in machinery spaces outside of the well and in the lift pit shall be protected from malfunction caused by water.

5.3.4 Suitable means shall be provided in the lift pit to ensure that water will not rise above the level of the fully compressed car buffer.

5.3.5 Means shall be provided to prevent the water level in the pit from reaching equipment which could create a malfunction of the firefighters lift.”

Trap door

78. Clause 5.4 concerns the rescue of trapped firefighters:

“5.4.1 An emergency trap door shall be provided in the roof of the car measuring a minimum of 0,5 m 0,7 m with the exception of a 630 kg lift where the trap door shall be at least 0,4 m 0,5 m.

5.4.2 The emergency trap door shall conform to 8.12 of EN 81-1:1998 and EN 81-2:1998.

Access to the inside of the car through the trap door shall not be obstructed by a permanent fixture or lighting. Where a suspended ceiling is fitted, it shall be easily openable or removable without the use of special tools. The release point(s) shall be clearly identified from inside the car.

...

5.4.4 Self rescue from inside the car

Access shall be provided to enable full opening the trap door from inside the lift car, for example by the provision of adequate stepping points within the car, with a maximum step rise of 0,4 m. Any stepping point shall be capable of supporting a load of 1 200 N.

...”

Fire protection

79. Clause 5.7 deals with the lift machine and associated equipment:

“5.7.1 Any compartment containing the lift machine and its associated equipment shall be provided with at least the same degree of fire protection as is given to the lift well.”

Fire control switch and system

80. Clause 5.8 concerns control systems and the fire control switch:

5.8.1 A firefighters lift switch shall be located in the lobby intended to be used as the firefighters service access level. The switch shall be located within 2 m horizontally from the firefighters lift, at a height between 1,8 m and 2,1 m above floor level. It shall be marked with a firefighters lift pictogram in accordance with annex F.

5.8.2 Operation of the firefighters lift switch shall be by means of the emergency unlocking triangle, as defined in annex B of EN 81-1:1998 and EN 81-2:1998. The operating positions of the switch shall be bi-stable and clearly marked '1' and '0'. In position '1' Firefighters service is initiated.

This service has two phases; for the function of Phase 1 see 5.8.7 and for Phase 2 see 5.8.8.

An additional external control or input may be used only to automatically return the firefighters lift to the fire service access level (see clause 0.5) and keep the firefighters lift at that level with open doors. The firefighters lift switch must still be operated to the '1' position to complete the Phase 1 operation.

5.8.3 On operation of the firefighters lift switch, all lift safety devices (electrical and mechanical) shall remain operative apart from the door reversal devices mentioned under Phases 1 and 2 5.8.7 c) and 5.8.8 f).

...

5.8.7 Phase 1: Priority recall for the firefighters lift

This phase can be manually or automatically initiated.

This initiation shall ensure the following:

- a) all landing controls and the controls in the firefighters lift car shall be rendered inoperative and all existing registered calls cancelled;*
- b) the door open and emergency alarm buttons shall remain operative;*
- c) door reversal devices for firefighters lifts that may be affected by smoke or heat, shall be rendered inoperative to allow the doors to close;*
- d) the firefighters lift must function independently from all other lifts in a common group;*

- e) on arriving at the fire service access level the firefighters lift, shall be retained there with the car and landing doors kept in the open position;*
- f) the fire service communication system as described in 5.12 shall be operative;*
- g) the audible signal called for in 5.8.6 shall sound on initiation of Phase 1, when the lift is under inspection control. Where provided, the intercom system described in 14.2.3.4 of EN 81-1:1998 and EN 81-2:1998 shall be activated. The signal shall be cancelled when the firefighters lift is removed from 'Inspection Control';*
- h) a firefighters lift travelling away from the fire service access level shall make a normal stop at the nearest possible floor, without opening its doors and return to the fire service access level;*
- i) the well and machine room lighting shall be automatically illuminated upon initiation of the firefighters lift switch.*

5.8.8 Phase 2: Use of the lift under firefighters control

After the firefighters lift has parked at the fire service access level with the doors open, control will be entirely from the firefighters car control panel and the following shall be ensured:

- a) where Phase 1 has been initiated by an external signal the firefighters lift shall not operate until the firefighters lift switch has been operated;*
- b) it shall not be possible to register more than one car call simultaneously;*
- c) whilst the car is in motion, it shall be possible to register a new call from within the car. The previous call shall be cancelled. The car shall travel in the shortest time to the new registered floor;*
- d) registration of a car call shall cause the lift car to travel to, and stop with the doors remaining closed at, the selected floor;*
- e) if the car is stationary at a landing, it shall be possible to control the opening of the doors only by the application of constant pressure on the 'door open' car button. If the 'door open' car button is released before the doors are fully open, the doors shall automatically re-close. When the doors are fully open, they shall remain open until a new call is registered on the car control panel;*
- f) the car door reversal devices and the door open button, (except that defined in 5.8.7 c)), shall remain operative as in Phase 1;*

g) the firefighters lift shall be returned to the fire service access level by switching the firefighters lift switch from '1' to '0' (for a maximum of 5 s) and back to '1' to repeat Phase 1. This does not apply where a firefighters lift switch is provided in the car as described in h) below;

h) where an additional firefighters car key switch is provided, it shall be marked with a pictogram and the '0' and '1' positions shall be clearly indicated. The key shall only be removable in the '0' position.

The operation of the key switch shall be as follows:

1) when the lift is under firefighting control from the switch at the fire service access level, the key switch in the car must be switched to the '1' position in order to initiate car movement;

2) when the lift is at another floor and not at the fire service access level and the key switch in the car is turned to the '0' position, further car movement is prevented and the doors will remain open;

i) the registered car call shall be visually displayed on the car control panel;

j) the position of the car shall be shown when the normal or emergency power is available, both in the car and at the fire service access level;

k) the lift shall remain at its destination landing until a further car call is registered;

l) the fire service communication system as defined in 5.12 shall remain operative during Phase 2;

m) when the firefighters switches are returned to the '0' position the firefighters lift control system shall only revert to normal service when the lift has been returned to the fire service access level.

Secondary power supply

81. Clause 5.9 concerns power supplies for firefighters lifts:

"5.9.1 The power supply system of the lift and lighting shall consist of primary and secondary (emergency, stand-by or alternative) supplies. The level of fire protection shall be at least equal to that given to the lift well (see annex C).

5.9.2 The secondary power supply shall be sufficient to run the firefighters lift at the rated load and to satisfy the time requirement referred to in 5.2.4"

Fire service communication system

82. Clause 5.12 sets out the requirements for the fire service communication system:

5.12.1 A firefighters lift shall have an intercom system or similar device for interactive two way speech communication, whilst the firefighters lift is in Phases 1 and 2, between the firefighters lift car and:

a) the fire service access level; and

b) the firefighters lift machine room or in the case of machine roomless lifts at the emergency operation panel(s) as defined in Amendment 2 of EN 81-1:1998 and EN 81-2:1998. Where a machine room is provided the microphone is only made active by pressing a control button on its unit."

British Standard EN 81-58: 2003 Safety rules for the construction and installation of lifts. Examination and tests. Landing doors fire resistance test {BSI00001720}

83. BS EN 81-58: 2003 was published in July 2003.

84. In summary, this standard sets out the method of test for determining the fire resistance of lift landing doors which may be exposed to fire from the landing side. Clause 18 of this standard recommends that, following testing of the landing doors, a test report is produced.

British Standard 5588-5: 2004 Fire precautions in the design, construction and use of buildings. Access and facilities for fire-fighting {BSI00001723}

85. BS 5588-5: 2004 was published in November 2004 and replaced the 1991 edition. It was replaced in October 2008 by BS 9999: 2008.

Scope

86. In Clause 7 - Fire-fighting facilities | 7.1 - Fire-fighting shafts | 7.1.1 - Provision of fire-fighting shafts the BS notes that:

"Fire-fighting shafts should be provided in tall buildings, buildings with deep basements and buildings with large floor areas."

A table entitled 'Table 4' states: *'Buildings or parts of buildings where the height of the surface of the floor of the topmost storey (excluding any storey consisting entirely of plant rooms) exceeds 18 m' should be provided with "Fire-fighting stair; Fire-fighting lobbies provided with a fire main; fire-fighting lift installation."*

This is discussed in more detail in Section H.

Definitions

87. Clause 3 - Terms and Definitions contains the following key definition:

"3.12 Fire-fighting lift lift with fire protection measures, including controls that enable it to be used under the direct control of the fire service in fighting a fire."

Requirements of a firefighting lift

88. Clause 7.2.4 recommends the following:

“Fire-fighting lift installations should conform to BS EN 81-72 and to BS EN 81-1 or BS EN 81-2 as appropriate for the particular type of lift.

A fire-fighting lift, unlike a normal passenger lift, is designed to operate so long as is practicable when there is a fire in parts of the building beyond the confines of the fire-fighting shaft, as it is used to transport fire-fighters and their equipment to a floor of their choice.

NOTE The lift may be used in normal times as a passenger lift by the occupants of the building but, in order to prevent the risk of the entrance being obstructed when the lift is required to go into the fire-fighting mode, it is essential that it is not used for moving refuse, nor for moving goods. In buildings provided with a single lift, its use for the transport of goods needs to be avoided unless essential, lift lobbies need to be kept clear, and when used for moving goods. In buildings provided with a single lift, its use for the transport of goods needs to be avoided unless essential, lift lobbies need to be kept clear, and when used for moving goods it is essential that the doors are not propped open.

It is essential that the lift doors are power-operated.”

Lift car

89. Clause 7.2.7 - Fire-fighting lift cars says:

“The construction and design of fire-fighting lift cars, together with the installation of fire-fighting lifts, should conform to BS EN 81-72.

Fire-fighting lift cars should be provided with a means of external rescue of trapped fire-fighters in the lift car.

...

In buildings provided with more than one lift, fire-fighting lift cars should be clearly and conspicuously marked with a notice conforming to BS 5499-1 stating “Fire-fighting lift: Do not use for goods or refuse.”

Water protection

90. Clause 7.2.8 - Water protection of lift wells says:

“...To minimize the effect of water penetration, electrical equipment within the fire-fighting lift well and on the car should be protected against water in accordance with BS EN 81-72.”

Fire control system and switch

91. Clause 8.1 - General states:

“Fire-fighting lift control systems should conform to BS EN 81-72. A fire-fighting lift switch should be provided to enable the fire service to obtain immediate control of the fire-fighting lift(s) in a fire-fighting shaft. Provision should be made to control access to the fire-fighting switch. If there are two or more lifts installed together, there should be clear indication as to which lift is the fire-fighting lift.”

92. The relevant parts of Clause 8.2 - Operation of the fire-fighting lift control system state:

“Lifts in the fire-fighting shaft should operate normally until the fire-fighting lift switch is activated.

NOTE 1 When the fire-fighting lift is activated it immediately renders inoperative all call buttons both on the lift landings and in the lift cars, and brings the fire-fighting lift and other lifts in the fire-fighting shaft to the fire service access level. It is not necessary to interconnect separate or multiple groups of lifts with other fire-fighting lifts as it can be undesirable to disable the whole building.

NOTE 2 The locking shut of the landing doors is carried out as part of the normal lift operations. Operation of the fire-fighting lift is dependent on the successful locking shut of these doors.

If, as part of the fire strategy in a particular building, the fire-fighting lift (and any other lifts within the fire-fighting shaft) is brought to the fire service access level on operation of the fire alarm system, the lift car and landing controls should be disabled until the fire-fighting lift switch has been operated.

If a lift is travelling away from the fire service access level it should stop (without opening its doors) at the next available floor according to the lift speed and the minimum slow-down distance of the drive system. The lift should then reverse direction to travel without stopping to the fire service access level.

NOTE 3 It is important that any lift travelling away from the fire service access level is able to stop and reverse without the car doors opening.

On arriving at the fire service access level, all lift doors in the fire-fighting shaft should open to allow any passengers to exit, after which the lift doors should close on all the lifts, except the fire-fighting lift.

The fire-fighting lift should return as soon as practicable to the fire service access level. It should be possible for the fire-fighting lift (and any other lifts within the fire-fighting shaft) to be returned to fire service access level at any time by switch the fire-fighting lift switch from “1” to “0” (for a minimum of 5s) and back to “1”.

NOTE 4 It might be desirable to install a “Lift under fire service control” sign illuminated within each lift car, which remains illuminated until the fire-fighting lift switch is returned to the “0” position.

The car controls of the fire-fighting lift should become active only after it has arrived at the fire service access level and the fire-fighting lift switch has been operated. Once the fire-fighting lift has arrived at the fire service access level, its doors should open and it should then operate as follows:

a) Fire personnel entering the lift car should be able to register a call to any selected landing in the building by sustained pressure on a car control until the car doors have fully closed.

b) If a car control is released before the doors have fully closed, the doors should immediately reopen and the call should be cancelled.

c) Once the lift is moving, it should be possible to register additional calls on the car controls. The lift should travel in the direction of the first call registered, and should stop at the first floor encountered for which a call is registered.

d) The doors should remain closed unless they are operated by continuous pressure on the “door open” control. It should not be possible to open the doors without sustained pressure on the control.

e) Release of the ‘door open’ control before the doors are fully open should cause the doors to automatically re-close.

NOTE 5 This allows fire service personnel to observe the situation immediately outside the lift landing doors in the fire-fighting lobby.

f) Once the doors are fully open they should remain open until a new call is registered at the car control station.”

Secondary power supply

93. Clause 14 - Electrical services | 14.1 Primary and secondary supplies states:

“Where electrical services in the building are essential to maintaining the effectiveness of fire-fighting facilities, a secondary power supply (e.g. a generator) should be provided that is capable of operating safely in fire conditions.

...

Both the primary and secondary sources of power to the fire-fighting shaft should be sufficiently protected against fire and water damage. They should also be separated from each other, so that a failure in cable or equipment, either by mechanical breakdown or damage by fire, in any one system, does not affect the other supply. Protection against fire can be achieved through choice of cable, choice of route (e.g. through protected areas, or external to the building) or by the use of fire-resisting construction”

...

The primary electrical supply to a fire-fighting lift should be obtained from a sub-main circuit exclusive to the lift and independent of any other main or sub-main circuit. Other lifts in the fire-fighting shaft may be fed from the same primary supply, provided that:

- (a) The supply is adequate for this purpose; and*
- (b) arrangements are such that a fault occurring in any other lift in the fire-fighting shaft or power supplies will not affect in any way the operation of the fire-fighting lift.*

The secondary power supply should be independent of the primary power supply to the fire-fighting shaft, e.g. an automatically starting system. The secondary power supply should be capable of providing the power for a fire-fighting lift within 30s of the failure of the primary electrical supply. Where the secondary power source is a generator, it should be capable of providing the necessary power for at least 3h without replenishment of fuel. A supply from another substation should be from one that does not normally provide the incoming supply to the building. The secondary power supply should be of sufficient capacity to:

1) maintain in operation:

- i) the firefighting lift and its ancillary equipment;*
- ii) normal lighting and other services within the fire-fighting shaft;*
- iii) the fire service communications system (see clause 9);*
- iv) any powered ventilation or pressurization system which operates in conjunction with the operational use of the firefighting shaft;*
- v) any pump(s) required to feed the fire main;*
- vi) the stair enclosure openable vent.*

2) permit the automatic recall to fire service access level of all other lifts in the fire-fighting shaft, if necessary in sequence and at reduced speed.

94. Clause 14.2 states:

“Cables supplying current to the fire-fighting lift installation and any other fire-fighting facilities associated with the fire-fighting shaft should be installed in accordance with BS 7671 and the manufacturer’s instructions, and should:

- a) be located in a protected shaft, where possible in the lift well; or*
 - b) be adequately protected against the action of fire for a period not less than that required for the structural fire protection of the firefighting shaft;*
- or*

c) be classified as CWZ in accordance with BS 6387: 1994 and, where applicable, also meet the requirements of BS 7846: 2000 Annex L relating to cables of a diameter exceeding 20mm.

Any electrical substation, distribution board, generator, hydraulic pump or other apparatus which supplies or transmits power to the fire-fighting lift installation, or any equipment associated with the fire-fighting shaft (e.g. pressurization fans, pumps for fire mains, etc.) should be:

- 1) protected from the action of fire in the building for a period not less than that specified for the enclosing structure of the firefighting shaft*
- 2) in accordance with the general principles of structural fire protection for a lift machinery space (see BS EN 81-1 and BS EN 81-2).*

95. Clause 14.3 states:

“An indication of the status of any of the following should be provided adjacent to the fire-fighting lift switch and duplicated in the fire control room:

- a) the primary and secondary power supplies*
- b) any powered ventilation or pressurization systems;*
- c) any pumps feeding fire mains.”*

96. Clause 8.3 - Changeover from primary to secondary supply after operation of the fire-fighting lift switch states:

“On loss of the primary supply the lift, if travelling, comes to an emergency stop and the lights go out. The emergency lighting comes on immediately. There is then a delay of up to 30 s while the secondary supply is established, which is indicated by the restoration of the main lighting in the lift car. The system design should be in accordance with BS EN 81-72.

Changeover of electrical supplies should be in accordance with BS EN 81-72.”

Fire service communication system

97. Clause 8.4 - Lift communications systems states:

“A lift communication system conforming to BS EN 81-72 should be provided as part of the fire-fighting lift installation and should be separate from the fire service communications system (see Clause 9).”

E.3. Second lift works – Project 2 – c. 2012-2015

E.3.1. Legislation

98. I have not identified any relevant legislation.

E.3.2. Statutory Guidance

99. It is outside the scope of my expertise to analyse or comment on Approved Document B. To provide some context for my report, I have set out the views of other Inquiry experts where they are about lifts.

100. At L.2.2.1-L.2.2.3, Dr Barbara Lane's report notes that:

"The guidance at the time of the most recent 2012-2016 refurbishment, Section 17.2 of ADB 2013, requires a firefighting lift to be installed in tall residential buildings.

As seen in Diagram 52 of ADB 2013, ADB 2013 states that the fire-fighting lift landing doors should be at least FD60 fire doors.

ADB 2013 Section 17.13 then refers to Section 7 & 8 of BS 5588-5: 2004, which requires a firefighting lift to have the following features..."

101. At L.3.4.1 Dr Barbara Lane's report notes that "ADB 2013 still refers to BS 5588-5: 2004 and also BS EN 81-72: 2003."⁴

E.3.3. Standards

102. At the time of Project 2 the standards setting out the features of a firefighting lift still applied. BS EN 81-72: 2003 was not revised until 2015, i.e. after the completion of much of the Project 2 works. In my view, it would therefore not have been reasonable to expect compliance with the 2015 standard, given how much of the works had been completed.

103. BS EN 81-58: 2003 relating to the method for determining the fire resistance of lift landing doors was also applicable at the time of Project 2. That was not superseded until 2018.

104. Overall, my view is that the features of a firefighting lift as described in Section E.2 which applied to Project 1 were effectively the same for Project 2. There were no relevant changes to the definition or features of a firefighting lift in the period between the two Projects.

105. When I refer to the firefighting lift standard at the time of Project 2, I repeat the definitions set out in Section E.2 relating to Project 1.

⁴ The relevant provisions of BS 5588-5: 2004 and BS EN 81-72: 2003 are set out above.

E.3.4. Codes of Practice

Lift and Escalator Industry Association (LEIA) technical guidance document, Guidance on the Management of Lifts, Escalators and Similar Products (April 2009)

106. As explained earlier in the report, guidance from LEIA demonstrates good industry practice. Section 3.1 of this guidance document relates to the need for owners to keep up to change with changes that might affect lift equipment. It states:

“3.1 Legislation, standards, codes of practice and other recommendations

Owners have a responsibility under the law and will need to keep up to date on any changes that might affect their lift/escalator equipment. It is recognised that this is a highly specialised and sometimes complicated field but assistance is available and can be provided by reputable lift manufacturers and maintenance contractors.

Where building maintenance managers have their equipment regularly examined by an insurance inspector then they too will normally advise on matters where there might be a breach of legislation or where passenger safety is concerned.”

Lift and Escalator Industry Association (LEIA) Code of Practice: Maintenance requirement for lifts, lifting platforms, escalators and moving walks’ (13 May 2013)

107. Section 4.3.1 of this document states:

“Changes to relevant standards’ which states ‘The maintenance contractor should inform the responsible person in writing of relevant changes to safety standards relevant to existing installations e.g. BS EN 81-80, BS EN 115-2, BS 7255, BS 7801.”

108. Furthermore, Annex A entitled ‘First inspection visit’ of the Code of Practice states:

“In an ideal situation before an item of plant is taken onto a maintenance agreement the proposed maintainer should inspect the item of plant to be maintained to determine their condition and the frequency of maintenance or amount of repairs work that would be required to get the plant to a safe condition.’ It goes on to state: ‘The condition report may result in the need for the responsible person to place an order for corrective works to be undertaken. In such situations it will assist the responsible person if they know what is vital or critical as against desirable.”

109. An example checklist is then set out at Annex A.

110. Annex D also notes:

“Checks for lifts with special operation in the event of fire

Many lifts have special features e.g. for use in the event of fire or evacuation. These should be checked as follows:

Firemen's, firefighting or evacuation lifts switches should be checked weekly;

A failure of the primary electrical supply should be simulated monthly to check the secondary supply and operation of the lift on the supply.

An annual test of all functions including communication systems. This should be specified to be included as part of the maintenance agreement."

F. Commentary on the Original Lift Installation

111. Grenfell Tower was built between 1972-4 and the original lift installation was completed in that period.
112. I have seen a general arrangement drawing {TMO10023897} (Appendix 12) by Hammond & Champness which dates from July 1971, i.e. the time of the construction of Grenfell Tower. I have considered this drawing. It shows the following important details:
- 112.1. A cut out in a front wall at level D-2 FFL for a fireman's switch. The cut out is shown as 140 x 140, so it can be assumed that the original lift(s) had a form of fireman's control.
- 112.2. The drawing title block gives some basic details of the two lifts including that their speed was 200 feet per minute (this is approximately 1.0 m/second) and that their capacity was 8 persons/1200lbs (approx. 545kg).
113. Overall there are limited contemporaneous records of the original lift installation such as specification, test certificates or operating & maintenance manuals.
114. There is so little evidence that I cannot give the Inquiry an informed view about whether lift as originally fitted complied with standards at the time. All that I can say is that I have seen no evidence that standards that applied in 1972-4 were not met at the time, but there is not enough evidence for me to come to any safe conclusion, either way. However, it does appear that a fireman's switch was fitted to the lifts, which was required by the standards at the time.

F.1. Refurbishment of the lifts prior to Project 1

115. The 2002 Project Brief for Project 1 {TMO00853783} contains the following information:

8.0 EXISTING INSTALLATIONS (GRENFELL TOWER)

- 8.1 Installer: Hammond & Champness Ltd
- 8.2 Installed: 1986
- 8.3 Machine room: Directly above
- 8.4 Floors served: Street level, Walkway level, 1st through to 20th floor (22)
- 8.5 Shaft arrangement: Duplex, concrete, central RSC and division screens
- 8.6 Speed: 1.6 m/s, traction
- 8.7 Car capacity: 8 person 630 kg
- 8.8 Entrances: One panel side opening, GAL
- 8.9 Controller: TVLE with H&C modifications

- 116. The B&Y Feasibility Study for Project 1 {BUT00000002} dated July 2003 also contains a description of the two electric passenger lifts which were installed at Grenfell Tower before the Project 1 works which matches the description above.
- 117. The Project Brief and Feasibility Study state that the lifts were installed in 1986, their speed was 1.6m/s (i.e. faster than the lifts installed in 1972) and their capacity was 630kg (higher than the lifts as installed in 1972). Overall, this supports the view that the lifts were refurbished or modernised in 1986. I have not seen any supporting documentation from this period however.
- 118. I have also reviewed documents which indicate that a refurbishment of the lifts took place in (approximately) 1991-1992. In particular, I have seen a review of the alarms at Grenfell Tower dated 15 April 1991 by Buckle and Partners {RBK00013175}. This review was undertaken in the context of a project for the establishment of an estate based management office. It notes:

9. Estate Management Office

The foregoing outlines a number of alarms/indications that will 'arrive' at the estate management office and these are summarised as follows:-

- (a) Entry door left open alarms.
- (b) Fire exit door alarms.
- (c) Smoke alarm signal.
- (d) Rooflight vents open - high ambient temperature.
- (e) CCTV surveillance monitors.
- (f) Anti-tamper alarm to CCTV cameras.
- (g) Passenger lift alarms.

On receipt of these alarms/indications certain actions have to be taken by the estate management team.

119. I have also reviewed these meeting minutes dated 24 January 1992 which also refer to a lift car refurbishment involving Buckle and Partners and Floyd Slaski Partnership {RBK00050455}. Minutes of a meeting dated 27 January 1993 also refer to a lift refurbishment {RBK00050497}, as well as 25 August 1993 {RBK00050542}.
120. I have also seen a tender document submitted by Leonard Lifts dated 18 December 1992 {RBK00050493} to provide the following works:

<u>Item No.</u>	<u>Description</u>	<u>£</u>
(a)	Safety mirror.	937.00
(b)	Clean lift car doors.	258.00
(c)	Suspended ceiling/lighting.	1,412.00
(d)	Flooring.	838.00
(e)	Handrail.	763.00
(f)	Corner housings/trailing cables.	2,205.00
(g)	Car push button station.	1,158.00
(h)	Car floor indicator panel.	850.00
(j)	Clean lift landing doors.	875.00
(k)	Provisional Sum for General Contingency.	1,500.00

121. On the basis of this summary of tender, it appears that the works done to the lifts at Grenfell Tower in 1992-1993 were not significant. It appears that the works done involved a general cleaning and redecoration of the interior of the lift car.
122. I have also seen an architects' instruction dated 24 June 1993 {RBK00050522}:

3.0 Confirmation of instruction to carry out works to lift installation as the attached Buckle & Partners instruction order no. L1.

4.0 Please omit from the BQ the following item:

D7/S/b Refurbishment of lifts £15,000.

Add:

Lift car refurbishment to Grenfell Tower in accordance with the sub-contract tender of Leonard Lifts in the sum of £10,796.00

123. I have not been able to establish with much specificity what works were carried out in 1992-1993 but it seems to have been a cleaning and redecoration of the lift cars only, i.e. not significant works. Given that extensive works were undertaken on the lifts in 2005-6, as part of Project 1, any work done in the early 1990s is of limited, if any, relevance to the performance of the lifts on the night of the fire. I have therefore not considered this period in further detail.
124. The Feasibility Study appears to have concluded that, while the existing lifts were outdated, there were no fundamental concerns about their safety. The Study did identify reliability as the main problem: there had been an *"inordinate number of malfunctions recorded ...over the previous years"*. There is insufficient information available for me to be able to assess whether there were, in fact, concerns about the safety of the lifts. Even if there were safety concerns in 2003, extensive works were then carried out on the lifts so any problems are highly unlikely to have had any connection with what happened on the night of the fire.

G. Parties Involved in the Lifts

125. In this section I explain the key parties involved in the lifts:

G.1.1. – Butler & Young Lift Consultants Limited

G.1.2. – Apex Lifts

G.1.3. – calfordseaden

G.1.4. – Kensington & Chelsea Tenant Management Organisation

G.2.1 – PDERS

G.2.2. – Bureau Veritas

G.2.3. – Gerald Honey Partnership

G.2.4. - Rydon

126. I set out their position and what they considered their role to be, on the basis of the documents I have seen and witness statements from the relevant people.

127. In later sections of this report I critically analyse whether the parties' own understanding of their roles was what I would expect from a competent contractor in their position, based on my opinion.

G.1. Principal Parties

G.1.1. Butler & Young Lift Consultants Ltd

Position

128. Lift consultants

Key people

Name	Role	Date of statement	URN of statement
Stephen Ellis	Associate Engineer	23/09/2019	{BUT00000040}
Ian Moorhouse	Director – until May 2005	23/09/2019	{BUT00000023}

Role in Grenfell Tower

129. B&Y were only involved in Project 1.

130. There is no available contract document between TMO and B&Y. I have seen the Project Brief produced by TMO in 2002 for the lift consultants {TMO00853783}. I have seen a letter sent by Ian Moorhouse to Janet Rhymes dated 7 April 2003 {BUT00000005} which states: "I thank you for the agreement formally instructing Butler & Young Lift Consultants Ltd as the consultants for the lift refurbishment at the above."

131. According to the witness statement of Stephen Ellis, at A2, B&Y's duties from 2003 to 2007 were: (i) discussing the scope of the proposed works with TMO (ii) surveying the site and preparing a feasibility study with options (iii) preparing a specification for the works (iv) tender appraisal and recommendation for contract award (v) contract administration, financial management and providing a planning supervisor (vi) witness testing the lifts on completion (vii) preparing the final account.
132. According to the witness statement of Ian Moorhouse, at A2, B&Y's appointment was for full lift consultancy services. He sets out at A3 that this included a feasibility study, preparation of a specification and tender analysis.

G.1.2. Apex Lift & Escalator Engineers Ltd

Position

133. Lift contractors

Key people

Name	Role	Date of statement	URN of statement
Gary Ager	Construction Project Manager – Project 2	30/10/2019	{APX00008762}
Roger Anthony	Project Manager – Project 1	29/10/2019	{APX00008780}
Warren Jenchner	Director	29/10/2019	{APX00008774}
Ray Murray	Sales Consultant – Project 2	29/10/2019	{APX00008773}
Gary Poynter	Construction Director – Project 1, limited involvement in Project 2	30/10/2019	{APX00008766}

Role in Grenfell Tower

Project 1

134. In relation to Project 1, Apex was contracted by B&Y to carry out lift works at Grenfell Tower. The contract between Apex and B&Y is exhibited to Warren Jenchner's statement at WJ/2 {APX00005619} and is dated October 2004.
135. I have considered this document, particularly Part One, 'Scope of the work'. In this section it states that:

"1.01 The scope of the works shall be for the complete refurbishment of one pair of duplex passenger lifts within Grenfell Tower, incorporating enhanced speed and car dimensions, plus the complete replacement of the hydraulic passenger lift which serves the Social Services offices at the lower levels of the Tower."

136. The document further notes:

“1.03 The works shall include all building, civil engineering and electrical works, plus other associated works necessary for the successful completion of the project...”

137. Crucially, it also states:

“1.06 The lifts shall achieve full compliance with, BS5655, SAFed LG1, HASAW, BS7255 Safe Working on Lifts, EN81-1 and 2, The Lift Regulations, and any other appropriate statutory instruments.”

138. The full specification produced by B&Y is then set out in full.

139. I note at 2A.06 of the B&Y specification, which also forms part of the B&Y/Apex contract, it says:

2A.06 Design Standards

The equipment and installation shall conform to this specification and to the relevant British Standards including Codes of Practice and, in particular, BS 5655, BS 7255 and EN81-1. Where this specification differs from those standards and codes, the provision of this specification shall prevail.

Reference to British Standards and Codes of Practice shall mean the edition current three months prior to the date for return of tenders. A certificate of compliance with the relevant British Standards shall be provided to the SO on request. Any changes during the course of the contract in the relevant British Standards and Codes of Practice shall be brought to the attention of the SO by the Contractor.

It shall be understood that the existing characteristics, particularly dimensions and clearances, may not comply with current British Standards and these shall be qualified in the tender return.

The lift is required to function under the following conditions without prejudicing the overall performance:

1. Temperature between +5°C and +40°C

140. Warren Jenchner's statement notes at answer 2 that *“The preparation of the contract and therefore the specification of the work was the responsibility of BYCL, on the instruction of their client. Once completed and disseminated to Apex, there would be no scope for Apex to enter into any discussions regarding changes to the proposed work, design issues and suggestion for alternative plans.”*

141. In conclusion, from the witness statements and documents, Apex's role in Project 1 was to carry out all building, engineering and electrical works according to the specification produced by B&Y.

Project 2

142. In relation to Project 2, Apex were contracted by Rydon to carry out lift works. I have looked at the contract dated 17 February 2015 between the parties {APX00007916} which states that Apex are instructed to proceed ‘*To carry out the supply and installation of 4no lift entrances...*’ At 2(c) it is noted that the order is placed with reference to the quotation dated 1 August 2014. Email correspondence at {RYD00031886} dated 18 February 2015 confirms the parties’ agreement to the contract.
143. That quotation is at {APX00000035} and is a quotation “*to supply and install complete new landing entrances for the new Walkway and Mezzanine floors.*”
144. There are two further quotations dated 5 February 2015 which are relevant. The first is a quotation to carry out a pre-condition survey {APX00006629} and the second is a quotation for Apex engineers to make the lift safe for Rydon builders to work safely in the lift shaft {APX00006628}.
145. Overall, Apex’s role in relation to Project 2 can be summarised as:
- 145.1. Carrying out a pre-condition survey.
 - 145.2. Supplying and installing four new lift entrances for the walkway+1 and mezzanine floors. This also would have included installing new car operating panels and new landing call stations and indicators.
 - 145.3. Making the lift safe for Rydon engineers to work on the lifts.
146. Fire control switch – it appears that as part of Project 2, a temporary fire control switch was installed on the walkway floor. This appears to have been disconnected at the conclusion of the works but not removed, and the ground floor switch was reconnected. It is not known who carried out these works. The witness evidence provided by Apex states that they did not do any work to the fire control switch as part of Project 2, so I cannot conclude at this stage that Apex carried out this work.

G.1.3. Calfordseaden

Position

147. Multi-disciplinary construction consultants

Key people

Name	Role	Date of statement	URN of statement
Michael Burke	Senior Lift Engineer – Project 2	23/09/2019	{CAL00000048}

Role in Grenfell Tower

148. On 10 March 2015 TMO wrote to calfordseaden asking them to complete “*a pre-condition survey before they carry out works.*” Calfordseaden responded stating that they could do a full condition survey and provided a price {CAL00000030}. On 11 March 2015 TMO

wrote to calfordseaden explaining: *“They want to know what improvements / component replacement we could do before works commence to improve reliability when down to one lift. I will brief you on the morning if that’s cool and meet you on site. We will also then just require a very quick joint inspection for pre -condition the day they start works.”* {CAL000000045}. A further email dated 17 March 2015 from TMO to calfordseaden explains effectively the same matters. In further correspondence calfordseaden stated to TMO that they would look at the lifts *“in our normal way.”* {CAL000000005}. Correspondence suggests the report was completed by approximately 25 March 2015 {CAL000000010}. The report is dated March 2015 {CAL000000001}.

149. Calfordseaden appear to have been approached on 2 April 2015 by TMO to *“do a pre condition survey to agree the condition of the lifts prior to works starting with the regeneration contractor.”* {TMO00852291}. It is not clear what occurred following this correspondence.
150. The witness statement of Michael Burke also notes that calfordseaden were contracted to carry out a pre-condition survey of the lifts.
151. Overall, calfordseaden appear to have been contracted to carry out a survey of the condition of the lifts prior to the commencement of Project 2. The purpose of this survey appears to have been to ensure that, while one lift was out of service, the other lift would be reliable.

G.1.4. Kensington & Chelsea Tenant Management Organisation

Position

152. Company limited by guarantee, client.

Key people

Name	Role	Date of statement	URN of statement
Robin Cahalarn	Lift Engineer	07/01/2020	{TMO00866023}
		Unsigned	{TMO00873798}
Siobhan Rumble	Estate Services Manager	31/08/2019	{TMO10050001}
Paul Steadman	Caretaker/Estate Services Assistant	17/07/2019	{TMO10049875}
		12/05/2020	{TMO00870944}
David Steppel	Engineering Manager		No statement obtained.
Claire Williams	Project Manager – Project 2	15/02/2019	{TMO00840364}
		02/09/2019	{TMO00842312}
Janice Wray		07/02/2019	{TMO00000890}

	Health and Safety Facilities Manager	01/11/2019	{TMO00847305}
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Role in Grenfell Tower

153. Paragraph 3.8 of the Chairman's Phase 1 report defines the TMO as below. I adopt this definition:

“The TMO is a company limited by guarantee, incorporated on 20 April 1995. On 28 February 1996 RBKC entered into a Management Agreement with the TMO, under which it appointed the TMO to carry out certain housing management functions. Thereafter further agreements were entered into between RBKC and the TMO, including Modular Management Agreements in 2006 and 2015. At all relevant times the TMO’s housing management functions extended to Grenfell Tower. “

154. As set out throughout this report, TMO contracted with a number of parties. Of principal importance are B&Y, the lift consultants for Project 1. TMO also contracted with PDERS for maintenance services and Bureau Veritas for insurance inspections.

155. Of significance to my report is the TMO’s fire safety policy. The version dated November 2013⁵ states at paragraph 2.2:

“For the purposes of Fire Safety legislation, specifically the Regulatory Reform (Fire Safety) Order 2005 (FSO), RBKC and the TMO are considered to be “responsible persons” and as such must ensure that “suitable and sufficient” fire risk assessments are carried out in the communal areas of all the residential blocks.”

156. Therefore, the TMO certainly considered themselves to have duties under the 2005 Order and to be the ‘responsible person’ as defined in the Order.

⁵ There are multiple versions of this document, as explained in Section L.1 below.

G.2. Other parties

G.2.1. PDERS

Position

157. Lift maintenance company

Key people

Name	Role	Date of statement	URN of statement
Sarah Dixon	Former Managing Director of Express Lift Co and Subsidiaries division of Otis Ltd.	23/10/2018	{MET00024030}
Philip Edwards	Operations Manager	04/04/2018	{PDR00000012}
Michael Fallis-Taylor	Current Managing Director of Express Lift Co and Subsidiaries division of Otis Ltd.	18/11/2019	{PDR00000050}
Mark Scott Wallis	Lifts maintenance engineer	28/10/2019	{PDR00000036}
David Smalley	Lifts maintenance engineer	01/10/2019	{PDR00000029}
Anthony Smart	Lifts maintenance engineer	30/09/2019	{PDR00000027}

Role in Grenfell Tower

158. In terms of the relationship between Otis and PDERS, the second paragraph of the witness statement of Sarah Dixon {MET00024030} states: *"I am the Managing Director of the Express Lift Co and Subsidiaries division of Otis Ltd. The division is made up of a number of UK lift maintenance businesses and sub-divisions, one of which is PDERS. While PDERS sits within the Express Lift Co and Subsidiaries division, in legal terms it too is an unincorporated trading division of Otis Ltd. Previously, PDERS was a limited company in its own right but its trade, assets and liabilities were transferred to Otis Ltd in January 2000."*
159. TMO gave PDERS formal notice of the award of the contract to PDERS on 11 November 2013 {MET00035731}.
160. According to the evidence of Michael Fallis-Taylor at paragraph 9, PDERS has been the Planned Preventative Maintenance providers for the lifts for TMO since 3 February 2014

covering routine servicing, call-outs and repairs in respect of all lifts and associated equipment managed by TMO.

