



# **Master Planning Report**

## **Pegasus Golf Resort**

### **Fire Safety & Protection**

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# 1. Introduction

This report has been prepared for Sports and Education Corporation Ltd to advise of the main Fire Safety & Protection issues that will be required in the new Pegasus Golf Resort on Pegasus Boulevard, Pegasus.

The following proposed new buildings are addressed in this report:

- Pegasus Country Club
- Spa & Hot Pools buildings,
- Golf Village,
- Hotel & Conference buildings, and
- Spa Village Tourist Accommodation buildings.

The methodology used to determine compliance with the NZBC Clauses C1-C6 Protection from Fire is the *Acceptable Solutions for Buildings other than Risk Group SH C/AS2 (first edition, June 2019)*. No assessment based on the *Verification Method C/VM2 (Amendment 5)* or an Alternative Solution is included.

The aims of this report are to define:

1. the required minimum Fire Safety systems for each building, and
2. the high level Fire Fighting water supply requirements for the site.

This Fire Design advice addresses the requirements of the Building Act 2004 only and does not address protection of the owner's property.



## 2. Pegasus Country Club

The **Pegasus Country Club** is proposed to be a single level 400m<sup>2</sup> 'crowd use' building and is expected to comprise a single firecell.

The building is not required under the Fire Code to be sprinkler protected. However, the building will require the following Fire Safety features:

### Means of Escape from Fire

- Type 4 automatic smoke detection and manual alarm system throughout.
- Emergency lighting where egress lengths exceed 20m and on changes in level.
- Illuminated exit signage above egress doors and along egress routes.
- Fire extinguishers
- Sufficient number of egress routes and door widths for the required design occupancy. A minimum of two escape routes will be required, separated by 8m.
- Internal surface finish requirements of walls, ceilings, flooring, suspended flexible fabrics needed to meet the requirements of the Acceptable Solution C/AS2 for a crowd use building.

### External Fire Spread:

The required distance to boundaries can be determined using one of several design methodologies. The Acceptable Solutions require at least 16m to any property boundary, and 17m to any sleeping accommodation building.

Provided the building height does not exceed 10m and property boundaries are at least 1m from the building, no restrictions on external cladding apply.

### Fire & Emergency New Zealand

- A Fire & Emergency NZ (FENZ) attendance point for their vehicles is required as the building is located remote from the street boundary. This shall be within 20m of the main entrance of the building.
- Access to the attendance point shall meet the following requirements:
  - be able to withstand a laden weight of up to 25 tonnes with an axle load of 8.2 tonnes or, have a load bearing capacity of no less than the public roadway serving the property, whichever is the lower,
  - be trafficable in all weathers,
  - have a minimum width of 4.0 m,
  - provide a clear passageway of no less than 3.5 m in width and 4.0 m in height at site entrances, internal entrances and between buildings.
- It is expected that all areas of the building can be reached within a 75m hose run distance of the attendance point and therefore an internal hydrant system is not required.
- As per Table 1 of PAS 4509:2008, a fire water classification of **FW2** is required for fire fighting water supplies if the building is sprinklered and **FW4** if the building is not sprinklered.

### 3. Spa & Hot Pools Buildings

The main Spa & Hot Pools building is proposed to be 2-storey and include double height spaces. It is to be 1,800m<sup>2</sup>, a 'crowd use' building and is expected to comprise a single firecell.

Five single storey 'domes' are also included, joined together with interconnecting tunnels. The total area of these is 4,725m<sup>2</sup>. It is assumed that each is fire separated from the other. The largest dome is 1,257m<sup>2</sup>.

Fifteen 'honeymoon cottages' are to be located along the access road, each 50m<sup>2</sup> single level.

#### Sprinklers:

The main Spa & Hot Pools building will likely need sprinkler protection because of the double height spaces.

The domes may need sprinkler protection depending on the construction type.

The honeymoon cottages will not require sprinkler protection.

