IN THE GRENFELL TOWER INQUIRY

RYDON MAINTENANCE LIMITED'S PHASE 1 CLOSING STATEMENT

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*References in the form **[A/p x]** are to page x of the document with Relativity reference A and references in the form **[Date/p y]** are to page y of the official transcript of the hearing held on Date.*

A INTRODUCTION

1. This is the Closing Statement for Phase 1 of the Grenfell Tower Inquiry of Rydon Maintenance Limited ("**Rydon**").

2. As the Chairman has stated:

> "*[…] until we understand the chain of events in some detail, it will not be possible to pinpoint the critical decisions that had a bearing on the exposure of the building to the risk of an uncontrollable fire.*"[1]
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> "*There are strong grounds for examining the cause and development of the fire and smoke as a first step, because until it has been possible to identify with reasonable certainty **what** happened it is difficult to direct attention to the question **why** it happened and to identify any errors or systemic failings that lay behind the tragedy.*"[2]
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> (Emphasis original)

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1 **[14 September 2017/p 14]**.

2 Chairman's Response to Submissions made on 11 – 12 December 2017 (Procedural Hearing No 1), dated 20 December 2017, para 19, available at: https://www.grenfelltowerinquiry.org.uk/sites/default/files/inline-files/Chairmans-Response-20.12.17_0.pdf, accessed 30 November 2018.

3. Rydon fully agrees with this reasoning. It therefore supports the approach taken by the Inquiry in restricting the focus of Phase 1 to the events of the early morning of 14 June 2017 at Grenfell Tower.

4. Rydon submits that the best manner in which to achieve Phase 1's objective, that is, to understand the chain of events in detail, would be for the Phase 1 Report to establish a provisional timeline of the fire. This provisional timeline would provide a baseline against which the Inquiry can proceed in Phase 2. Whilst evidence may arise in Phase 2 requiring the timeline to be revised, it should nonetheless assist in identifying those facts which are not controversial, identifying those which require further examination in Phase 2 and, in particular, focusing on those matters which are relevant to the Inquiry's remit.

5. Rydon reiterates its sincere condolences and sympathy to the bereaved, survivors and all of those affected by the Grenfell Tower fire. Rydon and its legal team have heard and read all of the evidence provided by witnesses from the BSRs and fire service personnel during Phase 1. It is impossible not to be moved and horrified by what happened on the night of 14 June 2017. Rydon intends no discourtesy in these submissions by refraining from commenting on this evidence in any detail. It is simply that, as there were no Rydon representatives present at the scene during the morning of 14 June 2017, Rydon has no direct knowledge of the matters on which much of the evidence inevitably focuses.

6. Save for briefly dealing with matters that have arisen so far which may be dealt with in Phase 2, Rydon therefore restricts itself in this Closing Statement to commenting, where it can, on matters which go toward achieving Phase 1's objective.

B THE EVENTS OF THE MORNING OF 14 JUNE 2017 AT GRENFELL TOWER

7. Rydon notes the four-stage schema that Prof Torero has established for the fire as follows:

> "• ***First Stage:*** *From the initiation of the event to the breaching of the compartment of origin [00.54 – 01.05]*
>
> • ***Second Stage:*** *From the breaching of the compartment of origin to the point when the fire reaches the top of the building [01.05 – 01.30]*
>
> • ***Third Stage:*** *The internal migration of the fire until the full compromise of the interior of the building, including the stairs [01.30 – 02.30]*
>
> • ***Fourth Stage:*** *The untenable stage [02.30 – extinction]*"[3]

8. In Rydon's submission:

(1) As expanded on in section B.3 below, the evidence does not support drawing a clear-cut boundary between vertical and lateral fire spread, as seems to be suggested by Prof Torero's distinction between the Second and Third Stages; and

(2) As expanded on in section B.4.1 below, whilst extremely difficult, it remained possible for residents to escape through the stairwell without protective clothing until after around 03.55. Therefore, the building cannot be said to have experienced "full compromise" during the Third Stage, between 01.30 and 02.30.

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[3] **[JTOS0000001/p 2/lines 13–18]**. Times are interpolated from fn 1 of the same source.

B.1 First Stage: Initiation, (before)[4] 00.54 – 01.05

9. It seems clear that the evidence supports a conclusion that the fire started in the southeast corner of the kitchen of Flat 16. It is a matter for the Inquiry as to whether to draw conclusions on this issue from the evidence that has been presented during Phase 1 and, if so, what conclusions to draw.

10. However, there appears to be a lacuna in the evidence to date, namely that no detailed forensic analysis has been undertaken as to what, precisely, was located in the corner-space next to the fridge freezer[5] or potential sources of ignition other than electrical items.

B.1.1 ITEMS STORED NEXT TO AND NEAR THE TALL FRIDGE FREEZER

11. The evidence of the residents of Flat 16 is that, on the night of the fire, there was only a mop/ brush and bucket kept in the corner-space[6] and that, although they sometimes kept other items such as washing powder or water there, they do not think there were any other items on 14 June 2017.[7]

12. Rydon draws the Inquiry's attention to a photo of the kitchen, Exhibit BEK/9,[8] and notes Counsel to the Inquiry's observation that the photo appears to show "*a mop and bucket or cleaning materials*" comprised of "*a pale blue object and some other objects*".[9] This suggests three or more objects were stored in the corner-space at the time of the photo, confirming that, at least from time to time, objects other than, or in addition to, the mop and bucket were stored there. Rydon intends no criticism of the residents of Flat 16 by submitting that it is

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4 Strictly speaking, the First Stage, initiation, must have started at some point prior to 00.54, as that was the time at which Mr Kebede phoned 999.