161. The contract documentation available is exhibited to the statement of Michael Fallis-Taylor at Exhibit MFT/3. It is not complete {PDR00000037}.
162. At MFT/4 is the Service Information and Preambles for the Contract {PDR00000049}. It is dated April 2012. At 2.0 of this document entitled "Description of the Works" it is noted

2.0 DESCRIPTION OF THE WORKS

- 2.0.1 The scope of the works is for the Contractor to provide a fully comprehensive servicing of the lifts throughout the Royal Borough of Kensington and Chelsea but not including any breakdown response repairs due to vandalism or misuse which shall be charged at hourly rates and the Schedule of Repair Rates as Appendix B.

The Works are essentially the routine inspection, maintenance and repair of lifts and the Works shall encompass, but not be limited to, the following basic areas of Work:

- a) The regular inspection and carrying out of all necessary maintenance, repairs and component replacements required in order to maintain the lifts, including the alarms and communication systems, in a safe and satisfactory working order, free from fault and defect, operating as designed and fit for the intended purpose.

163. Section 2.1 sets out the Maintenance Tasks and Frequencies. The contract provides for 12 monthly visits:

2.1 MAINTENANCE TASKS AND FREQUENCIES

- 2.1.1 The maintenance to each passenger or goods lift shall be undertaken monthly at 12 evenly and regular programmed visits. However, some non-passenger carrying hoists

- 2.1.7 The Works include servicing as specified on a regular basis and breakdown response repairs including those where the attending engineer finds the lift working on arrival, a door obstruction or unable to find the fault.

164. Of particular relevance, in a section headed 'Landing Entrances', the document states:

The fireman's control switch (where fitted) shall be checked for correct operation, any damaged lens shall be replaced.

M1

M1 is a code for, according to the document, monthly checks. The reference to the 'lens' is likely, in my view, a reference to the glass coverings that are sometimes found on older fire control switches to protect them. The glass is then broken by the Fire Brigade in the

event of a fire to gain control of the lift. The fire control switch at Grenfell Tower did not have a glass covering.

165. The document also contains a Schedule of lifts to be maintained:

H090	S217008800001	Grenfell Tower, Lancaster West Estate, W11 1TG	Traction. 2.0 M/S VVVF	Apex 14.5.06	12P 900 KG	Street Walkway 1st through to 20	Concierge. Reception. GAL&TVL Onix	2.0 Monthly	
H091	S217008800001	Grenfell Tower, Lancaster West Estate, W11 1TG	Traction. 2.0 M/S VVVF	Apex 14.5.06	12P 900 KG	Street Walkway. 1st through to 20	Concierge. Reception. GAL&TVL Onix	2.0 Monthly	

166. H090 and H091 are listed and it is noted that each lift requires a minimum of 2 hours of maintenance per month.

167. Appendix C contains an example of a quarterly lift maintenance report. Of particular relevance is the section headed 'Landings' which states "Fire Control" and has an empty box adjacent for adding information.

EXAMPLE OF QUARTERLY LIFT MAINTENANCE REPORT

CONTRACTOR'S NAME _____

Lift No. _____ Site Address: _____
 Inspections: (1) _____
 (2) _____
 (3) _____

<u>MACHINE ROOM</u>	<u>CODE</u>	<u>LANDINGS</u>	<u>CODE</u>
GEAR/OIL/BEAR'S/SEALS		PUSHES/P'INDICATORS	
SHEAVES/V/DIVERter/AUX		S'EDGE/RAYS	
SHEAVE BEARINGS		FIRE CONTROL	
MOTOR/COMM/BRUSH/BEAR'S		DOORS/SHOES/VP'S	
MG/COMM/BRUSH/BEAR'S		DOOR ROLLERS/CLOSURES	
BRAKE/LININGS		DOOR D'BLOCKS/SKATES	
CONTROLLER		LOCKS MECH/ELEC	
MCB/ELLISON/AUX		TRACKS/FRAMES	
SELECTOR MCH/TAPE/ROPE			
GOV/SR PULLEYS		<u>WELL</u>	
HW INDICATORS/TOOLS/SIGNS		DIR' SWITCHES/LIMITS	
HYDRO PUMP UNIT/OIL		O'TRAVEL LIMITS/MAINT'	
PIPES/JOINTS/SEALS		PIT STOP SWITCH	
		TENSION WEIGHT/SWITCH	
<u>CAR</u>		CWT SHOES	
PUSHES/P'INDICATOR		BUFFER/SWITCHES	
ALARM/LIGHTS/EM.SUPPLY		WEL LIGHTING	
S'EDGE/RAYS		HYDRO PIPES/SEALS	
OPERATOR/RAMP/SKATES		RAM(S)	
DOOR GEAR/MOTOR/CLUTCH		GUIDES/BRKTS/CWT SLING	
MECH STN/SWITCHES			
PROX/DET'HEAD		<u>ROPES/CHAINS</u>	
DOOR TRACKS/ROLLERS		SUS ROPE/CHAIN/ANCHOR	
DOOR/SHOES/VP		COMP ROPE/CHAIN/ANCHOR	
GUIDE SHOES		GOV/SAFETY ROPE/ANCHOR	
S'GEAR/SWITCH			
LOCK MECH/ELEC			
ENCLOSURE/SLING			
OVERLOAD DEVICE			

CODES: S SERVICEABLE WBS WORN BUT SERVICEABLE
 *RA REQUIRE ATTENTION *SBR SHOULD BE RENEWED
 NA NOT APPLICABLE (*ELABORATE ON BACK)

G.2.2. Bureau Veritas

Position

168. Bureau Veritas is an international certification agency which was contracted by RBKC to carry out 6-monthly lift Statutory Engineering Inspections at Grenfell Tower.

Key people

Name	Role	Date of statement	URN of statement
Michael Arnold	Completed Thorough Examination of lifts at GT in April 2017.		Awaiting statement
Isiaka Lasisi	Engineer Surveyor/Regional senior engineer – completed Thorough Examination of lifts at GT in November 2016.	08/11/2019	{BVL00000015}
Kyle Veitch	Technical, Quality and Risk Director	08/11/2019	{BVL00000006}

Role in Grenfell Tower

169. According to the witness statement of Kyle Veitch, Bureau Veritas entered into a Tri-Borough Inspection contract with RBKC, Westminster Council and Hammersmith and Fulham Borough Council in January 2013. The contract is not available.
170. The contract was renewed in March 2017 and the contract renewal documents are available {BVL00000004}. It states that *“This proposal is for the provision of compliance services for Statutory Engineering Inspections...”* It later states that BV offers *“an impartial and independent inspection and testing service that enables you to meet the relevant legal safety requirements,”* to ensure compliance with specific legislation, including (relevant to our purposes) Lifting Operations and Lifting Equipment Regulations (LOLER) 1998 Regulation 9.

G.2.3. Gerald Honey Partnership

Position

171. Lift consultants

Key people

Name	Role	Date of statement	URN of statement
Mike Sapsford	Lift consultant		No statement obtained.

Role in Grenfell Tower

172. The earliest piece of correspondence I have seen is between Claire Williams and Mike Sapsford at GHP and is dated 15 April 2015 {GHP00000007}. It states:

"Mike

It was good to talk to you today, so I could give you an insight into the project and the reason for your potential appointment.

Background

The works are to a 23 storey tower block, with 120 occupied flats. The lower 3 floors were previously non-residential and had individual access. Now these floors have been changed to residential use, and so the 2 lifts needs to stop at the lower 2 floors. It already stopped at ground to allow all egress from the building.

As per our conversation, works started on the first of the two lifts on 7 April. The aim is for works to complete Thurs 23/Fri 24 April. There will be a week when this lift and the other lift run together, then the other lift will be out of action from 27 April – 4 May.

These works are being done under a d&b contract with Rydon, and their specialist sub-contractor is Apex lifts, who manufactured and installed the lift approx. 4/5 years ago. Rydon's resume of works is as the email below and the pdf attachment.

The works entail:

Entire lift shaft inspection

Erecting scaffold from the pit of the lift to walkway + 1

Erecting a screen between the 2 lifts fixed to the separation mesh

Cutting 2 new lift openings on Walkway + 1 and Mezzanine

Fitting new doors runners etc and floor numbers in new lobbies

Clear debris from shaft and remove scaffold.

Fitting new numbers inside cart and re-programme lifts.

We had our overall lift consultant Calford Seaden have a look before works started. They ordered some reliability repairs, basically a couple of new rollers.

On 7 April our lift servicing contractor, PDRS inspected with Apex. There was no formal report back, from which I construe that there were no issues.

Service I am asking Gerald Honey to quote for

As discussed, what I would like to do is to get an inspection of the works on 23/24 April when Apex hand the first lift back to us. It seems that the specification has no detail that would give the TMO reassurance. What I would like, and I understand your consultancy specialises in lift works, is advice on:

- Any appropriate certification*
- Inspection post works/handover*

This will also inform on any issues that we may need to cover when the second lift is taken out of action, and the same services would apply. The completion date for this we are hoping will be just before the bank holiday, rather than after – so perhaps 30 April/1 May 2015.

If you have any comment or queries, please let me know. Otherwise, I look forward to receiving your fee quote. Thank you for your help.

Claire Williams

173. Mike Sapsford responded on 16 April 2015 {TMO00858327}, stating as follows:

“Dear Claire,

Thank you for your e-mail with Apex Lifts quotation attached.

Reviewing the scope of work which Apex Lifts prepared I agree that it is quite basic and only provides a general outline of what they intend to do, to enable the lifts to serve the two additional floors.

That said Apex Lifts, who are on our approved list of companies, are a responsible firm and having worked with them on previous projects I can say that they generally do a first class job and I would not expect them to provide you with anything less on this particular project.

With regard to what we, as a practice, are able to offer you so that you may be reassured that the works have been completed in a satisfactory and diligent manner is to carry out a thorough inspection of the completed works. This would include checking all of the new equipment for correct installation and in the case

of the new software checking the operation of the lift to ensure that it functions as it should do with the addition of the two new floors.

Whilst carrying out these checks we would also undertake a thorough inspection of the whole of the lift installation. This would then enable us to inform you of any other issues which we feel should be attended to either as part of the current maintenance agreement you have with Apex Lifts or have been in respect of compliance with current British Standard Codes of Practice/The Health & Safety at Work Act/The Equality Act (DDA).

This would be contained within a written report which we would provide following our inspection. We would also make recommendations regarding warranty/certification as applicable.

Our fee for carrying out this work on your behalf will be £675.00 + VAT per lift.

I trust I have interpreted your brief correctly and if our offer is deemed acceptable I look forward to receiving your further instructions in due course.

Regards,

Mike Sapsford"

174. Correspondence between Claire Williams at TMO and Mike Sapsford at GHP dated 21-22 April 2015 indicates that GHP were instructed to *"check the lift works and the identified maintenance items in Calfordseaden's lift report."* Mike Sapsford goes on to state: *"...I would propose that we only undertake a check of the completed work and also check to see whether Apex Lifts have attended to the outstanding maintenance related items as set down in Calfordseaden's report."* {GHP00000002}.
175. In her response, Claire Williams states that she would be happy to accept GHP's fee proposal for *"a physical inspection of completed works to each lift and also review of any certification."* {GHP00000002}.
176. The invoice provided by GHP dated 10 May 2015 is to provide *"professional services in carrying out a full condition survey and provide a detailed letter report on lift installation in accordance with your instruction."* {GHP00000003}.
177. The correspondence between GHP and TMO is confusing. Mike Sapsford's email on 16 April 2015 refers to carrying out a thorough inspection of the whole lift installation, including looking at compliance with British Standard Codes of Practice, The Health & Safety at Work Act, The Equality Act and writing a full report. However, in correspondence on 21 to 22 April 2015 it appears that the brief may have narrowed as the emails refer to GHP carrying out a check of the completed work only and outstanding maintenance items and the quoted price was lowered from £675 per lift to £510 per lift.

178. Overall, it appears to me that GHP were ultimately only contracted to check the completed works and outstanding maintenance items, and were not contracted to carry out a full condition survey.

G.2.4. Rydon

Position

179. Design and build contractors

Key people

Name	Role	Date of statement	URN of statement
Simon Lawrence	Contracts Manager	25/09/2018	{RYD00094220}
Simon O'Connor	Project Manager	28/09/2018	{RYD00094221}

Role

180. Rydon were contracted by the TMO to complete the design for the 2012-2016 works and to carry out and complete the construction of the works in accordance with the contract {TMO10041791}.
181. Rydon subcontracted the specialist works out to various specialist subcontractors. The Project 2 lift works were contracted out to Apex and the nature of that contract is set out in more detail above in section G.1.2 relating to Apex.
182. I have not looked in detail at the contract between Rydon and TMO, as I consider it outside the scope of my inquiry.

H. Requirement for firefighting lifts at Grenfell Tower

H.1. Introduction

183. In this section, I will consider if the standards of a 'firefighting lift' applied to modernized lifts or whether the standards only applied to 'new lifts'.
184. Overall, I think that, whether or not Project 1 involved the installation of new lifts or the modernization of existing lifts, good practice at the time should have led B&Y to consider whether the lifts met the firefighting lift standards, so far as was reasonably practicable.
185. I note that the B&Y specification appears to acknowledge this, as it states:

2A.05 Regulations

It shall be understood that the equipment specified and that the characteristics of the site, particularly dimensions and clearances, may not fully comply with current British and European Standards and these shall be qualified by the Tenderer in the tender return.

Although it is recognised that the existing structural constraints shall prevent full compliance with harmonised European Standards, the requirement is for the lift installation to include all of those items and features that do comply, as far as is reasonably practicable.

186. Although my view is that it did not matter, in terms of firefighting lift standards, whether the lifts were classified as 'new' or 'modernized', the issue has been raised in some of the witness statements so I have considered it in detail below. In particular, the issue is raised in Robin Cahalarn's statement at paragraphs 17 and 27. It is also raised in Roger Anthony's statement at paragraph 17 and Ian Moorhouse's statement at paragraph A12.a and Stephen Ellis' statement at A12.a. These statements all effectively say that, because the lifts were modernized, not new, there was no obligation to ensure compliance with contemporaneous standards for firefighting lifts.

H.2. Reasonable practicability

187. I will use the phrase 'reasonably practicable' in my report. This phrase is defined in BS 5655-11: 1989 and I have used this definition:

"Reasonably practicable is defined as follows: 'In deciding what is reasonably practicable the seriousness of risk to injury should be weighed against the difficulty and cost of removing or reducing that risk. In considering cost no allowance should be made for the size, nature or profitability of the business concerned. Where the

difficulty and cost are high, and a careful assessment of the risk shows it to be comparatively unimportant action may not need to be taken. On the other hand, where the risk is high, action should be taken at whatever cost.’ (Based upon HSE leaflet IND(G)1(L) REV 1987.).”

188. It is helpful to discuss how the assessment of ‘reasonably practicable’ applies in the context of features of a firefighting lift. On the one hand, there is the seriousness of risk of injury if the features are not present. For example, the risk of injury caused by a lift not having a secondary power supply or a trap door are serious, in my opinion. If a lift has a secondary power supply, it could operate for a longer period during a fire, helping firefighting operations and avoiding injury to residents and/or firefighters. The absence of a lift car trap door can mean the difference between life and death for a firefighter trapped in a lift during a fire.
189. On the other hand, there is the difficulty and cost of removing or reducing the risk. Using the example of a trap door again, this is an upgrade which (in my opinion) is relatively low cost and straightforward to integrate into an existing/refurbished lift (without replacing the car). At the same time, it can save lives (admittedly in the relatively rare scenario of a firefighter being trapped in the lift). So, a feature such as a trap door, which makes a clear difference to life saving and is low cost would, in most situations, be ‘reasonably practicable’.
190. In my opinion, the scale of Project 1 is directly relevant to the assessment of what upgrades were ‘reasonably practicable’. Where most of the components were being replaced, including the car, it would be easier, cheaper and therefore more practicable to implement at least some upgrades consistent with a firefighting lift. I expect there would have been little additional cost, for example, in ordering a lift car with a trap door.
191. I have seen no evidence to suggest that, at the time of Project 1, anyone thought about whether firefighting features (like a trap door) were ‘reasonably practicable’. I would be very surprised if basic improvements, such as a trap door, firemen’s intercom or water protection would not have been considered entirely practicable in that context.
192. To that extent, my opinion that the scale of the Project 1 works was such that the installation of larger lifts amounted to ‘new lifts’ is relevant to the issue of reasonable practicability. When comprehensive works are being undertaken and a large amount of replacement equipment is being specified and ordered, it is easier and more practicable to build in additional firefighting features. This does not appear to have been considered at the time of Project 1.

H.3. “Modernized” lifts

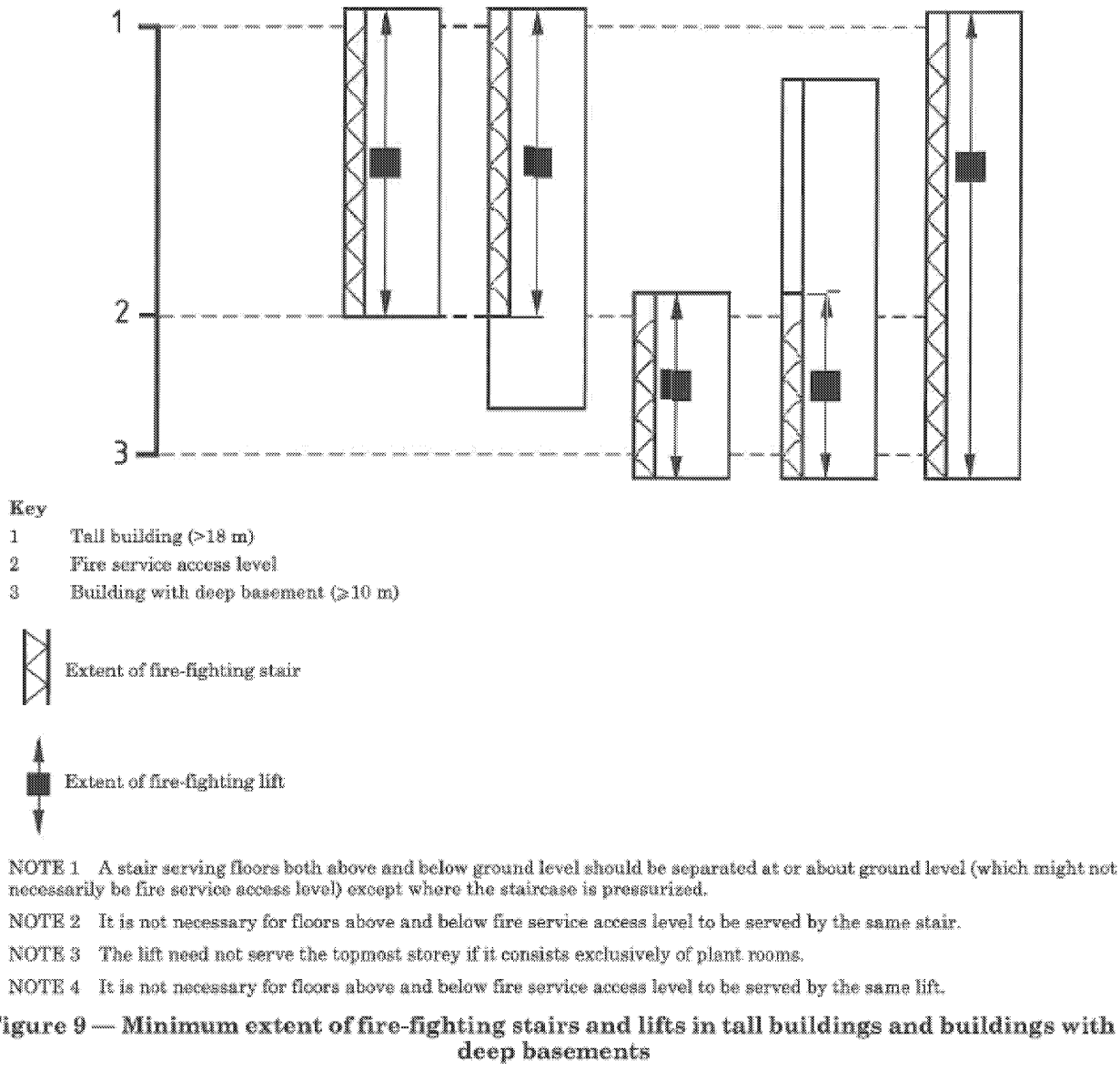
193. In this section I will consider whether, if Project 1 lift works were a lift modernization, the lifts should have been upgraded to comply with all the relevant standards for a full firefighting lift so far as was reasonably practicable.

194. As set out in Section E, the requirements of a firefighting lift are set out in a number of standards which, because they cross-refer to each other, should be read together. The relevant applicable standards are BS 5588-5: 1991 {BSI00001721}, BS 5588-5: 2004 {BSI00001723} and BS EN 81-72: 2003 {BSI00001725}. As explained in Section E, BS 5588-5: 1991, a British Standard which represents good practice, was superseded by BS EN 81-72, which contained mandatory requirements. The requirements of BS EN 81-72 were incorporated into BS 5588-5: 2004, a British Standard, also representing good practice, which was an update of the 1991 standard.
195. I have considered each standard and its relevance, but my view is that at the time of Project 1 there was no specific standard which considered or required the modernization of existing lifts up to the standards of a firefighters' lift. When undertaking a modernization, it would have been good industry practice to upgrade lifts in tall buildings to full firefighting standard, where practicable, because the work was an opportunity to enhance the firefighting features of the lifts.
196. BS 5588-5: 1991 does not state that it applies only to new buildings or to upgrades to existing buildings. However, my reading of the standard is that it is mainly aimed at the construction of new buildings. My reasoning is set out below.
197. The standard states in 'Clause 1 - General | 3 - Use of this Code | 3.6 - Provision and number of firefighting shafts' that:
- "The criteria for the provision and number of firefighting shafts in many building types are given either in building regulations or in the relevant Part of BS 5588. However, where no such guidance is available the provision and number of firefighting shafts should be based on the following:*
- (a) Buildings or parts of buildings where: 1) the height (see 2.18) of the surface of the floor of the topmost storey (excluding any storey consisting exclusively of plant rooms) exceeds 15m;*
- ...Should be provided with firefighting shafts each containing:*
- i) a firefighting stair*
- ii) firefighting lobbies provided with a fire main*
- iii) a firefighting lift installation."*
198. Grenfell Tower was approximately 67m⁶ and thus far exceeded 15m. Therefore my starting point is that Grenfell Tower was the type of building which required a firefighting shaft with a firefighting lift.
199. However, in the previous section of BS 5588-5: 1991, entitled '3.5 - Application of all the recommendations' there is a note which states: *"Where it would be impracticable to meet*

⁶ Paragraph 3.9 of the Chairman's Phase 1 report.

all the recommendations when installing a firefighting shaft in an existing building, it is suggested that the advice of the relevant authorities is sought.”

200. The firefighting shaft is a protected enclosure containing the stair, lobbies and lift together with its machine room. Project 1 did not involve the installation of a firefighting shaft, but rather the replacement of the lift within the lift well. Subclause 3.5 is therefore of limited relevance to Project 1.
201. BS 5588-5: 2004 also states in clause 7 that firefighting shafts with firefighting lifts should be provided in buildings or parts of buildings where the height of the surface of the floor of the topmost storey exceeds 18m (as opposed to 15m, as in BS 5588-5: 1991).
202. BS 5588-5: 2004 does not directly answer the question whether firefighting lifts should be provided in existing, as well as new, buildings. However, it is clear that in new buildings over 18m, firefighting lifts must be provided. The figure below, taken from BS 5588-5: 2004, sets out this requirement:



203. The next relevant standard is BS EN 81-72: 2003 concerning firefighters lifts. BS 5588-5: 2004 refers to the standards in BS EN 81-72 and so they should be read together. BS EN 81-72 states in Clause 1 - Scope, that it does not apply to lifts installed in existing buildings or to important modifications to existing lifts installed before the publication of the standard. It goes on to state that *“However, the standard may usefully be used as a basis.”*
204. BS EN 81-80: 2003 {BSI00001717} contains rules for the improvement of the safety of existing passenger and goods passenger lifts. Its *‘Introduction’* says that, in part, its purpose is to provide corrective actions to progressively and selectively improve the safety of all existing passenger and goods passenger lifts towards today’s state of the art for safety.

205. The standard also states at clause 1.4 that it is not intended to cover firefighting operations. My reading is that the standard does not contain any guidance on firefighting lifts or their modernization. Therefore, it is not relevant to Project 1.
206. BS 5655-11 is also of note. The 1989 edition {BSI00001728} was in force at the time of the Project 1 works. The 2005 edition {BSI00001724} was published in December 2005 so after Project 1 had started.
207. Looking first at BS 5655-11: 1989 this states in Clause 1.1, entitled 'Scope' that: *"This Part of BS 5655 gives recommendations for the engineering and safety features to be incorporated when modernizing electric lifts. Its objective is that components affected by such changes should comply with the safety rules in BS 5655: part 1 as far as is 'reasonably practicable'. Where it is not practicable to comply, such deviations as will secure a minimum standard of safety are described."*
208. BS 5655-11: 1989 only concerns the engineering and safety features to be incorporated when modernizing electric lifts. It does not cover upgrades or modernization of the firefighting features of electric lifts. It does not provide guidance on the modernization of lifts to firefighting standard.
209. However, section 2.4.1. of the Standard states that *"Where the controller of a fireman's lift (as defined in BS 5655: Part 6) is changed, the control system should comply with BS 5588: Part 5. This does not, however, imply compliance with all other requirements in that standard for a fire-fighting lift, especially with regard to the structural enclosure."*
210. This is the most significant and important part of the relevant standards in considering the question whether the existing lifts should have been upgraded. My view is that when the controller of a fireman's lift is changed, section 2.4.1 requires that the new control system must comply with the updated standards in BS 5588-5.⁷ The second sentence in section 2.4.1 means that it cannot be assumed that a lift that has an updated control system necessarily is a full firefighting lift. This paragraph does not recommend that, where reasonably practicable, a lift should be modernized to meet the other standards of a firefighting lift in BS 5588-5, such as having a trap door, communication systems, water protection or secondary power supply.
211. BS 5655-11: 2005 also concerns the modernization of existing lifts. The introduction notes that the most important reason for modifications is to enable owners to continue to fulfil their duty to provide for the safe operation of their lift installations.
212. However, as with the previous edition of BS 5655-11, the 2005 edition is also aimed at the engineering and safety features to be incorporated when modernizing electric lifts. It does not cover firefighting features to be incorporated. Therefore, it is of limited help.

⁷ I conclude at Section I.4.2 that an updated fire control switch which was fully compliant with BS 5588-5 should have been installed in Grenfell Tower.

213. My overall view is that there was no published standard at the time of Project 1 which clearly answered the question whether existing firemen's lifts in tall buildings should be modernized to full firefighting standard. The standards that I've discussed above either deal with the construction of firefighting lifts in new buildings, or with the modernization of existing lifts to meet safety standards (which does not include firefighting standards). The only relevant reference to the question is section 2.4.1 in BS 5655-11: 1989.
214. Although the relevant standards do not give a clear answer to the question, my view, based on my experience in the industry, is that good practice at the time of Project 1 required B&Y to consider whether the existing firemen's lifts at Grenfell Tower could be modernized to meet the firefighting lift standards, where it was reasonably practicable to do so. It may not have been possible to meet all the standards of a firefighting lift because of structural constraints. This is a point that I consider in Section 1.5 below.
215. In reaching my view, I have taken into account the fact that the works as part of Project 1 were extensive and involved replacement of a large number of parts. I should emphasise that the minor replacement of individual components would not necessarily trigger the obligation to consider whether the lifts should be upgraded to the firefighting standard. For example, if only the call panels or lighting were replaced, I do not think that it would have been necessary to consider the modernization of the lifts to firefighting standard.
216. However, because Project 1 was a large project involving specialist consultants and replacement of almost all of the components, it would have been good practice at this time to consider whether the lifts could be modernized to the firefighting lift standard, in so far as it was reasonably practicable to do so.
217. I have considered, in particular, paragraph 21 of Robin Cahalarn's statement in which he says: *"The British Standards referred to in the questions in the Inquiry were not from my understanding retrospective and, as stated, this was a refurbishment of the lifts."* For the reasons set out above, I do not agree with this statement. Given the extent of the lift works, it would have been good practice at this time to consider whether the lifts could be modernized to the firefighting lift standard, in so far as it was reasonably practicable to do so.
218. Although not published at the time, I think it is helpful to note that this gap in the published standards and Codes of Practice has been filled by BS 8899: 2016 - *Improvement of fire-fighting and evacuation provisions in existing lifts - Code of Practice* {BSI00001727}. This Code states in its 'Foreword' that:

"For more than 75 years, lifts have been used by fire and rescue personnel in fighting fires and evacuation of persons from buildings, but each lift product offered different solutions as to their usability for this purpose. As long ago as 1986, BS 5588-5 gave recommendations for the design of fire-fighting lifts and suitable building design requirements. In more recent years, BS EN 81-72 has been developed to give definitive guidance on the design of new lifts for this purpose, with BS 9999 giving recommendations on suitable building design."

This has led to the potential obsolescence of lifts designed and installed prior to application of BS 55588-5 or BS EN 81-72, and it can be challenging for fire and rescue services and other to ascertain exactly which provisions are available on any given lift installation and whether the provisions can be used in practice.

BS 8899 has been developed to assist in improving fire-fighting and evacuation provision in lifts installed before the publication of BS EN 81-72: 2015.”

219. As noted above, at the time of Project 1 I would have expected a reasonably competent lift consultant to have considered modernizing the lifts to the firefighting standard to the extent that it was reasonably practicable to do so. I would have expected this consideration to have been recorded in writing, for example in the minutes of meetings between the client and contractor, or, perhaps, in a feasibility study or in a separate risk assessment. On the basis of the documentation I have seen, the necessary consideration did not take place.

H.4. “New” lifts

220. The starting point for defining when lift works constitute the installation of a ‘new’ lift (as opposed to a lift modernization) is BS 5655-11: 1989 - *Lifts and service lifts. Recommendations for the installation of new, and the modernization of, electric lifts in existing buildings* {BSI00001728}. I set out in full the relevant parts of the standard below.
221. Section 2.4.1 states that: *“It is assumed that the existing guide rails and their fixings will be retained and if necessary, extended; any unsuitable for the new application should be replaced and considered as a new installation in accordance with section three.”*
222. At section 3.1, the Standard states: *“When a new lift is installed in a new lift well in association with an existing building, the installation should comply with BS 5655: Part 1. It should preferably comply with the standard dimensions specified in BS 5655: Part 5, i.e. the installation should be considered as being a new lift in a new building.”*
223. The next relevant standard is BS 5655-11: 2005, *Lifts and service lifts. Code of practice for the undertaking of modifications to existing electric lifts* {BSI00001724}. Clause 1, ‘Scope’ states that:
- 223.1. *“This part of BS 5655 does not cover any of the following types of lift: (a) new lifts (see Note 2).”*
- 223.2. Note 2 defined new lifts as follows: *“Where a lift falls into one of the following categories, it is deemed to be a new lift as defined in the Lifts Regulations 1997 and this part of BS 5655 is not applicable: ... - [lift] completely replaced; - only retains the guide rails.”*
224. BS 5655-11: 2005 was published in December 2005 i.e. after the Project 1 works had commenced. However, I consider it to be relevant as it confirms and codifies the existing differentiation between ‘new’ and refurbished/modernized lifts, as set out in BS 5655-11: 1989, above.

225. As set out above, both BS 5655-11: 1989 and BS 5655-11: 2005 consider the status of lifts with reference to the extent of the modifications and specifically whether the guide rails/their fixings have been retained.
226. In the following paragraphs I look at the evidence and have tried to piece together what was retained and what was replaced, as part of Project 1.
227. With reference to the B&Y Specification, section 1.3 sets out the equipment which was to be retained as part of Project 1 works, as follows:

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1.3 RETAINED EQUIPMENT

1.3.1 Two electric passenger lifts - HO90&91

Guides and single riser of car guide brackets

Landing back boxes.

228. Section 1.3 of the Specification implies that both car guide rails were to be retained in their original condition. I also consider that they must have been relocated to suit the larger car and counterweight size. The Specification does not explicitly state this, but I have inferred this, as in my opinion, the car guide rails had to have been relocated for the installation to have mechanically worked.
229. Section 2A.26 'Guides and Guide Brackets' of the specification reads: .

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2A.26 Guides and Guide Brackets

The Contractor shall ensure that the cross section of the 'T' section guide rails and the rail bracket spacing are calculated for the size and weight of the lift car plus load. A copy of the calculations shall be submitted to the SO for comment within three weeks of contract award.

One set of car guides plus the counterweight guides shall be re-located to suit the new condition.

230. In my opinion it would have been technically possible for the same car guide rails to have been re-used, provided the appropriate calculations were done (as required by 2A.26 of the Specification). In my experience it is not unusual for car guide rails to be re-used.
231. Paragraph 17 of the witness statement of Roger Anthony states that:

"I recall that this was a major project which required a "strip back to guides". The guides were left in and therefore the project remained a modernisation. The nature

of the works to be undertaken were set out in great detail in the specification and I ensured that work was carried out in accordance with the same.

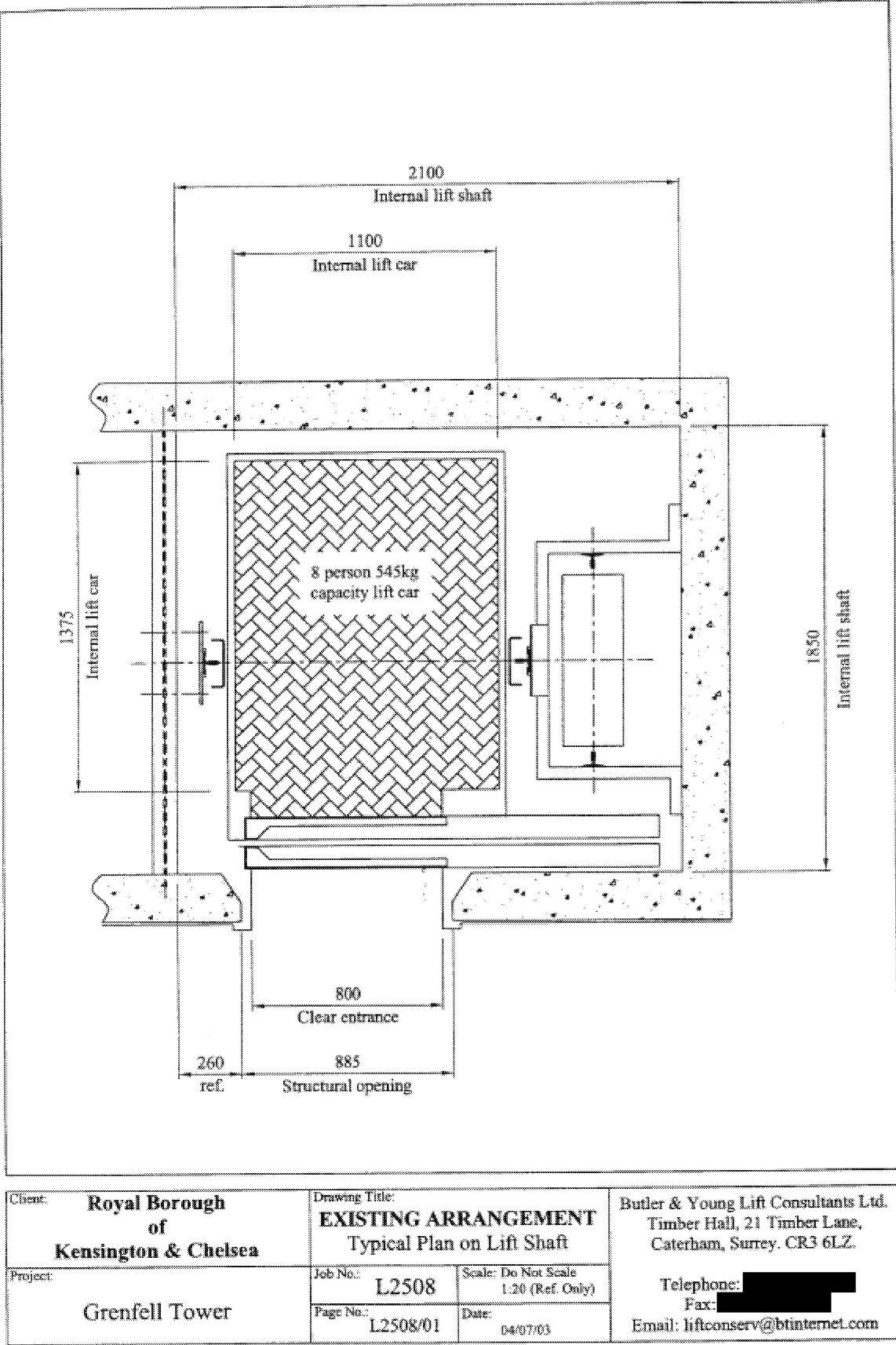
232. Paragraphs 17 and 27 of the witness statement of Robin Cahalarn state that:

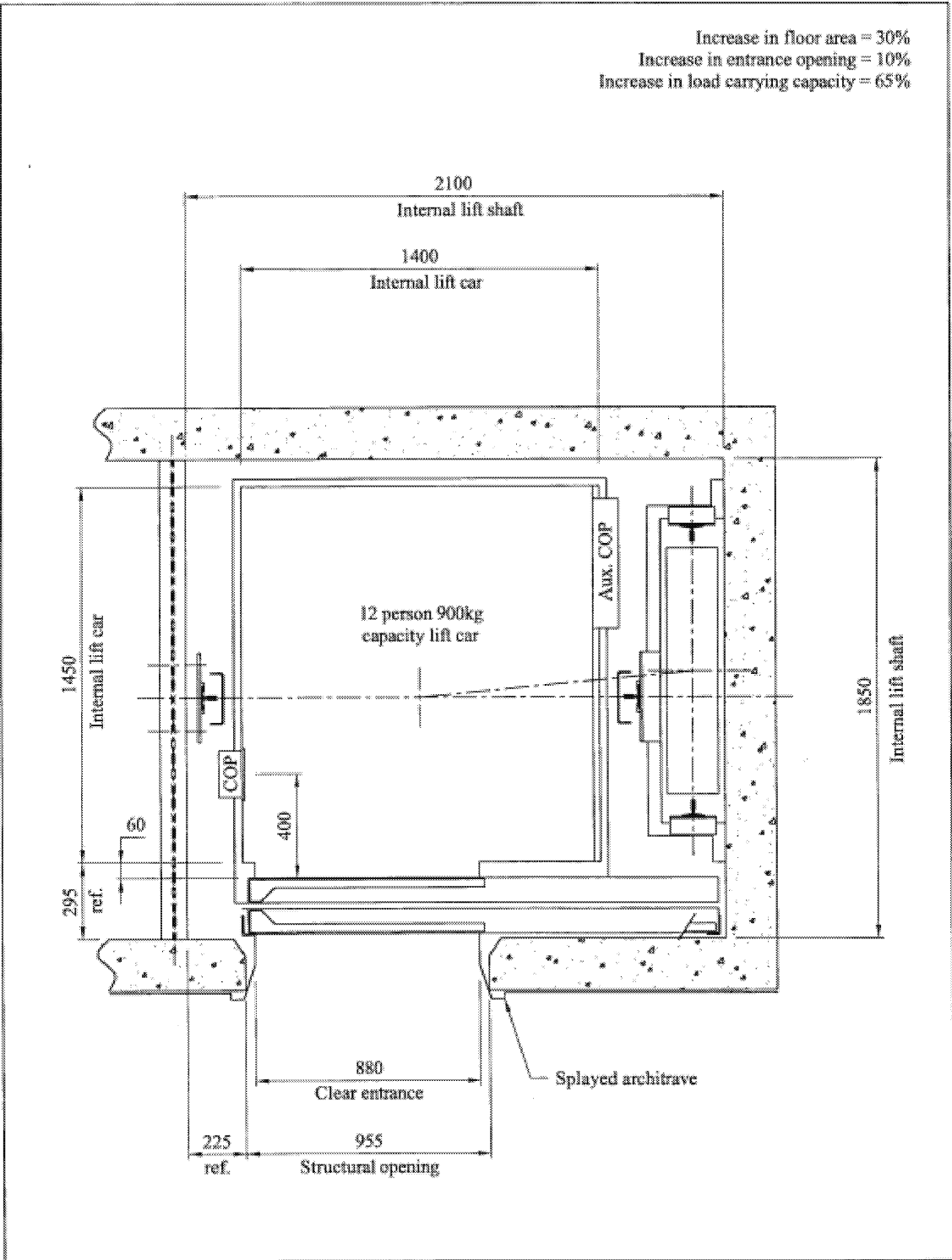
“17. A lift refurbishment is where you keep the same guide rails in the lift shaft, the same crown bar to suspend the lift cars and car frame.”