#### Means of Escape from Fire

In addition, the buildings will require the following Fire Safety features:

- Type 4 automatic smoke detection and manual alarm system throughout the main building and domes. The honeymoon cottages will require only domestic smoke alarms.
- Possible smoke extract to the main building's double height spaces
- Emergency lighting where egress lengths exceed 20m and on changes in level.
- Illuminated exit signage above egress doors and along egress routes.
- Fire extinguishers
- Sufficient number of egress routes and door widths, for the required design occupancy. A minimum of two escape routes will be required, separated by 8m.
- Internal surface finish requirements of walls, ceilings, flooring, suspended flexible fabrics needed to meet the requirements of the Acceptable Solution C/AS2 for a crowd and accommodation use buildings
- Fire separations including firedoors between each dome.

#### External Fire Spread:

The required distance to boundaries can be determined using one of several design methodologies. The Acceptable Solutions require at least 16m to any property boundary, and 17m to any sleeping accommodation building.

Provided the building height does not exceed 10m and property boundaries are at least 1m from the building, no restrictions on external cladding apply.

#### Fire & Emergency New Zealand

- A Fire & Emergency NZ (FENZ) attendance point for their vehicles is required as the buildings are located remote from the street boundary. This shall be within 20m of the main entrance of the building.
- Access to the attendance point shall meet the following requirements:
  - be able to withstand a laden weight of up to 25 tonnes with an axle load of 8.2 tonnes or, have a load bearing capacity of no less than the public roadway serving the property, whichever is the lower,

- be trafficable in all weathers,
  - have a minimum width of 4.0 m,
  - provide a clear passageway of no less than 3.5 m in width and 4.0 m in height at site entrances, internal entrances and between buildings.
- It is expected that all areas of the buildings can be reached within a 75m hose run distance of the attendance point and therefore an internal hydrant system is not required.
  - As per Table 1 of PAS 4509:2008, a fire water classification of **FW2** is required for fire fighting water supplies if the buildings are sprinklered and **FW6**, **FW6** and **FW3** respectively if the buildings are not sprinklered.

## 4. Golf Village

The **Golf Village** comprises:

- a) a 3-storey hotel with 1,000m<sup>2</sup> per level,
- b) a 3-storey secondary building with 400m<sup>2</sup> per level, and
- c) a 3-storey golf academy building with 550 m<sup>2</sup> per level.

### Sprinklers:

None of these buildings will necessarily require sprinkler protection.

### Means of Escape from Fire

The buildings will require the following Fire Safety features:

- Type 5 automatic smoke & heat detection and manual alarm system throughout the accommodation building(s).
- Type 4 automatic smoke detection and manual alarm system throughout the non-accommodation building(s).
- Emergency lighting where egress lengths exceed 20m and on changes in level.
- Illuminated exit signage above egress doors and along egress routes.
- Fire extinguishers
- Sufficient number of egress routes and door widths, for the required design occupancy. A minimum of two escape routes will be required, separated by 8m.
- Fire separations around each bedroom suite, separating the suites from adjacent suites and from the corridor.
- Fire protected accommodation corridors and separately fire protected stairs.
- Fire separations between sleeping and non-sleeping firecells.
- Fire rated doors to all fire separations.
- Internal surface finish requirements of walls, ceilings, flooring, suspended flexible fabrics needed to meet the requirements of the Acceptable Solution C/AS2 for an accommodation use building.

### External Fire Spread:

The required distance to boundaries can be determined using one of several design methodologies. The Acceptable Solutions require at least 16m to any property boundary, and 17m to any sleeping accommodation building.

Vertical fire spread via external windows needs to be prevented by including fire rated aprons/decks and/or fire rated vertical spandrels. Alternatively sprinklers could be included.

Given the building height will exceed 10m, restrictions on external cladding will apply.