5 That is, the corner marked "Mop & Bucket" in Exhibit BK/2, **[IWS00000490/p 28]**.

6 Inquiry Witness Statement of Behailu Kebede, para 49.f) **[IWS00000490/p 9]**. Inquiry Witness Statement of Elsa Afeworki, para 9 **[IWS00000280/p 3]**. However, compare Third MPS Witness Statement of Elsa Afeworki, p 1 **[MET00013021/p 1]**, where Ms Afeworki stated that although the mop and bucket were usually there, she could not say if they were there on the night of the fire. Inquiry Witness Statement of Almaz Kinfu, para 7 **[IWS00000457/p 1]**.

7 Seventh MPS Witness Statement of Behailu Kebede, p 1 **[MET00013022/p 1]**. Inquiry Witness Statement of Elsa Afeworki, para 9 **[IWS00000280/p 3]**.

8 **[MET00012989]**.

9 **[21 June 2018/pp 48–49]**.

possible their recollections of what was stored in the corner-space on the night of the fire could be faulty – simply that there was no particular reason for the residents to remember precisely what was there at the time.

13. In any event, the exact nature of the materials that were located in the corner-space is highly likely to have a significant impact on the fire's behaviour in the very early stages, since these materials would have been among the first involved in the fire. The same logic also applies to items that may have been stored on top of the fridge freezer.[10] In order for the experts' investigations, modelling and reconstructions to produce reliable results, Rydon submits that it is necessary first reliably to establish what was there and that this part of the evidence is incomplete.

B.1.2 POTENTIAL SOURCES OF IGNITION

14. Dr Glover dealt with evidence of abnormal electrical activity:

(1) He found evidence of abnormal electrical activity in two of the exhibits from Flat 16 that he examined, Exhibits MJS/1 and JDG/1.[11]

(2) However, he accepted that:

(a) non-electrical fire origins were outside the scope of his expertise;[12] and

(b) electrical damage could indicate abnormal electrical activity that had caused a fire *or* that was the result of a fire.[13]

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[10] In his Seventh MPS Witness Statement **[MET00013022/p 1]**, dated 16 April 2018, Mr Kebede recalled: "*I sometimes kept boxes of cornflakes on top of the fridge-freezer but that night I'm sure there weren't any.*" However, Exhibit BEK/8 **[MET00012988]** is a photo of the kitchen showing what appear to be four or five cereal boxes stored on top of the fridge freezer (albeit the photo was taken some time before the fire). Again, it is possible Mr Kebede's recollection could be mistaken, as there was no particular reason for him to have remembered precisely what was stored on top of the fridge freezer, especially some ten months after the fire.

[11] **[27 November 2018/pp 22–23]**.

[12] **[27 November 2018/p 4]**.

[13] **[27 November 2018/pp 6–7]**.

15. A necessary consequence of the limitations of Dr Glover's expertise is that his evidence cannot establish whether or not abnormal electrical activity *caused* the Grenfell Tower fire. Indeed, to identify the area of origin of the initial fire within Flat 16, he relied on the evidence of Profs Bisby and Nic Daeid.[14]

16. Prof Nic Daeid dealt with the origin of the fire more generally:

    (1) She relied on the residents' evidence as to what was stored in the corner-space,[15] and considered the LFB investigators' photos and notes, but did not carry out a first-hand investigation herself.[16]

    (2) Having determined that the area of origin was the southeast corner of the fire, she relied on Dr Glover's evidence to rule out electrical appliances other than the tall fridge freezer[17] and she ruled out a deliberate cause.[18]

    (3) But Prof Nic Daeid did not rule out accidental ignition of the materials that were in the corner-space, *except for* accidental electrical ignition.

17. Therefore, even taken together, the evidence of the Inquiry's fire origin experts has not ruled out a non-electrical accidental cause:

    (1) The limitations on Dr Glover's expertise means he cannot rule out *any* non-electrical causes;[19] and

    (2) Prof Nic Daeid has ruled out only (a) deliberate causes and (b) some accidental electrical causes. She has not, expressly at least, ruled out all accidental causes.

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14 **[27 November 2018/pp 4–5]**.

15 See, for example, **[NNDS00000001/p 27/para 8.4.4]** and **[28 November 2018/p 53]**.

16 **[NNDS00000001/pp 5–6/paras 4.4–4.5]**.

17 **[NNDS00000001/p 88/para 8.8.54]** and **[28 November 2018/pp 37–39, 42–44, 47–50, 53–54]**.

18 **[28 November 2018/p 77–78]**.

19 And he certainly did not go so far as suggesting that any of the potential causes he has identified were absolutely causative.

