



An
Bord
Pleanála

FSC Report Template (June 2024 version)

ABP-317561-23

Appeal v Condition(s)	Appeal against Condition 2
Development Description	Proposed 3 Storey Apartment Building over Basement at Nutgove Avenue, Dublin 14
Building Control Authority Fire Safety Certificate application number:	FSC2202086SD/7DN
Appellant	AF Construction Ltd
Agent	GSP Fire Ltd. Chartered Engineers & Fire Safety Consultants
Building Control Authority:	South Dublin County Council
Inspector	Bryan Dunne

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1.0 Introduction

- 1.1. The application is for a new three storey apartment building over basement carpark (37 apartments), located at the junction of Grange Road/Nutgrove Avenue, Rathfarnham, Dublin 14. The building is served by 4 single stairways that are continued down to serve a shared basement.
- 1.2. The application made to the Building Control Authority (BCA) was for a normal Fire Safety Certificate (FSC) application.
- 1.3. A decision was made by the BCA to grant an FSC with three conditions, of which, only Condition 2 is being appealed.

2.0 Information Considered

2.1. The information considered in this appeal comprised the following:

- An Bord Pleanála Case No. ABP-312605-22.
- FSC application form, drawings and report produced by the appellant and submitted to the BCMS system on the 15th April 2022.
- BCA's request for additional information dated the 10th May 2022.
- A copy of the additional information submitted by the appellant to the BCMS system on the 30th March 2023.
- BCA's request for additional information dated the 19th April 2023.
- Additional information submitted by the appellant to the BCMS system on the 11th May 2023.
- Fire Safety Certificate Grant issued by the BCA, Ref: FSC2202086SD/7D, Managers Order No. FSC132/23 dated the 14th June 2023.
- Appeal submission by the appellant to An Bord Pleanála dated 3rd July 2023.
- Appeal submission by the BCA – Fire Officer's Report dated the 19th July 2023.
- Further submission by the appellant to An Bord Pleanála on the 5th September 2023.

3.0 Relevant History/Cases

3.1. I am not aware of any relevant Building Control history relating to this appeal site.

There was no documentation of any previous Fire Safety Certificate (FSC), Revised FSC, Regularisation FSC or any dispensation/relaxation of the Building Regulations (relating to this site) included in the file being reviewed.

3.2. As part of the appeal application the appellant references what they refer to as a 'similar case', ABP Ref. No. ABP-312605-22. This application was for a nine storey over basement, mixed use development at the corner of Second Avenue and Cookstown Way at Cookstown Industrial Estate, Tallaght, Dublin. Their application included 3 apartment blocks ranging in height from 6 to 8 stories over a common basement carpark.

This FSC application was not made by the same Fire Consultant nor was it for the same client. The similarity between this previous application and the one currently being appealed is that they were both for apartment blocks over a common basement car park. At the time, the BCA put the following sprinkler condition on the 2022 application:

Condition 2

The proposed basement car park including ancillary areas at basement level shall be provided with a sprinkler system in accordance with BS9251:2021.

Reason

To comply with the provisions of Part B of the Second Schedule of the Building Regulations 1997-2019.

On appeal the BCA were instructed to remove this condition.

4.0 Appellant's Case

4.1. The appellant is appealing the attachment of Condition 2 to the grant of the FSC on the basis that it sets out requirements that are not necessary to demonstrate compliance with Part B of the Building Regulations. The following points are set out in support of their appeal:

- The development consists of three storey apartment blocks over a common basement car park. Each apartment block is served by a single stair which extends down to basement level and is double lobby protected with the initial lobby off the car park provided with 0.4m² ventilation. In addition, the carpark which is only required to have 2.5% natural ventilation is provided with approx. 5.4% and is equivalent to an open sided car park.
- The appellant states that TGD B: 2006+A1: 2020 makes no reference to the inclusion of sprinklers in basement car parks in buildings less than 30m in height nor is required in the draft TGD B: 2023.
- In addition, the appellant points out that ABP have previously adjudicated on a '*similar case*' (ABP Ref No. ABP-312605-22) where a sprinkler condition attached to a granted FSC was appealed that condition subsequently removed.