### Fire & Emergency New Zealand

- A Fire & Emergency NZ (FENZ) attendance point for their vehicles is required as the buildings are located remote from the street boundary. This shall be within 20m of the main entrance of the building.
- Access to the attendance point shall meet the following requirements:
  - be able to withstand a laden weight of up to 25 tonnes with an axle load of 8.2 tonnes or, have a load bearing capacity of no less than the public roadway serving the property, whichever is the lower,
  - be trafficable in all weathers,
  - have a minimum width of 4.0 m,
  - provide a clear passageway of no less than 3.5 m in width and 4.0 m in height at site entrances, internal entrances and between buildings.
- It is expected that all areas of the buildings can be reached within a 75m hose run distance of the attendance point and therefore an internal hydrant system is not required.
- As per Table 1 of PAS 4509:2008, a fire water classification of **FW2** is required for fire fighting water supplies if the buildings are sprinklered and **FW5**, **FW3** and **FW4** respectively if the buildings are not sprinklered.

## 5. Hotel & Conference Buildings

The **Hotel & Conference** building is proposed to comprise up to 3 floors, 5,00m<sup>2</sup> per floor, and contain a combination of cafés, restaurants, bars, conference facilities and temporarily sleeping accommodation. The building will contain a number of different firecells.

The building is not required under the Fire Code to be sprinkler protected. However, the building will require the following fire safety features:

### Means of Escape from Fire

- Type 4 smoke detection and manual alarm system throughout all non-sleeping spaces and a Type 5 smoke/heat detection and manual alarm system throughout all sleeping spaces.
- Emergency lighting where egress lengths exceed 20m, all exit ways (stairs/corridors in the sleeping spaces), all areas where the occupant load exceeds 250 people and on changes in level.
- Illuminated exit signage above egress door and along egress routes.
- Fire extinguishers
- Sufficient number of egress routes and door widths for the required design occupancy. Any space containing more than 50 people must include at least two means of escape.



- Fire separations around each bedroom suite, separating the suites from adjacent suites and from the corridor.
- Fire protected accommodation corridors and separately fire protected stairs.
- Fire separations between sleeping and non-sleeping firecells.
- Fire rated doors to all fire separations.
- Stairs shall egress direct to outside without combining with the ground floor space.
- Internal surface finish requirements of walls, ceilings, flooring, suspended flexible fabrics needed to meet the requirements of the Acceptable Solution C/AS2 for a crowd use and accommodation building. Further details can be provided if required.
- Fire rated upper floors
- Fire protected liftshafts
- Fire stopping to all service penetrations through fire rated elements.

### External Fire Spread:

The required distance to boundaries can be determined using one of several design methodologies. The Acceptable Solutions require at least 16m from any non-sleeping firecell to any property boundary, and 6m from any sleeping firecell to any property boundary.

Vertical fire spread via external windows needs to be prevented by including fire rated aprons/decks and/or fire rated vertical spandrels. Alternatively sprinklers could be included.

Given the building height will exceed 10m, restrictions on external cladding will apply.

### Fire & Emergency New Zealand

- A Fire & Emergency NZ (FENZ) attendance point for their vehicles is required as the building is located remote from the street boundary. This shall be within 20m of the main entrance of the building.
- Access to the attendance point shall meet the following requirements:
  - be able to withstand a laden weight of up to 25 tonnes with an axle load of 8.2 tonnes or, have a load bearing capacity of no less than the public roadway serving the property, whichever is the lower,
  - be trafficable in all weathers,
  - have a minimum width of 4.0 m,
  - provide a clear passageway of no less than 3.5 m in width and 4.0 m in height at site entrances, internal entrances and between buildings.
- It is expected that all areas of the building can be reached within a 75m hose run distance of the attendance point and therefore an internal hydrant system is not required.
- As per Table 1 of PAS 4509:2008, a fire water classification of **FW2** is required for fire fighting water supplies if the building is sprinklered and **FW7** if the building is not sprinklered.

## 6. Spa Village Tourist Accommodation Buildings

The Spa Village Tourist Accommodation buildings are proposed to be:

- a) 3 level mixed use units, and
- b) 1 or 2 level accommodation suites.