B.2 Start of Second Stage: Escape of the fire from Flat 16, 01.05 – 01.09

18. As per Prof Torero's analysis, the Second Stage of the fire begins with the escape of the fire from Flat 16 and the ignition of the façade. The experts now all broadly agree on timing, putting this event at some point between 01.05.57 and 01.09.30.[20] At present, the two competing hypotheses for how this occurred, as formulated by Prof Bisby, are:

(1) **Hypothesis B1: "***The route of fire spread from inside the kitchen of Flat 16 to the external cladding was due to impingement of flames and hot gases from the kitchen fire within Flat 16 venting through an open window, the window infill panel within which the extract fan was mounted, or via the extract fan itself. This subsequently ignited the external cladding above the kitchen window of Flat 16 and led to sustained burning of the external cladding*";[21] and

(2) **Hypothesis B2: "***The route of fire spread from inside the kitchen of Flat 16 to the external cladding was due to parts of the internal window surround and external cladding system being penetrated by the fire, thus allowing fire spread directly into the back of the cladding cavity from within the room of origin. This subsequently led to sustained burning of the cladding either within the cavity or on its external surface, or both*".[22]

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[20] Prof Bisby: "*by about 01:09:30*" **[LBYS0000001/p 143/para 685]**. Dr Lane: "*by 01:08*" **[BLAS0000005/p 6/para 5.2.1]**. Prof Torero: "*01:05:57(+2mins) - The first evidence of fire having reached the cladding system*" **[JTOS0000001/p 35/line 1058]**.

[21] Prof Bisby's Phase 1 – Final Expert Report, para 688 **[LBYS0000001/pp 144–145]**.

[22] Prof Bisby's Phase 1 – Final Expert Report, para 695 **[LBYS0000001/p 146]**.

B.2.1 PROF BISBY'S VIEW

19. In his Phase 1 – Final Expert Report, Prof Bisby's conclusion was that:

    (1) Hypotheses B1 and B2 were equally likely to have been true; but

    (2) A combination of the two was *more likely to be true than either by itself*.[23]

20. In oral evidence, Prof Bisby clarified his view, by stating:

> "***To be honest -- I do say this at some stage in my report -- I think the only credible answer to that question is that it's going to be some combination of those two***, *because no matter what, the hot gas and flames exiting the compartment are going to be heating the cladding externally, and no matter what, you are going to be getting heat through the window surround, whether it[']s there or not, and into the cladding. It's a question of the relative importance of those two modes of heating the cladding, and I would be very hard pressed to say which one I think is dominant [...].*"[24]
>
> (Emphasis added)

21. The corollary is that, in Prof Bisby's opinion, it would *not be credible* to conclude that the fire broke out of Flat 16 by only *one* of the routes suggested.

22. It is correct to note that Counsel to the Inquiry went on to press Prof Bisby repeatedly as to which of the two hypotheses he thought individually was the more likely. Prof Bisby expressly stated that he was "*not enthusiastic to be drawn on this point*", but that "*[i]f you really push me*" hypothesis B2 was "*ahead by a nose*."[25] This does not take matters much further. It is, as things currently stand, reluctant speculation by Prof Bisby.

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[23] Prof Bisby's Phase 1 – Final Expert Report, paras 1217–1220 **[LBYS0000001/pp 259–260]**.

[24] **[21 November 2018/p 125]**.

[25] **[21 November 2018/p 135]**.

23. Common sense suggests that if the window were open, as it was, it would provide a route for the fire to escape, particularly given the proximity of the fire to the window. The evidence also supports the conclusion that this is what happened.

24. As such, Rydon would suggest that, if the Inquiry feels that it is necessary to choose between the two answers (and it is not clear why it would) Prof Bisby's evidence that the most likely route of escape was a combination of the two hypotheses is to be preferred. As set out in section B.2.3 below, Rydon believes that the evidence establishes that the window was, in fact, open and allowed the fire to escape.

B.2.2 PROF TORERO'S VIEW

25. Prof Torero agreed that hypotheses B1 and B2 were "*clearly the two most probable causes*".[26] He considered that the Chairman needed to consider both his own analysis and Prof Bisby's. Prof Torero further explained that his own analysis was a "*purely physical analysis of the problem*" and that Prof Bisby's analysis "*comes more from observations of images and evidence*."[27] Prof Torero also stated that if there were "*a need to refine [...] the exact conditions that led to ignition of the external system*", then he would need to revise his modelling following tests to establish those conditions in Phase 2.[28]

26. At this stage, Prof Torero's view "*from a physical perspective*"[29] was that Hypothesis B2 was the most likely route of ignition of the façade, but he did "*not discount by any means [...] what the visual evidence might show*".[30] Prof Torero here rightly accepted, in Rydon's submission, that his view, based mostly on theoretical considerations, would need to be amended in the event that evidence came to light demonstrating its falsity.

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[26] **[20 November 2018/pp 61–62]**.

[27] **[20 November 2018/p 64]**.

[28] **[20 November 2018/p 49]**.

[29] **[20 November 2018/p 73]**.

[30] **[20 November 2018/pp 73–74]**.

B.2.3 THE OPEN KITCHEN WINDOW AND THE OTHER REFRIGERATION UNITS

27. It is clear that a fire involving the tall fridge freezer and the items in the corner-space between the fridge freezer and the window would have been readily able to vent out of an opening such as an open window and/or the fan opening and ignite the façade outside.

28. In addition, as set out below, Rydon submits that the factual evidence strongly suggests that: (1) the kitchen window was wide open; and (2) the spare refrigeration units are likely to have been involved in the fire before it escaped from Flat 16.