“27. ...For the reasons explained this was a refurbishment of the passenger lifts as per the Specification and as stated above the lifts kept the same car frame, guide rails and crown bar and the specification clearly records it was a refurbishment.”

233. The statements of Roger Anthony of Robin Cahalarn suggest that the same guides were left in and Robin Cahalarn suggests the same car frame and crown bar were used.

234. The Project 1 drawings titled ‘Existing Arrangement’ and ‘Proposal Arrangement’ {APX00005557} are inserted below. The drawings are dated 4 July 2003 and they are not to scale. It is likely that they were produced alongside the specification but it is very unlikely that they were the final drawings. Therefore, they can only provide a guide to the Project 1 works.





Client:	Royal Borough of Kensington & Chelsea	Drawing Title:	PROPOSAL ARRANGEMENT Typical Plan on Lift Shaft	Butler & Young Lift Consultants Ltd. Timber Hall, 21 Timber Lane, Caterham, Surrey. CR3 6LZ.
Project:	Grenfell Tower	Job No.:	L2508	Telephone: [REDACTED]
		Scale:	Do Not Scale 1:20 (Ref. Only)	Fax: [REDACTED]
		Page No.:	L2508/01	Date: 04/07/03
				Email: liftconserv@btinternet.com

235. These drawings show that the existing lift was 8 person, 545kg capacity and the new lift was 12 person, 900kg capacity.
236. In the pre-refurbishment drawings, two car guide rails can be seen on either side of the lift car. In the post-refurbishment drawings, two car guide rails can also be seen on either side of the lift car. The car guide rails on the counterweight side must have been relocated together with new guide fixings, because the car size was increased and also the counterweight size was increased. As for the car guide rails on the other side, they are fixed to the structural wall of the lift well. It is not clear from the drawings or other documentation if those car guide rails were left in the same position or whether they were relocated.
237. The minutes of a Contract Progress meeting dated 22 June 2005 {APX00005531} say that guides were relocated:

7.1 RA would provide revised method statements for:

- a) Diamond cutting,
- b) Guide relocation.

For second phase.

238. I have also seen several method statements for guide replacement and guide repositioning {APX00001058}, {APX00001059}, {APX00001060}, and {APX00001061}. Section 10 of the Apex Health & Safety File {TMO10028592} also contains three method statements called 'guide replacement', 'guide repositioning' and 'preliminary guide repositioning'.
239. Furthermore, I have looked at a letter dated 13 January 2006 sent by Apex to B&Y which explains the reasons for various delays to Project 1 {APX00000093}. The letter explains the work which Apex carried out to the lifts and there are multiple references to repositioning the guide rails.
240. Overall, in my view it is likely that the car guide rails were re-used but that they were extended and relocated. Likewise, it is likely that the counterweight guides were also re-used but relocated. As for the fixings, the counterweight fixings would likely have been new. The car guide rail fixings on the counterweight brackets would have been new. The car guide rail fixings for the other set of car guide rails would likely have been re-used, but I cannot be sure.
241. In terms of the crown bar and car frame, Robin Cahalarn's statement indicates that these components were retained. However, the B&Y lift specification makes clear in section 1.3 (set out above) that only the guides and single riser of car guide brackets and landing back

boxes were retained. This suggests that the crown bar and car frame were replaced. Furthermore, the lift car was replaced and the capacity of the lift car was increased. It would therefore have been essential to replace the crown bar and car frame because of the increase in the car width. In my opinion it would not have been possible to re-use these components. Although Robin Cahalarn's statement says that the same crown bar and car frame were used, I do not know where he has obtained this information and I think it would have been unlikely, if not impossible, to re-use these components.

242. In addition, according to the B&Y Specification, the following items were also replaced (this list is not exhaustive): the complete lift car, counterweight, the car sling and platform, safety gear, door operator, car doors, landing doors, landing control system, lift pit buffers, electrical wiring, lift controller, and the lift motor gear box.
243. As is clear from section 1.3 of the Specification, very little of the equipment/existing lifts was to be retained or re-used.
244. Taking all of this into account, in my view, the lifts installed as part of Project 1 were 'new' lifts. This is because of the extent of replacement of parts. Of particular importance is the fact that one set of car guide rails were relocated, one set of car guide rail fixings were replaced and the counterweight frame and supporting brackets (and associated fixings) were new. I have taken into account BS 5655-11: 2005 (set out above) which defines new lifts in Note 2 as where the lift is completely replaced or where only the guide rails are retained. I accept that BS 5655-11: 2005 was not published until Project 1 had started but as I explain at paragraph 201 above, BS 5655-11: 2005 simply confirms and codifies an existing differentiation between 'new' and refurbished/modernized lifts.
245. Also, from my review of all the documents surrounding Project 1, it is clear that the Project 1 works carried out on the lifts were large-scale. Project 1 involved professional lift consultants, lift contractors and lift sub-contractors. It involved replacement of most of the lift parts. The Project Brief was issued in mid-2002, the Feasibility Study in mid-2003 and Apex were appointed approximately 1 year later. Work started on site in January 2005 and the Certificate of Practical Completion was issued on 6 February 2006 {APX00005420}. On any view, this was a long project, lasting over a year following at least 2-3 years of preparation. According to B&Y's Final Account, Project 1 cost approximately £631,600 {APX00005532}. In every way, Project 1 was a large-scale project, not a small refurbishment or replacement of some individual parts. It is therefore my view that the lifts were 'new'.
246. Although I think the lifts were new, I do think that good practice required compliance with contemporaneous standards and codes of practice (including all the requirements of firefighting lifts in BS EN 81-72: 2003 and BS 5588-5: 2004) only insofar as it was reasonably practicable, taking into account any constraints imposed, for example, by the existing building structure. In my view the B&Y Specification itself acknowledges this in paragraph 2A.05, which is set out in the introduction to this section above, at paragraph 162.

247. A final point which I would like to make is that Robin Cahalarn's statement says at paragraph 22 that *"at the time the industry view was that a fireman's lift was a perfectly appropriate lift for a building which should have compartmentation."* I have seen no evidence from the industry, such as any guidance, to support this view. This view also does not reflect my own experience in the lift industry. For these reasons, I do not share Robin Cahalarn's view.
248. Overall, I have concluded that, regardless of whether the lifts were considered 'new' or 'modernized', good practice would have been to consider if the lifts could be fully upgraded to the firefighting standard, so far as was reasonably practicable. I acknowledge that there are other British Standards, for example, BS 5655-6: 2002 *Lifts and Service Lifts – Part 6 Code of Practice for the Selection and Installation of New Lifts*, which only apply to new lifts and therefore set out additional guidance on new lifts, which do not apply to modernized lifts in the same way. However, these standards do not set out new or additional firefighting lift standards and only cross reference to the standards I have considered. Therefore they do not add substantively to my analysis and I have not considered them in detail in my report. However, I do acknowledge that there are other additional standards that new lifts should meet which do not apply to modernized lifts. I have focused only on firefighting lift standards.

H.5. Conclusions

249. I have come to four main conclusions:

- 249.1. At the time of Project 1, the relevant standards did not clearly state whether lifts in existing tall buildings should be upgraded to firefighting lifts, where practicable.
- 249.2. However, in my view, which is based on good industry practice as well as the relevant standards, as part of Project 1, B&Y should have considered whether the lifts at Grenfell tower could be upgraded to firefighting lifts, where reasonably practicable.
- 249.3. From the documentation and witness evidence I have reviewed, there appears to have been no consideration of what firefighting lift features were 'reasonably practicable' in the circumstances.
- 249.4. It does not ultimately matter whether the lifts were characterised as the 'installation of new' lifts or a 'lift modernization'. My conclusion is the same.

I. Commentary on Butler & Young Lift Consultants Ltd's involvement

250. I will consider the duties and responsibilities of B&Y and their fulfilment of these duties and responsibilities. B&Y were only involved in Grenfell Tower at Project 1 and therefore all of the commentary in this section relates to Project 1 only.
251. As set out in Section E, above, my analysis of B&Y's duties and responsibilities is based on my experience of good practice in the lifts industry.

I.1. The hydraulic lift

252. Paragraph 6.39 of the Chairman's Phase 1 report found that the hydraulic lift (H092) which had served the non-residential lower floors of the building was removed in 2015. Therefore, the hydraulic lift is not relevant to my report. All references to lifts are to the electric lifts, Lifts H090 and H091.

I.2. The Project Brief

253. I have reviewed a document entitled "*Project Brief for Consultants... Project Title: Grenfell Tower - Lift Renewal, Date: August 2002*" {TMO00853783}.
254. This appears to be the Project Brief which is effectively split into two parts - the first part appears to be a RBKC document which was provided to the relevant people in RBKC and TMO and sets out various general matters and roles and responsibilities. The second part, called Appendix A, is the 'Client's Brief' i.e. it is a high-level document which sets out what the TMO wanted from the appointed lift consultant. As far as I can tell, when this document was written, B&Y had not been appointed as the lift consultants. Although I cannot be sure, I have assumed that B&Y were provided with this Brief before they were appointed as the lift consultants, as part of the tendering process. I have not seen any other copies or versions of the Brief.
255. From reading the Brief, I think it was clear that the TMO wanted the lift consultant to consider whether the lift works could achieve compliance with the latest British Standards. In support of this, I rely on the final sentence of the first paragraph of the Project Brief, Appendix A which says:

1.0 CLIENT REQUIREMENTS

- 1.1 The Tenant Management Organisation Ltd (TMO) and the Lancaster West Estate Management Board (EMB) require a condition and feasibility report on the two traction passenger lifts serving Grenfell Tower and the single hydraulic passenger lift serving the adjacent offices. The report shall address the clients concerns in respect to the immediate and medium term maintenance viability of the existing installations given the current levels of failures, availability of replacement parts, compliance to latest British Standards and energy conservation.

256. I also rely on section 4.10 of the Project Brief (set out below). I think the most important part of this is section (c) in which the TMO very clearly asks the lift consultant to consider the issue of firefighting lift requirements.

4.10 Standards

- (a) The installation shall comply with BS EN⁸1: 1998 "Safety rules for the construction and installation of lifts" Part 1: Electric lifts, the Health and Safety Statutory Instrument No. 831 "The Lift Regulations" and Electromagnetic Compatibility and IEE Regulations.
- (b) However, given the dimensional constraints associated with an existing building, the report shall identify any area where the new installation cannot meet current recommendations or legislation and make recommendations to reduce any potential risks.
- (c) Given the height of Grenfell Tower together with the existing physical building constraints, the report should shall address the issues of Fire Fighting and Evacuation lift requirements and how they affect the proposed works.

257. The other important part of this Project Brief is Section 10 which lists the TMO's "General Requirements." Paragraphs 10.23 and 10.26 set out two requirements which relate to the fireman's switch. These paragraphs require a fireman's switch which is to be operated by an express anti vandal key.

10.23 Fireman's switch at ground floor.

10.24 All sheaves and diverters to be guarded.

10.25 Down or full collective.

10.26 Landing doors and fireman's switch to be operated by 'Express' anti-vandal drop key.

I.3. The duty to highlight non-compliance with relevant legislation, standards and codes

258. According to the witness statement of Stephen Ellis, at A2, B&Y's duties from 2003 to 2007 were, but not limited to: (i) discussing the scope of the proposed works with TMO (ii) surveying the site and preparing a feasibility study with options (iii) preparing a specification for the works (iv) tender appraisal and recommendation for contract award (v) contract administration, financial management and providing a planning supervisor (vi) witness testing the lifts on completion (vii) preparing the final account.
259. Looking at the first duty, "*discussing the scope of the proposed works with TMO*". I have seen the Project Brief and set out the most relevant parts in the previous section. Most importantly, the Brief asked the lift consultant to consider the issue of firefighting and evacuation lift requirements and how they would affect the proposed works. The next stage of the process would be for B&Y and TMO to discuss achievement of the goals set out in the Brief. This would include a preliminary discussion of the feasibility of achieving compliance with the relevant firefighting lift standards. As part of these discussions I would have expected B&Y to have drawn TMO's attention to the relevant British Standards for firefighting lifts, their applicability and the feasibility of achieving compliance with the standards. This includes advising TMO that tall buildings should have a firefighting lift.
260. The next stage of the process would be "*surveying the site and preparing a feasibility study with options*". In the Feasibility Study, I would expect to see an analysis of the existing equipment, and the feasibility of whether it can be re-used, a lift well dimensional survey to assess the dimensions of the pre-existing lift, a photographic survey and critically, an assessment of the feasibility of achieving compliance with the current standards and codes, including the requirements of a firefighting lift. I note that the B&Y Feasibility Study purports to consider achieving compliance with the relevant standards:

1.0 INTRODUCTION

- 1.1 The following feasibility study has been prepared for the Royal Borough of Kensington and Chelsea and is based on specific site surveys of the lift equipment, investigation of the log cards and maintenance records, plus discussions with the TMO and local RBKC staff.

The RBKC brief also required an investigation into the possible presence of asbestos within the common areas and the results of this investigation are included under cover of a separate section.

- 1.2 The principal areas covered are:

1. Specification and life expectancy of the lift equipment,
2. Compliance with current Health and Safety at Work requirements, the recommendations of British Standards and EN81/1,
3. Present condition of the equipment and quality of maintenance standards,
4. Facilities for the Disabled and the requirements of the Disability Discrimination Act 1998, plus the forthcoming EN81/70.
5. Suitability for continued and future use.

- 3.10 This report has been principally concerned with establishing the relative merits of each of the three options with the following particular considerations:

1. Compliance with the Health and Safety at Work Act and BS7255, Safe Working on Lifts.
2. Compliance with the requirements of relevant British Standards and EN81/1, where appropriate.

261. The report should have included an analysis of whether it was reasonably practicable to bring the lifts up to full firefighting lift standard and, if not, why not. As part of this analysis, I would have expected B&Y to have provided TMO with (i) the cost of bringing the lifts up to full firefighting lift standard (ii) a warning of any potential structural, electrical or plumbing constraints and the relevant specialist from whom further advice may need to be sought e.g. a structural engineer (iii) to highlight the potential risks arising from not installing firefighting lifts.
262. Overall, I would have expected to see in the report an option of bringing the lifts up to full firefighting standard alongside other options and the benefits/disadvantages of each (including considerations such as cost, length of programme of works, need to decant residents etc.)

263. I would have expected B&Y to advise as to the best option but ultimately, the final decision would have been for TMO.
264. I have reviewed a memorandum sent by John Rogers, Project Manager, to Paul MacAinsh {TMO00869720} dated 16 December 2003. The main topic of the memorandum is leaseholder consultation and the extent to which the costs of Project 1 should be recharged to leaseholders. The memo states:

TMO	
MEMORANDUM	
To: Paul MacAinsh	From: John Rogers
CC:	Ext: 2761
Date: 16 th December 2003	
My Ref:	Your Ref:

Paul

Grenfell Tower Lift Refurbishment

Stamp: Tenants' Organisation, 17 DEC 2003, Received by Leasehold Services

- This project was put on hold before resident consultation took place but is likely to be re-activated.

The original lifts were installed in 1971 and refurbished in 1985. They are unreliable and do not comply with current requirements. Additionally the residents suffer long waiting times, as the lift capacity is insufficient.

The alternatives are

- a. Replace with like-for-like so far as is possible. This would improve the reliability but not significantly reduce waiting times. The budget cost is about £414k
 - b. Install larger, faster lifts and increase the car entrance width. This would not provide a lift service to current standards but would improve reliability and significantly reduce waiting times. The budget cost is about £600k.
265. From reading the text of this memo, it appears that the TMO were aware that neither option for the lift works proposed by B&Y would bring the lifts up to compliance with current standards. No explicit reference is made to firefighting lifts. However, it suggests that some discussion had taken place between B&Y and the TMO regarding whether the lifts could be brought up to current standards. This analysis and/or discussion is completely omitted from the Feasibility Study and I have not seen it documented anywhere else.
266. I have reviewed the minutes of meetings between B&Y and TMO during Project 1 as well as their relevant correspondence. There is no evidence in the minutes or correspondence that any consideration was given to the feasibility of installing either fully compliant firefighting lifts or such features of a firefighting lift as were reasonably practicable within Grenfell Tower. The focus of the minutes and the correspondence is on increasing car size and other issues. Although Stephen Ellis says at paragraph A12(c) that it was addressed, I have seen no documentary evidence that the question of whether the lifts should be brought up to the firefighting standard was asked or answered by B&Y or anyone else during Project 1.

267. I also note that Robin Cahalarn says in his statement that he “*may have had some conversation and communications with Butler & Young and/or Apex regarding the refurbished passenger lifts but primarily this would have been Dave Steppel.*”
268. Given the obvious importance of these features to fire safety, I would have expected to see documented discussions and decision-making in relation to inclusion of firefighting lift features. While I note that Stephen Ellis says in paragraph A12(c) of his statement that ‘structural’ and ‘environmental constraints’ were the barriers to installing firefighting lifts, I can see no reference to those conclusions within the minutes or the correspondence or any discussion about the possibility of upgrading the lifts to firefighting lifts.
269. As to the remaining duties set out by Stephen Ellis in his statement:
- (iii) preparing a specification for the works - I address my concerns regarding the specification later in this report in Section I.4. My main concern with the specification is that it does not provide for a firefighting lift (in so far as it was reasonably practicable).
 - (iv) tender appraisal and recommendation for contract award - I have no material concerns with the way in which this process was carried out.
 - (v) contract administration, financial management and providing a planning supervisor - I have no material concerns with the way in which this process was carried out that lay within my expertise but other experts may have comments.
 - (vii) preparing the final account.
270. As for witnessing the testing of the lifts (item vi), I have considered Clause 2A.77 of the B&Y specification which sets out what was required as part of witness testing. I have also considered the Certificates completed at the conclusion of Project 1. These are unsatisfactory in some respects - parts are not fully completed and other parts are unclear. However, I do not consider any of these deficiencies are likely to have been material so I do not consider these in further detail.

I.4. The 2004 Specification

271. As set out in Section G.1.1 above, B&Y carried out a Feasibility Study for TMO which led to the drafting of a technical specification for “*The refurbishment of two passenger lifts and replacement of one hydraulic passenger lift at Grenfell Tower at Grenfell Tower, Lancaster West Estate, London W11, for the Royal Borough of Kensington & Chelsea*” {BUT00000044}. This was published in April 2004. The specification set out the expected performance of the lifts following the works and was intended to guide the lift sub-contractor (in this case, Apex) in designing the lifts.
272. The basic specification from B&Y for the two refurbished lifts was:

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1.1 THE LIFTS

1.1.1 TWO ELECTRIC PASSENGER LIFTS - HO90&91

Type	: Duplex electric passenger lifts
Capacity	: 12 person / 900Kg
Serving	: 21 floors, 21 openings
Levels	: Ground, Walkway and First to Nineteenth Floors inclusive.
Travel	: 62.75m
Control System	: Microprocessor duplex collective with full analogue devices, plus the facility for remote monitoring and firemans control.
Drive Machine	: Geared traction with energy efficient, variable frequency motor.
Speed	: 2.0 mps.
Car	: 1400mm wide x 1450mm deep x 2200high clear approximately. : Patterned stainless steel panels.
Doors	: Single panel side opening in patterned stainless steel 900mm wide x 2000mm high.
Architraves	: Stonehenge design with tapered vertical sections in patterned stainless steel
Sills	: Extruded manganese bronze.
Door Operator	: Power operated, variable frequency drive with variable speed control.
Passenger Protection	: Electronic multi beam detector.
Car Station	: Linished stainless steel faceplates incorporating the full range of Facilities for the Disabled: : Tactile identification of colour coded pushes, with audible response, to be half illuminance at all times, full illuminance when pressed. : Hands free autodialling unit with induction loop facility, in lieu of telephone, connecting direct to a nominated area when the alarm push is used.

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	: Scrolling position indicator, which shall also scroll messages viz 'Lift Returning to Ground Floor' etc.
	: Voice synthesiser announcing floor levels, door movement, messages etc.
	: Communication system to security office
Auxiliary Car Station	: Duplicating the full range of colour coded and audible car pushes.
Landing Push Stations	: Surface mounted stainless steel faceplates engraved with the floor level incorporating tactile pushes with audible response, to be half illuminance at all times and full illuminance when pressed.
Landing Indicators	: Within a surface mounted canted station at 1800mm from finished floor level incorporating a scrolling position indicator which shall also scroll messages viz 'Lift Undergoing Maintenance' etc. when the lift is being serviced.
	: The unit shall also incorporate vertically scrolling arrows to indicate direction of travel, plus a dual tone bleep system to advise the same when the lift arrives at the floor in response to a landing call.
Machine Room	: Above.
Shaft Construction	: Reinforced concrete.
Last Level Served to Soffit of Shaft	: 3950mm
Pit Depth	: 1550mm
Maintenance	: 12 months from handover of the final lift of the extended defects liability period.

Note! The specification shall be generically led, with component parts being generally available to the whole UK lift industry, thus allowing simple access to replacement parts in the future.

This will allow maintenance to be undertaken by any competent lift contractor for a minimum 25 year period.

I.4.1. Clause 2A.07 – Related Documentation and References

273. B&Y provided in their April 2004 specification (Clause 2A.07 Related Documentation and References, page A2/5) the following:

2A.07 Related Documentation and References

This tender documentation shall be read in conjunction with, and its requirements are in addition to, the general conditions of contract and any drawings and other documents issued with it and listed in this invitation to tender and as set out below.

Health and Safety at Work etc. Act 1974 (HSWA)
 Disability Discrimination Act 1995 (DDA)
 Management of Health and Safety at Work Regulations 1999 (MHSWR)
 Workplace (Health, Safety & Welfare) Regulations 1992 (WPR)
 Provision & Use of Work Equipment Regulations 1998 (PUWER)
 Lifting Operations & Lifting Equipment Regulations 1998 (LOLER)
 Reporting of Injuries, Diseases & Dangerous Occurrences Regulations 1995 (RIDDOR)
 The Lifts Regulations, 1997
 Factories Act 1961
 Electricity at Work Regulations (H&SE).
 Offices Shops and Railway Premises Act 1963
 LG1 SAFed Regulations
 PM26 - Safe Working at Landings
 Control of Pollution Act 1974
 The Building Regulations
 The London Fire Brigade
 The London Electricity Board
 The Building Industry National Codes of Practice for Passenger Lifts
 Supply of Machinery (Safety) Regulations 1992
 Electromagnetic Compatibility Regulations 1992
 I.E.E. Regulations for Electrical Installations, current edition
 CDM Regulations 1994, Managing Construction for Health & Safety
 CIBSE - Guide D, Transportation Systems in Buildings
 COSHH - Current edition
 BS 2633 - Arc welding of ferritic steel
 BS 308 - Drawing practice.
 BS 3939 - Graphical Symbols for electrical power, telecommunications and electronic diagrams.
 BS 4568 - Steel conduits and fittings.
 BS 4568 - Metric steel conduit
 BS 4678 - Cable trunking.
 BS 476 - Fire tests on building materials and structures.
 BS 5420 - Degree of protection of enclosures for LV switch gear.
 BS 5514 - Overload requirements
 BS 5536 - Preparation of technical drawings for micro filming.
 BS 5588 - Fire Precautions in the design, construction and use of building
 BS 5655 - Lifts and Service Lifts.
 BS 5674 - Thermosetting armoured cables
 BS 5750 - Quality management system.

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BS 6207 - MICC Cables
 BS 6231 - PVC insulated cables
 BS 6977 - Insulation for lifts and for other flexible connection.
 BS 7211 - Thermosetting cables for electrical supplies
 BS 7255 - Safe Working on Lifts
 EN81-1 - 1998 Safety Rules for the Construction and Installation of Lifts.
 EN81-70 - 2003 Accessibility to Lifts for Persons Including Persons with Disability
 BS 7671 - Requirements for Electrical Installation
 BS ISO 9000, 9001, 9002, 9003 - Quality Assurance
 BS EN 60947 - Specification for low voltage switchgear and control gear.
 PREN 1050 - Safety of machinery risk assessment
 LPS 1207 - Loss prevention standard.

274. This part of the specification is confusing. First, there are a number of references to legislation, British Standards, Codes, etc. which, by 2004, had been withdrawn or superseded. For example, the relevant parts of the Factories Act 1961 had been repealed in 1998.
275. Second, there are some references that are simply unclear. For example, there is a reference to '*BS 5588 - Fire Precautions in the design, construction and use of building*'. The reference to BS 5588 does not specify which part and which year of BS 5588 is being referred to. For example, Part 5 of BS 5588 was published in 1991 and then re-published in 2004. Furthermore, there is a reference to the '*Building Industry National Codes of Practice for Passenger Lifts*.' It is unclear to me exactly what this is a reference to.
276. Third, there are a number of references to legislation, British Standards, Codes, etc. that were not applicable to the specification. The specification refers to the '*Lifts Regulations 1997*.' This legislation concerns CE marking and is only applicable to 'new' lifts. Given that B&Y's position is that Project 1 did not involve the installation of new lifts, the reason for referring to the Lifts Regulations 1997 is not clear.
277. Fourth, the specification does not include references which ought to be included. For example, BS EN 81-72: 2003 is not referred to, concerning firefighting lifts. As noted above, BS 5588 is referred to generally, but the specification does not specify which parts are applicable, and which version is applicable. For example, there is no specific reference to BS 5588-5: 1991.
278. I cannot say that the errors in this part of the specification led to any specific flaws or defects in the installation of the lifts. But the scattergun approach taken in this part of the specification reflects an unprofessional and casual approach to the drafting of a specification. This is an important document which is intended to provide guidance both to the client and to sub-contractors. Therefore, it is important that it is factually correct.

I.4.2. Clause 2A.70 – Fireman's Controls

279. Section 2A.70 of the B&Y Specification sets out the requirements for firemans control:

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2A.70 Firemans Control

Each firemans control switch shall have a bevel edge escutcheon for operation of the drop release key.

The faceplate shall be engraved with the words "ON" and "OFF" in characters 10 mm high and engraved arrows indicating direction of operation of the switch. The faceplate shall also be engraved with the words "FIREMANS CONTROL" in characters 15 mm high and all engraving shall be 3 mm deep and filled flush with red epoxy resin.

Activation of the switch shall change the control of the lift to firemans control. The landing indicators shall identify the lift mode by scrolling the message 'LIFT ON FIREMANS CONTROL'. Under firemans control, the lift shall:

1. FIREMANS CONTROL SWITCH - ON

The lift shall remain in service at any position in the lift shaft upon operation of the switch but car and landing calls shall be cancelled and rendered inoperative immediately.

If the lifts are travelling in the UP direction, they shall slow and stop at the nearest floor without opening the doors and return to the Ground floor. If the lifts are already travelling downwards they shall continue to do so and travel to the Ground floor. If the cars are stationary at one of the floors, they shall return to the Ground floor. In all these cases, the doors shall not open and no calls shall be registered or answered.

On reaching the Ground floor, both the car and landing doors shall open and remain open. The car pushes shall assume control, of the firemans lift only but all landing pushes shall remain inoperative whilst the lift is on Firemans Control.

Registration of a car call and closure of the doors shall only be by sustained pressure on a lift car push, after which the lift shall commence travelling to the registered floor. Should a further call be lodged below the first call once the lift is in motion but within stopping distance, the lift shall answer the lowest call and, upon arrival, shall cancel the other call(s).

The lift doors shall only be opened at floor level by sustained pressure on the 'door open' push and if released before the doors fully open, the doors shall close.

Once fully open the sequence may be repeated.

Whilst on Firemans Control, the car call acceptance indication and the car and landing position indicators will remain operative, the latter scrolling "LIFT ON FIREMANS CONTROL" and the floor position alternatively.

2. FIREMANS CONTROL SWITCH - OFF

The lift shall revert to normal operation.

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280. In my view, the B&Y specification section 2A.70 Fireman's Controls describes a system which, by 2004, had become out of date and obsolete.

281. The switch described and the associated systems should have been compliant with BS 5588-5: 1991, section 14 (set out in detail above in Section E.2.2).
282. In fact, the system described in the B&Y specification was closer to the fireman's control system set out in BS 2655-1: 1970 (set out in detail above in Section E.1.2).
283. The most important difference between the two systems is the type of key which would have been used to operate the switch. The switch design by 2004 recommended use of the "emergency unlocking triangle" key which is a European-standardised design of key and is different from the drop keys used to operate earlier switch designs. The use of a European-standardised key avoids confusion as it is a standardised design of key.
284. However, it is important to recognise that the TMO's Client Brief did require a 'fireman's switch' which was to be operated by an 'Express anti-vandal drop key'. The TMO therefore specified a switch and key which was not compliant with the British Standards.
285. I have also considered {TMO00853769} which appears to be an email sent by Robin Cahalarn (TMO) to Ian Moorhouse (B&Y) on 6 August 2004.

Robin Cahalarn

To: liftconserv@btinternet.com
Cc: John Rogers
Subject: Tender analysis

Ian, I have now looked through tender analysis a few minor observations :

Apex return:

- 1.Spec calls for Drop releases on landing doors -not euro release -Schedule 2 Page5 &11
- 2.Tenants will be included on colour choice -stainless steel pattern /cars & flooring.
- 3.Windcrest system required as boroughwide.
- 4.Traction sheaves to be fitted with removable rim for easy replacement.

286. This email appears to be Robin Cahalarn's comments on Apex's tender for the Project 1 works. My interpretation of this document is that Apex had included a 'Euro release key' in their tender whereas the B&Y specification called for a 'drop key' and so Robin Cahalarn was commenting that the tender was incorrect in this respect.
287. The email refers to drop releases on landing doors – I think this is a reference to the type of key to be used to release open the landing doors on a lift in an emergency. This is the same key that is also used to operate a fire control switch. This is supported by the WSP report which states: *"A drop type key is used to both operate the fireman's switch and to open the landing doors of the lift in an emergency."* Overall, I think this email shows that the TMO were clearly requesting that the old drop release type switches were to be installed and not the modern and BS-compliant European-standardised switches.
288. In this situation, I would expect B&Y to bring this to the TMO's attention. Ultimately, however, if the TMO wished to use the non-compliant key and switch, that would be open to them and I would not criticise B&Y for fulfilling their client's wishes, if they had given

them all the right information and warnings. I have not seen any documents which show whether these discussions took place.

289. Also, for clarity, this switch described in the Specification was installed as part of Project 1 on the ground floor. As part of Project 2, the lift service was extended to the mezzanine and walkway+1 floor. Two fire control switches were installed at Grenfell Tower on the ground and walkway floors. My view on the basis of the evidence I have seen is that as part of Project 1, a fire control switch was installed on the ground floor. As part of Project 2, I think a second switch was temporarily installed on the walkway floor which was then disconnected at the end of Project 2. All the evidence I have seen suggests both switches were effectively the same. I set out the evidence I rely upon and my analysis in more detail in Section Q.

I.4.3. Clause 2A.14 Controller: Duplex Lift Control Logic

290. Clause 2A.14 of the Specification, Controller: Duplex Lift Control Logic, stated as follows:

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8. Firemans Control

Firemans Control is required on each lift.

291. As noted above, the reference to Fireman's control in this section is obsolete, as by 2004 the relevant standards required firefighting control and switch, as defined in BS 5588-5: 1991.
292. The reference to providing Fireman's control on 'each lift' is also confusing. The specification did not envisage separate fire control switches for each lift.

I.4.4. Clause 2A.47 Lift Car: Enclosure

2A.47 Lift Car: Enclosure

The Contractor shall provide a 600mm x 1200mm montage having two isometric views of the lift car, complete with all finishes for consideration by the residents.

Stainless Steel

The car walls, ceiling and front return panels plus the car and landing doors and architraves shall be fabricated in 16 gauge, 316 grade patterned stainless steel for which the Contractor shall provide a mill certificate to the SO, prior to any fabrication.

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Ceiling and Roof

The car ceiling shall be constructed from patterned stainless steel panels not more than 250mm in width and shall be reinforced externally with 14 gauge sheet zintec treated with a non-slip compound.

The design of the roof shall be such that it will adequately support the weight of 150Kg at any point on the roof surface without causing permanent deformation or damage. The working area shall be flat, smooth and without tripping hazards.

- 293. This section of the B&Y specification does not specify that a trap door should be provided in the car roof, which is a requirement for firefighting lifts.
- 294. This section also does not state that the materials used in the lift car should be a minimal fire risk, which is a requirement of firefighting lifts.

I.4.5. Clause 2A.48 Lift Car: Station

2A.48 Lift Car: Station

The faceplate shall be fabricated from 3mm finished stainless steel fitting flush to the wall panel and supported by stand-off furniture hinges on a metal back box mounted in the side wall, adjacent to the slam post.

The minimum lateral distance to the centre of any push from the return shall be 400mm

The hinged faceplate shall have secret fixings and shall incorporate the car station fixtures. The Contractor shall submit a drawing, for approval by the SO, indicating the incorporation, size and arrangement of the following:

1. TMO Lift Number and Identification - engraved characters, black, 20mm characters.
2. Contract Load in Kgs and Persons - engraved characters, black.
3. Auto Dialling Telephone Unit - engraved instruction, yellow.

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4. Floor Pushes.
5. Speech Synthesiser.
6. Car Position and Direction Indicator.
7. Door Open Push.
8. Alarm Push, engraved characters, yellow.
9. Key Operated Fan Switch, engraved characters, black.
10. No Smoking Notice - engraved characters, red.
11. Car Preference Key Switch, engraved characters, black.
12. Emergency Lighting Test Switch with LED indication.

Unless specified otherwise, all engraved characters shall be 12mm and flush filled with epoxy resin.

The flat form trailing cables shall run continually from the controller to the car and shall be connected to terminal blocks permanently mounted in the metal back box behind the car station.

The car station fixtures shall be secured by weld studs to the faceplate to enable simple access and replacement of components by authorised personnel.

295. This clause in the B&Y specification gives details of faceplates in the lift car(s). It does not give any details of the Fire Service Access Level (FSAL) as required for firefighting lifts. In addition to the normal storey markers, there should be a sign indicating which level is the Fire Service Access Level.
296. Furthermore, the specification should have required a sign in the lift car stating: *"Firefighting lift. Do not obstruct lift doors. Do not leave goods in lift."*

I.5. Requirements of a firefighting lift missing from the Specification and whether it was reasonably practicable to install these features

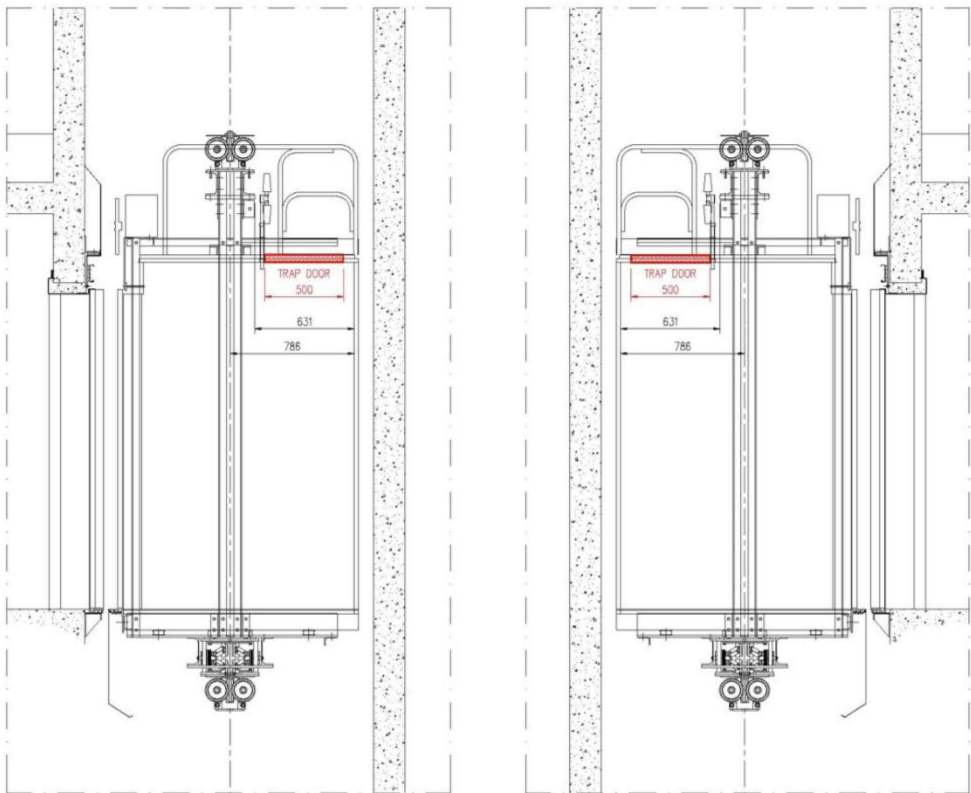
297. Throughout the specification, the term 'fireman's lift' is used which, by 2004, had become obsolete. The correct term was, and remains, 'firefighting lift'.
298. In Section H.2 I considered the approach to assessing reasonable practicability. I noted that there is no documentary evidence of any consideration of the practicability of upgrading the existing lifts to firefighting lift standards or even incorporating any additional upgrades insofar as reasonably practicable.
299. I note the witness statement to the Inquiry of Stephen Ellis at A12(c) , in which he states:
- "My understanding is that it was considered at the time that, due to structural and environmental constraints, complete compliance with BS5588 [i.e. installing firefighting lifts] would only be fully achieved by the installation of completely new lifts in new buildings. I believe these matters were discussed and agreed with KCTMO at an early stage."*
300. The difficulty is that there are no minutes of meetings or records dealing with the 'constraints' he refers to. Therefore I cannot comment on the details or reasonableness of the assessment which he says was carried out. I can say that any assessment should have been properly documented. If B&Y considered that 'structural constraints' were a barrier to bringing the lifts up to firefighting standards, I would have expected B&Y to have identified the need for advice from a structural engineer before reaching a final view whether it was reasonably practicable to bring the lifts up to those standards. I have not seen any evidence of any structural assessment having been undertaken.
301. Based on my analysis of the B&Y Specification, the following features of a firefighting lift were missing or non-compliant relative to the standards for firefighting lifts:
- 301.1. Emergency trap door ('trap door')
 - 301.2. Firefighting lift well water protection
 - 301.3. Firefighting lift control systems
 - 301.4. Changeover from primary to secondary supply after operation of the firefighting lift switch ('secondary power supply')
 - 301.5. Fire service communication system.