The buildings are not required under the Fire Code to be sprinkler protected. However, the buildings will require the following Fire Safety features:

### Means of Escape from Fire

- Type 5 smoke/heat detection and manual alarm system in the mixed use buildings. The accommodation suites will require only domestic smoke alarms.
- Emergency lighting where egress lengths exceed 20m, all exit ways (stairs/corridors)
- Illuminated exit signage above egress door and along egress routes.
- Sufficient number of egress routes and door widths for the required design occupancy. Any space containing more than 50 people must include at least two means of escape.
- Fire separations around each bedroom suite, separating the suites from adjacent suites and from the corridor.
- Fire protected accommodation corridors and separately fire protected stairs.
- Fire separations between sleeping and non-sleeping firecells.
- Fire rated doors to all fire separations.
- Stairs shall egress direct to outside without combining with the ground floor space.
- Internal surface finish requirements of walls, ceilings, flooring, suspended flexible fabrics needed to meet the requirements of the Acceptable Solution C/AS2 for an accommodation use building. Further details can be provided if required.
- Fire rated upper floors
- Fire stopping to all service penetrations through fire rated elements.

### External Fire Spread:

The required distance to boundaries can be determined using one of several design methodologies. The Acceptable Solutions require at least 6m to any property boundary and 7m between buildings.

Cladding to external walls which are higher than 10m must comply with the Fire Code's Peak Heat Release rates etc.

Vertical fire spread via external windows needs to be prevented by including fire rated aprons/decks and/or fire rated vertical spandrels. Alternatively sprinklers could be included.

### Fire & Emergency New Zealand

- A Fire & Emergency NZ (FENZ) attendance point for their vehicles is required as the building is located remote from the street boundary. This shall be within 20m of the main entrance of the building.
- Access to the attendance point shall meet the following requirements:
  - be able to withstand a laden weight of up to 25 tonnes with an axle load of 8.2 tonnes or, have a load bearing capacity of no less than the public roadway serving the property, whichever is the lower,

- be trafficable in all weathers,
  - have a minimum width of 4.0 m,
  - provide a clear passageway of no less than 3.5 m in width and 4.0 m in height at site entrances, internal entrances and between buildings.
- It is expected that all areas of the building can be reached within a 75m hose run distance of the attendance point and therefore an internal hydrant system is not required.
  - As per Table 1 of PAS 4509:2008, a fire water classification of **FW2** is required for fire fighting water supplies if the building is sprinklered and **FW3** if the building is not sprinklered.

## 7. Sprinkler Protection

Some of the new proposed buildings must be sprinkler protected. While not mandatory, the owner may choose of course to sprinkler protect any number of the other buildings.

A sprinkler system will require a:

- water supply,
- booster pump (depends on the water supply)
- control valves, and
- fire service inlet.

The water supply may be from the townsmain (with or without a booster pump) or a water storage with pump.

A townsmain water supply presently exists in Pegasus Boulevard. A booster pump may be needed if this townsmain does not provide sufficient water pressure.

## 8. Fire Fighting Access

FENZ must be able to drive their vehicles to within 20m of the main entrance to each of the buildings.

## 9. Fire Fighting Water Supply

On site hydrants may be needed to ensure FENZ has sufficient fire fighting water. PAS 4509:2008 gives guidance as to the volume and rate of the fire fighting water supply for various types and uses of buildings.

Table 1 gives the Hazard Classification for various types and uses of buildings and their firecell floor area. This also depends on whether or not the building is sprinkler protected.

Table 2 gives the volumetric flow rate of a townsmain supply and the equivalent water storage volume for the various Hazard Classifications. FENZ may however allow a smaller volume. Any proposed deviation must be discussed with FENZ.

A summary of Table 1 & 2 for water storage volumes for each of the proposed new buildings is as follows:

Building	Assumed Largest Firecell floor area (m2)	Fire Hazard Category	Sprinklers	Hazard Classification	Water Storage (m3)
Pegasus Country Club	400	2	Yes	FW2	45
			No	FW4	540
Spa & Hot Pools - main building	1800	2	Yes	FW2	45
			No	FW6	2160
Spa & Hot Pools - domes	1257 (largest)	2	Yes	FW2	45
			No	FW6	2160
Spa & Hot Pools - honeymoon cottages	50 per cottage	1	Yes	FW2	45
			No	FW3	180
Golf Village - hotel	1000	2	Yes	FW2	45
			No	FW5	1080
Golf Village - secondary building	400	2	Yes	FW2	45
			No	FW3	180
Gold Village - golf academy	550	2	Yes	FW2	45
			No	FW4	540
Hotel & Conference building	5000	2	Yes	FW2	45
			No	FW7	To be calculated
Spa Village Tourist Accommodation buildings	50 (assumed)	1	Yes	FW2	45
			No	FW3	180

As can be seen from the table above, the required water storage volume for the most demanding building, the Hotel & Conference building, is enormous, unless the building is sprinklered.