On the basis of the above points, appellant recommends the removal of Condition 2.

5.0 Building Control Authority Case

5.1. In support of their case for sprinkler protecting the proposed basement car park the BCA's response to this appeal was broken down under the following headings:

- (a) Technical Guidance Document B (TGD B) Review
- (b) Basement Car Park Ventilation
- (c) Draft Building Regulations
- (d) Background Research into Car Fires
- (e) Case Studies
- (f) Electric Vehicles
- (g) Dublin Fire Brigade Firefighting Intervention
- (h) Electric (EV) Car Fires
- (i) EV Firefighting Operations
- (j) Structural Integrity/Fire Protection Concerns
- (k) Broader Implications Considered
- (l) Conclusion

(a) Technical Guidance Document B (TGD B) Review

The BCA begin by identifying the changes made under Section 3.5.2 in the 1997 and the 2006, 2020 (Reprint) of TGD-B and make the point that in the 2006 version the guidance in relation to car parks was modified with the following statement being removed *'there is evidence that fire spread is not likely to occur between one vehicle and another'*. In addition, they take issue with the statement *'the fire load is well defined'* and are of the view that the background information they provide raises questions with regards this statement.

(b) Basement Car Park Ventilation

They note that under Section 3.5.2 of TGD-B the current minimum ventilation requirements for mechanical or natural ventilation are typically 10 air changes per hour or 2.5% of the car park floor area, with the ventilation being provided primarily to move the products of combustion away from the fire location which in turn assists in the control of fire spread and protects the lives of fire fighters. The point is raised that there is currently no requirement in BS 7347-7: 2013 to meet any set visibility or temperature criteria for either the means of escape or the firefighting phase of any fire incident and that the existing ventilation requirements are very likely to be inappropriate for multiple vehicle fires.

In addition, they make the point that EV car fires produce higher volumes of smoke with a prolonged burn period which in turn exasperates the risk in the basement from both a means of escape and firefighting operations point of view.

(c) Draft Building Regulations

The BCA make reference to both the Draft Building Regulations (brown book) and the Proposed Building Regulations (blue book) and the fact that both recommended basement car parks be provided with sprinkler systems to be BS5306 and that they are making the case for this same provision now, some 50 years later.

(d) Background Research into Car Fires

As part of their submission the BCA makes reference to the following documents:

1. Fire Note 10 "Fire and Car Park Buildings" produced by The Ministry of Technology and Fire Offices Committee Joint Fire Research Organisation, 1968
2. "Fire Spread in Car Parks" produced by the BRE in 2006 after been commissioned by the UK Department of Communities and Local Government
3. "Natural Fires in Closed Car Parks" research undertaken by Daniel Joyeux, 2007

A summary of the research above identified:

- The cars used and the material they were constructed from have a far lower calorific value than modern vehicles.
- Compared to when the above studies were undertaken, the predominant manufacturing material in cars is now plastics.
- It is expected that during the early stages of a vehicle fire the failure of plastic fuel tanks is expected and will spread fire.
- Modern cars are larger than those used in the above studies.
- Vehicle fire temperatures in excess of 1100dec C are expected as a result of larger vehicles in tighter spaces with lower ceilings.
- Sprinklers are effective in both controlling a developing and fully developed fire. Without sprinklers fire is likely to spread from car to car and dangerous levels of smoke are likely for longer periods (BD2552 p.46).
- Basement car parks can no longer be considered to have well defined fire loads.
- Concerns are raised with regard to assumptions that fire services attends 3 out of 5 fires within 3 minutes in metropolitan areas.

(e) Case Studies

The BCA includes a list and brief summary of relevant case studies from car park fires both nationally and internationally where fire spread beyond the vehicle of origin and involved multiple vehicles which in some instances resulted in fatalities.