29. This evidence would support a conclusion that Hypothesis B1 had a primary role in the initial escape of fire. However, aside from evidence provided by Mr Kebede regarding open flat windows, neither Prof Bisby, nor Prof Torero appear to have sufficiently considered this factual evidence.

B.2.3.1 The factual evidence strongly suggests that the kitchen window was wide open

30. Rydon would invite the Inquiry to find that, at least, the smaller kitchen window was wide open, for the following reasons.

31. Two days after the fire, Mr Kebede recalled that the "*window was open by about ten inches*".[31]

32. LFB and Bureau Veritas investigators concluded, following their investigations immediately following the fire, that the kitchen window was open on 14 June 2017.[32]

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[31] Second MPS Witness Statement of Behailu Kebede, p 2 **[MET00006339/p 2]**.

[32] For example, see Fire Investigation Scene Additional Notes of WM Bradshaw, dated 16 June 2017 **[MET00005764/p 5]**, MPS Witness Statement of Matthew Leaver, dated 10 October 2017 **[MET00007781/p 11]** and Bureau Veritas Fire and Safety Department Report, dated 7 November 2017 **[MET00007996/p 8/para 3.12]**.

33. Although, around a year after the fire, Mr Kebede later stated that he could not remember,[33] or did not specifically notice,[34] whether the window was open, he stated in his witness statement to the Inquiry that "*[d]uring summer, the kitchen window was normally kept open all the time.*"[35] Given that there is no dispute that conditions were warm and summery on 14 June 2017, Rydon submits that, at the very least, and absent contrary evidence, the starting point should be that it is more likely than not that the window was open.

34. Prof Bisby's view, based in part on Mr Kebede's evidence, but also on his own analysis, is that video 1 from his Phase 1 – Final Expert Report showed "*the larger pane, the tilt pane, […] tilted inwards 40/50 millimetres, a couple of inches*"[36] and the "*smaller window […] an inward swinging window […] open 10 inches, so it's essentially wide open.*"[37]

35. Rydon would also draw the Inquiry's attention to photos taken by Mohamed Hariri, a resident of Flat 21, Floor 5, who exited the tower through the main entrance at 01.02.58,[38] which do not appear to have been considered thus far by the experts. These photos, Rydon submits, are consistent with a finding that the kitchen window was open, and flames had begun to escape Flat 16 via the window by 01.04:

    (1) In Rydon's submission, Exhibit MH/1,[39] taken at 01.04,[40] could be interpreted as indicating fire initially beginning to exit the kitchen of Flat 16 via the wide open, smaller kitchen window that was next to the column, below the fan and hinged on the column side. The flame seems

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33 Eighth MPS Witness Statement of Behailu Kebede, p 3 **[MET00015023/p 3]**.

34 Inquiry Witness Statement of Behailu Kebede, para 69 **[IWS00000490/p 13]**.

35 In the same place.

36 **[21 November 2018/p 118]**.

37 **[21 November 2018/pp 126–127]**.

38 **[MET00016072/p 4/row 83]**.

39 **[IWS00001097]**.

40 **[IWS00001094/p 5/para 29]**.

to be coming out of the open side of that window, that is, the side furthest from the column and to the right as viewed in the image.

(2) Exhibit MH/2,[41] taken at 01.07,[42] shows a similar situation to that in Exhibit MH/1.

36. Finally, the earliest video of the fire taken by Mr Kebede,[43] at around 01.05.36, appears to show flame at the left-hand side of the window (as viewed from the outside), that is, the hinge side nearest the column, starting at about 01.05.37. Note that the window's multi-link hinge arrangement would produce a gap on the hinge side when the window was wide open, through which the flame could travel as well as the main opening.

B.2.3.2 The spare refrigeration units are likely to have been involved in the fire before it escaped from Flat 16

37. Prof Nic Daeid states that:

> "*it is unlikely that the old freezer and small fridge are in the area of origin of the fire although these appliances were clearly involved in the fire at some later point.*"[44]

38. It is not clear from Prof Nic Daeid's evidence whether she intends to express a view as to whether the old freezer and small fridge became involved before the fire escaped from Flat 16. [45]

39. In Rydon's submission, it is entirely possible that:

(1) the smaller refrigeration units were ignited and involved in the fire before FF Brown and CM Batterbee first made entry to the kitchen around 01.20.48; but

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41 **[IWS00001098]**.

42 **[IWS00001094/p 5/para 29]**.

43 **[MET000083355]**.

44 **[NNDS00000001/p 74/para 8.8.25]**.

45 **[NNDS00000001/p94/para 8.10.10]**. **[28 November 2018/p79]**

(2) that the fire in the smaller refrigeration units had been extinguished by the general firefighting activities of FF Brown and CM Batterbee as they made their entry – in particular their door procedure and pulsing the room with jets between 01.14 and 01.20.[46]

40. Moreover, given the smaller refrigeration units were located only around 0.5m away from the tall fridge freezer it is, in fact, more likely than not that they *were* involved before the fire escaped – regardless of whether they were the origin of the fire. If that is the case, the spare refrigeration units would have added additional fuel to the fire prior to its escape from Flat 16, further increasing the likelihood that it was able to vent out of the open window and impinge directly on the ACM panels.