A summary of Table 1 & 2 for townsmain hydrant demand for each of the proposed new buildings is as follows:

Building	Sprinklers	Hazard Classification	Required water flow within 135m (l/min)	Additional water flow within 270m (l/min)	Maximum number of hydrants supply to the flow
Pegasus Country Club	Yes	FW2	750	750	2
	No	FW4	3000	3000	4
Spa & Hot Pools - main building	Yes	FW2	750	750	2
	No	FW6	6000	6000	8
Spa & Hot Pools - domes	Yes	FW2	750	750	2
	No	FW6	6000	6000	8
Spa & Hot Pools - honeymoon cottages	Yes	FW2	750	750	2
	No	FW3	1500	1500	3
Golf Village - hotel	Yes	FW2	750	750	2
	No	FW5	4500	4500	6
Golf Village - secondary building	Yes	FW2	750	750	2
	No	FW3	1500	1500	3
Gold Village - golf academy	Yes	FW2	750	750	2
	No	FW4	3000	3000	4
Hotel & Conference building	Yes	FW2	750	750	2
	No	FW7		To be calculated	
Spa Village Tourist Accommodation buildings	Yes	FW2	750	750	2
	No	FW3	1500	1500	3

As can be seen from the table above, the required water flow rates for the most demanding building, the Hotel & Conference building, is significant, unless the building is sprinklered.

The 3-waters consultant can advise on the capacity of the existing townsmain to supply Fire Fighting water to the site.

To enable the required water flows within the distances given above, additional on-site hydrants may be needed.

# 10. Appendix A - PAS 4509:2008

Table 1:

Table 1 – Method for determining required water supply classification

Sprinklered structures														
Category	Water supply classification (see table 2)													
Single family homes with a sprinkler system installed to an approved Standard	FW1													
All other structures (apart from single family homes) with a sprinkler system installed to an approved Standard	FW2													
Non-sprinklered structures														
Category	Water supply classification (see table 2)													
Housing; includes single family dwellings, multi-unit dwellings, but excludes multi-storey apartment blocks	FW2													
All other structures (characterised by fire hazard category <sup>(1)</sup> ), examples of which are given below	Water supply classification (see table 2)													
	Floor area of largest firecell of the building (m <sup>2</sup> )													
	0-199 <sup>(10)</sup>	200-399	400-599	600-799	800-999	1000-1199	1200-1399	1400-1599	1600-1799	1800-1999	2000-2399	2400-2599	2600-2799	> 2800
FHC 1 <sup>(2)</sup>	FW3	FW3	FW3	FW4	FW4	FW4	FW5	FW5	FW5	FW5	FW5	FW5	FW5	FW6
FHC 2 <sup>(3)</sup>	FW3	FW3	FW4	FW5	FW5	FW5	FW6	FW6	FW6	FW7	FW7	FW7	FW7	FW7
FHC 3 <sup>(4)</sup>	FW3	FW4	FW5	FW5	FW6	FW6	FW7	FW7	FW7	FW7	FW7	FW7	FW7	FW7
FHC 4 <sup>(5)</sup>	FW4	FW6	FW6	FW6	FW6	FW7	FW7	FW7	FW7	FW7	FW7	FW7	FW7	FW7
For special or isolated hazards not covered in above categories <sup>(9)</sup>	FW7													
NOTE –														
(1) Fire hazard category as defined in the compliance documents for the New Zealand Building Code, Acceptable Solution C/AS1.														
(2) FHC 1 is sleeping activities including care facilities, motels, hotels, hostels; crowd activities of <100 people including cinemas, art galleries, community halls, lecture halls, churches; working/business/storage activities processing non-combustible materials such as wineries, cattle yards, horticultural products; multistorey apartment blocks.														
(3) FHC 2 is crowd activities of >100 people, libraries, book storage, night clubs, restaurants; working/business/storage activities with low fire load such as hairdressers, banks, medical consulting rooms, offices.														
(4) FHC 3 is working/business/storage activities with medium fire load such as manufacturing, processing, bulk storage up to 3 metres.														
(5) FHC 4 is working/business/storage activities with high fire load such as chemical manufacturing, feed mills, plastics manufacturing, supermarkets or other stores with bulk display over 3 metres.														
(6) For special or isolated fire hazards in an area with a lower water supply classification, an assessment should be carried out to determine measures to mitigate the hazard or increase the water supply (see 4.4).														
(7) The values in the table were determined by heat release rate modelling for fully developed fires.														
(8) All non-sprinkler protected structures, except houses, have an entry level of FW3.														
(9) Examples of special or isolated hazards may include bulk fuel installations, timber yards, tyre dumps, wood chip stock piles, recycle depots, and marinas.														
(10) For non-sprinkler protected fire hazard category 1 structures less than 50 m <sup>2</sup> in floor area, the FW3 requirement may be reduced by up to 50% with the agreement of the Fire Region Manager. Examples of the sorts of structures intended to be covered by this comment are predominantly garages, sheds, and outbuildings.														