(f) Electric Vehicles

The BCA puts forward evidence from Hertzke et al (2018) on the increase in the sales of EV cars in the period 2010 to 2017 and from Diaz et al (2020) & DETEC (2020) stating that fires involving lithium-ion batteries pose hazards significantly different to conventional fires in terms of ignition, rate of development and toxicity of emissions. In addition, Diaz et al (2020) identifies particular challenges with respect to EV's including thermal runaway, the fact that lithium-ion batteries can fail very quickly after sustaining damage, the long extinguishing time for these types of vehicles, water quantity required for extinguishing purposed and recycling of damaged vehicles.

(g) Dublin Fire Brigade Firefighting Intervention

The BCA note that it is generally accepted that fires in electric vehicles pose a significant range of challenges not normally associated with internal combustion engine (ICE) vehicles, including the need for greater quantities of water to extinguish a fire and the fact that EV fires also have a propensity to reignite.

Firefighting Operations with ICE Cars

The BCA point out that in their standard approach to dealing with ICE car fires, typically the fire is extinguished within 3-4 minutes with the entire incident taking less than 15-20 minutes.

(h) Electric (EV) Car Fires

In this section of their report the BCA provides a comparison of some of the risks associate with EV fires compared to ICE car fires, see below.

Risk	ICE (Internal combustion Engine) Car Fires	EV (Electrical Vehicle) Car Fires	EV Vehicle Notes
Environmental Damage	Environmental damage from firefighting water run off	Environmental damage from firefighting water run off	Exponentially higher toxic run off containing heavy metals given the quantities of water needed to extinguish
Gases produced	Large volumes of Carcinogenic/Mutagenic/Reproductive toxin gases	Large volumes of Carcinogenic/Mutagenic/Reproductive toxin gases	Given the extinguishment difficulties, Toxic Smoke production is like to greatly exceed ICE Vehicle values
Fire Spread	Potential for fire spread to other vehicles	Potential for fire spread to other vehicles	Given the extinguishment difficulties, the likelihood for fire spread to adjoining vehicles increases significantly
Heat Release Rate	High heat release rate ($\geq 3\text{MW}$)	High heat release rate ($\geq 3\text{MW}$)	Similar values identified

Effluent	Corrosive/Toxic effluent from battery	Corrosive/Toxic effluent from battery	
Fuel Tanks	Potential for plastic fuel tank to rupture creating a running fuel fire	Not Applicable	Not Applicable
Pyrotecnic Explosion	Potential for Pyrotechnic explosion of airbag inflators system	Potential for Pyrotechnic explosion of airbag inflators system	Similar characteristics
Smoke Spread and Volume	Possible smoke egress into stairwells compromising means of escape	Possible smoke egress into stairwells compromising means of escape	Higher smoke volumes exacerbate this risk
Shock Hazard	Not Applicable	Electric Shock hazard	High Voltage Battery System

(i) EV Firefighting Operations

In this section the BCA address the phenomenon known as thermal runaway which is a chain reaction that produces an uncontrolled release of heat from the battery pack. The difficulty firefighters experience in dealing with this process include:

- Access to the battery area to deliver water
- The high levels of water required to extinguish this type of fire
- The possibility of the battery reigniting several hours later

(j) Structural Integrity/Fire Protection Concerns

The BCA make reference to the research carried out by Mr. Martin Shipp et al for the BRE on enclosed car park fires which concluded that as a result of the presence of alternative fuels further research should be undertaken on the structural protection to enclosed car parks. They give the example of a Merseyside car park fire which caused significant failing to the car park structure.

(k) Broader Implications Considered

Additional considerations identified by the BCA include:

- The significant amount of water required to extinguish an EV fire
- An increase in the number of responding appliances to 2 possibly 3 pumps per incident
- The high quantity of toxic water runoff
- Toxic gases contaminating firefighters PPE requiring a full change after each EV fire
- The increase in the number of EV's increases the potential for multi-EV incidents putting additional demands on BCA resources
- The transport of the EV post suppression to mitigate against the potential for re-ignition
- The likely hood of the fire brigade having to escort the transported EV post fire incident
- The possible need for the BCA to consider full vehicle immersion technology post suppression

(I) Conclusion

The BCA point out that current guidance does not take into consideration the loading of modern vehicles including EV's, hydrogen vehicles and that with these vehicles becoming more common, fires in basement car parks will expose residents and fire fighters to additional hazards.