B.2.4 SUMMARY

41. Rydon submits that, at present, it is not possible for the Inquiry to reach a conclusion as to the precise manner in which the fire escaped Flat 16's kitchen and ignited the façade for the following reasons:

(1) The two main experts on this point do not agree which of the two hypotheses should be preferred. In fact, Prof Bisby's view appears to be that it is likely that both hypotheses should be rejected, individually, in favour of a combination of the two;

(2) Both experts agree that further investigation and testing is needed;[47] and

(3) Rydon submits that, as set out in section B.2.3 above, there appears to be relevant factual evidence which has not yet been considered in their reports.

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[46] Prof Nic Daeid: **[NNDS00000001/p 31/para 8.5.14]**, CM Batterbee: **[MET00012871/pp 6–7]**, FF Brown: **[MET00010867/pp 8–9]**.

[47] Prof Bisby: **[LBYS0000001/pp 146–148/paras 694, 712, 714]**. Prof Torero: **[20 November 2018/pp 49, 90–93]**.

42. Finally, Rydon would also observe that there is no dispute that there would always be venting of fire once the kitchen fire was of sufficient intensity, which could occur with many kitchen fires: windows and window systems are not designed to be fire proof.

B.3 Second Stage moving in to Third Stage: Vertical and lateral fire spread until full compromise of the interior, 01.05 – 02.30

43. Rydon does not, of course, dispute that the fire demonstrated a rapid spread across the exterior of the building to the top of Grenfell Tower and notes that the experts have drawn comparison between the fire at Grenfell Tower and fires at other buildings with ACM cladding installed on their exteriors. Rydon accepts that, at Grenfell Tower, the presence of ACM cladding was an important factor, but submits that it was not the only factor in the spread of fire across the exterior of the building.[48] Moreover, Rydon agrees with the views expressed by Prof Bisby, Dr Lane and Prof Torero that the exterior of the building was a complex structure, and examining the precise contributions that each part of its construction played in the fire spread will require further work to be carried out in Phase 2.[49]

44. Consequently, Rydon is surprised that Profs Bisby and Torero appear to suggest in some parts of their evidence that:

(1) effectively, the only difference between Grenfell Tower and the comparator fires was the presence of extensive lateral fire spread and;

(2) that difference can be explained entirely by the presence of the architectural crown, as such a feature was not present from the buildings involved in the other fires.[50]

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[48] See, for example, **[LBYS0000001/p 4/para 19]** and **[BLAS0000002/p 17/paras 2.9.9 and 2.9.19–2.9.22]**.

[49] Prof Bisby: **[LBYS0000001/p 4/paras 19–20]**, Dr Lane: **[BLAS0000002/p 17/paras 2.9.25–2.9.27]**, Prof Torero: **[JTOS0000001/pp 70 and 131/lines 1967–1975 and 3082–3086]**.

[50] Prof Bisby: **[21 November 2018/pp 200–201]**, Prof Torero: **[JTOS0000001/p 131/lines 3092–3095]**.

45. Rydon submits that:

(1) the evidence shows that, as the fire climbed the building, lateral spread occurred before the fire had reached the architectural crown, and that the lateral spread across the crown did not show any significant advance over the lateral spread occurring on the rest of the building;

(2) although rapid, as submitted by Prof Torero and discussed below, the fire at Grenfell Tower spread upward relatively slowly when compared to fires at other buildings with ACM cladding;

(3) the experts have not considered relevant fires at other buildings where ACM cladding was present, but *both vertical and lateral* spread was limited; and

(4) therefore, caution should be preferred when trying to draw conclusions regarding the reasons for the external fire spread at this stage.

B.3.1 LATERAL SPREAD OCCURRED BEFORE THE FIRE HAD REACHED THE ARCHITECTURAL CROWN

46. In his Revised Phase 1 Report, when summarising the Second Stage of the fire, Prof Torero states that:

> "*[…]* ***flames on a vertical surface will spread far more rapidly in the upward direction than they will laterally***.
>
> *This was observed at Grenfell Tower where, in approximately the first 15 minutes following the establishment of flames on the exterior of the building, the flame spread rapidly from Level 4 to the top of the building,* ***while in the same period*** *only spreading laterally a matter of meters to the North.*"[51]
>
> (Emphasis added)

47. Rydon agrees that, in general, fire will spread far more rapidly upward than it will horizontally and submits that, absent contrary evidence, this provides an

[51] **[JTOS0000001/p 69/lines 1941–1946]**.

adequate explanation for the fact that flames were observed to spread less far laterally than vertically during the Second Stage. Indeed, Prof Torero appears to suggest exactly this mechanism in the extract quoted above.

48. However, in his summary of the Third Stage, Prof Torero suggests that:

> "*The third stage of the fire begins at approximately 01:30 when the external fire propagation reaches the top of the building and* ***begins*** *to spread laterally.*"[52]
>
> (Emphasis added)

49. Rydon submits that there is clear evidence of lateral spread *prior* to the time that the fire had reached the top of the building,[53] as acknowledged by Prof Torero himself, earlier in his report. On this point, Rydon therefore invites the Inquiry to reject the suggestion that external fire propagation only began to spread laterally *after* the time it had reached the top of the building around 01.30.

50. Furthermore, contrary to Prof Bisby's and Prof Torero's views, Rydon submits that the lateral spread across the crown did not show any significant advance over the lateral spread occurring on the rest of the building.