SNZ PAS 4509:2008

Table 2:

Table 2 – Method for determining firefighting water supply

Fire water classification	Reticulated water supply			Non-reticulated water supply	
	Required water flow within a distance of 135 m	Additional water flow within a distance of 270 m	Maximum number of fire hydrants to provide flow	Minimum water storage within a distance of 90 m (see Note 8)	
				Time (firefighting) (min)	Volume (m <sup>3</sup> )
FW1	450 L/min (7.5 L/s) (See Note 3)	–	1	15	7
FW2	750 L/min (12.5 L/s)	750 L/min (12.5 L/s)	2	30	45
FW3	1500 L/min (25 L/s)	1500 L/min (25 L/s)	3	60	180
FW4	3000 L/min (50 L/s)	3000 L/min (50 L/s)	4	90	540
FW5	4500 L/min (75 L/s)	4500 L/min (75 L/s)	6	120	1080
FW6	6000 L/min (100 L/s)	6000 L/min (100 L/s)	8	180	2160
FW7	As calculated (see Note 7)				
NOTE –					
(1) Table 1 lists the minimum requirements for firefighting water supplies. In developing towns' main reticulation systems, a water supply authority needs to cater for domestic/industrial water usage in addition to the above. This procedure is outlined in Appendix K.					
(2) Special or isolated fire hazards which have higher requirements in an area of lower water supply classification must determine measures to mitigate the hazard or increase the water supply (see 4.4).					
(3) Where houses have a sprinkler system installed to an approved Standard, the distance to a fire hydrant or alternative water supply may be negotiated by agreement with the Fire Region Manager.					
(4) The water requirements for fire protection systems must be considered in addition to the firefighting water supplies, as detailed in table 1 (FW2), the fire protection system demand plus 1500 L/min (25 L/s) at 1 bar residual pressure.					
(5) The minimum flow from a single hydrant must exceed 750 L/min (12.5 L/s), except for those cases where a home sprinkler is installed, in which case the minimum is 450 L/min (7.5 L/s) while the maximum design flow, for safety reasons, is limited to 2100 L/min (35 L/s).					
(6) If the minimum water storage requirement as listed in the above table is not available from the reticulated system (reservoir), water can be sourced from an 'alternative supply' as approved by the Fire Region Manager. This water supply must always be within 90 m of the fire risk.					
(7) FW7 is for either special or isolated hazards or where the fire hazard due to the size of the largest firecell and its fire hazard category make specific fire engineering assessment necessary. Appendix H and J must be used as the basis for calculating this required firefighting water supply.					
(8) See Appendix B.					



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