301.6. Fire resistant landing doors

302. I will now consider, in turn, whether based on the information available to me, each of the above features was 'reasonably practicable' to install/upgrade as part of Project 1.

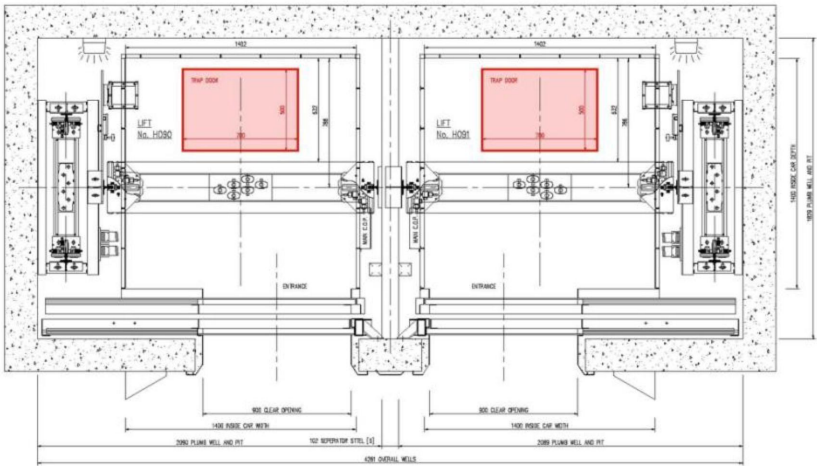
Trap door

303. The provision of an emergency trap door would in my opinion have been straightforward and at little additional cost at the point when the lift cars were replaced with larger versions in Project 1.
304. I have considered this issue in some detail and, below, I have created drawings which demonstrate where a trap door could have been incorporated, demonstrating its feasibility.



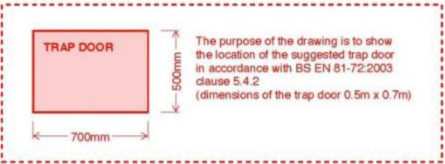
Section

Section



Plan

Notes:



CONFIDENTIAL

GTI Inquiry
Lift Trap Door

Project Blue 2 (258294-00)

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Water protection

305. In relation to the firefighting lift well water protection, this could comprise of two different groups of features:

- 305.1. Waterproof covers/protection from falling water. These are installed on top of the lift car and on the landing door gear to prevent components being damaged from dripping water used in firefighting operations. These features are straightforward to install at little additional cost. I can see no reason why their installation would not have been reasonably practicable as part of Project 1, yet they are not required in the B&Y specification. I have seen no evidence that they were installed.
- 305.2. Pit drainage. There should be a means provided to prevent water from reaching electrical equipment which could create a malfunction of the firefighting lift. Whether this feature would have been reasonably practicable depends on whether there were viable methods of removing water from the lift pit, such as a sump pump. The viability of installing this equipment could depend on structural issues, which are outside my expertise. However, absent any documents showing that the installation of pit drainage was considered but rejected (for specified reasons), I cannot conclude that its installation was not viable.

Firefighting lift control system

306. In relation to the firefighting lift control system, as set out in Section I.4.2 of my report, the 'fireman's control system' set out in the B&Y specification was materially different and inferior to what was required. In my opinion, there was no real cost or viability obstacle to specifying, ordering and installing a compliant firefighting lift control system as part of Project 1. I list the practical differences between these systems in Section I.4.2 but, the most important difference is that the compliant firefighting lift control system would have been operated via a 'Euro triangular key.' However, I appreciate that the TMO Client Brief did specify the older 'fireman's control system'. In this situation, B&Y's duties would have been to make the client aware that they were specifying an old control system (I have not seen evidence that this occurred).

Secondary power supply

307. In respect of the secondary power supply, whether its installation is reasonably practicable depends on how difficult it is to provide the features specified in the relevant guidance. Those features are set out in Section E.2.2 of this report. In some buildings, the provision of an alternative supply could require additional transformers or emergency generators. I have seen no evidence that those involved in Project 1 considered the viability of a secondary power supply. I have insufficient information about the likely cost or other practical obstacles to a secondary power supply being provided at Grenfell Tower. Therefore, I cannot conclude that it was or was not reasonably practicable to install.

308. It is also relevant to note that I have seen at least two documents regarding the power supply to the lifts at Grenfell Tower. A Fire Risk Assessment carried out by Carl Stokes dated 17 October 2014 {CST00000712} states on page 14 that: *“both lifts installed in this building are fire fighting/evacuation lifts according to the TMO’s documentation, these fighting/evacuation lifts have their own independent dedicated power supply and fire fighters control switch.”* I am not sure exactly what the phrase ‘independent dedicated power supply’ means. But in so far as this statement suggests that the lifts had a secondary power supply, this is not consistent with the B&Y specification.
309. Furthermore, I have also considered an email exchange between Matt Smith at Max Fordham and Carl Stokes {CST00000013}, in which Matt Smith stated: *“Also, if the lifts are ‘Fire Fighting’ lifts, then there should be secure, dual supplies to them. This is not shown on the schematics.”* This further supports my view that there was no secondary power supply to the lifts at Grenfell Tower.
310. I have seen no other evidence to suggest that the lifts had a secondary power supply.

Fire service communication system

311. As regards the fire service communication system, the requirements in this respect are set out in Section E.2.2. No such system was fitted at the Grenfell Tower. In my opinion, this would have been a relatively inexpensive upgrade to install and I am not aware of any practical barriers to doing so in this instance.

Fire resistance landing doors

312. As for fire resistant landing doors, it is unclear from the evidence whether these were provided or not. Looking first at the B&Y specification, paragraph 2A.61 makes no mention of provision of fire resistant landing doors. The B&Y Feasibility Study at 5.1.3 refers to provision of *“robust, fire assessed, patterned stainless steel doors.”* The witness evidence indicates that the doors were manufactured by Propbrook but neither Apex nor Propbrook have been able to locate any evidence as to the fire resistance of the doors supplied to Apex as part of Project 1. This is set out in the Apex witness statements and an email from Propbrook dated 30 March 2018 {APX00008687}.
313. I have also looked at the ‘Certificates of test and examination for electric passenger and goods lifts’ completed by Apex following Project 1. The certificate for Lift H091 {APX00008690}, signed by Roger Anthony on 9 August 2005, at clause 2.9 contains the following questions and answers:

“a) Does the contract require the landing door assemblies to be fire rated: [tick]
Yes

If YES what is the fire rating requirement: 2 Hour

b) is the test certificate available and in order [tick] Yes

...

e) Confirm that the fire rated elements of the door assembly are correctly fitted [tick] Yes.”

314. The equivalent section on the certificate for Lift H090 {APX00008692}, signed by T Cook on 3 February 2006, at clause 2.9 has not been completed.
315. Overall, I cannot be sure what the fire resistance of the landing doors was. It is my view, however, that it would have been of minimal cost and reasonably practicable to ensure that the landing doors were fire resistant and it ought to have been done.

Conclusions

316. Accordingly, while I have insufficient information to conclude whether the pit drainage and the secondary power supply were reasonably practicable to install as part of Project 1, the vast majority of firefighting lift features would have been relatively inexpensive (in the context of the overall Project 1 lifts budget) and straightforward to install. Therefore, I cannot agree with Stephen Ellis' suggestion that these features of firefighting lifts were not viable to install due to 'structural' or 'environmental' constraints. His evidence suggests an 'all or nothing' approach to firefighting lift features, whereas the viability of each upgrade should have been considered individually and, where reasonably practicable, Apex should have been required by the specification to install/provide them.
317. I have also considered the cost of upgrading the lifts to the full firefighting standard. It is very difficult to say, given the information I have in front of me, how much extra it would have cost to upgrade the lifts to the full firefighting standard.
318. I note that at paragraph 40 of his statement, Robin Cahalarn says *“In terms of the possible upgrade, I do not recall the reference to the costs meeting the recommended standards and upgrade but from my knowledge at the time, I would anticipate that each lift within the portfolio would have cost more than £10,000 each to upgrade [to a firefighting lift]...”* I do not know exactly where Robin Cahalarn got the figure of £10,000 per lift but, assuming he is right, this would represent a total cost of £20,000, which would be about 3% of the total contract price of approximately £600,000. 3% is a small proportion of the overall contract price, particularly given the importance of the firefighting lift features. Assuming that these rough costings are correct, I think it is unlikely that this additional cost would have been a good reason for not installing the full firefighting lift features.

I.6. Butler & Young witness evidence and the extent of its responsibilities

319. I was provided with and considered the witness statements of Stephen Ellis (formerly a B&Y Associate Engineer) and Ian Moorhouse (formerly a B&Y Director).
320. The witness statements acknowledge that the two passenger lifts at Grenfell Tower did not meet the requirements for a firefighting lift (as they lacked essential features such as a trap door and water protection). These witnesses say that firefighting lifts were not

needed because the Project 1 lifts were not ‘new lifts’ as significant equipment had been retained (Ellis para. A12.a)) and as complete compliance with the firefighting lift standard in BS 5588 would only be achieved when installing “*completely new lifts in new buildings*” (Ellis para. A12 (B) and (C)). At paragraph A13 of his witness statement. Stephen Ellis sets out the steps taken by B&Y to ensure the lifts’ compliance and at paragraph A18 he confirms that B&Y had no concerns about the lifts’ compliance or suitability.

321. Ian Moorhouse drafted the Project 1 Specification which was then used for the tender and for Apex’s works. As I have explained above, the Specification fell below the standards applicable to a lift consultant’s specification for such a project. Ian Moorhouse’s witness statement explains that the Project 1 lifts were not considered to be ‘new lifts’ (paragraph A12) and were not treated as such by the Employer’s Requirements. At paragraph A12, Ian Moorhouse states: “*Clause 2A.06, ‘Design Standards’ concludes in the first paragraph with this statement ‘Where this specification differs from those standards and codes, the provision of this specification shall prevail’.*”
322. He also states that the Project Brief was “*particularly developed...with considerable lift knowledge*”—it required fireman’s control but not firefighting status for the lifts. He assumes that BS 5588 compliance could only be achieved with new lifts in new buildings. Ian Moorhouse states that requirements for the lifts were discussed with John Rogers (Project Manager) and David Steppel (Building Services Manager), on behalf of the client, but he made no record of discussing BS 5588 compliance.
323. For the reasons set out in detail within section H of this report, my opinion is that the lifts installed in Project 1 were, for regulatory purposes, ‘new’ lifts rather than refurbished lifts. Furthermore, my view is that B&Y staff working on Project 1 ought to have reasonably appreciated, based on the particular nature and extensive scope of the proposed works, that these were ‘new’ lifts for purposes of the relevant BS and guidance. This ought to have led to consideration and discussion with the client of the requirement for firefighting lift requirements to be met. This is particularly important given that the TMO Project Brief explicitly raised the issue of compliance with firefighting lift standards and the latest British Standards.
324. Having considered the relevant documentation as well as the witness evidence above, my view is that there is evidence of an uncritical acceptance by B&Y of the Project Brief, without sufficient consideration being given to what the relevant standards or guidance required. Although the TMO had a level of knowledge about lifts and the detail of the Project Brief (through its lift engineer), B&Y were instructed as a specialist lifts consultant. I would have expected B&Y to have used their specialist knowledge to scrutinise what the client wanted and to ensure the final result was compliant with the relevant standards and guidance. In my opinion, a reasonably competent specialist lifts consultant in B&Y’s position should have clearly raised the issue of non-compliance if non-firefighting lifts were to be installed. I have seen no evidence that this was done here.
325. The statements of Ian Moorhouse and Stephen Ellis suggest that firefighting lifts can only be installed in new buildings (see A12.c in each statement), this is, in my opinion, a

significant and worrying misunderstanding of the relevant standards. While the particular features of a building may impose structural constraints that make some features of a firefighting lift impracticable to install, there is no evidence that this analysis was carried out in the case of Project 1 or that firefighting lifts' installation was, in fact, not viable in this instance.

I.7. Conclusion

326. My key conclusions as to B&Y's role in Project 1 are as follows:

- 326.1. The scale of the Project 1 works were significant and amounted to an almost complete replacement of the lifts. Therefore, it was appropriate at this point to consider whether the lifts could be brought up to the full firefighting standard;
- 326.2. The B&Y April 2004 Specification was deficient in a number of respects. Overall, it did not specify the features of a firefighting lift, which it should have done, unless it was not reasonably practicable to incorporate such features. I have seen no witness evidence or documents which suggest that any such deliberation or discussion took place.

J. Commentary on Apex Lift & Escalator Engineers Ltd's involvement

327. In this section of the report I will consider Apex's involvement in Project 1 and Project 2 and their compliance with their duties. As noted before, my analysis of Apex's duties is predominantly based on my experience of good industry practice.
328. Furthermore, in section G.1.2 above, I considered Apex's role in the works at Grenfell Tower, including the terms of their contractual arrangements with the relevant parties.

J.1. Project 1

329. Considering first Project 1 only, in broad terms, my view is that Apex's responsibilities would have been to design and manufacture the lifts (or subcontract to an approved supplier), to install and commission the lifts and to provide 1 year of defects liability.

J.1.1. The 2004 B&Y specification

330. In terms of design, my view of the allocation of responsibilities between Apex and B&Y is that B&Y were to provide a specification which set out the expected performance of the lift and Apex's responsibility was to design a lift which could achieve the specified performance.
331. I note that at paragraph 1.06 of the B&Y/Apex contract, it states that *"The lifts shall achieve full compliance with, BS5655, SAFed LG1, HASAW, BS7255 Safe Working on Lifts, EN81-1 and 2, The Lift Regulations, and any other appropriate statutory instruments."* As set out throughout my report, I do not think this is a comprehensive list of the relevant codes and standards which the lifts should have complied with, and I do not consider that the lifts achieved compliance with the applicable codes and standards.
332. I note Warren Jenchner's statement in which he states at answer 2 that *"The preparation of the contract and therefore the specification of the work was the responsibility of BYCL, on the instruction of their client. Once completed and disseminated to Apex, there would be no scope for Apex to enter into any discussions regarding changes to the proposed work, design issues and suggestion for alternative plans."*
333. My view, based on good industry practice, is that Apex, first as a tenderer for the contract and then as a sub-contractor, had a duty to inform B&Y that the specification did not comply with the relevant codes and standards. It is likely that the first appropriate point at which this should have been raised was the initial site visit, as part of the tendering process. Had it not been raised at this point, it should have been raised subsequently, for example once Apex was awarded the contract. Ideally this would have been in writing or would have been documented in the minutes of the meetings. Had this occurred, I would have then expected B&Y to have raised this with TMO together with their own analysis as

to whether the concerns were well-founded or not, and potential options for moving forward. As ever, the final decision would have been for TMO but with advice from B&Y.

334. Therefore, as ought to be clear, I disagree with Warren Jenchner's statement of Apex's responsibilities in his statement.
335. I have not seen any evidence to suggest that Apex did raise such issues with B&Y and the witness evidence does not suggest otherwise.

J.1.2. Workmanship

336. In terms of the standard of work done in relation to Project 1, from the available information the work generally appears to have been done to a good standard and using good quality equipment and suppliers. Because I was unable to attend the site I was unable to confirm first-hand whether the lifts installed complied with the 2004 B&Y Specification, but the surrounding documentation suggests that they did.

J.1.3. Fire control switch

337. The ground floor fire control switch installed as part of Project 1 did not comply with the relevant standards. As part of Project 1, a switch which was fully compliant with BS EN 81-72: 2003, section 5.8.2 should have been installed. This is set out in full above in Section I.4.2 of the report, but the key requirement is that operation of the lift switch should have been by means of the 'emergency unlocking triangle'. In Section Q below I explain in more detail the significance of this mechanism, but the key point is that a switch with this mechanism should have been procured and installed by Apex. In fact, the switch that was installed had a different and non code-compliant design.
338. It is important to note that the TMO Project Brief and B&Y Specification specified the incorrect design of fire control switch and the switch installed by Apex appears to have been compliant with the B&Y specification.
339. I have seen evidence that Apex's original tender appeared to make provision for a code-compliant switch, and that Apex were asked to change this to the express drop key, as set out in the Specification. In particular I have considered {TMO00853769} which appears to be an email sent by Robin Cahalarn (TMO) to Ian Moorhouse (B&Y) on 6 August 2004.

Robin Cahalarn

To: liftconserv@btinternet.com
Cc: John Rogers
Subject: Tender analysis

Ian, I have now looked through tender analysis a few minor observations :

Apex return:

1. Spec calls for Drop releases on landing doors -not euro release -Schedule 2 Page5 &11
2. Tenants will be included on colour choice -stainless steel pattern /cars & flooring.
3. Windcrest system required as boroughwide.
4. Traction sheaves to be fitted with removable rim for easy replacement.

340. I have commented on this email in Section I.4. Overall I think this email shows that the TMO were clearly requesting that the old drop release type switches were to be installed and not the modern and BS-compliant European-standardised switches.
341. In my view, Apex ought to have raised with B&Y the fact that the fire control switch in the specification was non code-compliant. I have not seen any evidence that this was done. If it was raised with B&Y, B&Y should have then raised this with TMO so that they could make a final decision. If the final decision was that the original non code-compliant design ought to be used, then I consider that it would have then been reasonable for Apex to have procured and installed a non code-compliant switch.
342. I have been unable to establish exactly where Apex bought the ground floor switch. None of the Apex witnesses were able to confirm this information either. Gary Poynter (Apex) stated in his witness statement at A21 that the ground floor switch was potentially procured by A&A Electrical. Enquiries have been made with A&A Electrical but they were unable to confirm whether the switches were supplied by them. Ultimately, it does not affect my opinion who manufactured the switch. I have seen the switch removed from Grenfell and examined it, as set out later in this report (see Section Q).
343. Overall, the ground floor fire control switch installed by Apex as part of Project 1 did not comply with the relevant standards and Apex should have raised this issue with B&Y.

J.1.4. Landing door assemblies

344. I have been unable to confirm whether the lift doors as installed in Project 1 had the appropriate fire resistance. It would have been Apex's responsibility to ensure that the lift doors ordered had the appropriate fire resistance. There are two test certificates available, one for Lift H090 {APX00008692} and one for Lift H091 {APX00008690}. Looking at the test certificate for Lift H091, section 2.9, it states that the contract required the landing doors assemblies to be fire-rated, that the fire resistance is 2 hours and that the test certificate is available and in order. However, the equivalent section of the Lift H090 test certificate is blank. It is therefore not clear to me whether the landing door assemblies supplied and fitted were fire-rated. I note that the statements of Gary Poynter, Roger Anthony and Warren Jenchner state that the doors were likely manufactured by Propbrook

and that they have been unable to obtain any certification confirming the fire resistance of the doors. The position is therefore unclear. In any event, the landing door assemblies should have been fire resistant.

J.1.5. Testing

345. I have reviewed the test certificates for Lift H090 {APX00008692} and Lift H091 {APX00008690}. In particular section 14 of each certificate contains questions relating to whether the lift complied with firefighting lift standards. Both certificates indicate that the lifts were not firefighting lifts. These certificates would have been passed on to B&Y and TMO and therefore one would assume that they also would have been aware that these lifts were not firefighting lifts. Generally, the certificates are completed in a somewhat confusing and inconsistent manner but, for present purposes, this is unlikely to be material.
346. B&Y issued a site visit and outstanding works report dated 2 February 2006 for Lift H090, which comprised of 33 items. The signature and date areas of this report have not been completed. There is no evidence these items have been completed. I have not seen the outstanding works report for Lift H091 but correspondence from Robin Cahalarn dated 20 February 2006 {APX00005598} implies that it did exist.

J.1.6. Fire alarm recall

347. I have seen a number of documents which suggest that Apex installed a fire alarm recall system as part of Project 1. Fire alarm recall was not included in the Butler & Young specification. The key documents I have seen are as follows:

- 347.1. {TMO00863276} – This email chain contains an email dated 13 July 2005 from Janice Wray to Steve Ellis stating:

From: Janice Wray
To: liftconserv@btinternet.com
Sent: Wednesday, July 13, 2005 11:33 AM
Subject: Grenfell Tower Lift Refurbishment

For Attention of Steve Ellis

Steve

I'm sure I should know the answer to this but my colleague has asked if the new lifts at Grenfell Tower return to the ground level in the event of the fire alarm being activated. Could you please advise

Many Thanks

Janice

- 347.2. The same email chain contains a response from Steve Ellis dated 13 July 2005:

From: Butler & Young Lift Consultants Ltd [mailto:liftconserv@btinternet.com]
Sent: 13 July 2005 14:25
To: Janice Wray
Subject: Re: Grenfell Tower Lift Refurbishment

Janice,

No provision has been made for fire alarm recall, albeit all modern microprocessor controllers incorporate the capacity to do so if required.

What comprises the common parts fire alarm system? Our records indicate nothing in the machine room. If FA recall is required the FA contractor would need to provide a set of volt free contacts in the lift machine room.

The lifts do incorporate Fireman's control, manually operated.

On my next visit tomorrow I will check again what FA equipment is located in or near the machine room.

Regards

Steve Ellis

347.3. There are further emails in this chain discussing obtaining a quote from South Eastern for installation of the fire alarm recall.

347.4. {APX00008296} – Minutes of a contract progress meeting dated 18 August 2005 between Apex, TMO, and Butler & Young. The minutes note:

7.1 JW would advise further on Fire Alarm recall requirements.

347.5. According to the minutes, JW is a reference to Janice Wray from the TMO.

347.6. {TMO00863276} – the final email in this chain, noted above also, is dated 13 September 2005 and states:

From: Janice Wray
Sent: 13 September 2005 11:16
To: Sarah Everson; 'Steve Ellis'
Cc: Damian Donnelly; Dave Steppel; Roger Green; Robin Cahalan
Subject: FW: Grenfell Tower Lift Refurbishment

Sarah / Steve

at the recent contract meeting it was agreed that we should obtain costings for installing a lift recall feature whereby the lifts return to ground level when the fire alarm is activated. My colleague Roger Green has kindly provided a costing for the work his fire alarm engineers would need to do and so we now require a costing from Apex for their work to facilitate this. I would be grateful if you could arrange this and also if you could advise if these costs could be met within the project budget

Please advise

thanks

Janice Wray
TMO Health & Safety Adviser

- 347.7. {APX00008297} - Minutes of a contract progress meeting dated 22 September 2005 between Brodie Plant Goddard, Apex, TMO, and Butler & Young. The minutes note:

6.1 Apex still to cost additional acoustic measures and fire alarm recall facilities.

- 347.8. {APX00008298} - Minutes of a contract progress meeting dated 26 October 2005 between Brodie Plant Goddard, Apex, TMO, and Butler & Young. The minutes note:

3.2 RC advised TMO were reviewing the provision for fire alarm recall. Roger Green at TMO dealing.

- 347.9. {APX00008299} - Minutes of a contract progress meeting dated 23 November 2005 between Brodie Plant Goddard, Apex, TMO, and Butler & Young. The minutes note:

3.2 Roger Green of TMO would contact RA or SE in respect of fire alarm recall requirements - volt free contacts in the machine room.

- 347.10. {APX00008300} - Minutes of a contract progress meeting dated 19 December 2005 between Brodie Plant Goddard, TMO, and Butler & Young. The minutes note:

3.0 SITE ARRANGEMENTS / MAINTENANCE VISITS / FIRE ALARM RECALL WORKS BY OTHERS / CHRISTMAS COVERAGE

3.1 Roger Green of TMO would contact SBE re Fire Alarm Recall details.

- 347.11. {APX00001066} – Letter from Apex to B&Y dated 13 January 2006 setting out costs for legitimate variations in lifts. The letter states:

Dear Sirs

Re: Grenfell Tower – Lancaster West Estate

Further to your recent request we have pleasure in submitting the following costs for legitimate variations:

To supply and install hydraulic motor acoustics

For the sum of £1040-00

To connect the fire alarm recall to the building system

- 347.12. {APX00005425} – Letter from B&Y to Apex confirming the additional works. The date of the letter is unclear but it is clearly after 13 January 2006.

This VO confirms acceptance of works additional to contract as set out in your letter dated 13th January 2006.

1. Hydraulic machine room acoustics.	£1,040.00
2. FA recall.	£147.51

- 347.13. {APX00005428} – Minutes of contract progress meeting dated 18 January 2006. The minutes note:

3.0 SITE ARRANGEMENTS / MAINTENANCE VISITS / FIRE ALARM RECALL WORKS BY OTHERS

3.1 Apex F.A recall works had been costed. TMO to provide FA signals,

- 347.14. {TMO00863273} – An email dated 24 March 2006 from Roger Green to Robin Cahalarn referring to planned testing of the fire alarm recall system:

From: Roger Green
Sent: 24 March 2006 09:27
To: Robin Cahalarn
Cc: 'Steve ellis (steve@bylcl.co.uk)'; 'Richard braxton (richard.braxton@apex-lifts.co.uk)'
Subject: RE: Grenfell Tower lift motor room

Robin
 Their supervisor has told me they are going to be back their today and next week to complete and tidy up .
 Will also need to meet with lift engineers to test and prove the FA system brings the lifts back to the ground floor when it goes into alarm .
 Date TBA

regards Roger Green

- 347.15. {TMO00863333} – An email dated 11 April 2006 from Roger Green to Robin Cahalarn and Janice Jones confirming that the fire alarm recall system is operational:

From: Roger Green
Sent: 11 April 2006 13:27
To: Robin Cahalarn; Janice Jones
Cc: Janice Wray
Subject: RE: Grenfell tower connecting up fire recall



Robin

We tested the new fire alarm , in the lift motor room , and the operation of bringing both lifts down to ground floor (in the event of a fire alarm) , it all worked as required .
The site has been cleared up as requested

Janice Jones

Could you advise tenants in the tower that the lifts, in the event of a fire alarm , will automatically go down to the ground floor and doors will open to allow passengers out .Once the car is empty the doors will shut and the lift operation will cease until the fire alarm is reset .

regards Roger

348. From my review of these documents, it appears that a fire alarm recall system was installed by Apex which caused the lifts to automatically return to the ground floor if the fire alarm was activated. Robin Cahalarn has provided a witness statement addressing the fire recall function. However he has stated at paragraph 3 of his witness statement that: *"I am unable to recall whether or not the system installed automatically brought lifts down to the ground in case of a fire alarm being activated."*
349. He further states at paragraph 6 that he does not know how the fire recall function was intended to work. He goes on to say: *"...based on my experience, I would expect that the fire recall function would have been part of the wider building management system for which there would have been a panel on the ground floor. This panel would have controlled the lighting, ventilation, fire alarms and smoke detection."*
350. As to when and whether the fire recall system was disconnected, Robin Cahalarn states at paragraph 9 of his statement that he has no knowledge of whether the fire recall function was disconnected or not. Overall, therefore, there is very little information as to when the function was disconnected.
351. In my opinion, fire alarm recall is not a feature of a firefighting lift and its installation was not required by the various lifts standards, where a manual fire control switch was present. However, I do consider that the system can be useful and I do not criticise its installation.

J.1.7. Summary of conclusions as to Apex's Project 1 involvement

352. While B&Y was a specialist lifts designer, Apex was a specialist lifts contractor and should have been well aware of what was required to ensure compliance, whether or not it was spelled out in the specification. Indeed, Warren Jenchner at paragraph 8, 13 and 14 sets out his qualifications within this sector, his position on the LEIA Board and states that he is constantly abreast with changes in the lift industry.
353. Apex, in my opinion, chose to uncritically accept and apply the B&Y specification in spite of it being materially non-compliant with the relevant BS/guidance. This was a missed

opportunity for TMO, B&Y and other organisations involved with Project 1 to reassess the compliance requirements and to adjust the specification/contract accordingly.

354. Overall, my view in relation to Project 1 is that Apex did not act as a responsible lift contractor ought to because they failed to flag to B&Y that the lift specification was non-compliant with the relevant codes, particularly in relation to firefighting lifts.

J.2. Project 2

355. Considering Project 2 only, in broad terms, my view is that Apex's responsibilities would have been to provide 4 new landing door assemblies and to carry out any modifications necessary to suit these new entrances. Therefore, the scope of Apex's Project 2 work was very limited compared to its involvement in Project 1.
356. There are no specifications available for the installation of 4 new lift entrances in 2015. It is known that the new lift structural entrances were cut open on the mezzanine and walkway+1 floors.
357. As I set out in full in Section Q, my view is that a second fire control switch was installed on the walkway floor for the duration of the works and then disconnected. I have not yet been able to establish who carried out these works. The witness evidence provided by Apex states that they did not do any work to the fire control switch as part of Project 2, so I cannot conclude at this stage that Apex carried out this work.
358. On a closer analysis, my view as to Apex's responsibilities in relation to Project 2 is as follows:
- 358.1. Carrying out a pre-condition survey – in my view this survey was fairly narrowly limited to assessing the feasibility of installing the new landing entrances. It did not require Apex to flag broader issues of the lifts' non-compliance with codes/standards. However, Apex should have noted as part of this survey that the fire control switch would need to be temporarily re-sited to the walkway floor, even if they were not carrying out the work themselves.
- 358.2. Supplying and installing four new lift entrances for the walkway+1 and mezzanine floors. This also would have included installing new car operating panels, new landing call stations, new indicators and control modifications. In my view Apex's responsibilities were narrowly limited to carrying out this task. I do not think that there was a wider duty to flag the lifts' non-compliance with relevant codes/standards. Apex's involvement in Project 2 was much more limited in relation to Project 2, and the Project 2 lift works were much smaller in scale and scope compared to Project 1.
- 358.3. Making the lift safe for Rydon engineers to work on the lifts.
- 358.4. Testing – at the conclusion of Project 2, Apex should have re-tested the ground floor fire control switch. I have not seen any evidence that this was tested and it should have been documented somewhere appropriately.

359. The contractor who installed the temporary fire control switch on the walkway floor ought to have removed this switch after it was disconnected, and when the ground floor switch was reinstated. The evidence suggests that it was not Apex who installed the temporary fire control switch. However, if it comes to light that in fact that they did install the temporary fire control switch on the walkway floor, then they should have removed it once they reinstated the ground floor switch.
360. Overall, Apex's responsibilities in relation to Project 2 were far more limited in scope as the project itself was much more limited. My main concern is the lack of certification in relation to the fire resistance of the new landing doors. There should have been testing of the ground floor fire control switch on the lifts which complied with the relevant standards and this testing should have been documented. There also should have been certification which confirmed that the landing doors were fire resistant, ideally to the same level as the existing landing doors installed as part of Project 1.

J.3. Conclusions as to Apex's involvement

361. In summary, my conclusions as to Apex's involvement with Grenfell Tower are as follows:

- 361.1. In relation to Project 1, Apex uncritically accepted the B&Y specification. They should have flagged to B&Y that the April 2004 specification did not make provision for firefighting lifts, and it should have done, in so far as it was reasonably practicable. In this regard, Apex did not act according to good industry practice or as a reasonable lift contractor.
- 361.2. In relation to Project 2, Apex's involvement was far more limited. Given the scope of works which they were contracted to carry out, I do not think that Apex had a duty to flag the issue of the lifts' non-compliance with relevant standards and codes to TMO or any other body. In this regard I have no significant criticism of Apex.

K. Commentary on calfordseaden's involvement

362. Calfordseaden inspected and reported on the lifts at Grenfell Tower prior to the commencement of works as part of Project 2. This is set out in detail in section G.1.3. The report produced is dated March 2015 {CAL00000001}. Having considered carefully the scope of what calfordseaden were asked to do by the TMO, in my view, their responsibilities were:
- 362.1. To carry out a full condition survey to establish the reliability of the lifts.
 - 362.2. To provide a view as to how long a lift would take to put back into service if it broke down during the period of works.
 - 362.3. To potentially ensure a more enhanced maintenance regime during the period of the works.
363. In my view, it was not the responsibility of calfordseaden to advise TMO that the lifts were not full firefighting lifts. I do think calfordseaden ought to have described the lifts accurately, but I consider this to be different from providing advice as to compliance of the lifts with relevant codes and standards, which I do not think calfordseaden needed to do. This is due to the very narrow scope of calfordseaden's brief which appeared to concentrate on the lift reliability, programme of works and enhanced maintenance during the works. I have seen no evidence to suggest that calfordseaden were asked to consider the compatibility of the lifts with current British or European Standards and, given their limited involvement with the project, I would not have expected them to review this issue unless asked.
364. As the lifts were intended to be operable by the fire service in the event of a fire, calfordseaden should have warned TMO that, as one of these lifts would be out of action during the period of the works, alternative measures should be put in place to ensure safety. I have seen documents which demonstrate that the LFB were aware of the scope of works and were told by the TMO when the relevant lift works had been completed {LFB00000951}.
365. I have considered the witness evidence of calfordseaden Senior Lift Engineer Michael Burke. In paragraph 28 of his witness statement for the Inquiry, Michael Burke suggests that considering compliance with the firefighting lift requirement was not within the scope of his brief. I would agree with this opinion.
366. However, I do note that the March 2015 report states that the lifts comply with current British Standards and Health and Safety requirements applicable at the time of the installation/refurbishment:

3.1. COMPLIANCE WITH STANDARDS

The lifts comply with the current British Standards and Health & Safety requirements applicable at the time of the installation/refurbishment.

367. My view, as set out in this report in detail, is that, at the time of the Project 1 works, the lifts should have been upgraded to firefighting standard in so far as it was reasonably practicable. As the lifts did not meet this standard, the above statement is, in my view, incorrect. It is misleading and also somewhat confusing as Michael Burke's witness statement, and the correspondence between the parties, suggests that the brief did not include assessing compliance of the lifts against relevant British Standard. It is therefore not clear how Michael Burke considered himself able to make this assessment, and he should not have done without having carried out the appropriate checks and tests. In my opinion, this statement should not have been contained within the report.
368. At paragraphs 20 and 22 of his witness statement for the Inquiry, Michael Burke states that he did not test the lifts' operation in fire mode and did not test the fire control switch as he was not required to do so. The report also states:

1.2. BASIS OF REPORT

The report has been prepared following a visual survey of the lifts carried out on Thursday 19th March 2015.

At the time of the inspection both lifts were in service and operational.

No electrical or mechanical testing was undertaken at the time of our survey.

Documentation referred to when preparing this report includes:

- Lift Maintenance Log Cards

369. Michael Burke should in my opinion have tested the fire switch or recommended it to be tested by the lift maintenance contractor, as recommended by LEIA and documentary evidence held on record. He does not mention or recommend the routine testing of the fire switch. It is not clear what the report means when it states that no electrical or mechanical testing was undertaken at the time of the survey.
370. The LEIA document on guidance on the management of lifts, escalators and similar products (April 2006) section 3.3.1, Fire, recommends "*if a firemans lift exists does it perform satisfactorily? If a firefighting lift exists are the arrangements in place for the necessary test to be undertaken?*" In my opinion, this requirement should have been highlighted in his report.
371. Overall, Calfordseaden:
- 371.1. Did not have a duty to flag the lifts' non-compliance with relevant legislation, standards and codes.

- 371.2. Should have checked the fire control switch as part of their testing, and recorded the results of this testing in their report.

L. Commentary on Kensington & Chelsea Tenant Management Organisation's involvement

372. In section G.1.4 above, I set out the TMO's role as defined in the Phase 1 report.
373. Whether the TMO fulfilled the definition of a 'Responsible Person' as per the 2005 Order and therefore whether the duties flowing from that Order applies to the TMO is an issue to be dealt with by others. It is outside the scope of my expertise to make any conclusions on this issue. I would only note that, as set out in section G.1.4, the 2013 version of the TMO's policy on fire safety defined the TMO as the 'Responsible Person' under the 2005 Order at paragraph 2.2.
374. I have proceeded on the assumption that the TMO were the "Responsible Person" for the purposes of the 2005 Order.

L.1. Policy on firefighting lifts

375. I am instructed to consider whether TMO's policy on firefighting lifts complied with the Relevant Standards. I have seen many different versions of the TMO Fire Safety Strategy. Many of them appear, however, to be duplicates or drafts. I have therefore set out below the versions I have seen which are different from each other and the relevant dates. At the time of writing the report, I am confident that I have seen all of the different versions of the policy.

L.1.1. The 2012 strategies

376. The date of the first version of the Strategy which I have seen is somewhat unclear but, looking at the Appendices and other parts of the document, it appears to be dated September 2012, or thereabouts {TMO10001582}.
377. Section 18.2 states:

"Fire Safety & TMO lifts

As much of the housing stock is medium and high rise the TMO have a large number of residential blocks which are served by one or more lifts. Not all of the criteria which define a "fire fighting lift" are appropriate to our lifts. Specifically, for example the requirement to have a trap door in the roof the lift car etc. could be detrimental to the safety of our lifts. However, TMO lifts serving blocks of a height greater than 18meters do meet a significant number of these fire-fighting lift criteria and these are set out below –

- 1. Minimum car size (1100mm wide x 1400mm deep) for 8 persons capacity (630kg).*
- 2. dedicated power supply serving lift (3 phase). Additionally, ancillary items such as lift alarm, lighting etc. are also served by their own dedicated power supply*
- 3. 2-way communication on new lifts includes connection to Customer Service Centre / out of hours monitoring service when the lift alarm is activated*
- 4. Firemans Control Switch fitted. When operated this causes the lift to return to ground floor and open to allow the fire fighters access. It stops landing calls being registered and allows the authorised person e.g. LFB operative to take control of the lift (by applying a constant pressure on any call button).*
- 5. lift car and landing doors are composed of stainless steel that is not less than 16SWG thick and over 2 hours fire resistance.*

Additionally, the TMO

- 6. has a comprehensive servicing and maintenance contract is in place for all lifts. This includes monthly inspections.*
- 7. employs Engineers responsible for the supervision and monitoring of the contract / contractors.*
- 8. has the Council's Insurers, Bureau Veritas, carry out 6-monthly inspections which include a full safety check.*
- 9. Neighbourhood Management staff (Estate Services Assistants, porters, inspectors and Estate Services Team Leaders) and Health & Safety staff carry out regular estate inspections which include visual inspection of the lift car and testing of the lift alarm.*

Attached at Appendix 7 is a comprehensive list of all TMO lifts (fire fighting lifts as described above are indicated by bold type).