They argue that the introduction of sprinklers in underground car parks would appear to be the only solution to preventing fire spread between vehicles or between stories.

For the above reasons, the BCA included Condition 2 on the granted FSC.

6.0 Assessment

6.1. *De Novo assessment/appeal v conditions*

Having considered the drawings, details and submissions on the file and having regard to the provisions of Article 40 of the Building Control Regulations 1997, as amended, I am satisfied that the determination by the Board of this application as if it had been made to it in the first instance would not be warranted. Accordingly, I consider that it would be appropriate to use the provisions of Article 40(2) of the Building Control Regulations, 1997, as amended'.

6.2. *Content of Assessment*

While the BCA goes to some lengths to explain their reasoning for this condition the fact remains that the requirement in Section 5.4.3.1 of TGD B (reprinted edition 2020) is very clear in that "basement car parks are not normally expected to be fitted with sprinklers", see below.

5.4.3.1 Basements - Smoke ventilation from basements generally take the form of outlets vents connected directly to the open air. Such ventilation should be provided from every basement storey except in the following:

- (a) a basement in a dwelling house (Purpose Group I(a) and I(b));
- (b) a basement having an area less than 200 m² and a floor which is not more than 3 m below the adjacent ground level.

Smoke vents should be sited at high level and should be distributed around the building perimeter to maximise the effectiveness of cross-ventilation. The clear cross-sectional area of all smoke vents, allowing for frames and louvres, should not be less than 2.5% of the basement storey served. Where a basement is compartmented, each compartment should be ventilated separately. Generally, smoke vents from basements should be permanently open and unobstructed, but where they are readily accessible from the outside, consideration can be given to suitably indicated removable covers. Smoke vents should not be positioned where they would prevent the use of the means of escape from the building.

As an alternative to outlet vents as described above, a system of mechanical extraction may be provided, where the basement is also protected by an appropriate sprinkler system complying with BS 5306: Part 2: 1990. The ventilation system should meet the criteria set out in 3.5.2.5 and should operate automatically on activation of the sprinkler system.

Basement car parks are not normally expected to be fitted with sprinklers.

It would be my opinion that not having the basement car park sprinkler protected is in compliance with Section 5.4.3.1 of TGD B which would generally be accepted as prima facie compliance with Part B of the Second Schedule of the Building Regulations. In addition, I would be of the view that conditions such as this that are imposed by some BCA's lead to inconsistency in building design nationally which is something I believe is to be avoided.

Finally, it is worth noting that a new version of TGD B (2024) has recently been published by the Department of Housing, Local Government and Heritage and there is no mention of basement car parks requiring sprinklers.

7.0 Recommendation

On the basis of my assessment, I recommend that An Bord Pleanála grant the appeal and instruct the BCA to remove Condition 2 from the Fire Safety Certificate for the reasons and considerations set out below.

8.0 Reasons and Considerations

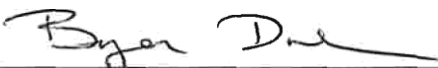
Having regard to the original FSC application and appeal made, I am of the opinion that the appellant has demonstrated that there is no requirement for the basement car park to be sprinkler protected to meet the requirements of TGD B. Therefore, condition number 2 as originally attached by the BCA to the fire safety certificate is not necessary to meet the guidance set out in TGD B or accordingly to demonstrate compliance with Part B of the Second Schedule to the Building Regulations 1997, as amended and should be removed.

9.0 Conditions

N/A - on this occasion Condition 2 should just be removed.

10.0 Sign off

I confirm that this report represents my professional assessment, judgement and opinion on the matter assigned to me and that no person has influenced or sought to influence, directly or indirectly, the exercise of my professional judgement in an improper or inappropriate way.



Bryan Dunne

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5th July 2024