51. For example, figs 133, 135–137 (north face),[54] figs 139, 144–146 (west face)[55] and figs 151 and 155 (south face)[56] of Prof Bisby's Phase 1 – Final Expert Report show a diagonal flame front. Prof Bisby relies on the diagonal flame front shown in these photos to support his conclusion with regards to the architectural crown.

52. However, the diagonal flame front is consistent with normal fire dynamics of upward and lateral spread. If the architectural crown had been a "*linear fuse*

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52 **[JTOS0000001/p 120/lines 2831–2832]**.

53 For example, **[BLAR0000005/p 38/Fig 10.39]**.

54 **[LBYS0000001/pp 216–218]**.

55 **[LBYS0000001/pp 223 and 226–227]**.

56 **[LBYS0000001/pp 232 and 234]**.

moving around the top of the building",[57] as Prof Bisby put it, the expectation would be that the flame front advanced laterally at the crown significantly ahead of the flame front lower down the tower. But this is not the case: the flame front at the crown was never significantly ahead of the flame front at the upper levels of the tower. See, in particular, figs 136, 145 and 155.[58] Rydon submits that the rate of lateral spread seen at the crown is not any faster than would be expected from the rate of lateral spread as the fire moves vertically upward and around the building.

B.3.2 THE FIRE AT GRENFELL TOWER SPREAD UPWARD RELATIVELY SLOWLY WHEN COMPARED TO FIRES AT OTHER BUILDINGS WITH ACM CLADDING

53. Rydon agrees that the external spread of fire at Grenfell Tower was rapid in the context of fires at residential buildings in general. However, in the context of fires at buildings involving ACM cladding on the exterior, the upward spread was, relatively, slow.

54. Prof Torero noted in his oral evidence that the upward flame spread at Grenfell Tower travelled at around 4m/min as against the fastest comparable spread observed at a fire at The Address, Dubai in 2015, which travelled upward around 5½ times faster, at around 22m/min.[59] As Prof Torero made clear in his report, a "*comparison with other international events [involving ACM cladding] shows that upward flame spread for the Grenfell Tower is among the slowest*".[60]

55. This difference alone suggests that there are significant differences between Grenfell Tower and the other buildings that Prof Torero cites. Given this factor, it would not be safe at this stage to draw a conclusion which suggests that the only material difference between Grenfell Tower and those other buildings was the architectural crown, since Profs Bisby and Torero rely on the architectural

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57 **[21 November 2018/p 198]**.

58 **[LBYS0000001/pp 217, 226 and 234]**.

59 **[20 November 2018/pp 107–108]**. Assuming a height of 3m per storey, the upward spread at Grenfell Tower was around one storey every 45 seconds as against one storey every eight seconds at The Address, Dubai.

60 **[JTOS0000001/p 4/lines 92–93]**.

crown to explain the presence of lateral spread at Grenfell Tower, not the relatively slow rate of vertical spread.

56. Rydon submits that the Inquiry should not discount the possibility that the differences at Grenfell Tower which led to the vertical spread being relatively slow – that is differences other than the presence of the architectural crown – may also explain, or have contributed to, the unusually large amount of lateral spread.

B.3.3 FIRES AT OTHER BUILDINGS WHERE ACM CLADDING WAS PRESENT, BUT BOTH VERTICAL AND LATERAL SPREAD WAS LIMITED

57. Whilst Prof Torero has made a comparison of the rate of vertical fire spread at Grenfell Tower with the rate of vertical fire spread at other buildings whose exterior façades involve ACM cladding, he has not made an exhaustive comparison of the fire at Grenfell Tower with every fire at similar buildings (and nor does he purport to have done so). However, Rydon submits that by invoking comparison with the limited set of buildings represented in Prof Torero's sample, there is a risk that the Inquiry might be led into drawing improper conclusions.

58. There have been fires at other buildings that were clad with ACM products similar, or identical, to those specified and installed at Grenfell Tower which did not involve significant vertical or lateral fire spread and, in some cases, were contained within the compartments of origin. The reasons for the different outcomes at those buildings are not yet known, but these buildings will have differed from Grenfell Tower in a number of ways: amongst others, in their architecture, the products specified for insulation and cavity barriers and so on. Rydon expects that the Inquiry's experts will be examining such further relevant comparisons extensively during Phase 2 and makes no further comment at present.

B.3.4 CAUTION SHOULD BE PREFERRED WHEN TRYING TO DRAW CONCLUSIONS REGARDING THE REASONS FOR THE EXTERNAL FIRE SPREAD AT THIS STAGE

59. Rydon submits that, for the reasons set out above, the Inquiry is not yet in a position to reach any firm conclusions regarding the reasons for external fire spread at Grenfell Tower. Rydon notes that quantification of the contributions from factors other than ACM all remain to be determined, in the experts' opinions. Rydon agrees that is sensible and that further modelling and reconstruction work needs to be done to complete the evidence before the Inquiry makes findings in respect of these issues.