378. I have a number of comments to make on this section of the fire safety strategy:

- 378.1. First, the strategy refers to TMO lifts serving blocks of a height greater than 18 meters. I think this is probably a reference to the British Standards which require firefighting lifts in buildings over 18 metres. I therefore think it is likely that the TMO were aware that existing buildings over 18 metres should have firefighting lifts, if it would be reasonably practicable.
- 378.2. Second, the strategy sets out the requirements of a firefighting lift which the TMO lifts do satisfy. However, it does not set out the requirements of a firefighting lift which the TMO lifts do not satisfy such as having dual power supply, water protection, etc.

- 378.3. Third, the strategy says that *‘not all the criteria which define a ‘firefighting lift’ are appropriate to our lifts.’* I have not seen evidence in the strategy or in any other documents that the TMO carried out any sort of assessment of their buildings which would lead to this conclusion. Given that every building is different, for example, in terms of age, structure, etc. it seems to me that this statement is far too sweeping and general and, from what I have seen, not backed up by a proper assessment of the buildings.⁸ I would have expected the TMO to have looked at Grenfell Tower individually and made a reasoned technical assessment of which features of a firefighting lift were appropriate.
- 378.4. Fourth, the strategy goes on to say *“Specifically, for example the requirement to have a trap door in the roof of the lift car etc. could be detrimental to the safety of our lifts.”* I find this statement difficult to understand from the perspective of lift fire safety. The lift car trap door feature of a firefighting lift is supposed to enhance fire safety and make it easier to rescue a firefighter if they become trapped inside the lift. I do not know what the TMO could have meant by their statement, and whatever they did mean is not explained in the strategy. I have also not come across problems with lift car trap doors and safety during my years in the lifts industry.
- 378.5. Overall, in this part of the Strategy, the TMO appear to be picking and choosing the parts of the British Standard requirements for a fire fighting lift which the TMO lifts satisfy. They have effectively created a ‘TMO-specific’ definition of a fire fighting lift which only incorporates some of the British Standard requirements. I disagree with paragraph 36 of Robin Cahalan’s statement where he says: *“I am not aware that the TMO would adopt its own definition of a firefighting lift and do not understand this reference in the Inquiry’s letter.”* I think the TMO Strategy clearly does adopt its own firefighting lift definition.
- 378.6. Finally, at the end of the section it states: *“Attached at Appendix 7 is a comprehensive list of all TMO lifts (fire fighting lifts as described above are indicated by bold type).”* In Appendix 7, Lifts H090 and H091 at Grenfell Tower are listed and highlighted in bold, suggesting that, according to the Strategy, they are firefighting lifts.

Grenfell Tower, W11	Passenger Lift	H090	“A” L/H lift
Grenfell Tower, W11	Passenger Lift	H091	“B” R/H lift

379. Confusingly, I have seen another TMO Fire Safety Strategy dated September 2012 {TMO10001578} which says the following, in the equivalent section on lifts:

⁸ I would also direct the reader to my comments in Section L.3 about the TMO brief for project 1 and that they requested B&Y to assess the firefighting capabilities of the lifts in 2003/4 and this was not done.

“Fire Safety & TMO lifts

As part of the work that we have been undertaking on our fire risk assessments we have put together the following information which relates to TMO lifts serving blocks over 18 meters in height. Whilst it is acknowledged that our lifts do not fully satisfy all of the criteria for fire-fighting lifts we can confirm that they meet the following –

- 1. Minimum car size (1100mm wide x 1400mm deep) for 8 persons capacity (630kg).*
- 2. dedicated power supply serving lift (3 phase). Additionally, ancillary items such as lift alarm, lighting etc. are also served by their own dedicated power supply*
- 3. 2-way communication on new lifts includes connection to Customer Service Centre / out of hours monitoring service when the lift alarm is activated*
- 4. Firemans Control Switch fitted. When operated this causes the lift to return to ground floor and open to allow the fire fighters access. It stops landing calls being registered and allows the authorised person e.g. LFB operative to take control of the lift (by applying a constant pressure on any call button).*
- 5. lift car and landing doors are composed of stainless steel that is not less than 16SWG thick and over 2 hours fire resistance.*

Additionally, the TMO

- 6. has a comprehensive servicing and maintenance contract is in place for all lifts. This includes monthly inspections.*
- 7. employs Engineers responsible for the supervision and monitoring of the contract / contractors.*
- 8. has the Council’s Insurers, Bureau Veritas, carry out 6-monthly inspections which include a full safety check.*
- 9. Neighbourhood Management staff (Estate Services Assistants, porters, inspectors and Estate Services Team Leaders) and Health & Safety staff carry out regular estate inspections which include visual inspection of the lift car and testing of the lift alarm.*

Attached at Appendix 7 is a comprehensive list of all TMO lifts (fire fighting lifts as described above are indicated by bold type).

380. This version of the policy acknowledges that the lifts do not meet all the criteria for a firefighting lift and then simply lists the criteria which they do satisfy.
381. I have seen another version of the policy which is dated October 2012 {TMO10001577}. The equivalent part of the policy states:

“Fire Safety & TMO lifts

As much of the housing stock is made up of medium-rise and high-rise blocks a large number of these are served by one or more lifts. Where appropriate “fire fighting lifts” are provided within TMO residential blocks. This is to satisfy the requirements of the Building Regulations because of the height of the building (over 18 meters) etc. When the lifts are installed they are compliant with the relevant standards current at that time. Similarly when replacement lifts are installed these are compliant with the standards current at the time of replacement. The criteria for TMO fire fighting lifts is set out below-

- 1. Minimum car size (1100mm wide x 1400mm deep) for 8 persons capacity (630kg).*
- 2. dedicated power supply serving lift (3 phase). Additionally, ancillary items such as lift alarm, lighting etc. are also served by their own dedicated power supply*
- 3. 2-way communication on new lifts includes connection to Customer Service Centre / out of hours monitoring service when the lift alarm is activated*
- 4. Firemans Control Switch fitted. When operated this causes the lift to return to ground floor and open to allow the fire fighters access. It stops landing calls being registered and allows the authorised person e.g. LFB operative to take control of the lift (by applying a constant pressure on any call button).*
- 5. lift car and landing doors are composed of stainless steel that is not less than 16SWG thick and over 2 hours fire resistance.*

Additionally, the TMO

- 6. has a comprehensive servicing and maintenance contract is in place for all lifts. This includes monthly inspections.*
- 7. employs Engineers responsible for the supervision and monitoring of the contract / contractors.*
- 8. has the Council’s Insurers, Bureau Veritas, carry out 6-monthly inspections which include a full safety check.*
- 9. Neighbourhood Management staff (Estate Services Assistants, porters, inspectors and Estate Services Team Leaders) and Health & Safety staff carry out regular estate inspections which include visual inspection of the lift car and testing of the lift alarm.*

Attached at Appendix 7 is a comprehensive list of all TMO lifts (fire fighting lifts as described above are indicated by bold type).”

382. In respect of the penultimate sentence of the first paragraph above, this, in my opinion, sets out the expectations accurately i.e. lifts being replaced or new lifts being fitted should comply with the relevant standards applicable at the time. As set out above, this would, in my opinion, have required firefighting lifts to have been installed as part of Project 1 insofar as was reasonably practicable.

383. However, as in previous policies, the policy sets out the BS criteria which the TMO lifts do meet, but does not set out the criteria which the TMO lifts do not meet. Furthermore, the policy refers to 'TMO firefighting lifts'. If a lift does not meet each and every requirement of the BS definition, it cannot and should not be termed a 'firefighting lift', as the TMO policy does. To do so creates dangerous confusion about the status of the lift and the additional protections it provides. This confusion can then stand in the way of appropriate modernisation, 'bringing up to code' and actions in the event of a fire. The need for absolute clarity about available features in a lift is underlined by the recent introduction of a requirement for lifts to contain a checklist of available features (e.g. trap door, water protection, secondary power supply) on a sheet attached to the inside of the lift. This requirement was not in place at the relevant time. However, knowledge that a lift is a firefighting lift (in accordance with the correct definition, not the TMO definition) allows fire services, maintenance contractors and others to be aware of what additional protections the lift offers.

L.1.2. The 2013 strategies

384. I have also seen a version of the policy dated November 2013 {TMO00830598} which is materially the same as the policy set out above in Section L.1.1., dated October 2012.

L.1.3. The 2015 strategies

385. I have seen a version of the strategy dated May 2015 {TMO00858525} which states:

"Fire fighting lifts

As much of the housing stock is medium- and high-rise many of the blocks are served by one or more passenger lifts. Where appropriate "fire fighting lifts" are provided within TMO residential blocks. The criteria for a TMO fire fighting lift is set out below-

[the remainder is the same as previous strategies]

386. The requirement that lifts being replaced or new lifts being fitted should comply with the relevant standards applicable at the time appears to have been removed from this version of the policy. As a result, this policy is less compliant with the relevant requirements than the previous version of the policy. Also, the policy also only states that 'where appropriate' firefighting lifts will be provided, but it does not specify what 'where appropriate' means.
387. Overall, the policy does not say that firefighting lifts which are compliant with the relevant building standards must be provided. It states that the TMO's version of firefighting lifts will be provided 'where appropriate' but does not explain what this means and is therefore very vague. It continues to create confusion by adopting the TMO's own definition of a firefighting lift, which is different from the definition in the relevant standards.

L.1.4. The 2016 strategies

388. I have also seen a 2016 strategy {TMO10045571} which states:

“As much of the housing stock is medium-rise and high-rise many of the blocks are served by one or more passenger lifts. Where appropriate “fire fighting lifts” are provided within TMO residential blocks. This is to satisfy the requirements of the Building Regulations which consider the height of the building etc. When lifts are installed they comply with the relevant standards at that time and when they are subsequently replaced the replacement lift is compliant with the standards current at the time of replacement. The criteria for a TMO fire fighting lift is set out below“

[the remainder is the same as previous strategies]

389. As above, in respect of the final sentence of the above paragraph, this, in my opinion, sets out the expectations accurately i.e. lifts being replaced or new lifts being fitted should comply with the relevant standards applicable at the time. As set out above, this would, in my opinion, have required firefighting lifts to have been installed as part of Project 1 insofar as was reasonably practicable.

L.1.5.The 2017 strategies

390. I have considered the following strategy dated June 2017 {TMO00832724}:

19.2 Fire fighting lifts

19.2.1 As much of the housing stock is medium-rise and high-rise many of the blocks are served by one or more passenger lift. Where appropriate, "fire fighting lifts" are provided within TMO residential blocks to satisfy the requirements of the Building Regulations. When lifts are installed and when they are subsequently refurbished / replaced works are done to comply with standards which are current at the time of the work. The criteria for a TMO fire fighting lift is set out below-

1. Minimum car size (1100mm wide x 1400mm deep) for 8 persons capacity (630kg).
2. Dedicated power supply serving lift (3 phase). Additionally, ancillary items such as lift alarm, lighting etc. are also served by their own dedicated power supply

13

3. 2-way communication on new lifts includes connection to Customer Service Centre / out of hours monitoring service when the lift alarm is activated
4. Fireman's Control Switch fitted. When operated this causes the lift to return to ground floor (lower ground in the case of Trellick Tower as that is where the LFB enter the block) and open to allow the fire fighters access. It stops landing calls being registered and allows the authorised person e.g. LFB operative to take control of the lift (by applying a constant pressure on any call button).
5. Lift car and landing doors are composed of stainless steel that is not less than 16SWG thick and over 2 hours fire resistance.

Additionally, the TMO

6. has a comprehensive servicing and maintenance contract in place for all lifts. This includes monthly inspections.
7. employs contract managers who are responsible for the supervision and monitoring of the contract / contractors.
8. has RBKC's Insurers, Bureau Veritas, carry out 6-monthly inspections which include a full safety check.
9. Neighbourhood Management staff (Estate Services Assistants and Team Leaders) and Health & Safety staff carry out regular estate inspections which include visual inspection of the lift car and testing of the lift alarm.

A comprehensive list of all TMO passenger lifts (highlighting those which are fire fighting lifts as described above) is available from the Health & Safety and the Asset & Regeneration Team.

391. As in previous versions, this version of the policy contains the same bespoke TMO definition of a firefighting lift, which I have criticised above. However, as above, it does set out the correct position that lifts being replaced or new lifts being fitted should comply with the relevant standards applicable at the time.
392. Overall, I would repeat my analysis earlier in this section in relation to this 2017 policy, which is materially the same as previous iterations of the policy.

L.2. TMO definition of a firefighting lift

393. I note that in Robin Cahalarn's statement he says at paragraph 36: *"My understanding is that the concept of the firefighting lift did not fully come into force until about 2015..."*
394. I do not agree with this statement for reasons set out all the way through my report. In particular, in Section E I explain that the phrase 'fireman's lift' was in use from the 1970s but from at least 1991 the concept of a 'firefighting lift' was known in the industry and used in British Standards.
395. Furthermore, there is evidence in the documents that the phrase 'firefighting lift' was known and used within the TMO.
396. I have seen minutes of a meeting on 23 February 2010 {RBK00053579} between Robin Cahalarn, Janice Wray, Salvus Consulting and other TMO staff in which Robin Cahalarn is recorded as explaining three different classifications of lift – fireman's lifts, firefighting lifts and evacuation lifts. This demonstrates clearly that Robin Cahalarn and TMO staff were using the term firefighting lift. The minutes state that the criteria for a firefighting lift were discussed and it was concluded that TMO lifts meet the majority, but not all, the criteria for a firefighting lift. This further demonstrates that those within the TMO understood the requirements of a firefighting lift and were aware that the TMO lifts, which would include Grenfell Tower, did not meet all the requirements of a firefighting lift:

RC then outlined the 3 different classifications of lifts in terms of fire – Firemans Lift, Firefighting Lift and Evacuation Lift. After some discussion the group concluded that most of the Borough's lifts meet the majority (but not all) of the criteria which define a firefighting lift. It was agreed that, for the purposes of the Action Plans, JW and RC would document the criteria that TMO lifts do meet. RC clarified that the requirements for lifts below a certain size are less onerous and so these lifts are less likely to comply with a significant number of these criteria.

Action: RC & JW to document the criteria that the TMO's fire fighting lifts meet and advise Salvus so that this can be included in future Action Plans

397. This extract from an email chain with LFB {CST00001269} shows the phrase 'firefighting lift' was being used in the subject title by Janice Wray, and she refers to a discussion with Robin Cahalarn about firefighting lifts:

From: Janice Wray [mailto:jwray@kctmo.org.uk]
Sent: 03 March 2010 10:16
To: Andrew Furness
Cc: Adrian Bowman; Robin Cahalan; Russell Thompson; Lornette Pemberton
Subject: FW: meeting requirements for fire fighting lifts

Andy

Further to the discussion at the recent progress meeting Robin and I have put together the following information which relates to TMO lifts serving blocks over 18 meters in height -

398. This extract from the TMO's Asset Investment and Engineering Health & Safety Group's meeting dated 26 August 2010 {TMO10000725} shows the use of the phrase:

Previous Minute 12.0 Lift Shut Ins - Fire Brigade New Approach:
Previous Minute 12.4 - Older lifts Where Alarms not linked to 24 hour repairs system.

Agenda Item 6 - Fire Fighting TMO Lifts – (JW E mail sent 8/7/10)
Regarding issues relating to the above and other related LFB matters, confirmed that the assistant to the Borough Commander has now retired and a new officer has just taken up this role. In discussion with the Borough Commander JW suggested that TMO H&S Section arrange a meeting to brief the new officer on the TMO's approach to fire safety, fire fighting lifts, efforts to reduce the number of lift trap-ins and particularly the LFB's attendance at these etc. JW hopeful that this meeting can be arranged for Sept 2010. LFB has yet to provide the statistics on TMO lift shut-ins attended by them in the last financial year – although these have now been requested several times. JW anxious to see whether the situation has improved or declined in the last year.

Action H&S Section

399. Furthermore, this email from Robin Cahalan dated 28 February 2011 uses the phrase 'firefighting lift' {CST00001781}:

From: [REDACTED]
Sent: 28 February 2011 14:03
To: Janice Wray
Subject: Re: Fire fighting /evacuation lifts

Hi Janice

As far as I know the requirements for a fire fighting lift/evacuation lift did not change in the March 2010 edition of Building Regs, next time I am in the Hub could we sit down with Robin as he might have different information than me. Does he have copies of the information he is taking about he could forward to me?

Carl

-----Original Message-----

From: Janice Wray <jwray@kctmo.org.uk>
To: [REDACTED]
Sent: Mon, 28 Feb 2011 13:32
Subject: FW: Fire fighting /evacuation lifts
Carl

Received this from Robin

J

From: Robin Cahalarn
Sent: 28 February 2011 11:25
To: Janice Wray
Subject: Fire fighting /evacuation lifts

As recently discussed ,standards on fire fighting /evacuation lifts ,which are not retrospect have become a lot clearer over the last year ,none of the TMO lifts are fire fighting or evacuation lifts .

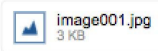
The tmo stock do have some of the requirements ,but the cost to meet the recommended standards would prevent us upgrading our lifts .

400. Also, the Fire Safety Strategies set out above show that the TMO were using the phrase firefighting lift in 2012 and seemed to understand that the concept existed, even if they used an incomplete definition.
401. I also note an email sent by Janice Wray to Yvonne Masset at RBKC {TMO00851259} on 4 June 2014. The email was part of a chain in which Yvonne Masset appears to have been enquiring about finding housing for a wheelchair user. Yvonne Masset specifically asks about the lift dimensions. In response, Claire Williams provided the dimensions and noted that the lifts were firefighting lifts. She did not specify that this was the TMO's own, bespoke definition of a firefighting lift. As stated above, my view is that this use of the term 'firefighting lift' to describe the lifts at Grenfell Tower, which were not firefighting lifts, was liable to cause potentially dangerous confusion.

RE: Grenfell tower - new homes with wheelchair access

From: Claire Williams

To: Yvonne.Masset@rbkc.gov.uk



Yvonne

The building is served by 2 lifts.

The lifts are both fire fighting type, so the regulations say:

- Minimum car size 1100 x 1400 mm, 630 kg
- Minimum door width 800 mm

402. Overall, my view is that the phrase 'firefighting lift' and the concept was enshrined in the British Standards as early as 1991 and was certainly known in the industry prior to 2015.

L.3. Correspondence with LFB

403. I have seen a pre-refurbishment email sent by Janice Wray of the TMO to the London Fire and Civil Defence Authority {TMO00854034} from 1999. In the email Janice Wray notes that none of the TMO's lifts are firefighting lifts and asks for advice regarding the evacuation of disabled residents.
404. I have seen an email sent by Janice Wray at the TMO to the LFB {CST00002922} dated July 2010 which advises the LFB that the TMO lifts meet some, but not all, of the firefighting lift criteria: This email is forwarded to Nicholas Comery at LFB again in May 2012 {CST00002920}.

From: Janice Wray
Sent: 08 July 2010 16:58
To: 'john.calvert@london-fire.gov.uk'; 'BRIAN.DEANS@london-fire.gov.uk'
Cc: Robin Cahalan; Adrian Bowman; Simon Throp; Lornette Pemberton; John Borra
Subject: fire fighting lifts in TMO properties
Attachments: roca_TMO lifts list,July 2010.xlsx; roca_FIRE FIGHTING LIFTS list, March 2010.xlsx

John / Brian

As part of the work that we have been undertaking on our fire risk assessments we have put together the following information which relates to TMO lifts serving blocks over 18 meters in height. Whilst it is acknowledged that our lifts do not fully satisfy all of the criteria for fire-fighting lifts we can confirm that they meet the following –

1. Minimum car size (1100mm wide x 1400mm deep) for 8 persons capacity (630kg).
2. dedicated power supply serving lift (3 phase). Additionally, ancillary items such as lift alarm, lighting etc. are also served by their own dedicated power supply
3. 2-way communication on new lifts includes connection to Customer Service Centre / out of hours monitoring service when the lift alarm is activated
4. Firemans Control Switch fitted. When operated this causes the lift to return to ground floor and open to allow the fire fighters access. It stops landing calls being registered and allows the authorised person e.g. LFB operative to take control of the lift (by applying a constant pressure on any call button).
5. lift car and landing doors are composed of stainless steel than is not less than 16SWG thick and over 2 hours fire resistance.

Additionally, the TMO

6. has a comprehensive servicing and maintenance contract in place for all lifts. This includes monthly inspections.
7. employs a dedicated Lift Engineer who is responsible for the supervision and monitoring of the contract / contractors.
8. has the Council's Insurers, Zurich, carry out 6-monthly inspections which include a full safety check.
9. Estate staff (caretakers, porters, inspectors) and Neighbourhood Officers carry out regular estate inspections which include visual inspection of the lift car and testing of the lift alarm.

I have also attached a copy of two spreadsheets – the first is a comprehensive list of all TMO lifts and the second lists all of our lifts which meet the above criteria.

I hope this is useful and please let me know if anything is unclear or if you require anything further.

405. I have seen the text of a letter sent by the Assistant Commissioner in early 2014 to London Borough Housing Departments, social housing landlords and associations regarding firemen's and firefighting lifts. The text says {LFB00040516}:

“As previously advised by email dated 18/2/2014, the Assistant Commissioner recently issued the attached letter to the London Borough Housing Departments, social housing landlords, and related associations in regards to lifts for fire service use and smoke ventilation provisions in residential blocks of flats.

Within it you will note the following paragraph relating to lifts for fire service use:

“Where it has been identified that a “fireman’s” lift (as opposed to a fire fighting lift) is installed within a building then we would request that the responsible person liaises with the relevant London Fire Brigade local Fire Safety Regulation Team to advise them of the premises address and style of lift present (in accordance with sharing of information detailed in Article 13(3)(c) of the Regulatory Reform (Fire

Safety) Order 2005). This allows any necessary pre-planning to be undertaken and consideration of a familiarisation visit to the premises by our crews.”

Fire Engineering Group advise that where information relating to “fireman’s” lifts at a specific premises is received by Area Fire Safety Teams, there is an expectation that this information is recorded and shared for both Fire Safety Regulation and Operational purposes. Therefore in order to clarify how to handle and process this information when received, they advise that the following course of action is taken.

A formal Fire Safety Station Notification form (SFS_A020_a2a) should be fully completed and issued to the local Fire Station in accordance with FSIGN 113, with all relevant details concerning the premises and the “fireman’s” lift being included. The “fireman’s” lift should be highlighted as being a fixed fire fighting installation that does not meet modern standards, which may have implications for operational personnel attending incidents.

Once the completed Fire Safety Station Notification form has been issued, a copy should be uploaded to the eFSF/ Fire Safety Portal system, as per FSIGN 113.

If the information received by the Area Fire Safety Team relates to an ‘unknown’ premises, consideration should be given to programming an FS01 audit of the premises.

For existing and future FS01 audits issued for blocks of flats, Inspecting Officers should ensure that they research the electronic premises file (as per FSIGN 201), to check whether any correspondences have been received or Fire Safety Notification forms issued in relation to the standard of lifts for fire service use or other relevant features at the premises. Such information should be used to help inform the fire safety audit process.

Fire service access arrangements, and the standard and maintenance of all facilities for fire service use (including lifts) should be accounted for as part of the premises fire risk assessment.

Could you please forward this email to all Inspecting Officers in your team. Should Inspecting Officers require any further technical assistance in relation to lifts for fire service use, please contact Fire Engineering Group.”

- 406. The lifts installed at Grenfell Tower were a hybrid between a firemen’s lift and a firefighting lift, in that they contained a mixture of the features of both types of lifts.
- 407. In correspondence with the LFB, the TMO advised them that the lifts at Grenfell Tower were firefighting lifts, and then listed the features of a firefighting lift which they did have, which was not all the features.
- 408. The TMO did not, as far as I have seen, complete a Fire Safety Notification form explaining that the lifts at Grenfell Tower were not fully firefighting lifts and/or that they did not meet modern standards for tall buildings.

L.4. Project 1

409. It is outside the scope of my expertise to comment on whether TMO were, due to the relevant legislation and regulations, the body with final authority to ensure appropriate fire safety measures were in place.
410. However, from all of the evidence which I have seen, the TMO were the body who were managing Grenfell Tower. Furthermore, they were managing a large amount of housing stock, including other high-rise buildings, and they had employed specialist lift engineers, Robin Cahalarn and Dave Steppel. For these reasons, the TMO had certain duties.
411. TMO appointed B&Y as lift consultants for Project 1. As part of this, they requested a Feasibility Study relating to the proposed lift works and discussions were had with B&Y as to the Project Brief. At the conclusion of this process B&Y produced the specification which I have discussed in detail elsewhere in this report.
412. I have reviewed the Project Brief written by the TMO for the lift consultants. As noted in earlier sections of this report, it crucially refers to achieving compliance with British Standards and to consideration of firefighting requirements.

1.0 CLIENT REQUIREMENTS

- 1.1 The Tenant Management Organisation Ltd (TMO) and the Lancaster West Estate Management Board (EMB) require a condition and feasibility report on the two traction passenger lifts serving Grenfell Tower and the single hydraulic passenger lift serving the adjacent offices. The report shall address the clients concerns in respect to the immediate and medium term maintenance viability of the existing installations given the current levels of failures, availability of replacement parts, compliance to latest British Standards and energy conservation.

4.10 Standards

- (a) The installation shall comply with BS EN⁸1: 1998 "Safety rules for the construction and installation of lifts" Part 1: Electric lifts, the Health and Safety Statutory Instrument No. 831 "The Lift Regulations" and Electromagnetic Compatibility and IEE Regulations.
- (b) However, given the dimensional constraints associated with an existing building, the report shall identify any area where the new installation cannot meet current recommendations or legislation and make recommendations to reduce any potential risks.
- (c) Given the height of Grenfell Tower together with the existing physical building constraints, the report should shall address the issues of Fire Fighting and Evacuation lift requirements and how they affect the proposed works.

413. I have considered who might have written this Brief and comment as follows:

- 413.1. At point 1.5 of the first part of the document, Robin Cahalarn is noted as the contact in Technical Services at the TMO.
- 413.2. I have also considered the email chain at {TMO00853853} which is set out below in full. I think that this chain suggests that Robin Cahalarn had a lot of input into the writing of the technical parts of the Brief.

Robin Cahalan

From: John Borra
Sent: 19 June 2002 10:51
To: Robin Cahalan
Subject: FW: Grenfell Tower - Lift Renewal

I'll leave your capable hands

Jb

-----Original Message-----

From: Lindsey Whitehouse@rbkc.gov.uk
[mailto:Lindsey.Whitehouse@rbkc.gov.uk]
Sent: 19 June 2002 09:34
To: john.borra@kandc-limo.org.uk
Cc: robin.cahalan@kandc-limo.org.uk
Subject: Grenfell Tower - Lift Renewal

John,

I'm putting together the consultant's brief for the above project, due to start on site in 2004.

Could you please help by providing some information for me, by 26th July:-

Who will be the TMO Technical Services representative on the project team?

How many lifts are there?

How many floors do they each serve?

Do you have any specific requirements for the brief?

Are there any issues / problems which we should bring to the attention of the consultants?

What problems are being experienced with the existing lifts? (e.g. high level of breakdowns, problems with obtaining replacement parts)

Thanks

Lindsey

The Royal Borough of Kensington and Chelsea

This e-mail may contain information which is confidential, legally privileged and/or copyright protected. This e-mail is intended for the addressee only. If you receive this in error, please contact the sender and delete the material from your computer.

Obtaining parts

Breakdown

BS - 2 way

Car has control

Equipment not energy/heat

SITE VISIT 24/6

Camera reception poor? due to bad lighting

Landing architecture/pits OK.

Keep drinking screen clean & paint

D works in M/R.

Deep pits.

22 lifts or 3

PRICES - 3 (281)

RTG

STREET, WALKWAY, 1-20, 22 floors
(Both)

H&C 1975

Partial refurb 1986

Minor works to lift car

1993 (and external Kier)

? Size of lift car

Lighting

Disabled

Lift speed

? Keep landing architecture

200 FPM

£250K

- 413.3. Robin Cahalarn was emailed by Lindsey Whitehouse, who was named as the Project Manager in the first half of the Brief. She probably also helped write the Brief.
414. This Project Brief would have been an important part of the discussions between the TMO and B&Y as to the lift works and it would have fed into the Feasibility Study and the subsequent specification.
415. The Feasibility Study notes, at the beginning, that it considers the recommendations of British Standards.

1.0 INTRODUCTION

- 1.1 The following feasibility study has been prepared for the Royal Borough of Kensington and Chelsea and is based on specific site surveys of the lift equipment, investigation of the log cards and maintenance records, plus discussions with the TMO and local RBKC staff.

The RBKC brief also required an investigation into the possible presence of asbestos within the common areas and the results of this investigation are included under cover of a separate section.

- 1.2 The principal areas covered are:

1. Specification and life expectancy of the lift equipment,
2. Compliance with current Health and Safety at Work requirements, the recommendations of British Standards and EN81/1,
3. Present condition of the equipment and quality of maintenance standards,
4. Facilities for the Disabled and the requirements of the Disability Discrimination Act 1998, plus the forthcoming EN81/70.
5. Suitability for continued and future use.

416. The Feasibility Study produced by B&Y does not mention the issue of firefighting lifts, and does not discuss the feasibility and budget costs of bringing the lifts up to the firefighting lift standard. Furthermore, the minutes of the project meetings from this period also do not contain any reference to bringing the lifts up to the firefighting lift standard.
417. I do not know why the issue was not considered. However, in my view, the TMO were clearly aware that firefighting lift requirements existed because they are mentioned in the Project Brief. In my opinion, when B&Y did not consider the issue of firefighting lifts in the Feasibility Study, TMO should have questioned B&Y about this omission and discussed the issue in more detail and recorded these discussions. Robin Cahalarn had specialist lifts knowledge and therefore would and should have known enough about the relevant standards to ask about this omission.

418. I have seen an email from Robin Cahalarn {TMO00863355} which appears to contain detailed comments and consideration of the Feasibility Study. The email states:

Robin Cahalarn

To: John Rogers (E-mail); Steve Ellis (E-mail)
Subject: Feasibility studies Grenfell Tower

I have looked through the reports following our meeting of yesterday and would comment as below:

Hydraulic Lift:

Appendix A -page B Top photograph is upside down

2 I am disappointed at some of the photos & remarks attributed to the standard of maintenance and would question the relevance of this in this lift refurbishment feasibility report. Zurich Insurance & TMO monitor and inspect the lifts at regular intervals and ILS who have been employed by RBK&C for over 20 years maintain the lifts to an acceptable comprehensive level. I would suggest possibly that your visit fell between service visits and items mentioned would now of been dealt with. I do accept that you stated service contractor doing well to maintain lift service.

3 I attended site following our meeting & found some oil in lift pit not excessive & the floor level was level not a trip hazard as page E.

I also investigated the possibility of resiting the lift motor room & would suggest this could be done by repositioning on ground floor at back of lift shaft, cycle sheds would need to be moved.

Passenger Lifts

1. Obviously the decision on the acceptable option will be financially lead but my initial reaction would be for Option 3 +A.

2. 2.0 Page 3 Concierge is 24 hours

3. 3.1 Page 5 I dont understand the last sentence in this statement.

4. 5.1.2 Page 10 What would be done by the successful tenderer engineer on the retest for 1 week -would it just be service & adjust or would new parts be fitted (if available)

5. 6. Traffic Study I dont really understand this study, maybe the figure statistics need clarification, we can discuss at next meeting.

6. 9. Pages F, G, H, J, K, P & M As item 2 above on hydraulic lift, I would expect some need for cleaning during normal service visit, which would of been following your site visit or visits.

7. Page W -we haven't found the lift controllers to be a major cause of breakdowns, although I accept the controllers are obsolete & difficult to source with new parts.

Lift breakdowns since 1.4.03 H90 -6 breakdowns, 2 door obstructions, 1 equipment failure, 2 Working on arrival & 1 lift engineer reported ground fl pos indicator not working.

H091 - 1 breakdown Doors not closing.

The above comments are made to be constructive and I hope they are of help, in obtaining the best possible lift refurbishment

419. In my view, this email clearly shows that Robin Cahalarn closely reviewed the Feasibility Study and commented upon it in detail. At no point in these comments does Robin Cahalarn raise the issue that the Feasibility Study does not consider the issue of the lifts' compliance with current standards. It is, of course, possible that the issue was raised in other correspondence, but I have not seen any correspondence yet which does raise the issue.
420. I note that he also comments that the decision on the acceptance option will be financially led.
421. The next issue is the Specification produced by B&Y. There is no direct evidence that the specification was approved by TMO.
422. However, Robin Cahalarn says at paragraph 19 that: *"I was not personally involved in the production of the specification but I would have expected any specification to require compliance with Building Regulations, British Standards and associated guidance in force at the time"* and paragraph 25 that *"To the best of my knowledge it would have been approved by Dave Steppel in the knowledge that it provided fireman lifts, which it was understood was the requirement for a building built at the time of Grenfell Tower."*

423. I have seen a number of emails which show that B&Y sent a draft specification to members of the TMO, including Janice Wray, Robin Cahalarn and John Rogers and they were asked for their comments on the specification and provided comments ({TMO00853775}, {TMO00853776}, {TMO00853777}, {TMO00853780}, {TMO00853865}). For example, an extract of {TMO00853775} shows significant review by the TMO:

Robin Cahalarn

To: Butler & Young Lift Consultants Ltd
Cc: Dave Steppel; John Rogers
Subject: RE: Grenfell Tower

Steve I have been through specification and would comment as follows:

Part 1.3 Page1/7- It looks like we are retaining all equipment ,suggest highlite lift id -Two electric passenger lifts

Part 2A.02 Page 2A/2- Have normal hours of work been agreed -?Saturday

Part 2A.07 Page 2A/6- RBK&C Design note 11- ? is this required.

Part 2A.11 Page 2A/8 -Controller -ok withh fully collective , but to be set up as down collective ,to give better service

Part 2A.74 Page 2A/43- Machine Room access -steel assembly to be painted black gloss ,must be anti slip

Part 2A.76 Page 2A/46- Out of hours call outs -normal hours 1 hour response -out of hours not specified are you looking for 1 hour at all times?

Part 2A.76 Page 2A/46 - Do we specifically require a technician on stand by ? Qualified fitter may be sufficient & more obtainable & cost effective,with technician as back up.

Part 2A.44 Page 2A/28 -Car floor covering -should be altro non slip ,colour to be agreed.

We will also require a set of protective drapes & fixing studs to each car ,to be included in spec.

Have you sent copy of specification to EMB -Damian Donnelly for comment?

424. These emails make clear that the TMO looked at the specification in detail. None of the emails show that members of the TMO asked B&Y why the specification did not include the full features of a firefighting lift. This is particularly odd given that the TMO Project Brief contained a reference to firefighting lift features.
425. Robin Cahalarn's statement is clear that the TMO thought that the lifts did not need to be firefighting lifts and that the phrase firefighting lift was not in use until 2015. I cannot agree with that statement for reasons set out throughout this report. In particular I note that the TMO Project Brief itself contained a recommendation to consider firefighting lift features and it appears that this Brief was drafted with the input of Robin Cahalarn himself (see extracts from relevant documents above).
426. I think that the TMO should have asked B&Y why the lifts were not firefighting lifts. The TMO should have known that firefighting lifts were required and they should have asked more questions.
427. TMO would have had the authority to choose which lift works option they wanted, and as part of this process it would have been for TMO to consider what was reasonably practicable, in terms of cost and other considerations, based on information provided by B&Y, the specialist lift consultants.

428. In conclusion, considering Project 1 overall, my view is that B&Y and Apex failed to properly advise TMO as to the requirements of a firefighting lift and as to the need to have such lifts in a building such as Grenfell Tower, in so far as it was reasonably practicable.
429. However, in my opinion, TMO also failed to clearly consider the need for firefighting lifts and to ask B&Y to specifically consider the possibility of providing firefighting lifts and provide advice on the issue.

L.5. Project 2

430. Rydon (design and build contractors appointed by TMO for Project 2) contracted with Apex in 2014 for Apex to create four new landing entrances on the walkway+1 and mezzanine floors and to reprogram the lifts accordingly.
431. As part of the Project 2 works, the fire control switch was temporarily relocated from the ground floor to the walkway floor. In my view, Project 2 provided an opportunity for TMO to review the existing lifts at Grenfell Tower and consider whether it required full firefighting lifts (in so far as it was reasonably practicable).
432. It is apparent from documents dating to the period between Project 1 and Project 2 that TMO were aware that the lifts at Grenfell Tower did not meet the full firefighting lift standards. For example, the minutes of a meeting dated 23 February 2010 {RBK00053579} document a discussion that TMO lifts met the majority, but not all of the criteria of a firefighting lift. Furthermore, in an email dated 28 February 2011 {CST00001781}, Robin Cahalarn wrote to Janice Wray stating: *'As recently discussed, standards on fire fighting/evacuation lifts, which are not retrospect have become a lot clearer over the last year, none of the TMO lifts are fire fighting or evacuation lifts. The tmo stock do have some of the requirements but the cost to meet the recommended standards would prevent us upgrading our lifts.'*
433. There is a specific reference in this email to cost factors prohibiting the upgrading of the TMO stock of lifts generally but I have not seen any evidence of any further or more detailed consideration and analysis of those cost factors and why they would have been prohibitive in the case of Grenfell Tower.
434. It appears that the expectation of RBKC Building Control was that the lifts at Grenfell Tower will be 'firefighting lifts'. I refer to the Meeting Notes of 6 November 2012 (attended by Building Control, Studio E and Exova) {EXO00001371}, which record Dave Gammon of Building Control stating that: *"DG's comment was that new lift in reception area should be a fire-fighting lift"*. It is unclear from these minutes whether the participants were using the standard definition of a 'firefighting lift' or TMO's own (and incorrect) definition of such a lift.
435. The following day, Adrian Jess of Studio E e-mailed {SEA00006526} Terry Ashton of Exova with notes of the previous day's Building Control meeting. These state that *"BC Submission should clarify that existing lifts are 'fire fighting' from Ground Floor..."* This email suggests that there was a misunderstanding about the status and compliance of the

existing lifts. This may have been a factor in the failure by TMO to consider/record the consideration of the viability of an upgrade to compliant 'firefighting lifts' as part of Project 2.