B.4 Fourth Stage: Untenable period, 02.30 until extinction

B.4.1 HOT ZONE IN THE STAIRWELL

60. Dr Lane indicates that, in her view, a hot zone developed between Levels 13 and 16 in the stairwell. Dr Lane suggests that:

(1) the hot zone may have developed due to a stairwell door being held open due to firefighter activity;

(2) it "*seems likely that residents above Level 11 could not escape at this time due to the resulting conditions in the stair. Conditions on the stair appear to have been such that the stair lights on Level[s] 13 – 16 were melting at that time. Temperatures of 150°C would have caused immediate pain to exposed skin. Therefore, it would likely have caused a physical and psychological barrier to escape.*"; and

(3) this "*may have been a temporary condition around 02:00 – 02:30*".[61]

[61] **[BLAS0000014/p 76/para 14.4.166]**. The quotations are taken from subparas f) and i) respectively.

61. Rydon does not dispute that the evidence shows that the stairwell was subject to significant heating on Levels 13 – 16 at some point during the fire. However, it is questionable whether:

(1) A firefighter, even in protective clothing, could have remained at a door, even if they were keeping at low level, with such hot gases or flames issuing from it as to burn the adjacent stair light fitting entirely; and

(2) Dr Lane's timing is correct.

62. Several residents evacuated from the building by moving through Levels 13 – 16 in the stairwell during, or very shortly after, the times in which Dr Lane suggests this would have been all but impossible:

(1) Nick Burton and Pily Burton escaped from Level 19 (with firefighter assistance) and reached the base of the stairwell at around 02.33,[62] their escape from Level 19 having taken around 10 minutes.[63]

(2) Flora Neda and Farhad Neda escaped from Level 23 (without firefighter assistance) and reached the base of the stairwell at around 02.42,[64] their escape from the top of the tower having taken around 10–15 minutes.[65]

63. It is highly unlikely that the stairwell could have experienced heating to temperatures of 150°C and above between approximately 02.00 and 02.30 but returned to conditions through which it was possible to evacuate without protective clothing within a matter of minutes thereafter. Given that the Gomes family escaped through the stairwell, leaving Level 21 at around 03.25, and with Marcio Gomes the last of them to exit the tower at around 03.55,[66] Rydon would

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62 **[MET00016072/p 38/rows 789 and 791]**.

63 Mr Burton made his second 999 call at 02.13 **[LFB00000344]**, around 10 minutes before firefighters reached his front door **[IWS00000064/p 9/para 39]** and **[6 November 2018/pp 60–61]**.

64 **[MET00016072/p 39/row 814]** and **[MET00016072/p 40/row 821]**.

65 **[IWS00000886/p 8/para 45]** and **[18 October 2018/pp 93–94]**. See also **[18 October 2018/pp 74–75]** where Mr Neda describes receiving at text message at 02.02, which was around 15 minutes before they started to make their escape.

66 **[IWS00001078/p 34/para 177]**.

suggest that the hot zone more likely developed at some time around or after 04.00.[67]

64. Finally, Rydon would note that the evidence of residents escaping via the stairwell set out above is also inconsistent with Prof Torero's suggestion that the building "*including the stairs*" experienced "*full compromise*" during the Third Stage of his schema, between 01.30 and 02.30.[68]

B.4.2 MATTERS NOT INSIDE RYDON'S SCOPE OF WORKS DURING THE REFURBISHMENT

65. For the avoidance of doubt, the following matters were not inside Rydon's scope of works during the refurbishment:

(1) Replacement/ refurbishment of the front doors of the flats in Grenfell Tower on Levels 4 – 23. Those doors had been replaced in 2011 prior to Rydon's involvement. Rydon notes that the evidence suggests the door closers were in poor condition, and submits that this is a matter for the experts to deal with and consider the effect.

(2) Works to the lifts. Again, the lifts were refurbished prior to Rydon's involvement. Rydon's works in relation to the lifts during the refurbishment were limited to the installation of new entrances to the lift shafts on Levels 1 and 3 to serve the new flats built as part of the refurbishment.

B.4.3 THE SMOKE VENTILATION SYSTEM

66. The smoke ventilation system formed part of Rydon's Mechanical & Electrical ("**M&E**") works. This meant that the parties involved included consultants to the KCTMO, such as Max Fordham LLP and Rydon's M&E subcontractor, J S Wright & Co Limited ("**JSW**"). The specialist nature of the work necessitated

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[67] And, Rydon would submit, there are other more plausible reasons which could explain why no residents evacuated from above the hot zone during the times that Dr Lane has indicated, such as the fact that the "stay-put" policy was still in force at that time for FSG callers.

[68] **[JTOS0000001/p 2/lines 16–17 and fn 1]**.

the involvement of PSB UK Limited, who were commissioned by Max Fordham to provide technical proposals and advice and also involved with designing and commissioning the system under contract with JSW. Rydon's role in the process was one of coordination, ensuring that the specialist subcontractors were corresponding with each other and liaising with the client.

67. Rydon notes that some reference has been made to the smoke ventilation system as a possible route of smoke travel, but that the evidence to date does not allow any conclusion to be drawn that this possible route of smoke spread was significant and further work is planned for Phase 2 by a number of the expert witnesses.[69] In any event, the experts accept that the smoke ventilation system was only designed to remove smoke from one floor and would never have had sufficient capacity to remove smoke from multiple floors.[70]

B.4.4 GAS RISER PENETRATIONS TO STAIRWELL

68. Dr Lane has amended her view as to whether gas pipe penetrations to the stairwell were responsible for spreading fire to the stair. As set out in her supplemental Phase 1 Report, Dr Lane's view is now that:

> *"19.6.8 During my site inspection I observed service penetrations included a lateral gas pipe penetration on 12 floors (Levels 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17 and 21) to the riser gas pipe within the stair. These pipe penetrations did not appear to be fire stopped (Section 16.7).*
>
> *19.6.9 However, I did not observe evidence of fire spread to the stair by this penetration. Therefore, it does not appear that this non-compliance contributed to the spread of fire to the protected stair."*[71]

69. During oral evidence, Dr Lane did not resile from the view set out in her supplemental report, save that she noted the possibility of smoke transfer

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[69] For example, Dr Lane: **[BLAS0000002/p 69/para 2.23.52]**.