436. As noted above, Project 2 was a missed opportunity to flag up these concerns and for TMO to consider whether the lifts at Grenfell Tower should have been upgraded to the full firefighting standard, if reasonably practicable.

L.5.1.Fire recall

437. As noted in Section J.1.6. the evidence suggests that, as part of Project 1, Apex installed a fire recall function to the lifts at Grenfell Tower. Robin Cahalarn states in his supplementary statement that he does not recall whether a fire recall system was installed.
438. The evidence suggests that, at some point, this recall function was disconnected. I have come to this conclusion on the basis of the following documents:
439. {TMO00859283} – This document is an email chain which starts with an email from Claire Williams to Simon Lawrence at Rydon dated 10 September 2015:

Simon

Further to our telecon of today, can you please confirm that your contractors have adjusted the current 2 lifts to both stop at 'walkway'/level 2 (rather than the ground/street level) in case of fire.

440. On the same day, Simon Lawrence responded to Claire Williams as follows:

Claire,

I've had a chat with Jason and apparently I was wrong. During early fire brigade meetings with Simon O we were told that the lifts have to be brought down to ground in case of emergency. Which what they still do.

On the phone you said that there was a fire alarm which brought the lifts down to ground. I can't understand how that is possible because you do not have any audible fire alarms in the communal areas. In addition to this I don't believe that the existing panel by the walkway entrance door is working anyway. So I'm not sure what has happened.

Do you have anymore information? Is it possible that the lift alarm button was pressed by the resident in error which brought the lift down?

441. My interpretation of these emails is that Claire Williams was under the impression that the lifts had an automatic fire recall function, due to a concern raised by a resident. She was emailing Simon Lawrence to ask if he could adjust this automatic recall function so that it took the lifts to the walkway floor, instead of the ground floor, as the ground floor was occupied by Rydon and residents could not leave the building from the ground floor. Simon

Lawrence's response indicates that he did not think that the lifts had an automatic fire recall function and that he did not understand how such a function could operate, given that there were no audible fire alarms in the communal area.

442. On 11 September 2015 Claire Williams wrote to Simon Lawrence {RYD00051659} stating:

Hi Simon

After our conversation I have asked about audible alarms, and will check with Alex Bosman/Chubb on the fire panels.

I have asked Peter Maddison to let me know which flat reported this so we can get some feedback.

Meantime, there is an issue if the lift goes to ground – as residents cannot escape from within your cordon. I am mindful that you are away next week, so can you please pick up with H&S/CDM and Artelia how this needs to work to ensure safety for residents and any visitors.

Thanks

443. Simon Lawrence responded on 11 September 2015, stating:

Morning Claire,

I understand your concern but I don't believe you have any working systems within Grenfell that will send the lifts to ground in case of a fire. In any case there certainly aren't any audible alarms apart from the smoke detectors within the residents own flats and a lift button that residents press if they are stuck in a broken lift.

I believe that you only have an existing visual fire alarm panel on walkway level inside the front door which flashes a light if a smoke detector in the communal is tripped. It can't be connected to the lifts because over the past year there has been some flashing lights when smoke heads have been tripped or faulty but the lifts still work fine.

If you remember this fire panel was originally located behind the old concierge desk on the ground floor. At that time your strategy involved the Concierge or Security guard seeing the light flashing then calling either the fire brigade or your emergency callout team. Over a year ago this was moved to walkway when the concierge got stripped out. Since then I don't believe you have anyone monitoring the panel because there is no longer a concierge. So effectively it is redundant.

I can only think that maybe your lifts either reset themselves because of a fault or someone was working on the lifts at the time and one of the residents happened to be in the lift at the same time. It may be worth you talking to your lift maintenance engineers. Alternatively it could just be one of the residents group taking the lift down to the lower floors where we are working and realising that they cannot get out because of our hoarding. Then asking the question what happens in a fire.

I've consulted my H&S manager this morning and reviewed the situation. Our thoughts are that we could put temporary signs in the lifts advising that residents should go to Floor 2 (Walkway level) in the event of an emergency. Other than that your fire strategy will stay the same, which is a stay put policy. The main entrance/exit is only at walkway level and your existing emergency staircase also ends at walkway level. We have a process in place with the Fire Brigade that they can access the ground floor to get to the dry riser, etc.

444. In this email, Simon Lawrence confirms his view that there is no system at Grenfell Tower which would automatically bring the lifts down to ground floor if the fire alarm was activated.

445. On 2 October 2015 Claire Williams wrote to Simon Lawrence again regarding this issue {TMO00859251} making the following request:

Simon

1 Testing the fire alarm panel

Is it possible you can get to a smoke detector and see if by setting the alarm off that it makes the lifts go to the ground floor – or not? Can you do this today please? We are concerned that the fire panel may have some connection to the lifts that we are not aware of. Please advise if there are any problems with this, I will be on site probably after 3pm.

446. Simon Lawrence responded on the same day stating:

1. Your old existing fire alarm panel (located in the walkway lobby) has been off for about the last 3-4 months. It was switched off to isolate the fire dampers so we could replace them.

447. In {TMO00859277} there is correspondence between TMO and the lift maintenance engineer in which TMO ask whether there is an alarm which sends the lifts to the ground floor. The response from the maintenance engineer dated 5 October 2015 is clear:

Hi all

The alarm does not take the lift to the ground floor but the car and landing calls will take the lift down.

Ken

448. There is a final piece of relevant correspondence dated 8 October 2015 at {TMO00852582} from Claire Williams to Peter Maddison:

Peter

There was a meeting about Grenfell today and we talked about the lifts, and Simon Lawrence had responded yesterday (as below in blue) to my enquiries.

Alex had established that the lifts were not linked to any alarm system, and so are not programmed to go to the ground floor in case of emergency.

449. Overall, it appears that the TMO investigated the issue of whether the lifts automatically returned to the ground floor in case of fire, and it appears that they did not. No testing appears to have been done to confirm this, but the view of Simon Lawrence is that it would not have been possible for such a system to be in place.

450. I have also considered a report by WSP dated 20 April 2018 on the Building Management System, for the Metropolitan Police {MET00018469}. Page 11 of that report states: *“There was no link shown in the documentation between the BMS and the Lifts. This was confirmed from the surveys and software retrieved from the system.”* It further states at page 15: *“Both lift cars were stuck on the 10th Floor. It is normal practice for lifts to be linked to the Fire Alarm system, and to ground in the event of an alarm. It would appear that this didn’t happen either because they weren’t linked, or because the link didn’t operate (or the Fire System didn’t operate).”*
451. A further report was produced by BRE dated 10 February 2020, {MET00065879}, Appendix 8 of my report, which primarily looked at the smoke control system. At section 2.6 the report considers whether there was a connection between the lift controller and the smoke detection system. In summary, the findings of the report are that the relevant cables were all disconnected, with straight cut ends. My conclusion from this is that there was no connection between the lift controller and the smoke detection system.
452. Robin Cahalarn’s statement does not shed any further light on why the connection was physically disconnected (or when or by whom), as he states that he has no knowledge of whether the fire recall system was disconnected or not.
453. At this stage, there is insufficient information for me to comment on when the fire alarm recall was disconnected, why it was disconnected, and who may have disconnected the system. I can say, however, that it was disconnected by cutting the physical wiring connection as per the BRE report above.

L.6. Maintenance

454. The evidence I have seen indicates that the fire control switch was tested by PDERS on a monthly basis.
455. I have seen the witness statement of Siobhan Rumble. At paragraph 29 she says that prior to the refurbishment there was a Fire Brigade drop key which could be used by Estate Services Assistants (ESAs) to open the lift doors. She also says at paragraph 38 that the ESAs would check weekly whether the lift was operating correctly and whether the Fire Brigade drop key was working correctly. She says at paragraph 40 that the ESAs had to check on a monthly basis that the lift alarm system was working.
456. I have also seen the witness statement of Paul Steadman dated 17 July 2019, the caretaker, later Estate Services Assistant, at Grenfell Tower. He says, at paragraph 9 of his witness statement, that:
- “More specifically, in weekly health and safety inspections I was required to check that the lifts were operating correctly, the lift car lights were working correctly... the LFB drop key was working correctly...”*
457. In a supplementary statement dated 12 May 2020, Paul Steadman clarifies at paragraph 6 that he did not mean the LFB lift drop key, but was referring to the LFB drop key for the

main door to the Tower (which was different from the lift drop key). He states in this statement that he would not touch the LFB lift drop key.

458. He also explains in this statement at paragraph 5 that he would check the lifts each week by riding up and down in them a few times. He would then check the alarm but pressing the alarm button which would connect him to the Customer Service Centre or, out of hours, Pinnacle (until February 2020).
459. Overall, it is clear that Paul Steadman did not test the fire control switch on a weekly basis, or at all.
460. I have also considered paragraph 20 of Paul Steadman's statement dated 17 July 2019 in which he says:

"I would then get the lifts back up and check that the lift doors were working and the emergency button inside the lift was connecting to the line. Two new lifts were put into Grenfell Tower about 12 years ago and I recall that there was a gentleman called Robin Khern who would check they were working for the TMO."

461. I have assumed that the reference to 'Robin Khern' is a reference to the TMO Senior Lift Engineer, Robin Cahalarn. Robin Cahalarn's statement at paragraph 28 says that he tried to visit every TMO lift every 6 months.
462. Neither Paul Steadman nor Robin Cahalarn tested the fire control switch on a weekly basis. Having considered BS 5588-5: 1991, section 5, subsection 17.2, point (b) I consider that best practice would have required testing of the operation of the fire control switch on a weekly basis by an individual on site. In my view, it would have been reasonable for this weekly testing to have been carried out by a person authorised by TMO on site, such as a caretaker, particularly given that monthly checking of the fire control switch was carried out by a qualified lift maintenance engineer. Overall, I consider that TMO should have arranged for weekly testing of the fire control switch.
463. BS 5588-5: 1991, section 5, subsection 17.2 point (e) states that operational testing of the firefighting lift controls as described in Section C1 ought to be carried out annually. The procedure described in C1 is comprehensive. I have reviewed the witness statements of David Smalley and Mark Wallis, particularly paragraphs 25-28 and 22-24 respectively. In my view, the testing described in their statements matches up to parts of the procedure in C1 but is not as comprehensive as the procedure described in C1. I have seen no other evidence to suggest that on an annual basis the full tests described in C1 were carried out. In my view TMO should have arranged for the testing described in C1 to happen on an annual basis and they failed to do so.
464. However, the testing described above is intended to test the operability of existing equipment and is not intended to highlight non-compliance with standards. With that in mind, it appears that on the night of the fire, the fire control switch was likely functional (provided that the correct key was used) and had been tested on a monthly basis.

L.7. Conclusions

465. Overall, in my view:

- 465.1. KCTMO's policy on firefighting lifts set out their own internal definition of a firefighting lift and was liable to cause confusion by using the same language;
- 465.2. The TMO failed to properly raise with B&Y and, to a lesser extent, Apex, the issue of ensuring the lifts were compliant with contemporaneous standards of fire safety, as part of Project 1;
- 465.3. Project 2 was a missed opportunity for the TMO to consider whether it was possible to upgrade the lifts to full firefighting standard, and they should have considered the possibility at this stage. That consideration and the resulting decisions ought to have been properly documented;
- 465.4. The fire control switch should have been tested weekly, not just monthly. Full testing of the firefighting lift controls should have been organised annually.

M. Commentary on PDERS' involvement

466. PDERS were the lift maintenance contractor since 3 February 2014 and carried out routine planned preventative maintenance at approximately monthly intervals and attended Grenfell Tower for call outs, repairs, and breakdowns.

M.1. Maintenance of fire control switch

467. In the witness statement from Michael Fallis-Taylor dated 11/18/2019 (assumed to be 18 November 2019), he states in response to question 34 that on 9 May 2017 the PDERS engineer tested the fire control subsystem. Although work sheets are available for the routine visits generally, the sheets do not specifically record the testing of the fire control switch.
468. The witness statement of Mark Wallis is significant because Grenfell Tower was on his regular maintenance route at the relevant time. He explains that his April and May 2017 routine maintenance reports were signed off by Anthony Smart, a colleague, as Mark Wallis did not have the requisite computer (PDA) device at the time. Mark Wallis acknowledges that the fire control switch testing was not recorded on the worksheets showing maintenance visits. I consider that it would have been very helpful for this to have been done, not least so that other organisations and persons (such as TMO, Carl Stokes etc.) would have been able to verify that the fire control switch was operational.



Service Visit Report



Job Number	PD807174	Customer Order Number															
Unit Number	PD807174	Parts Used															
Site Address	Grenfell Tower Grenfell Road London W11 1TG																
Unit Reference	H090																
Date of Service Visit Report	31/05/2017																
Visit Type	S																
Works Completed	<p>As part of the scheduled maintenance visit, the below items were checked by our engineer and found to be serviceable :</p> <ul style="list-style-type: none"> Car Enclosure and COP Emergency Alarm System Indicators and Call Buttons Floor Levels and Selector Machine and Brake Controller and Drive Overspeed Devices Operation of Car Doors Car Top Door and Gate Check Shaft Equipment Pit and Underside of Car 																
Signature Declined	N	Observations	<p>seals leaking slightly on gear. door operator needs setting up once builders have completed works. contractors have glued display plate to wall and will create damage to wall. customer action recommend lg1 car lighting and car fan have a separate feed lg1 done nov visit dec visit. unit requires pit ladder</p>														
Decline Reason		Total Time on Site	2.00														
		Total Travel to Site	0.00														
		Customer Name	Customer Unavailable For Signature														
		Signed Date & Time															
<table border="1"> <thead> <tr> <th>Engineer Name</th> <th>Date Attended</th> <th>Site Arrival</th> <th>Site Depart</th> <th>Time on site</th> <th>Travel to site</th> <th>Customer Signoffs</th> </tr> </thead> <tbody> <tr> <td>A Smart (58579)</td> <td>09/05/17</td> <td>13:00</td> <td>15:00</td> <td>2.00</td> <td>0.00</td> <td>N/A</td> </tr> </tbody> </table>				Engineer Name	Date Attended	Site Arrival	Site Depart	Time on site	Travel to site	Customer Signoffs	A Smart (58579)	09/05/17	13:00	15:00	2.00	0.00	N/A
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469. Nonetheless, Mark Wallis at paragraphs 22-24 of his witness statement describes in detail how he carried out testing of the fire control switches via insertion and operation of an express drop key, including checking that the lift descended as required, that the doors could be gradually opened. He states that he recalls these checks specifically because, once the fire had occurred, he realised he may need to recall them. He states further that the switch operated correctly on his last maintenance visit on 9 May 2017 (as it had done every month) and required no maintenance.
470. It is a matter for the Inquiry whether to accept Mark Wallis' evidence on the steps taken to test the switch and that this had been done on 9 May 2017 as described. If his account is accepted, however, my view is that the testing described was sufficient and the correct operation of the switch on 9 May 2017 suggests that it was fully operational at that point in time, if the correct key was used.
471. The evidence I have seen indicates that the fire control switch was tested on a monthly basis. This requirement is contained in the contract between PDERS and TMO {PDR00000049}. Particularly having considered BS 5588-5: 1991, section 5, subsection 17.2 and the 2013 LEIA guidance on lift maintenance (set out in Section E above), I consider that best practice would have required testing of the operation of the switch on a weekly basis by an individual on site. However, as set out above in section L.5 in my view, it was reasonable for PDERS to test the operation of the switch on a monthly basis during their routine maintenance and it was the responsibility of TMO to carry out weekly testing in between PDERS' monthly visits. Furthermore, given that monthly testing of the switch was carried out by an experienced and qualified PDERS lift maintenance engineer, it would have been reasonable for weekly testing between these visits to have been carried out by a person authorised to do so by TMO, for example a caretaker. Therefore, I have no criticism of PDERS on this matter.

M.2. Maintenance of the lifts generally

472. My review of lift-related correspondence and documentation suggests that there was significant concern by residents and the TMO about the quality of PDERS' maintenance of the lifts. In particular, this appeared to relate to the frequency of lift breakdowns, which caused considerable inconvenience to the residents.
473. These concerns are exemplified by the following documents:
- 473.1. {MET00037641} – A Directors Meeting Task List which showed, for example, delays in obtaining parts for Grenfell Tower:

Kensington & Chelsea TMO

Directors Meeting Task List

1. PDERS response time to breakdown calls needs immediate improvement (especially in the out of normal working hours periods) as we are not always achieving the agreed 4 hours, let alone the contractual 2 hour requirement.

IMMEDIATE ACTION FOR DAVE WATKINS AND PHIL EDWARDS TO HAVE EMAIL VISIBILITY OF EVERY CALL SO AS TO ENSURE THAT WE ATTEND IN A TIMELY FASHION AS CONTRACTUALLY REQUIRED.

Mark Wallis and Antony Smart do not understand why we have a poor in hours response, as they advise they are always inside 2 hours from the time they receive the call. We are unsure why this is concurrent but believe it may be due to technology. Every call must be phoned through to the engineers by the front desk team rather than rely on PDA alone.

. OOH has been informed that this contract takes priority, via email.

Callouts are being reviewed by DW delay and advising and compiling evidence for delays if any.

2. Grenfield Tower experienced an extremely long wait for replacement parts.

IMMEDIATE ACTION FOR DAVE WATKINS AND PHIL EDWARDS TO INVESTIGATE AND PROVIDE A DETAILED REPORT AS TO WHAT HAPPENED AND WHAT WE HAVE DONE TO ENSURE THAT THERE IS NO REPEAT OF THIS IN THE FUTURE.

Please see separate EVENT SHEET for Grenfell Tower

3. We need to improve the day to day communication and relationship between PDERS and the K&C team

IMMEDIATE ACTION FOR DAVE WATKINS TO WORK FROM THE K&C OFFICES 1 DAY PER WEEK AS A MINIMUM (HOT DESK WILL BE PROVIDED) AND HAVE A DAILY CALL WITH PAT BARRETT SO AS TO KEEP HIM ABREAST OF ALL ONGOING ISSUES.

Daily communications is at an all-time high with Mark Wallis having weekly meetings with Patrick Barrett. DW speaks with Patrick delay and with the new lead engineer (Mark Wallis) in place both parties feels this need is no longer required (agreed in Aprils Review in May)

- 473.2. {MET00039497}, which records a meeting between PDERS and TMO on 6 April 2017:

Minutes for PDERS meeting.

COMPANY:	PDERS Lifts		
PURPOSE:	Monthly meeting		
LOCATION:	Network HUB	Date:	.0604.17
		Time:	14:00
PRESENT:	Patrick Barrett (TMO) (PB) David Watkins (PDERS) (DW)	Contracts Manager Field Service manager	
APOLOGIES:	Anthony Cheney (TMO) (AC) Maria Ares (TMO) (MA) Phil Edwards (PDERS) (PE)	Head of Contract Management Technical Administrator	

ITEM	DESCRIPTION	ACTION BY
1.0	Introductions 1. As present.	
2.0	Contractors Monthly Service Reports 1. Monthly Servicing for March 2017 is now up to-date, however PB raised concerns that the engineers are not providing adequate information regarding the current condition of the lifts under their observation, PB stated that this information provides both PDERS and KCTMO of valuable information that can be monitored. 2. PB stated that he has received any Audit Inspection and that this has been requested now for some time, DW stated that he has completed some inspection and will send them next week.	DW
3.0	Insurance Reports and Updated Tracker 1. PB raised further concerns regarding the insurance inspection and there defects, the process of carryout these works has not been followed and we are not receive information as to if and when they have been completed, MA has issued all insurance inspection to DW for the month of March totalling to 137, DW stated that he has an issue with his emails and requested if they could be sent again, MA to provide information again, MA requested that all inspection should be done on individual sheets as they need to be filled in each individual folder on her system DW to action. 2. PB has further requested that he is still waiting for the tracker to be update with the relevant information. DW issued a template of a tracker whereby PB stated that it doesn't provide all the relevant information that we need DW to review. PB to send copy of the original tracker to DW to populate, PB relayed the importance of having this completed as it also forms part of our compliance stats, DW to action.	DW
4.0	KPI's 1. PB stated that the KPIs for the previous month were very poor and below standard and that this was unacceptable and that PDERS needs to improve their performance across the board, PB said that looking at the stats it was apparent that the out of hour calls were not hit the target times and this has had a great impact on their service delivery, PB stated that he may need to review the allocated times in the contract and use it accordingly if	DW

	<p>performance doesn't change drastically DW to look into their process on the callouts.</p> <p>2. DW confirmed that he has received a copy of Aprils KPIs and has notice that performance still needs to improve DW stated that he will ensure that the performance for this month will improve as they have increased the number of engineers on the contract MA will send April KPIs to PE/DW on 24/04/17 and PE/DW will review send them back by 28 /04/17</p>	PE/DW
5.0	<p>Operational Concerns</p> <p>1. Shutdowns have improved and calls are getting better but all shutdowns must be called through to our office at the time of it happening so we can monitor them through our call centre.</p> <p>2. DW updated PB regarding Grenfell Tower Lift H090 whereby works were carried out over the weekend DW stated that all works to the lift had been completed and the lift returned to service, he further advised that they will be taking out the other lift H091 for similar works to be carried out on the 09/04/2017 PB requested a detailed report of the works carried out</p> <p>3. Further issue highlight by DW was that the rewiring of Adair Tower whereby the lift trail flex has been delayed due to the wrong size being sent therefore will need to be reorder DW to provide date install.</p> <p>4. PB raised concerns as to the number of call outs to particular lifts over a short period of time and who monitors it and create an action plan.</p> <p>5. DW raised concerns regarding the lifts at Dartrey Tower especial Lift H008 whereby there is an issue with the second floor entrance which has gap over 6mm and could cause finger trappings. PB requested that Jim Rooney from PDERS Repairs team should carry out a survey and provide an action plan on how to address the issue DW to liaise with Jim</p>	<p>DW</p> <p>DW</p> <p>DW</p> <p>DW/PB/JR</p>
6.0	<p>Administration Concerns including reporting</p> <p>1. DW stated that another Engineer will be starting on 10/04/17 as a lead engineer on this contract and will be holding weekly meeting with the TMO Contract Manager to address any immediate concerns that may arise.</p> <p>2. PB stressed that insurance items must be carried out as they are a legal requirement. MA requested that an individual document per lift be provided for the insurance items as the tracker is not sufficient. PE agreed.</p>	DW
7.0	<p>Invoicing</p> <p>1. PB stated that maintenance invoices and credit notes are due for servicing, along <u>with invoices</u> for reactive call outs Stressed that it is the end of the financial year and this need urgent attention PE to finalise.</p>	
8.0	<p>AOB</p> <p>1. Next monthly meeting to take place Thursday 04/05/17 14:00pm</p>	

473.3. {MET00036105} exemplifies the type of resident complaints which I have seen:

From: Patrick Barrett
Sent: 23 March 2017 17:09
To: 'Watkins, David' <David.Watkins@elagroup.co.uk>; 'Edwards, Philip' <Philip.Edwards@elagroup.co.uk>
Subject: Grenfell Tower Lift COMPLAINTS
Importance: High

Dave/Phil,
Please see below copy of extract from the complaint received.

Ref: Com170210476

Further to our complaint response from the Catherine Dack from complaint team of KCTMO but referring from you to me. You have given details explanation and in conclusion you have emphasized your contractors have undertaken a significant amount of work to reinstate lift H091. It's not even a two weeks that one of the lift went out of service for two days.

The Lift H091 when closes its door, it sounds like 18th century's rail engine and not only that the residents can hear the noises from their sitting room day and night. It's a quite a nuisance. It's a matter of time both lifts will come to their end of useful life and its only 10 years old.

Please see attached pictures for your information as an evidences and confirmation and the irony is someone either the KCTMO or their contractors may a service contract in place and making money on parts and labor and callout charges, out of our suffering and misery

Patrick Barrett
Contracts Manager, Assets & Regeneration
t: [REDACTED] m: [REDACTED]



w: www.kctmo.org.uk
a: The Network Hub, 292a Kensal Road, London, W10 5BE
 Before printing, please think about the environment

474. Almost all of the complaints which I have reviewed related to the reliability of the lifts. While there may have been issues with the standard of maintenance generally, I have not seen material evidence which suggests that the maintenance of the fire safety features of the lifts was deficient.
475. Furthermore, the lifts were operational when the LFB initially arrived at Grenfell Tower. Later in the report I consider how the lifts were used during the fire. Therefore, in so far as any reliability issues were reported in relation to both lifts, on the night of the fire both lifts were operational. The lifts did eventually stop functioning but this is likely due to the extreme conditions in Grenfell Tower and not due to maintenance deficiencies.
476. Overall, although there is evidence that there were maintenance deficiencies prior to the fire, they did not, in my view, appear to affect the fire control switch or operation of the lifts, which were the two elements relevant to the lifts' operability on the night of the fire. This is explored in further detail in Section Q of this report.

M.3. Highlighting non-compliance with relevant standards

477. I considered the PDERS evidence on the issue of whether the lifts were or ought to have been firefighting lifts. In considering this issue, it is important to distinguish between (1) the initial survey by PDERS at the start of the maintenance contract and (2) the regular visits by lift maintenance engineers.

M.3.1. Initial survey

478. Considering first the initial survey, I would have expected that, as part of the contract between PDERS and TMO, PDERS would have been required to carry out an initial survey of the lifts. In my view, the following section of the Service Information and Preambles for the Contract {PDR00000049} between PDERS and TMO requires an initial survey:

780

Condition and asset reports

The Contractor shall provide a report within the first six months of the contract detailing the condition of each lift, along with a complete asset list that includes each major component/piece of equipment of each lift. The report shall also contain any recommendations for remedial works.

479. As part of this initial survey, I would have expected TMO to have provided PDERS with relevant information relating to the lifts, including that they considered the lifts to be firefighting lifts. I would have then also expected a senior technical surveyor employed by PDERS to visit Grenfell Tower and to complete a full survey of the lifts. This would have included looking at the firefighting features of the lifts. If the lifts did not comply with the requirements of a full firefighting lift, I would have expected the senior technical surveyor to have recorded this and reported this to TMO. Therefore, as part of the initial survey I would have expected PDERS to have noted whether the lifts were full firefighting lifts and, if they were not, to have informed TMO.
480. I have read the witness statement of Michael Fallis-Taylor, in particular paragraphs 17 to 21. In these paragraphs he states that PDERS was not contracted to provide advice or recommendations in respect of fire safety or the fire safety suitability of the lifts, including whether the lifts installed were firefighting lifts. He also says that PDERS did not consider the lifts to be firefighting lifts. He says that responsibility for the application of the relevant standards lies with the duty holder, and not PDERS.
481. In response to this I would point to the LEIA Code of Practice entitled '*Maintenance requirement for lifts, lifting platforms, escalators and moving walks*' dated 13 May 2013. It had been published before the start of PDERS' contract with TMO and PDERS is a member of LEIA. In particular, at Annex A entitled 'First inspection visit' the Code of Practice states: '*In an ideal situation before an item of plant is taken onto a maintenance agreement the proposed maintainer should inspect the item of plant to be maintained to determine their condition and the frequency of maintenance or amount of repairs work that*

would be required to get the plant to a safe condition. It goes on to state: *'The condition report may result in the need for the responsible person to place an order for corrective works to be undertaken. In such situations it will assist the responsible person if they know what is vital or critical as against desirable.'* An example checklist is then set out at Annex A. At the end of that checklist it states:

'Identification and check of any operation in the event of fire:

- no special operation*
- recall to floor(s)*
- firemans lift to BS 2655*
- firefighting lift to BS 5588-5*
- firefighters' lift to BS EN 81-72'*

482. In my view, this demonstrates that the LEIA recommends that as part of the first inspection visit, the contractor should make an assessment as to the type of lift which was installed. For example, in this particular case, as part of the initial survey, PDERS should have noted that the lift was a hybrid between a fireman's lift (to BS 2655) and a firefighting lift (to BS 5588-5). In my view, it would have been good practice for PDERS to have also highlighted to TMO that the lift should be a full firefighting lift, in so far as it was reasonably practicable.
483. However, I agree with the statement of Michael Fallis-Taylor that PDERS were not ultimately responsible for ensuring compliance with the relevant standards. Rather, their duty was limited to highlighting non-compliance as part of the initial survey. It was then up to TMO to choose how to respond.
484. I would also point to paragraph 4.3.1 of the LEIA document entitled *'Changes to relevant standards'* which states *'The maintenance contractor should inform the responsible person in writing of relevant changes to safety standards relevant to existing installations e.g. BS EN 81-80, BS EN 115-2, BS 7255, BS 7801.'* This section further supports my view that good practice requires a maintenance contractor to advise a client on relevant safety standards applicable to an existing lift installation and changes to those standards.

M.3.2. Regular maintenance visits

485. Moving on to the regular maintenance visits by PDERS' lift maintenance engineers, my view is that PDERS' lifts maintenance engineers could not have been reasonably expected to consider compliance issues during routine or reactive visits. The lift maintenance engineers' role was focused on maintenance and repair rather than ensuring that the lifts were firefighting lifts. I would not have expected PDERS lift maintenance engineers to consider or highlight any non-compliance issues.
486. Overall, PDERS should have informed TMO that the lifts did not comply with the contemporaneous standards for a firefighting lift at the time of the initial survey, which would have been carried out by a senior technical surveyor or individual with an equivalent

level of seniority, experience and qualifications. As to the regular maintenance visits carried out by lift maintenance engineers, I do not consider that these engineers had a duty to consider compliance with contemporaneous standards. Their duty was limited to maintenance and repair of the lifts.

M.4. Conclusions

487. In conclusion, my view as to the involvement of PDERS is as follows:

- 487.1. That they should have recorded the checking of the operation of the fire control switch and associated systems.
- 487.2. That, assuming that PDERS were checking the operation of the fire control switch and associated systems each month, it does not appear that any other potential maintenance deficiencies would have affected the operability of the fire control switch or the lifts themselves on the night of the fire.
- 487.3. That, at the start of PDERS' contract with TMO for lift maintenance, as part of PDERS' initial survey, they should have identified that the lifts were not firefighting lifts and they should have flagged this to TMO, as per LEIA guidance.
- 487.4. That it was not the responsibility of lift maintenance engineers who attended Grenfell Tower on a monthly basis to highlight the lifts' non-compliance with relevant standards to TMO.

N. Commentary on Bureau Veritas' involvement

488. In my view, BV's responsibilities were limited to carrying out Statutory Engineering Inspections. In practical terms that would entail checking the functionality, safety of features installed and any observations for remedying defects in existing/installed safety features. It did not entail checking whether the lifts complied with the relevant standards, including the standards for a firefighting lift. The checks would also consider whether observations made previously had been implemented.
489. Below, I consider Bureau Veritas' witness evidence in relation to what was and ought to have been done by its staff.

N.1. Isiaka Lasisi

490. The evidence of the Bureau Veritas engineer, Isiaka Lasisi, sets out the testing procedure carried out by BV engineers. He tested the lifts on 2 November 2016, i.e. the penultimate insurance inspection before the fire. He describes at paragraph 6 the general process of carrying out functional tests on safety switches, which involve checking whether the switch in question operates by wedging it open or taping it shut. He states that they do not check electrics or wiring. He states at paragraph 12 that a Thorough Examination lasts approximately 7 hours.
491. At paragraphs 15 to 17 Isiaka Lasisi explains further the inspection process. He notes that upon arrival he would have checked that the lifts were working. He would have checked the previous inspection report, including whether the observations noted in the previous report had been complied with. He goes through the various elements of the lifts which he would have checked including, at paragraph 17, the firefighting unit. He states that he would have sent the lift to the top floor and activated the fire control switch. Furthermore, at paragraph 22 he notes that he would have carried out a functional check of the fire control switch.
492. In my view, the testing of the fire control switch described by the BV engineer was adequate and sufficient for statutory engineering purposes.
493. At paragraphs 21 to 22 Isiaka Lasisi explains that, before any inspection, he would not have received any information about the compliance of the building with Building Regulations (or other codes or guidance) or its fire safety features. Rather, his role was to inspect the lift as found and ensure it functioned correctly, not to make any assessment of whether the lift was suitable or appropriate for the building.
494. In my view this is a reasonable statement of Isiaka Lasisi's duties.

N.2. Kyle Veitch

495. The evidence of Kyle Veitch sets out his understanding of BV's role, namely, to carry out inspections of equipment and ensure it is safe, but not to consider whether the type of lift installed is compliant with applicable regulations.
496. Kyle Veitch's evidence about the extent of BV's role accords with my understanding and expectations.

N.3. Michael Arnold

497. Michael Arnold was the last Bureau Veritas engineer to have carried out an inspection of Grenfell Tower, on 10 April 2017. I reviewed the Thorough Inspection form resulting from this visit which are inserted below {TMO00834794}, {RBK00035444}. This shows no Category A defects (i.e. faults which could be a danger to life). As with Isiaka Lasisi's form relating to the November 2016 inspection, it does not expressly confirm testing of the fire control switch.



Report Id 6058872_S217012770009_H090_1-2E5AH14

Report of Thorough Examination of Lifting Equipment

Health & Safety at Work Act 1974

Lifting Operations and Lifting Equipment Regulations (Regulation 9)

Provision and use of Work Equipment Regulations (Regulation 6)

Grenfell Tower (TMO) Grenfell Towers, Silchester Road Estate London W10 6SE			
Sub-location	H-Left Hand		
Client reference	H090		
BV Identifier	1-872051591		
Written Scheme Reference	- Version 0 / / N		Review Date
Last examination date	02/11/2016	Next examination date	10/10/2017
Date Report Issued	12/04/2017		
Type of Examination carried out:	P: Periodic, 6 Monthly.		
Description	Electric Passenger Lift		
Additional Details	Left Hand Lift / 25 Floors / Serving 24 Floors ONLY / 1 skip Floor between the 2nd and 3rd Floors		
Manufacturer	Apex Lifts.	Date	2005
Serial Mark / N°	V2VEC66129B/H090.		
Test Certificate N°	Not Required.	Date	
Safe Working Load	12 Persons or 900 KG as marked		

I confirm that the equipment was thoroughly examined on the 10/04/2017 and subject to any remedial action(s) noted in Section A being completed, is safe to operate.

Report Authenticated By:
Michael ARNOLD ()
Qualification: Engineer Surveyor

Kyle VEITCH
Technical Quality & Risk Director
Signed on behalf of Bureau Veritas UK Limited



Report Id 6058872_S217012770009_H090_1-2E5AH14

Report of Thorough Examination of Lifting Equipment

Health & Safety at Work Act 1974

Lifting Operations and Lifting Equipment Regulations (Regulation 9)

Provision and use of Work Equipment Regulations (Regulation 6)

A. Defects which are or which could become a danger to persons, the remedial actions, and the dates by which defects are to be remedied

None.

B. Other Defects

1. The dirty Lift well pit should be suitably cleaned free. 2. The damaged various Floors Landing door Lock release rollers should be suitably renewed. 3. The motor and gear units oil Leak should be suitably sealed and spilt oil suitably cleaned free and de greased. 4. The spilt oil on the motor and gear units brake drum should be suitably cleaned free and de greased. 5. The Lift car door safety edge devices should be suitably earth bonded. 6. The temperamental / inoperative various Landing door emergency release facilities should be suitably adjusted and rectified. 7. The inoperative Lifts various Lift car push button permanent illumination bulbs and call acceptance bulbs should be suitably replaced / reinstated.

C. Observations

Internal Lock Examination (BVUK): 10/04/2017 [All Locks Examined]. The following recommendations are made: 1. That a suitable method to collect oil from the guides rails be installed within the Lift well pit area. 2. That the safe working Load be suitably displayed at the trap door within the motor room. 3. That a prescribed type DANGER voltage notice be displayed on the Lifts main isolator, Lifts consumer unit and Lifts control panel in the motor room. 4. That a yellow Landing safety barrier be provided for use by maintenance and inspection personnel. 5. That a safe Ladder to access the pit be provided.



Report Id 6058872_S217012770009_H091_1-2E5AH1I

Report of Thorough Examination of Lifting Equipment

Health & Safety at Work Act 1974

Lifting Operations and Lifting Equipment Regulations (Regulation 9)

Provision and use of Work Equipment Regulations (Regulation 6)

Grenfell Tower (TMO) Grenfell Towers, Silchester Road Estate London W10 6SE			
Sub-location	H-Right Hand		
Client reference	H091		
BV Identifier	1-872051592		
Written Scheme Reference	- Version 0 / / N		Review Date
Last examination date	02/11/2016	Next examination date	10/10/2017
Date Report Issued	12/04/2017		
Type of Examination carried out:	P: Periodic, 6 Monthly.		
Description	Electric Passenger Lift		
Additional Details	Right Hand Lift / 25 Floors / Serving 24 Floors ONLY / 1 skip Floor between the 2nd and 3rd Floors		
Manufacturer	Apex Lifts	Date	2005
Serial Mark / N°	V2VEC66129A/H091.		
Test Certificate N°	Not Required.	Date	
Safe Working Load	12 Persons or 900 KG as marked		

I confirm that the equipment was thoroughly examined on the 10/04/2017 and subject to any remedial action(s) noted in Section A being completed, is safe to operate.

Report Authenticated By:
Michael ARNOLD ()
Qualification: Engineer Surveyor

Kyle VEITCH
Technical Quality & Risk Director
Signed on behalf of Bureau Veritas UK Limited



Report Id 6058872_S217012770009_H091_1-2E5AH1I

Report of Thorough Examination of Lifting Equipment

Health & Safety at Work Act 1974

Lifting Operations and Lifting Equipment Regulations (Regulation 9)

Provision and use of Work Equipment Regulations (Regulation 6)

A. Defects which are or which could become a danger to persons, the remedial actions, and the dates by which defects are to be remedied

None.

B. Other Defects

1. The dirty Lift well pit should be suitably cleaned free. 2. The damaged Various Landing door Lock release rollers should be suitably replaced. 3. The motor and gear units oil Leak should be suitably sealed and spilt oil suitably cleaned free and de greased. 4. The oil on the motor and gear units brake drum should be suitably cleaned free and de greased. 5. The Lift car door safety edge devices should be suitably earth bonded. 6. The Lift car poor Levelling should be suitably corrected. 7. The missing 1 x bottom bolt from the 4th Floors Landing door self closing arm plate on the Landing door should be suitably replaced. 8. The temperamental / inoperative various Landing door emergency release facilities should be suitably adjusted and rectified. 9. The inoperative Lifts various Lift car push button permanent illumination bulbs and call acceptance bulbs should be suitably replaced / reinstated.