[70] Dr Lane: **[26 November 2018/p 167]**, Prof Torero: **[20 November 2018/p 193]**.

[71] **[BLAS0000019/p 29/paras 19.6.8–19.6.9]**.

between lobbies via the pipe boxing in the stairs.[72] Rydon submits that it is unlikely that transfer by this route was significant, given its small size, but notes that Dr Lane has reserved her conclusion as to the significance of each route for Phase 2.

B.5 Matters regarding the events of 14 June 2017 at Grenfell Tower which the experts have indicated should be dealt with during Phase 2

70. Rydon notes that the experts are instructed to report on various issues to Phase 2, including, amongst others:

(1) Prof Torero:[73]

(a) Forensic fire and smoke spread throughout Grenfell Tower;

(b) The correlation between the fire safety provisions and the fire safety strategy for Grenfell Tower, and various aspects of the adequacy of the London Fire Brigade's procedures and training;

(c) Overview of conclusions to be drawn about the Grenfell Tower fire;

(d) Overview of lessons to be learned when comparing the Grenfell Tower fire with other fires, both international and domestic; and

(e) Any recommendations arising from the same.

(2) Prof Bisby:[74]

(a) Final conclusions about fire spread to and over the exterior of the building;

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72 **[26 November 2018/pp 69–76]**.

73 **[20 November 2018/pp 2–3]**.

74 **[21 November 2018/pp 3–4]**.

(b) Performance of the materials which formed part of the exterior of the building and their respective contributions, if any, to the spread of fire, which would include, a review of testing by the BRE and other relevant testing bodies; and

(c) A review of the standard testing regime.

(3) Dr Lane:[75]

(a) The effect of non-compliances identified, including whether they resulted in the building being less satisfactory than it was before the work was carried out;

(b) What, if any, alternative compliance approaches were in fact adopted; and

(c) Final view on compliance of the building works carried out over time at Grenfell Tower with the applicable regime.

71. Further, the active and passive firefighting measures of the building are going to be subject to further expert comment, including by a lift expert (to be instructed), gas expert (Rodney Hancox), water expert (Dr Ivan Stoianov) and firefighter expert (Steve McGuirk).

72. Given that the experts will be carrying out a significant amount of further work so that they are able to report on these matters during Phase 2, Rydon's submission is that it would be inappropriate for the Inquiry to reach any firm conclusions on these matters prior to hearing all of the expert evidence in Phase 2. Where the experts have, nonetheless suggested any firm conclusions in their Phase 1 reports in respect of these matters, such conclusions should be read subject to this proviso.

[75] **[22 November 2018/pp 21–22]**.

C CONCLUSION

73. Phase 1 of the Inquiry is, primarily, a fact-finding process. As Rydon understands matters, the focus of Phase 1 has not shifted from that set out by Counsel to the Inquiry in his opening statement:

> "*This means that the focus of Phase 1 will be the events of the night of 14 June 2017 and, in particular, the state of the building at the time of the fire, including the existing fire safety and prevention measures at Grenfell Tower; where and how the fire started; the development of the fire and smoke; how the fire and smoke spread from its original seat to other parts of the building; the chain of events before the fire was finally extinguished; and the circumstances of the residents and others present in the tower, including those who evacuated the tower.*"[76]

74. Where the Inquiry has sufficient, reliable evidence to reach conclusions on these matters, it will, of course, be expected to do so in the Phase 1 report. But where issues remain as yet undetermined, or require further investigation, Rydon submits that reaching conclusions prematurely would do a disservice to all those whom the Inquiry is here to serve. Rydon notes that some of the evidence during Phase 1 has focused on matters prior to 14 June 2017 such as alleged defective work. As these fall outside of the scope of Phase 1, Rydon makes no substantive comments in this statement, but will be ready and willing to assist the Inquiry during Phase 2 if it wishes to pursue these issues.

75. There is also an imperative for the Inquiry to make recommendations as soon as practicable, where such recommendations can be made on the basis of reliable evidence, and Rydon supports the process for considering interim recommendations that the Inquiry has adopted.[77]

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[76] **[4 June 2018/p 12]**.

[77] Chairman's Response to Submissions made at the Procedural Hearing on 3 September 2018, dated 12 September 2018, available at: https://www.grenfelltowerinquiry.org.uk/sites/default/files/inline-files/12.09.2018%20Chairman%27s%20response%20to%20the%20submissions%20at%20the%20Procedural%20Hearing%20on%203%20September%202018.pdf, accessed 29 November 2018.

76. Rydon remains committed to assisting the Inquiry's work and will continue to do so as the Inquiry moves into Phase 2 and begins the process of determining the remaining issues before it in the new year.

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