C. Observations

Internal Lock Examination (BVUK): 10/04/2017 [All Locks Examined]. The following recommendations are made: 1. That a suitable method to collect oil from the guides rails be installed within the Lift well pit area. 2. That the safe working Load be suitably displayed at the trap door within the motor room. 3. That a prescribed type DANGER voltage notice be displayed on the Lifts main isolator, Lifts consumer unit and Lifts control panel in the motor room. 4. That a yellow Landing safety barrier be provided for use by maintenance and inspection personnel. 5. That a safe Ladder to access the pit be provided.

498. I am aware that a witness statement from Michael Arnold has not yet been received. Therefore, I am unable to definitively comment on the adequacy of the inspection which was carried out on that occasion. However, if the procedure adopted by Michael Arnold was similar to that of Isiaka Lasisi (as described in his statement), then the inspection was likely to have been adequate. However, I reserve my opinion in this respect until I have sight of Michael Arnold's witness statement, at which stage I may, if appropriate, produce a short supplementary report to deal with this matter.

N.4. Conclusions

499. For the reasons set out in this section, my view is that Bureau Veritas' role at Grenfell Tower was limited to inspecting the safety features actually installed in the lifts rather than considering the design's compliance (or otherwise) generally. I broadly agree with Kyle Veitch's analogy at paragraph 8 of his witness statement that Bureau Veritas' role was similar to that of a mechanic carrying out a MOT inspection.
500. I note that there is a difference between the documentation produced at the time by Bureau Veritas and the witness statements, as to whether the fire control switch was tested. This testing is not documented but the witness statements say that it took place. It is not for me to come to a conclusion as to which evidence should be preferred. I only note that it would have been good practice if Bureau Veritas had recorded testing of the fire control switch in their reports.
501. In my view, it was not Bureau Veritas' responsibility to consider or report on whether the lifts at Grenfell Tower ought to have been firefighting lifts or not. Accordingly, I consider that Bureau Veritas' inspections were in line with what I would expect of a Statutory Engineering inspection. This is, however, a preliminary conclusion, pending review of Michael Arnold's witness statement.

O. Commentary on Gerald Honey Partnership's involvement

502. In his email dated 15 April 2015 {TMO00858327}, Mike Sapsford from GHP sets out the service which would be provided to TMO. In particular, he states that GHP would carry out a thorough inspection of the whole lift installation which would enable him to tell the TMO if there were any issues in respect of compliance with current British Standard Codes of Practice, The Health & Safety at Work Act and/or The Equality Act. However, subsequent correspondence on 21 to 22 April 2015 suggests that the brief was narrowed {GHP00000002}, and GHP were only contracted to review the lift works which Apex had carried out, and to review maintenance items and certification.
503. Given this narrowing of the brief, GHP's responsibilities were quite limited, namely to check whether the issues flagged by the Calfordseaden report had been addressed and to check the workmanship of the works carried out by Apex as part of Project 2. Given that their brief was to check the lift works carried out by Apex as part of Project 2, I consider that this included testing of the fire control switch as well as the car and landing pushes and indicators.
504. Having considered the letter produced by GHP {GHP00000004} it is not possible to establish whether GHP tested the fire control switches on the ground floor or the walkway floor and associated systems. They should have tested the switch and systems. In any event, given the evidence of regular checks after its installation which did not detect any problems with the switch or control system, there is no reason to conclude that a test, if carried out, would have picked up any faults. I also do not consider that GHP had a wider duty to raise issues of the lifts' general non-compliance with the firefighting standard.
505. However, they should have flagged the fact that the redundant fire control switch on the walkway level had not been removed. GHP ought to have raised this as, in my view, as a snagging item.

P. Commentary on Rydon's involvement

506. As set out above, Rydon were the principal contractors in relation to Project 2. They were contracted to carry out the design and construction of the works, however they subcontracted much of the work to more specialist subcontractors. In relation to lifts, they subcontracted the work to Apex which was reasonable as Apex were specialist lift contractors.
507. Overall, in my view it was not Rydon's responsibility to identify that Grenfell Tower should have had firefighting lifts and/or that Grenfell Tower did not have firefighting lifts. It was reasonable for Rydon to subcontract the specialist lifts works to Apex and, particularly in that context, I do not consider Rydon to have had any duties regarding highlighting the lifts' non-compliance with applicable codes and standards.

Q. Review of Fire Control Switch

Q.1. History of fire control switches installed at Grenfell Tower

508. The standards and codes set out in Section E required a fire control switch to be provided at the time of the original lifts' installation in the 1970s. There is very little available information about what switch was then in place, where it was located and how it was maintained.
509. I have seen a general arrangement drawing {TMO10023897} (Appendix 12) by Hammond & Champness which dates from July 1971, i.e. the time of the construction of Grenfell Tower. It shows a cut out in a front wall at level D-2 FFL for a fireman's switch. The cut out is shown as 140 x 140, so it can be assumed that the original lift(s) had a form of fireman's control.
510. Two fire control switches were fitted at Grenfell Tower – one switch was on the walkway floor and one switch was on the ground floor. The switch on the ground floor was the switch which CM Christopher Secrett attempted to use on the night of the fire.

Q.1.1. Project 1

511. The B&Y specification required a 'fireman's control' at paragraph 2A.70. The requirements applicable to a fire control switch at the date of Project 1 are set out in Section E.2.2 above.
512. Apex, which would have sourced the fire control switch for Project 1, has been unable to provide any purchase order, specification or other document confirming the make and model of the fire control switch. However, the witness statement of Gary Poynter submitted to the Inquiry, in answer to question 21, states that, in relation to Project 1, *"as far as I can recall, the fire control switches were procured from AA Electrical"*. I am unclear why Gary Poynter refers to 'switches' for Project 1 in plural, given that there is no evidence of there being a second switch at that time.
513. Dr Barbara Lane, in figure L19 of Appendix L, considered that the switch observed at ground level of Grenfell Tower was identical to the model set out in the A&A Electrical Distributors Ltd. catalogue. I agree with that observation. Enquiries were made with A&A Electrical but they were unable to confirm whether the switch installed at Grenfell Tower was supplied by them.
514. Overall, I do not consider that this gap in my knowledge affects my final conclusion. As set out later in the report, I examined the switch removed from Grenfell Tower. I also instructed the University of Northampton to test an A&A Electrical switch as part of my work. That examination report is found at Appendix 6 to my report.
515. The TMO Project Brief and B&Y specification, at 2A.70, broadly reflect the requirements for a fire control switch at this time, except they specify the wrong key mechanism and key. As set out in the applicable standard (BS EN 81-72: 2003), the *"operation of the*

firefighters lift switch shall be by means of an emergency unlocking triangle, as defined in annex B of EN81-1:1998 and EN 81-2: 1998". The benefit of the switch utilising an 'unlocking triangle' over an express/drop key is that the exact dimensions of the triangle are provided in the relevant guidance, meaning these triangle keys are produced to standard dimensions. There are no standard dimensions provided in the guidance for drop/express keys.

Location of fire control switch installed as part of Project 1

516. This fire control switch was likely installed on the ground floor. The B&Y specification states that the lifts serve the ground floor and the walkway:

Serving : 21 floors, 21 openings

Levels : Ground, Walkway and First to Nineteenth Floors inclusive.

517. The General Arrangement drawings for Project 1, dated 03/09/2004 {APX00008713} (Appendix 13) also state at Note 18 that the fireman's switch was on the ground floor.
518. Furthermore, I have seen correspondence between Janice Wray and Collette O'Hara at the LFB about a fire which happened on 30 April 2010 {SEA00000060}. The email says:

*"You mentioned that there may have been a problem with the lifts at the time of the fire and that specifically they may not have **returned to ground level** when called by the FB. ILS our lift maintenance contractors tested the fire fighters override switches etc. on both lifts yesterday and confirmed that both were operating perfectly and lifts **had both returned to ground** when called as required." [Emphasis added].*

519. This also implies that the fire control switch was located on the ground floor, as that is where the lifts ought to have returned to upon operation of the fire control switch.
520. I have also considered a record of a meeting dated 6 November 2012 between John Allen and Dave Gammon at Building Control, Adrian Jess from Studio E and Terry Ashton at Exova {EXO00001371}. The meeting notes state:

*"DG's comment was that new lift in reception area should be a fire-fighting lift. AJ explained that **existing fire-fighting lift extended to ground floor level**. DG expressed concern that existing fire-fighting lift did not serve new mezzanine level. TA stated that all parts of this level were likely to be within 45m of the entrance to the building and, therefore, it was not necessary for the fire service to use the fire-fighting lift. DG stated that this would cause confusion but asked that this issue be dealt with in the fire strategy report." [Emphasis added].*

521. Furthermore, the Inquiry was sent an email by Kevin Warnock at Apex on 31 May 2019 {APX00008669}. The email stated:

"Dear Sirs

In addition to the documentation submitted today, we attach two further photographs that have recently come to light which we think might help the Inquiry. We are aware that the expert witness testimony has focused on the functionality and operation of the lift fire control switches at the Grenfell Tower. The attached photographs were taken by our engineering surveyor prior to Apex quoting for work on the new door entrances in 2014. The filenames suggest these pictures were taken on 17/07/2014.

We believe these photographs show the fire control switches on the ground floor of Grenfell Tower at this time. They appear to be the original switches installed by Apex when the lifts were refurbished in August 2005.”

522. The photograph {APX00008668} shows a fire control switch:



523. Overall, all of the evidence points towards the conclusion that, as part of Project 1, Apex installed a fire control switch on the ground floor of Grenfell Tower.

Other relevant matters

524. There is one other potentially relevant event in the history of the fire control switch which was installed as part of Project 1.
525. I have seen an LFB document entitled 'Notifiable Fire Report' {LFB00010934} which refers to a fire on 30 April 2010. It notes:

2. Crews also found that there was an issue with the fire lift not responding when requested. This slowed their response to the fire floor.

526. I have also seen correspondence between Janice Wray and Collette O'Hara at the LFB dated 5 May 2010 about a fire which happened on 30 April 2010 {SEA00000060}. The email says: *"You mentioned that there may have been a problem with the lifts at the time of the fire and that specifically they may not have returned to ground level when called by the FB. ILS our lift maintenance contractors tested the fire fighters override switches etc. on both lifts yesterday and confirmed that both were operating perfectly and lifts had both returned to ground when called as required. Therefore, there does not appear to have been a problem but if further information comes to light then I would be grateful if you could please advise."*
527. This email suggests that the fire control switch did not work. I cannot say for certain whether this happened because of a user error or because there was a fault with switch or control system.
528. This incident is also addressed in the first witness statement of Janice Wray at paragraphs 198 to 200. Her evidence is that the firefighters' failure to operate the switch was due to user error. She also comments that they may have overloaded the lift by exceeding the safe working load. There is no evidence to the contrary, and so it is most likely on the evidence that the reason the firefighters could not use the switch was due to a failure to operate the switch correctly.
529. In addition to the confirmation from ILS in the email cited above, I have also seen evidence that the fire control switch was tested regularly up until the night of the fire in 2017. In particular, the witness statement of Mark Wallis from PDERS states that he tested the switch during his monthly maintenance visits which took place before the fire, and he noted that the fire control switch was functional.

Q.1.2. Project 2

530. Project 2 extended the lifts' operation to the mezzanine and walkway+1 floors. My interpretation of the evidence is that a second fire control switch was temporarily installed on the walkway floor for the duration of the Project 2 works. I think this occurred because the entrance to Grenfell Tower was temporarily moved to the walkway floor. This email chain between Claire Williams and Janice Wray at the TMO confirms that the entrance was moved for the duration of the works only {CST00001858}.
531. Carl Stokes' record of significant findings dated 17 October 2014 {CST00001734} states:

19a	High	The lifts in this building are fire fighter/evacuation lifts, the entrance to this building is now from the walkway level. It is not known if the fire service override controls for these lifts have been <u>moved</u> ?	Have these two lifts been reprogrammed so that the fire service can control them from the walkway level? Have the fire service control switches been relocated to the walkway level from the ground/ street level? If so can the service documents and certificates from the lift contractors please be forwarded so that there is evidence if required that the lifts are in full working order as fire fighter/evacuation lifts.
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532. My interpretation of this document is that, as the entrance to the building had changed, the fire control switch was relocated from the ground floor to the walkway level.
533. I have also considered an email exchange between Claire Williams and Simon Lawrence (and others) at Rydon dated September 2015 {ART00004794}:

----- Original message -----

From: Claire Williams <cwilliams@kctmo.org.uk>
Date: 10/09/2015 17:09 (GMT+00:00)
To: Simon Lawrence <slawrence@rydon.co.uk>, Steve Blake <SBlake@rydon.co.uk>
Cc: "neil reed (neil.reed@uk.arteliagroup.com)" <neil.reed@uk.arteliagroup.com>, "MALCOLM Andrew (andrew.malcolm@uk.arteliagroup.com)" <andrew.malcolm@uk.arteliagroup.com>
Subject: Grenfell lift

Simon

Further to our telecon of today, can you please confirm that your contractors have adjusted the current 2 lifts to both stop at 'walkway'/level 2 (rather than the ground/street level) in case of fire.

Thanks

Claire Williams
Project Manager

534. There is quite a large amount of subsequent correspondence {TMO00859283}, {RYD00051659}, {TMO00859251}, {TMO00859277}, {TMO00852582}. The correspondence makes clear that, in the event of a fire, residents were to use the walkway floor to evacuate. The correspondence I have found does not clearly state that the fire control switch was in fact moved to the walkway floor. Overall, I have not been able to find any correspondence that definitively confirms that a second switch was installed temporarily on the walkway floor.
535. However, I have seen a subsequent document from Carl Stokes entitled Record of Significant Findings and Action Plan {CST00002206} dated 26 April 2016 which states:

19g	High	It is not known if the fire service controls for the lifts been moved back down to the street level?	Can it be confirmed that the fire service controls for the lifts been moved back down to the street level? If not then this must be undertaken immediately.
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536. I have seen correspondence between Janice Wray and Anthony Cheney {TMO00860348} which suggests that Anthony Cheney was in charge of confirming whether the fire service controls for the lifts had been moved back down to street level, but I have not yet seen any confirmation that he carried this out or provided this confirmation.
537. Finally, I have seen a spreadsheet setting out actions from the Fire Risk Assessment dated August 2016 {CST00000196}. It notes:

It is not known if the fire service controls for the lifts been moved back down to the street level?	Can it be confirmed that the fire service controls for the lifts been moved back down to the street level? If not then this must be undertaken immediately.
	COMPLETED

538. This suggests, but does not explicitly confirm, that the ground floor fire control switch had been reconnected by August 2016.
539. Looking at all of these documents together, they suggest that the fire control switch was likely originally at ground floor level, a second switch was then temporarily installed at the walkway level at some point, and that the walkway switch was then disconnected (but not removed) and the ground floor fire control switch was put back into service.
540. I have not yet been able to establish with more certainty that this is what occurred, and I cannot be more precise about when this likely occurred but it was likely before August 2016. However, the WSP report makes clear that the walkway switch was disconnected by the time of the fire. Furthermore, from the WSP report it is clear that the ground floor switch was put back into service and was the switch used on the night.
541. Although the walkway switch was disconnected from the lifts, it was not removed. It should have been removed to avoid confusion for users of the switch. As with the switch installed as part of Project 1, the switch on the walkway floor also should have been operated by a triangular key, but was not.
542. I have not been able to find out any information about the provenance of the walkway floor switch. However, I have examined both switches (set out in more detail below) and the walkway floor switch was the same design as the ground floor switch.

Q.2. Firefighter evidence regarding their use of the fire control switch on the night of the fire

543. In this section I consider the relevant firefighter evidence regarding their attempts at using the fire control switch on the night of the fire. The following witness evidence from LFB is relevant:

Name	Role	Date of statement	URN of statement
Mark Atkinson	Head of Procurement at LFB	16/12/2019	{LFB00083885}
Ben Gallagher	Firefighter (Crew Manager)	11/01/2018	{MET00010083}
		12/06/2019	{MET00040215}
Andrew Mobbs	Head of Business Intelligence in the	07/02/2020	{LFB00089149}

	Information Management Team		
Ricky Nuttall	Firefighter	07/08/2019	{MET00056991}
Christopher Secrett	Firefighter (Crew Manager)	06/02/2018	{MET00010105}
		22/11/2018	{MET00039598}
		07/08/2019	{MET00056990}
		13/02/2020	{LFB00091726}

Q.2.1. Crew Manager Christopher Secrett

544. A CCTV image {INQ00000138} shows CM Secrett attempting to use the drop key in the fire control switch. The image is time stamped **01:01:21**.

545. I have considered the transcript of the evidence given by CM Secrett to the Inquiry on 4 July 2018. The transcript, from page 191 onwards, records the following questions and answers:

“Q. Right. Now, we have you coming into the lift lobby and then you walk into the lift lobby in the next picture, which is INQ00000137. Is that you?

A. That's me, yes.

Q. You're striding with purpose towards something. What are you looking to do?

A. I'm looking to secure the fire lift.

Q. Right. In the next picture, timed at 01.01.35, you're doing something with your right hand. Can you explain what you're doing?

A. Yes, so I've put my express lift key or drop key into the box that operates it and I'm trying to switch it on, which would engage the fire lift operation.

Q. Right. Did you have any success with that?

A. No, I didn't, no.

Q. If you go to INQ00000138, which I think is the next one, that is showing you doing something with your right hand with the lift key and something with your left hand. What are you doing with your left hand, do you think?

A. It looks like I'm calling the lifts the conventional way by pressing the button.

Q. Right. While turning the lift key with your right hand?

A. Yeah, I think by that stage I'd accepted defeat that it wasn't going to work, so I called it as a member of the public would call the lift.

Q. Right. When you turned the key, did you hear a click or feel a click?

A. No. I remember it was -- it was hitting a stop. Normally when you put it in and you twist it, you feel sort of a positive click where it throws a lever over which engages it, but it wasn't doing that; it was just hitting some sort of stop on the key. The mechanism wasn't -- it wasn't connecting to the mechanism. It wasn't working.

Q. Right. We see in this image, as you told us, that you're operating the fire recall control panel and pressing the general recall button at the same time?

A. Mm-hm.

Q. That's right, is it?

A. Yes.

Q. That's what you're doing. Why were you attempting to operate both functions at the same time?

A. It's no -- I may have even been trying to get my key out of the -- sometimes they're quite stiff to get in. I may even have been trying to retrieve my key and just calling the lift. There's no little trick you can do if you do both at the same time, it's nothing like that. I'm either still trying it and pressing the lift to call it on its way, or I'm physically trying to get my key back out and just call the lift normally.

Q. What happened with the lift when you tried each and both of these functions?

A. With the fire lift operation, nothing, and when I called it normally, the lift - - I can't remember if the doors opened straight away or if the lift came down, but when I called the lift the sort of conventional way, it came and the doors opened.

Q. Did you ask anybody else in your group of firefighters to try to operate the fire lift key?

A. No, I don't think I did, from memory."

Q.2.2. Firefighter Daniel Brown

546. Firefighter Brown also gave the following evidence to the Inquiry on 29 July 2018. The transcript, on page 3, records:

"Q. First of all, could you describe what happened when Crew Manager Secrett tried to summon the lift?

A. So Crew Manager Secrett basically put the key in -- to operate a fire lift, you will have a panel which actually says -- it will say either "Firefighter's lift" or "Fireman's lift". Once you put the key in and turn it, it's essentially a complete override of the lift and it should give us complete overall control of that lift, and that lift should descend immediately down to the ground floor.

Q. What happened?

A. It stopped off at a floor above the ground floor.

Q. Did it come to the ground floor?

A. It did eventually.

Q. Could you take it under control? You, the Fire Brigade.

A. Not as a firefighter's lift, no.

Q. Not as a firefighter's lift?

A. Or a fireman's lift."

Q.2.3. Crew Manager Gallagher

547. In his initial witness statement dated 11 January 2018 CM Ben Gallagher stated that he later attempted to use the fire control switch with his own drop key. He gave oral evidence to the Inquiry to this effect too on 10 September 2018. However in a later statement dated 2 June 2019 he confirmed that there was already a drop key in the switch which he attempted to use to take control of the lifts.

"Today I was shown a video by Investigator Paul FULLER, who has taken this statement. It shows my crew and myself in the downstairs lobby area. The video shows a time of 01.33.02 which is about the correct time that I was there.

It then shows me going to the lift where there is already a key in place. I don't know who placed the key there in the first place. I can be seen trying to operate the lift with the key.

I was trying to take control of the lift. The lift doors opened and you can see me peer into the lift. I saw the smoke as the doors opened. I mention the smoke in my first statement.

I left the key there. You can see that on the video. I don't know what happened to the key afterwards."

Q.2.4. Firefighter Nuttall

548. In a witness statement dated 7 August 2019, Firefighter Ricky Nuttall stated that he was seen on CCTV removing the drop key from the fire control switch at Grenfell Tower. He was asked to send the key to the LFB investigation team, but he explains in the statement

that he cannot be sure that the key he posted to the LFB investigation team was the same key which he removed from the fire control switch at Grenfell Tower:

“Jamie asked me if I had any fire keys/drop keys, he explained I had been seen on CCTV removing a drop key on my last wear of BA as I was being held in the lobby area at Grenfell Tower.

I can honestly say that I have no memory of taking or removing a drop key from the lift at Grenfell Tower. My last wear of BA (Breathing Apparatus) was at around 9 to 9:30 am. I can not add anything to this other than when Jamie asked me for the drop key I thought I had two (2) but when I checked my tunic I only found one (1) and it was this one I posted. I am not say that this is the very same drop key that CCTV captured me removing from the lift at Grenfell Tower. Drop keys are not personal issue but it is common for fire fighters to source their own. I am only aware I saw the drop key at Grenfell and picked it up for future use. It may be that between June 2017 and to the time Jamie called me I may have changed drop keys with another fire fighter, again I can not say.”

Q.2.5. Phase 1 Report

549. The operation of the lift on the night is also considered in the Chairman’s Phase 1 report. The important parts are:

Volume 2, 10.33: *“The nature and mode of operation of the lift is considered elsewhere in this report. CM Secrett tried to secure control over the lifts using an express-type drop key. This attempt failed, but he was able to call the lift to the ground floor using the button on the lift control panel.*

Volume 4, 28.11: *“Although CM Christopher Secrett was unable to secure control over the lifts (for reasons that remain under investigation), the crews were able to use them to go to floor 2 and set up the bridgehead in accordance with the LFB’s normal operating procedure. It should be noted at this point that the firefighters’ inability to bring the lifts under their control is relevant to the circumstances in which some residents came to lose their lives. “*

Q.3. Examination of the switch

550. A number of examinations of the fire control switches were carried out after their removal from Grenfell Tower. Switches were removed from the ground floor of the building and also from the walkway floor of the building.
551. The WSP Site Inspection Report for the Metropolitan Police, dated August 2018 and set out at Appendix 3 is a comprehensive document detailing investigations carried out over 4 separate visits.

Q.3.1. Walkway floor switch

552. The following findings were made in the WSP report on pages 14-15, following inspection of the walkway floor switch:

1. *"A drop type key is used to both operate the fireman's switch and to open the landing doors of the lift in an emergency.*
2. *The notches on the release key align with similar notches inside the box in order to operate the switch. This is to prevent access by unauthorised persons.*
3. *It was not possible to operate the fireman's switch using the release key.*
4. *We removed the faceplate to discover that there were no wires connected to the fireman's switch.*
5. *The conduit from the shaft to the rear of the box contained one red wire. This was possibly a draw wire for future connection.*
6. *With the faceplate removed we checked the operation with the release key. It was very difficult to align the key to the slots in the brackets to operate the micro switch.*
7. *The micro switch was not bi-stable i.e. it was spring loaded and returned to its normal operating position."*

553. This examination found that the switch was not connected. I believe this is the switch which was temporarily installed on the walkway floor for the duration of the Project 2 works. In my opinion, this second switch should have been removed when Project 2 was completed.

554. The following photographs are taken from the WSP report.



Q.3.2. Ground floor switch

555. The following findings were made on page 16 of the WSP report, following inspection of the ground floor switch:

1. *"A green flag could be seen through the hole in the faceplate.*

2. *The fireman's switch was difficult to operate.*
3. *The faceplate was removed to determine the reason for failing to operate the switch.*
4. *We discovered that the mechanism was seized and damaged/deformed.*
5. *The contacts were open circuit when checked with a multimeter.*
6. *The wiring was coloured yellow and grey."*

556. The following photographs are taken from the WSP report.



557. A further examination of the switch took place detailed in the BRE Briefing Note appended at Appendix 5 of my report, dated 1 March 2019. As noted particularly in the photographs within that report, the side wards of the switch recovered from the ground floor at Grenfell Tower (BJG/74) were deformed. Below is photo 13 from the BRE Briefing Note showing BJG/74 from Grenfell Tower compared to an example switch, ER/2.



558. The Briefing Note also notes, as noted in the WSP report, that BJG/74 was jammed. On examination, it appeared that this jam was caused by a build up of builders' material.

During examination the jam was cleared and the switch operated correctly. It is not known how or why the jam occurred.

559. As to how the damage to the side wards occurred, the conclusion as set out in the Briefing Note is *"the damage to the 'side wards' was caused by an incorrect drop key being used, which subsequently deformed the 'side wards', or by an 'express' drop key being inserted too far in the barrel and a high twisting force damaged the 'side wards'."*
560. Arup appointed the University of Northampton to carry out non-destructive and destructive tests on an exemplar fire control switch and express drop key – obtained from A&A Electrical Ltd who are a recognised supplier of lift components and safety equipment. The results of these tests are detailed in Appendix 6 of this report and the conclusions were as follows:
- 560.1. *"The investigation carried out has led to the results summarized as follows:*
- 560.2. *The force used to operate the switch was measured to be 10.5 N.*
- 560.3. *The force to bend the switch frames depends on where the drop key hits the 'cheeks'.*
- 560.4. *The maximum deflection will occur at the point of application of the load.*
- 560.5. *The maximum deflection measured was approx. 1.76 mm. This value corresponds to the key turning torque of 12 Nm. This torque when transposed to a point force acting at point A of the key (see Figure 3(b)) gives the force of 266.7 N.*
- 560.6. *The torque applied to bend the drop key and to break the key near the hinge was 14 Nm. When this value is transposed to a point force acting at point A of the key the result is 311.1 N.*
- 560.7. *The FEM simulation tests were carried out to verify the measured values. An approximate/ simplified FEM model was applied.*
- 560.8. *In this model the frame structure at one side of the drop key was represented by a constrained steel plate with a "labyrinth".*
561. Overall, this testing showed that the damage to the side wards could have been caused by force produced by an adult.
562. Andre Horne's report dated 12 November 2019, appended at Appendix 7 of my report, also considered BJG/74 and noted:
- 562.1. *"When an attempt was made to toggle the switch to the On condition, the switch frame arms were found to be jammed. They did not move freely. Inspection as to the cause revealed that there was some debris evident on the frame which appeared to be dirt/mortar/sand possibly from the construction of the building. It could not be determined if some of this debris had become dislodged during the removal, transportation and storage of the panel to cause the jam or if it had been jammed prior to removal from the building. After some gentle manipulation by hand*

it moved freely. In our opinion, forceful manipulation of a fitting key would have moved the switch frame arms.”

563. He further noted:

563.1. *“My conclusion at this stage was that the side wards and switch frame arm on the Off side were bent due to the use of an ill-fitting key and the use of excessive force. The bent side wards and switch frame arm did not cause the jam experienced at the start of the examination. I was able to turn a key with the correct dimensions in either direction to turn the electronic switch On or Off.”*

564. Overall, therefore, BJG/74 was jammed but forceful manipulation of a fitting key would nevertheless have led to the switch working. Furthermore, the side wards and switch frame arm of BJG/74 were bent but this did not cause the jam and a fitting key would still have been able to operate the fire control switch. Andre Horne also concluded that the bent side wards were probably caused by someone forcing an ill fitting key into the switch.

565. On the basis of the above, it seems unlikely that the jam or the bent side wards could have caused the fire control switch to fail, if a fitting key had been used.

Q.4. LFB’s procurement of drop keys

566. I have considered the way in which drop keys are procured within the LFB.

567. First, I have considered the witness statement of Mark Atkinson. He is the LFB’s current Head of Procurement. He explains that lift keys would be purchased through the LFB’s Purchase Order Management System (“POMS”). He states that:

“Question 2: Are all LFB fire stations provided with the same model / type of express lift key?

The express lift key provided to fire stations via POMS is the Express VR drop release lift key. It is purchased from A&A Electrical for the purpose of replenishing the holding stock at the Brigade Distribution Centre, from where it is made available for issue to LFB fire stations when requested.”

568. His statement further explains that the manufacturer of the keys is a company called MPL Fabrications.

569. I have also considered the statements of Christopher Secrett. In his statement dated 22 November 2018, he notes:

“...The brigade supply them but I normally keep one in my tunic because of my role — I am often first in the buildings and would need a key to hand so I keep it in my tunic. The keys are always going missing and are used a lot so they are a regular order for our purchasing system. Purchase order management system (POMS) is how we order express keys through the LFB.”

570. In a further statement, dated 7 August 2019, CM Secrett explained:

“Drop keys’ are not personal issue within the LFB, they are provided within an assorted pack of 20 other similar type keys, stored on a pump and used by the different crew members.

Should a key be damaged or lost, it is LFB policy to re-order via POMS. POMS is the LFB internal ordering stock system. In my experience of using POMS they can take up to 4 weeks, and longer for an order to arrive. ‘Drop keys’ are an essential piece of kit. You can’t afford to wait 4 weeks for it to arrive, as we use them almost on a daily basis.

Unlike ordering personal issue uniform, ordering a drop key would not be personally sent to me, even though I had ordered it. It would arrive eventually for the station, for anyone to open, take and use.

‘Drop Keys’ do not have serial numbers. There is no way of telling who the specific key belongs to, or where it’s come from.

Its not uncommon for fire officers to personally purchase drop keys to keep on their person. They can be purchased easily on Ebay or Amazon for about £5-£10.

I have personally purchased about 3 keys during my 20 years career. I’ve done this using my personal Ebay account. I don’t search specific makes or brands as I wouldn’t know what company would make these keys, I just search the words ‘drop key’ and compare ‘good customers ratings’ which helps my decision.

The last time I purchased one was 27th April 2017 and I paid £13.98 for it. It was entitled ‘Fire Brigade Drop Key’. I attempted to show the police my purchase on my mobile phone from my Ebay account, but it’s now been ‘greyed out’ and I can’t access it. I purchased it using my Pay Pal account. I again using my mobile showed the police it was purchased from a ‘neil bennett’ this account has an email address

[REDACTED]

The one I purchased I kept it in my tunic, on the left shoulder pocket.”

571. In a further statement dated 13 February 2020 CM Secrett confirms the above information.
572. I also note the witness statement of Ricky Nuttall dated 7 August 2019 in which he notes that : *“Drop keys are not personal issue but it is common for fire fighters to source their own.”*
573. From the above information, it appears that, at the time of the Grenfell Tower fire, within the London Fire Brigade, firefighters were using keys bought through the POMS system, which were purchased from A&A Electrical, and were also using keys which they had sourced themselves, including through Ebay. I should say that, particularly on the basis of Ricky Nuttall’s statement, the evidence suggests that CM Secrett was not alone in sourcing his own key (other than through the POMS system). Although, as indicated elsewhere in the report, I have general concerns about the inconsistencies in the dimensions of drop keys, I am not in a position to criticise any individual firefighter who may have sourced a key other than through the POMS system.

574. I also note that on 8 August 2019 the LFB wrote to all stations requesting them to check that the correct drop keys were being used {LFB00083895}.

Q.5. The drop key used on the night of the fire

575. I have reviewed the evidence relating to the key that was used on the night of the fire.

576. Initially, in his statement dated 22 November 2018, CM Secrett stated:

“The key that I had at Grenfell tower I know I had had for a while and I had used it a number of times in different locations with no problems.

...

I vaguely remember that I was struggling to get the key out and I was pulling it a few times and realised that it was stuck in the box. I left the key in the box. I have then just called the lift as normal and used the lift as normal to get to the floor that we were going to.

I was not aware of any defect with the key and had used it successfully before on a number of occasions.

I do not remember going back to collect the key from the lift box so it may have been left there but I cannot be sure.

I do not know the exact location of the key that I used on that day, I have probably had three or four different keys since that day.”

577. CM Secrett stated in his witness statement dated 7 August 2019:

“The one I purchased I kept it in my tunic, on the left shoulder pocket.

On the night of the Grenfell Tower fire I was wearing my tunic and used the drop key from my pocket. I can’t categorically say that was the specific one I purchased from Ebay, back in April as these keys get swapped and replaced all the time and they are unidentifiable.

...

I didn’t return to retrieve my key and I haven’t seen the key again since.”

578. In his statement on 13 February 2020, CM Secrett stated:

“I do not recall specifically whether the express key that I had in my tunic on the night of the Grenfell Tower Fire was an express key issued by the LFB or one that I had purchased myself.

However, in my mind there was no discernible difference between the express key that I ordered from Ebay and the express keys supplied by LFB. Neither of them had any distinguishing marks or features.

I am now aware, following the email from Tom George on 8 August 2019, that some privately purchased express keys are not exactly the same as those issued by the LFB but I can not recall whether the key that I purchased on Ebay had those differences or not.

...

I do not recall specifically how long I had had the particular express key that I used on the night of the fire in my tunic pocket. I reiterate that I cannot recall whether it was LFB-issued or the one that I had purchased from Ebay.”

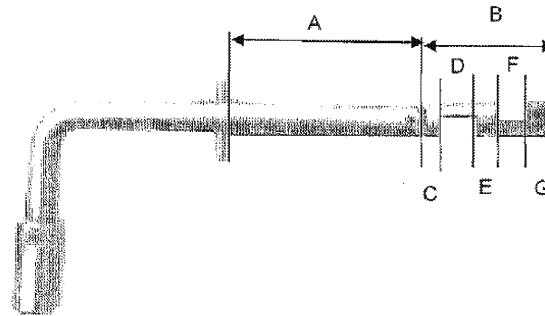
579. CM Gallagher’s evidence is that he attempted to take control of the lifts with a key which was already in place, but was unable to take control of the lifts.
580. Firefighter Nuttall’s evidence notes that he was seen on CCTV removing the drop key from the fire control switch. At a later date he was asked to post the drop key to the LFB investigation unit. He states that he thought he had two drop keys but when he checked his tunic he only found one and posted this to the LFB. His statement is clear that he is unsure whether the key he posted to the LFB investigation unit was the key which he retrieved from Grenfell Tower. The key posted by FF Nuttall was labelled LJH/67 and was tested by Andre Horne on 29 July 2019. I was present at this testing and the report is appended to my report at Appendix 7.
581. As to which drop key was used on the night of the fire, the following possibilities should be considered:
- 581.1. LJH/67 was the key used.
 - 581.2. A non-LFB issue key (e.g. a key from Ebay or another retailer) was used which has not been recovered.
 - 581.3. A key issued by LFB was used which has not been recovered.
582. I have considered whether I can come to a conclusion as to which key was likely used on the night of the fire in more detail below.

Q.6. Reasons for CM Secrett’s inability to take control of the lifts

583. In this section I consider which key was likely used on the night of the fire and why CM Secrett was not able to take control of the lifts. The two questions are potentially interlinked.
584. At Appendix 7 I have set out a report dated 12 November 2019 produced by Andre Horne. The fire control panel recovered from Grenfell Tower (BJG/74) was tested with two keys:
- 584.1. A standard Exprox Drop Release Lift Key (labelled ER/1) provided by WSP for testing.

- 584.2. A key provided by forensic locksmith Jeff Turner (not labelled).
585. It is important to note that, when recovered, BJG/74 had bent side wards.
586. In summary, key ER/1 did not fit BJG/74 properly. The key provided by forensic locksmith Jeff Turner did fit properly and operated the switch. The two keys were slightly different in dimensions.
587. The conclusion of the first round of testing was as follows:
- “The fireman’s drop key of Jeff TURNER (attending Forensic locksmith) was inserted into the lock and turned. The key fitted the slots correctly and was able to pass through the slots and engage the switch frame arms. The key Item ER/1 supplied as an exemplar key was subsequently tried on the lock. The key however fouled on the interior of the side ward on the On side and did not pass through the slot to engage the switch frame arm. The side ward on the Off side was found to be bent more and the key passed through the slot to engage with the switch frame arm. The two keys were compared side by side and it was evident that there was a slight difference in dimensions. The difference in dimensions was sufficient for the exemplar key to foul on the sidewards. If sufficient force was applied, the side wards would bend and the key would be able to be forced through the slots.*
- My conclusion at this stage was that the side wards and switch frame arm on the Off side were bent due to the use of an ill-fitting key and the use of excessive force. The bent side wards and switch frame arm did not cause the jam experienced at the start of the examination. I was able to turn a key with the correct dimensions in either direction to turn the electronic switch On or Off. At this stage the examination was suspended in order to source the fireman’s drop key alleged to have been used on the night of the fire.”*
588. BJG/74 was then tested with the drop key posted by Ricky Nuttall, LJH/67. In summary, LJH/67 was un-useable in BJG/74 because it was of the wrong dimensions. It could be inserted into the aperture but could not be turned at all. It was also concluded by Andre Home that, because the key was of the wrong proportions, it could not have caused the damage to the side wards observed in BJG/74.
589. The results of the testing were as follows:
- “The key was tried on the fire control panel, Item BJG/74 and the dimensions were found to be so grossly different that the key was un-useable on the fire control panel (in its current as well as undamaged condition). It was capable of being inserted in the aperture but could not be turned. It fouled completely on the side wards and even if excessive force had been applied, it would not be able to bend the side wards sufficiently to pass through the slots to engage with the switch frame arm and toggle the electronic switch. Due to misalignment, we concluded that the key could not have caused the damage observed on the side wards and on the switch frame arm on the fire control panel, Item BJG/74.”*

590. Overall, despite the observed damage to the fire control switch, Andre Horne's testing concludes that if a properly fitting key had been used, it is likely that the fire control switch would have worked as expected.
591. Further testing was carried out by Andre Horne detailed in his reports dated 15 May 2020 and 28 August 2020 and appended at Appendices 9 and 10 of my report. Andre Horne tested:
- 591.1. DER/22 – 15 lift keys of different types including 1 key which would fit into the fire control panel.
 - 591.2. SJG/01 – a fire brigade drop key purchased from Ebay.
 - 591.3. ER/1 – Express Drop Release Lift Key.
 - 591.4. LJH/67 – the lift key sent by Ricky Nuttall.
592. Andre Horne's testing found a significant difference in dimension between LJH/67 and the other three keys – DER/22, SJG/01, and ER/1. This difference rendered LJH/67 unuseable in fire control panel BJG/74 and the exemplar fire control panel ER/2. It should be noted that all of the keys were of different dimensions. The table setting out the measurements in his report is reproduced below:



	A	B	C	D	E	F	G
DER/22	57.5	35.26	4.5	10.24	5.24	9.94	5.90
SJG/01	55.79	35.55	4.54	10.13	4.63	10.00	6.76
ER/1	58.72	35.29	4.00	10.29	5.04	10.12	6.0
LJH/67	55.15	36.41	7.69	10.06	4.28	10.08	4.53

593. Furthermore, Andre Horne concluded that DER/22 was slightly ill-fitting and that it could have been responsible for the damage to the side wards found on BJG/74. He found: *"If a fire control panel with the same dimensions as Item BJG/74 is encountered and a drop key such as the one in Item DER/22 is used, it may cause the same problems encountered during the response to the fire in Grenfell Tower."* He also found that DER/22 would not have worked normally even if BJG/74 had not had bent side wards.
594. SJG/01 worked normally in both fire control switches.

595. Andre Horne summarised the results of testing in a table in his report dated 28 August 2020. I agree with his conclusions and set out his summary table below:

	Control panel BJG/74 (Grenfell Tower)	Control panel ER/2 (unused control switch purchased as an example)
LJH/67	Grossly ill-fitting. If inserted into this control panel the key would not turn and would not be capable of switching the control panel on/off. Incapable of causing the side ward damage seen in this control panel.	Grossly ill-fitting. If inserted into this control panel the key would not turn and would not be capable of switching the control panel on/off.
ER/1	Slightly ill-fitting. With force * this key would be capable of being turned in this control panel and at the same time causing damage similar to that seen in this control panel side wards. In these circumstances this key could have operated the control panel electronic switch.	Functioned correctly
DER/22	Slightly ill-fitting. With force * this key would be capable of being turned in this control panel and at the same time causing damage similar to that seen in this control panel side wards. In these circumstances this key could have operated the control panel electronic switch.	Functioned normally without fouling on the side wards
SJG/01	Functioned normally without fouling on the side wards. Would not have caused any damage to the side wards and would have operated the control panel electronic switch	Functioned normally without fouling on the side wards

* Because the panel BJG/74 is in a damaged state with bent side wards, I cannot categorically state what amount of force that would have been required to force the key through the side wards in its undamaged state.

596. Overall, I do not consider that there is sufficient evidence for me to come to a safe conclusion as to which lift drop key was used on the night of the fire.

597. However, I consider that I can make the following observations which may help the Inquiry come to a conclusion:

597.1. LJH/67 – The dimensions of this key were so different from the key needed to fit the switch that Andre Horne concluded that it is unlikely that, when inserted, a firefighter would have been able to turn the key at all. The evidence of CM Secrett is that, on the night of the fire, he tried turning the key in both directions and nothing

happened and he also says that he then felt the end drop down and engage and he turned it again clockwise and it did not activate the fire control switch.

- 597.2. There was damage to the side wards of the fire control switch, BJG/74. This damage could have been caused by using an ill-fitting key and applying excessive force. This damage could not have been caused by LJH/67. This damage could have been caused before, during or after the fire. The damage would not have stopped the fire control switch from working if a key of correct dimensions (or sufficiently close to the correct size) had been used.
- 597.3. The fire control switch was jammed with building debris, but with forceful manipulation with a fitting key the fire control switch would probably have worked.
- 598. Overall, I do not consider that I can come to a safe conclusion as to why CM Secrett was unable to take control of the lifts on the night. The main possibilities, in my view, are set out below, but I do not consider that I can come to a conclusion as to which of these possibilities is more likely or not.
 - 598.1. Possibility 1: CM Secrett was unable to take control of the lifts as a lift drop key of incorrect dimensions was used which could not operate the switch.
 - 598.2. Possibility 2: CM Secrett was unable to take control of the lifts as the fire control switch was faulty in some other, unidentified way.
 - 598.3. Possibility 3: CM Secrett was unable to take control of the lifts as the fire had affected the lifts in some way, such that the fire control switch did not work.
- 599. I consider that I can make the following observations which may also assist the Inquiry in coming to a conclusion as to why CM Secrett was unable to take control of the lifts, but I do not feel able to come to any conclusion:
 - 599.1. CM Secrett attempted to take control of the lifts at an early stage of the fire, at approximately 01:01am (see exhibit CMS/4 to CM Secrett's statement dated 22 November 2018). The lifts continued to operate 'normally' for some time after this (see Section R below).
 - 599.2. None of the forensic reports or examinations which I have seen disclose any fire-related or smoke-related damage to the fire control switch (BJG/74). I consider this of particular relevance when considering possibility 3 set out in the preceding paragraph.
 - 599.3. The witness evidence of engineers from Bureau Veritas and PDERS set out earlier in my report is that they tested the fire control switch before the fire and did not identify any faults.
 - 599.3.1. Isiaka Lasisi from Bureau Veritas tested the switch on 2 November 2016.
 - 599.3.2. Michael Arnold from Bureau Veritas tested the lifts on 10 April 2017. I am awaiting a witness statement from him but the inspection reports from the testing do not note any faults with the fire control switch.

599.3.3. Mark Wallis from PDERS tested the lifts, including the fire control switch on 9 May 2017 and did not note any faults.

600. I wish to emphasise one final point in relation to the fire control switch, which I consider of significant importance. The second report of Andre Horne shows that lift keys DER/22, SJG/01, ER/1 and LJH/67 were all of different dimensions, to a greater or lesser extent. DER/22 and LJH/67 were supplied by the LFB, and SJG/01 was the type of key which firefighters may have purchased. Neither DER/22, ER/1 or LJH/67 functioned completely properly in the fire control switch taken from Grenfell Tower. SJG/01 functioned normally in both switches. This wide variation of dimensions of the lift keys that could be used by members of the LFB is concerning.
601. As noted in my report above, particularly in Sections I and J, the lifts at Grenfell Tower should have had a different type of fire control switch. Grenfell Tower should have had an 'emergency unlocking triangle' design of switch, as specified in the relevant standards. The dimensions of these keys are standardised and set out in the relevant standards, meaning that there is much less chance of a firefighter having a key with the incorrect dimensions. The wide variation of dimensions of the various lift keys tested highlights the importance of the installation of the 'emergency unlocking triangle' design of switches.

R. Performance of the lifts on the night

602. In preparing this section of the report, I had regard to the Phase 1 report (outlining the events on the night of the fire), pertinent witness statements and reports relevant to lifts (such as the WSP report and lifts report of Dr Barbara Lane for Phase 1 of the Inquiry). It is the function of the Inquiry/Chairman to make findings of fact and, where such findings were made in the Phase 1 report, I set them out below to the extent that they are relevant to answering question 6 of my Instructions.

R.1. Use of lifts by residents to leave Grenfell Tower

603. I note that the lifts were used by some residents to leave Grenfell Tower during the fire.

603.1. Paragraph 10.288 of the Phase 1 Report says that, before 01.15, two people had left the tower using the lifts.

603.2. From the evidence I have seen this appears to have been Saleh Yusuf who left the lift around **01.01.53** and Farshid Kaficheraghi who left the building at around **01.06.52** {MET00016072}.

603.3. Paragraph 10.288 of the Phase 1 report says that, between 01.15 and 01.31, a further seven people left the tower using the lift.

603.4. At paragraph 10.163 the Phase 1 report explains that Daniel Griffin was woken just before 01.00 saw the fire, took the lift from Floor 6 to the ground floor and left the tower. He left the tower at **01:16:04**.

603.5. I also noted paragraphs 10.261 to 10.263 of the Phase 1 Report which explains that Emma O'Connor and her partner Luke Towner used the lift to leave the tower from Floor 20. On its way down, Maria and Fatima Jafari entered the lift at Floor 11. Maria and Fatima Jafari were shown getting out of the lift at **01.20.13** and Emma O'Connor and Luke Towner left the tower at **01.20.37-01.20.38**.

603.6. As explained in later paragraphs, Nadia Jafari and Rhea Rojo also used the lifts to escape the tower.

R.2. Use of lifts associated with fatalities during the fire

604. There are findings in the Phase 1 Report that use of the lift in the fire (which is not usually permitted and notices are usually posted in lift lobbies) may have been associated with fatalities during the attempted evacuation.

605. At paragraph 10.208 the Phase 1 report notes that Nadia Jafari suggested to her father using the lifts to leave the tower from Floor 11. She *"thought that there had been about six people in it once she, her father, and the woman from the stairwell had entered."*

606. I also note paragraphs 10.215 to 10.225 of the Phase 1 Report. The report concludes at paragraph 10.221 that there were likely 5 passengers when the north lift left the 11th floor. The lift became temporarily stuck on floor 10 (paragraph 10.215), the lights went out and smoke began to come in at the edges of the doors, making breathing difficult.
607. With reference to Nadia Jafari's evidence, the Chairman found at paragraph 10.215 of the Report, that:
- "The lift doors then closed and the lift continued down. It was dark inside the lift, which was "packed with smoke". The smoke lessened as the lift descended and Nadia Jafari was able to breathe. The lift door next opened on the ground floor and she ran out."*
608. At paragraphs 10.93-10.94, the report says that *"two residents (Rhea Rojo from Flat 91 on floor 12 and Nadia Jafari from Flat 86 on floor 11) stepped out of the lift on the ground floor. As they did so, black smoke billowed from the top of the lift door."*
609. On page 142 of Volume 2 of the Phase 1 Report (figure 10.27) there is an image which shows a thick plume of black smoke coming from the lift at **01:26:49**, the time it reached the ground floor.
610. Paragraph 10.224 of the Phase 1 Report found that the bodies of Mohamednur Tuccu, Khadija Khalloufi and Ali Yawar Jafar were recovered in the lift lobby at floor 10. These people may have been in the lift when it left Floor 11 and then got out of the lift when it reached Floor 10.
611. The possible explanation for the lift stopping at floor 10 is at paragraph 10.220 of the Phase 1 report. The report says that Mustafa Abdu may have called the lift from the floor 10 lobby, before continuing down the stairs.
612. If the lift had been in fire control mode, it would not have been possible for a resident to stop the lift by pressing the call button and the lift would have proceeded to the ground floor without stopping. When controlled by firefighters, the doors of the lift should not open unless specifically prompted by the firefighter using it (which can be done slowly to explore the area inside and limit smoke ingress--known as 'peep' mode).
613. Depending on the timing of the fire control panel triggering, the lift may or may not have contained residents inside who would have been conveyed to the ground floor (without the lift stopping at any floors in between).
614. I acknowledge that, if the lifts had operated correctly, they would not have been useable by residents to leave or attempt to leave Grenfell Tower because they would have been under firefighter control for their use in firefighting. On the other hand, if the lifts had been functioning properly and were in firefighting mode, they would not have exposed residents inside them to smoke (due to doors opening on a floor saturated in smoke) nor taken passengers to floors full of smoke, potentially leading to individuals' tragic deaths.
615. If there had been an operational fire alarm recall feature, this would have meant that the lifts would have automatically returned to the ground floor when the smoke detector was

activated. Residents would not have been able to call the lift. The firefighters would then have been able to override this by using the fire control switch.

R.3. Lift computer logs

616. I have also considered the lift computer logs from the night which are in the WSP report at page 21. The log for Lift H090 shows the following faults recorded:

617. The column titled 'Pos' refers to position. A position of 11 indicates Floor 10.

LOG	CODE	DESCRIPTION	POS	TIME	DATE	CARD	PHOTO Ref.
195	51	LIGHT DUTY	11	03:07	14/06/2017	A	DSC_0095
194	01	LOST LAR	11	01:16	14/06/2017	A	DSC_0096
193	04	DOOR OPEN PR. TIME-OUT	11	01:16	14/06/2017	A	DSC_0097
192	04	DOOR OPEN PR. TIME-OUT	11	01:16	14/06/2017	A	DSC_0098
191	04	DOOR OPEN PR. TIM- OUT	11	01:15	14/06/2017	A	DSC_0099
190	27	LOST LDG PUSH FEED	11	01:15	14/06/2017	A	DSC_0100
189	04	DOOR OPEN PR. TIME-OUT	11	01:15	14/06/2017	A	DSC_0101
188	20	FRONT SE OVERTIME	11	01:15	14/06/2017	A	DSC_0102
187	9	D/CLOSE PR. TIME-OUT	11	01:14	14/06/2017	A	DSC_0103
186	12	CALLS TF'D OR CNCL'D	11	01:14	14/06/2017	A	DSC_0104
185	04	DOOR OPEN PR. TIM- OUT	11	01:14	14/06/2017	A	DSC_0105
184	37	STUCK DOWN CALL	11	00:48	14/06/2017	A	DSC_0106
183	37	STUCK DOWN CALL	11	00:38	14/06/2017	A	DSC_0107
182	20	FRONT SE OVERTIME	7	00:29	14/06/2017	A	DSC_0108
181	37	STUCK DOWN CALL	11	00:15	14/06/2017	A	DSC_0109

Please refer to Appendix A for a description of all fault codes.

618. I have considered the “verbose” descriptions of the fault codes set out in Appendix A of the WSP report. I also requested further information from Thames Valley Controls about the meaning of the “verbose” descriptions. The relevant “verbose” descriptions and the further information provided by Thames Valley Control {TVC00000002} are set out below:

Fault code	'Verbose' description	Further information from Thames Valley Control
------------	-----------------------	------------------------------------------------

01	Lift Available Relay de-energised	<p>The LAR Relay (Lift Available Relay), on the motor panel provides the signal to the MPU (Microprocessor Unit). Whenever the LAR relay is de-energised, for example, due to the stop switch being operated, or the lift switched to maintenance control, the event will be displayed.</p> <p>The event will remain displayed while this situation continues to exist. All car and landing calls will be cancelled and the LSI (Lift Service Available) indicator will be off. (This LSI indicator is only provided when requested)</p>
04	Door opening protection fault	<p>This is when the door has failed to finish opening within 30 seconds. The event will be recorded, the MPU will stop activating the "Door Open Contactor" (OC) and the LSI indicator will be cancelled. After a short delay the MPU will activate the doors to close so the lift may move to another floor.</p> <p>This fault for example could be caused by an obstruction in the landing door track.</p>
09	Door closing protection fault	<p>This is when the doors have failed to close within 30 seconds. The event will be recorded, the doors will reverse and park open and all calls will be cancelled. The LSI indicator will also be cancelled.</p> <p>Prior to this situation occurring and if there are calls present, the MPU will reverse the doors if they failed to finish closing within 7 seconds. Three attempts are then made to close within 10 seconds and then the doors will go for the full 30 seconds to close.</p> <p>Following a door closing protection fault, the doors will park open and will only close again if a car or hall call is operated. If a door closing protection fault occurs again, the lift will then only respond to car calls.</p> <p>This fault may be caused by an obstruction in the door track, or persons reluctant to move clear of the doors.</p>

12	Call transferred or cancelled	<p>If the lift has not moved in response to calls present for 45 seconds, hall calls to which it should have attended will be released to the other lift (if one exists), the event is recorded, and the LSI indicator will be cancelled.</p> <p>If “Door Nudging” feature has been specified, the MPU will sound a “Selfish Use Buzzer” discontinuously (if fitted), in the lift car in order to encourage the occupant to let the lift go.</p> <p>If the lift still has not moved in response to the calls present for over 100 seconds all car calls will be cancelled. The buzzer will stop, and the LSI indicator will remain cancelled. If the lift is operating as a simplex, all hall calls will be cancelled as well.</p>
20	Safety edge is holding the front doors open for too long	If the lift doors are held open by continuous operation of the safety edge for more than 20 seconds, the event is recorded.
27	The feed to the landing push has been lost	If the feed to the landing push-button is lost, which could be caused by a blown LPF fuse, the event is recorded, the lift will run in bus stop mode and respond only to car calls.
37	A landing down push is stuck or being held in	If the down landing call is not released within the expected time, it will be presumed stuck. The call will be ignored in future until it is released and reinserted, the fault is recorded along with the floor level that is affected.
51	System bias to DOWN calls	This event is recorded after heavy duty or peak duty has finished, to indicate the system is back to normal.

619. The equivalent log for Lift H091 repeatedly shows the same communication failure between 02:31 and 02:33 and is therefore less informative. An extract is below:

All of the remaining faults were recorded on the date of the incident:

LOG	CODE	DESCRIPTION	POS	TIME	DATE	CARD	PHOTO Ref.
195	01	LOST LAR	11	02:33	14/06/2017	C	DSC_0039
194	48	SE COMMS FAILURE	11	02:33	14/06/2017	C	DSC_0040
193	50	SE COMMS OK SE5	11	02:33	14/06/2017	C	DSC_0041
192	48	SE COMMS FAILURE	11	02:33	14/06/2017	C	DSC_0042

620. The relevant “verbose” descriptions are set out below:

Fault code	'Verbose' description	Further information from Thames Valley Control
01	Lift Available Relay de-energised	<p>The LAR Relay (Lift Available Relay), on the motor panel provides the signal to the MPU (Microprocessor Unit). Whenever the LAR relay is de-energised, for example, due to the stop switch being operated, or the lift switched to maintenance control, the event will be displayed.</p> <p>The event will remain displayed while this situation continues to exist. All car and landing calls will be cancelled and the LSI (Lift Service Available) indicator will be off. (This LSI indicator is only provided when requested)</p>
48	Communication failed between M6809 & shaft encoder	This event is recorded if communication fails between the M6809 and the Shaft Encoder unit.
50	Shaft encoder SE500P communications successful	Shaft encoder SE500P communication successful. The Shaft Encoder gives feedback to the MPU regarding the position of the lift in the shaft.

621. Crucially, no codes relating to fire recall or fire switch were recorded by the lift computer. Code numbers 68 and 70 are listed in Appendix A of the WSP report as relating to fire recall and the fire switch:

(68) FIRE ALARM RECALL	Lift returns to fire floor - no calls can be entered
(69) LANDING INHIBIT	Set if Landing Calls Disabled due to DDS or PTT
(70) *FIRE SERVICE*	Lift on Fire Service

622. In terms of the timings show in the logs above, I requested information from Thames Valley Control as to whether they were likely to be accurate or not. The following information was provided {TVC00000001}:

"Item 6 (a) asks about time accuracy. The times reported in the event will be accurate to the time set in the M6809's (MPU) real time clock (RTC). With regard to the accuracy of this real time clock, there may be a slight (very minimal) drift over time (i.e. minutes rather than hours) and would also rely on the battery back-up still working on the RTC. So if it was set right in the first place, and checked periodically, it should be fairly close to the real time.

Item 6 (b) asks how the time is set. This is set via the Human/Machine Interface (HMI) on the MPU. It follows a fairly standard setting process.

Item 6 (c) asks about clock checking. The facility is there for lift maintenance engineers to check but whether this is actually carried out is down to the lift contractor. We are unable to comment and would refer you to the lift contractor, who would be able to confirm either way."

623. I have not seen any evidence that the clock was checked by the lift maintenance engineers and therefore I cannot comment on how accurate the timings on the lift log provided were.

R.4. Use of lifts by firefighters

624. In Sections Q.3 to Q.6 above I set out in detail the firefighter evidence concerning the performance of the fire control switch on the night of the fire. In summary, the firefighters were unable to take the lifts under control. There is insufficient evidence available for me to be able to conclude why this happened.
625. A number of firefighters gave oral evidence to Phase 1 of the Inquiry as to the ways in which the lifts could have been used on the night if they had been firefighting lifts. I have considered this evidence, which is extracted below.

R.4.1. Watch Manager Michael Dowden

626. Watch Manager Michael Dowden gave evidence on 26 June 2018 regarding the use of the lifts in a fire. I have looked particularly from line 10 on page 57 of the transcript to page 60 line 16:

“Q. In terms of functionality, where you can take over or take control, as you say, of the lift using the lift key, what benefits would that bring you as fire crew in terms of firefighting and search and rescue?”

A. Initially, it's the speed of access to get to the bridgehead, because obviously time is very, very key in particularly high-rise fires. Also, we can leave the lift at the bridgehead level, so if we rescue any casualties, again, we have ease and rapidity of getting the casualty out of the building and to a point of care.

Q. What about later on? What other benefits would having control over the lift give you in terms of rescue?

A. Can you just repeat that question?

Q. What benefits would having complete control over the lift give you in terms of rescue?

A. It would refer back to the same two points in terms of being able to get our personnel into the building and up to the fire floors quicker. In relation to Grenfell Tower, it was difficult because the fire was on the fourth floor, so we shouldn't really -- it's difficult -- you don't want to be going beyond the fire floor in any lift in a fire in a high-rise block. So it would only really be to transport personnel/equipment up to the bridgehead level, not beyond.

Q. In your experience, are there any risks to the occupants of the building during a fire in allowing or leaving the lift to be completely uncontrolled by the Fire Brigade?

A. Yes.

Q. What are they?

A. If it's completely uncontrolled by the Fire Brigade, that could lead to potentially residents using the lift in a fire, and potentially that's compromised, and then where the residents or occupants of that block may open the doors onto a fire floor or an area that is compromised. So that's why we generally will take command over it, so we can have control over that.

Q. So the consequences of the Fire Brigade not having control of the lifts are serious, are they?

A. They can be, yes.

Q. Can be. Do you know why the firefighting lift was out of order?

A. No.

Q. What was the immediate impact on your firefighting plans of the firefighting lift not working?

A. Initially there could've been a small delay in getting equipment up to the bridgehead but, as I said, because it was on the second floor, there was only a minimal travel distance from ground to second floor.

Q. Is there, or was there, an LFB plan or strategy for what should happen if the firefighting lift is out of order?

A. It's one of two things: you either have to utilise the stairwell or, as in the case I believe on that night, the crews, I believe, still actually used the lift to go up to the bridgehead.

Q. If the lift was out of order and not being capable of being brought under control of the Fire Brigade, what would you do to minimise the risks to occupants using it?

A. Looking at it now, the only thing we potentially could do is isolate the power supply to it. I don't think that was something that was done on that night.

Q. Would that be a normal thing to do?

A. Not normal, no.

Q. No. Can I ask you this: how normal in your experience is it when you arrive at a fire in a high-rise block to find that the lifts are either out of order or not being capable of being brought under LFB control?

A. In my own experience, I've not come across that before in an operational incident, no.

Q. Right. If the firefighting lift was out of order, how would that affect firefighting operations in the event that the fire didn't remain in its compartment of origin?

A. You know, the potential there is for residents still to use that in the -- and obviously the advice is not to use lifts in any fire incident, particularly in high-rise blocks, but, you know, obviously residents react differently in those situations; it's stressful, it's disorientating. Potentially, if they use the lift, that could expose them to real risk."

R.4.2. Crew Manager Charles Batterbee

627. CM Charles Batterbee also gave oral evidence to the inquiry on 28 June 2018. The transcript of his evidence from page 39 line 13 to page 41 line 13 states:

Q. Just looking at it first of all generally, when you can't take sole control of the lift, what consequences would that normally have in a fire in a high-rise block?

A. The consequences could be deadly.

Q. Could you explain?

A. Yes. So when you take control of the lift, as I've mentioned, our standard practice is a firefighter will get into that lift, and if you imagine, people in the room, you're in a lift and you're pressing the lift button, the open and close, there's so much control over that lift whereby if you press the door open button and then release it, almost like a car window going up and down, the second you take it off, that door will stop. So we don't have control of the door, and it also means that somebody from a higher floor may have already called the lift, which means that we could end up going up, have no control over the door and it would open on essentially the fire floor, which could be fatal.

Q. You say that could be fatal; how might that be fatal?

A. So, as I've explained, the lift, if it's not in firefighting mode and you decide to use it, and that lift goes up to a floor which is compromised by smoke or fire even and that door opens, you're not going to stop it.

Q. No.

A. So now essentially you're in a fire.

Q. And from the occupants' point of view, if they can call the lift freely at will and it's not under your control, what would that mean for their safety?

A. Sorry, could you repeat the question?

Q. If an occupant could call the lift freely –

A. Yes.

Q. -- in a fire, what would that mean for their safety?

A. If an occupant could call a lift -- well, generally the standard advice is don't use a lift in a fire in case it shuts down, the power shuts down, so it would be dangerous to get into that lift anyway.

Q. But if you, the Fire Brigade, did not have sole control over the lift and another occupant used it --

A. Yes.

Q. -- what risks would that present to the occupant?

A. Only the risk that if they got into that lift and it became compromised then they could be trapped in the lift where there is a fire present in a building.

Q. Yes. And so was the effect of not being able to bring it under control that it was effectively useless for your firefighting operations?

A. No, so obviously we've discussed the risk; however, we decided to take that risk because we wanted to get our equipment up to the bridgehead as soon as we could, and in that case it did go to the second floor.

R.4.3. Firefighter David Badillo

628. FF David Badillo gave oral evidence to the inquiry on 29 June 2018. The transcript from page 4 line 5 notes:

Q. Did that mean that the lift could be used freely by the occupants of the building?

A. Yes, it does, yes.

Q. Is that, in your experience, an acceptable risk in a high-rise fire?

A. It's a very high risk in a high-rise fire.

Q. Could you explain why?

A. We don't want members of the public using a lift in a fire situation because they can enter that lift and then something could happen to the power, and that will just stop the lift car on any floor it decides -- wherever it was descending, it will just stop and they won't be able to get out, and they're essentially trapped in that lift and it could -- I won't go into details.

The transcript from page 75:

"Q. In your experience, would the lift continuing as a normal lift have consequences for the occupants of the building?

A. There would be signs on every floor to say not to use the lift in the event of fire, because even if we took control of that firefighting lift, there's still another lift next to it which they could use.

Q. True. And if the lift was uncontrolled by the Fire Brigade and left available to occupants of the building to use, what consequences might that have for their safety?

A. It means that the lift could open on any door, could open up to the fire floor or a floor that is filled with smoke.

Q. Yes.

A. Yes, so could cause them danger.

R.4.4. Crew Manager Christopher Secrett

629. CM Secrett gave oral evidence to the inquiry on 5 July 2018. In his evidence, CM Secrett explained that firefighters had received information that a girl was trapped on floor 20 and they therefore attempted to rescue her. He explained how FF Dave Badillo, FF Christopher Dorgu and himself intended to go from the bridgehead to floor 20. He stated (page 71, lines 2-22):

“Q. What happened next? You tallied out, where do you go next?

A. We went to the lift.

Q. Is that in accordance with policy?

A. No.

Q. So why did you go to the lift?

A. It was a decision -- I can't remember if I made it solely or we discussed, but we was going a long way up the building, and it's not in policy but I wanted to use the lift to break the back of the journey going up there. It was probably in hindsight too far to go on a standard duration BA set because it's a lot of work to get up there, so I wanted to use the lift to get a lot of the hard work done for us.

Q. Did you tell anybody you were using the lift to get up to the 20th floor?

A. No.

Q. Okay. But I think I got your evidence, which is that you used it because you were concerned otherwise you'd run out of air because it was so far to go?

A. Exactly.”

630. CM Secrett also said the following which is recorded on the transcript on page 196 from line 13:

“Q. What risks to residents would your inability to bring the lift under your sole control present?

A. Well, there's a few. It allows the lift to be used by anyone who wishes to use it and the danger is they get in it and it, you know, stops and it fills up with smoke and they're stuck unexpectedly.

It also doesn't give us full control over it. So the normal procedure would be we would leave that lift at the bridgehead with the doors open, and if a casualty comes down, we can put them straight in the lift and take it down. Because we're unable to secure it, the lift would be going up and down the building if people are calling it, so that's another risk to the residents because it would slow down their rescue, effectively.

Q. What other risks might be presented? For example, to a resident who used the lift which then opened on a floor higher in the building?

A. Yes, so they might not be aware that there's a fire in progress and they might pop down to the fourth floor to see a friend and the doors will open and they'll be faced with a fire situation, and that's obviously extremely dangerous. We had no way of controlling that lift so it was just free for anyone in the building to call it and use it."

R.4.5. Firefighter Christopher Dorgu

631. FF Christopher Dorgu also gave evidence to the Inquiry on 9 July 2018 about their attempt to use the lift to effect a rescue on Floor 20. In particular, on pages 152-153 from line 6, he stated:

"Q. What did you understand about the capabilities of the lift as a firefighter's lift?

A. That we basically would have control over it, so we can call it down to the bridgehead, to the floor. We could travel up and down as we needed to effect rescues and distribute equipment.

Q. I think I have your evidence right: you didn't have a conversation with Chris Secrett about whether the lift was functioning in accordance with that capability?

A. No, no.

Q. Right. So eighth floor, the doors open, they don't close again. What were the conditions like on the eighth floor in the lobby?

A. Smoky. Because we had to leave the lift because it was obviously filling with smoke.

Q. How dense was the smoke?

A. In breathing apparatus, it's difficult to assess, but it was smoke -- it was visible smoke. You wouldn't want to breathe it in.

Q. So you then decide to use the stairs and you explain the decision-making you got to that. In the last part of the second paragraph on page 4 you say: "It wasn't

like we weren't taking a risk, it could of [sic] done that way but it shouldn't of done. It was not usual to do it [using the stairs] but necessary as there was no real option."

A. Yes.

Q. "Even without air it should technically be o.k. We've got more help coming, the fire should be out soon, the spread should be fine, people are evacuating o.k. Smokes spread as high as the twentieth for whatever reason. We presume she's in danger so we haven't got any other option. First options use the lift, second options use the stairs, o.k we'll use the stairs." Now, you've set out there a line of logic. Were those your thoughts at the time?

A. Yes."

632. Overall, the issue of whether and how the additional features of a firefighting lift (as well as the correct operation of the fire control switch) may have made a difference to firefighting operations/residents' ability to escape are a matter for the Inquiry and outside my expertise.
633. However, in my professional opinion, there are good and important reasons why residential high-rise buildings are required to have firefighting lifts (where it is reasonably practicable) with functioning fire controls. Some of these reasons are explained very cogently in the firefighter evidence.
634. These reasons are also set out in some detail in the British Standards documents mentioned earlier in the report. A failure to ensure the correct features and operation of the lifts, which in my professional opinion occurred in respect of the Grenfell Tower lifts, is not merely technical or academic.

R.5. Conclusions

635. From the available information, the two lifts on the night of the fire did not perform as would be expected due to the following, but not exhaustive, areas of concern.
- 635.1. The fire control switch did not work, and therefore the firefighters could not take the lifts under their control. The reasons as to why this might have happened are explored in detail in Section Q, but ultimately I cannot come to a safe conclusion as to why this occurred.
- 635.2. On the night of the fire, the lifts were operational according to the WSP report until approximately 03.07 (lift H090 – left hand lift) and 02.31 (lift H091 – right hand lift). During this period, the residents and firefighters at Grenfell Tower were able to use these lifts. I am unable to determine why each of the lifts stopped operating when they did, but in my opinion this was likely due to the extreme environmental conditions (smoke and heat) rather than any underlying maintenance issues.

- 635.3. As the lifts were not specified as firefighting lifts, there was no additional safety protection provided such as dual power supplies, water protection, car roof trap door, fire communication, ramped threshold and drainage. There are good reasons why such features ought to be provided.

S. Limitations of this report

636. As detailed in Section Q.5, it is not known what happened to the lift drop key used on the night of the fire. This has affected my conclusions. Had I been able to test the actual drop key used on the night of the fire (i.e. one that has been positively identified by a chain of custody as that key, rather than a key that *may* have been the key used) I may have been able to come to firmer conclusions as to why the firefighters were not able to take the lifts under control.
637. As Grenfell Tower was extensively damaged as a result of the fire, this report only covers documents disclosed. Arup structural engineers advised that Grenfell Tower was no longer safe to enter although there was extensive emergency scaffolding propping in place. Therefore it was not possible to examine the lift wells, motor rooms or any lift and associated equipment that may still be in place and a full lift survey was not done.
638. However, having regard to the entirety of information reviewed (including reports concerning the examination of the lifts), I do not consider my non-attendance at Grenfell Tower to be a material limitation as far as my report and conclusions are concerned.
639. In terms of considering why the lifts eventually stopped functioning on the night of the fire, the relevant information is contained within the event logs of the lift controller which I have referred to in other parts of this report. Attending Grenfell Tower would not have provided any further material information as to why the lifts eventually failed on the night of the fire.
640. A number of documents relating to the original installation and Project 1 in particular have not been available. Many have been destroyed. In particular, the Operations and Maintenance Manual which was produced following Project 1 was not available. Where relevant documents have not been available, I have indicated this in the main body of the report and explained the extent to which the missing information has affected my conclusions. However, overall, I have had access to sufficient information to address all of the questions in my instructions and I do not consider the lack of some documents to be a material limitation in terms of my report or conclusions.
641. At the time of writing I am waiting for a witness statement from Michael Arnold (BV Lift Engineer). I have been able to reach provisional conclusions on the relevant issues without this evidence. If necessary, I will revisit my conclusions upon receipt of this evidence and issue a supplementary report.
642. I have not, so far, been able to establish who, when and why physically disconnected the automatic lift fire recall function (linked to the Building Management System and the fire detection system).
643. The Inquiry also sought evidence from David Steppel of TMO and Jim Bryce of Butler & Young Associates but for justifiable reasons they have been unable to provide statements. I do not consider the lack of evidence from either Mr Steppel or Mr Bryce to have impacted materially upon my conclusions.

T. Final Conclusions

644. In concluding, I will begin by addressing each question set out in my instructions.

T.1. Relevant legislation, regulation and guidance for fire lifts and firefighting lifts in 1970s (original design and construction), 2005 (first lift refurbishment) and 2012-2016 (second lift refurbishment) (“the Relevant Standards”).

645. I consider in detail the relevant legislation, regulations, guidance and standards for all three of these periods in **Section E** of my report.

T.2. Did the lifts as installed/refurbished in 1972, 2005 and 2012-2016 comply with the Relevant Standards?

646. In terms of 1972-1974, at **Section F** I find that there is not enough information for me to be able to determine whether the lifts as installed complied with the Relevant Standards.

647. As to 2005, in my view, following the lift works, the lifts did not comply with the Relevant Standards.

647.1. The Relevant Standards are set out in **Section E.2** of my report. In that section I set out the standards for a firefighting lift, relying mainly on BS 5588-5: 1991, BS EN 81-72: 2003 and BS 5588-5: 2004.

647.2. In **Section H** I explain that, although Project 1 involved lift works in an existing building, there was still a duty to consider whether the lifts could be brought up to the full firefighting standard, and to consider how reasonably practicable this was.

647.3. In **Sections I** and **J.1** I consider the roles of the key parties, Butler & Young and Apex, in ensuring that the lifts complied with the Relevant Standards. I find that both companies could and should have done more to ensure compliance and/or flag non-compliance with the Relevant Standards to the TMO.

647.4. I also conclude in **Section L.3** that there is no evidence that the TMO asked the right questions to Butler & Young and/or Apex about whether the lifts met the Relevant Standards and could have been upgraded to do so.

648. As to 2012-2016, in my view, following these lift works, the lifts still did not comply with the Relevant Standards.

648.1. The Relevant Standards are set out in **Section E.3** of my report and I note that they had not significantly changed since Project 1, in Section E.2.

648.2. In **Section J.2** I consider Apex’s involvement in Project 2. I conclude that the scope of works in relation to Project 2 was limited, and therefore Apex was not under a

duty to tell TMO that the lifts at Grenfell Tower did not comply with the Relevant Standards.

- 648.3. I also look in **Section L.4** at the TMO's involvement. I find that they knew that the lifts at Grenfell Tower did not meet the Relevant Standards, and that Project 2 was a missed opportunity for the TMO to raise this and potentially carry out works to upgrade the lifts to the firefighting standard.

T.3. Did the Tenant Management Organisation's policy on firefighting lifts comply with the Relevant Standards?

649. In **Section L.1** I explain that the TMO's policies on firefighting lifts adopted their own definition of a firefighting lift, which was not the same definition as set out in the Relevant Standards. This meant that the policies were likely to cause confusion.
650. However, some of the TMO's policies on firefighting lifts complied with the Relevant Standards in some ways because they seemed to require new or replacement lifts to comply with the Relevant Standards which, presumably, would include the firefighting lift standard.

T.4. If they did not, to what extent did they fail to comply and what impact would this have had on their functionality, particularly with regard to fire safety and their ability to function in a fire?

651. In **Section I**, particularly **Section I.3, I.4 and I.5** I set out the ways in which the lifts did not comply with the requirements of a firefighting lift.
652. There are a range of ways in which these missing features could have impacted on the functionality of the lifts and their ability to function in a fire, and those are also detailed in these sections. I also touch upon this issue in **Section R**, particularly **R.4**.

T.5. Were the lifts maintained to an appropriate standard and in compliance with the Relevant Standards and industry practice?

653. I consider the maintenance of the lifts in detail in **Section M** (relating to PDERS), **Section N** (relating to Bureau Veritas) and the Relevant Standards regarding maintenance are set out in **Section E**.
654. I focused on looking at the maintenance of the features of the lifts which could affect the performance of the lifts in a fire, i.e. the fire control switch.
655. In this respect, although I identify some failures, overall, the lifts appear to have been maintained to an appropriate standard and generally in compliance with the Relevant Standards and industry practice.

T.6. How did the lifts perform on the night of the fire? What were the reasons for any failure to perform?

656. I set out in detail the way the lifts performed on the night of the fire in **Sections Q**, particularly **Q.3** to **Q.6**, and **Section R**.
657. I conclude that, despite trying, CM Secrett was unable to use the fire control switch to take control of the lifts. I have tested a number of drop keys but I cannot say with certainty that one of the keys tested was the key used by CM Secrett. I therefore cannot come to a safe conclusion as to why the firefighters were unable to take control of the lifts on the night of the fire. As the fire control switch had been tested quite recently, prior to the fire (if the relevant witness evidence is accepted by the Inquiry), I do not think that it is likely that a maintenance failure caused the problems with the fire control switch.
658. I conclude that, because the firefighters could not take control of the lifts, the lifts continued to operate as normal during the fire until 03:07 (Lift H090) and 02:31 (Lift H091). This meant that residents were able to call the lifts and use the lifts as normal.
659. I also note that, because the lifts were not firefighting lifts, they lacked a number of additional safety protection features.

DECLARATION

I understand that my duty in providing this written report and evidence to assist the Inquiry, and that this duty overrides any duty to any other party.

I confirm that I have no conflict of interest of any kind, other than any which I have already set out in this summary of findings. I do not consider that any interest which I have disclosed affects my suitability to give expert evidence to the Inquiry on any issue on which I have given evidence and I will advise the Inquiry if, between the date of this summary and the Inquiry hearings, there is any change in circumstances which affects this statement.

STATEMENT OF TRUTH

I confirm that I have made clear which facts and matters referred to in this report 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.

Signature:



Name in Full: Roger Ernest Hawkins