Owner / Applicant Information

Robert J Smith
Purdue University
1801 NEWMAN ROAD
SUITE 208
WEST LAFAYETTE IN 47906

Phone 7654962308

Email SMIT2452@PURDUE.EDU

Submitter Information

Edwin L Rensink
RTM Consultants Inc
6640 Parkdale Place
Suite J
Indianaplis IN

Phone 3173297700

Email rensink@rtmconsultants.com

Designer Information

Geoffrey Lisle
BSA LifeStructures
9365 Counselors Row

Indianapolis IN

Phone 3175183936

Email glisle@bsalifestructures.com

Project Information

Purdue University Engineering & Polytechnic Gateway
400 Central Drive

West Lafayette IN 47907

County TIPPECANOE

Project Type New [Y] Addition [ ] Alteration [ ] Existing [ ] Change of Occupancy [ ]

Project Status [U] F=Filed U or Null=Unfiled

IDHS Issued Correction order? [No] Has Violation been Issued? [No]

Violation Issued by: NA

Local Building Official

Phone: 3174176651 Email: blancaster@dhs.in.gov

Local Fire Official

Phone: 3174176651 Email: fire@purdue.edu

Variance Details

Code Name: Other Code (Not in the list provided)

5801.1, 2014 IFC

Conditions: Sec. 5801.1, IFC requires storage and use of flammable gases to be in accordance with the 2010 Edition of NFPA 55. The hydrogen gas system in the Powertrain Technology Lab in the lower level of the building will not be designed as a bulk flammable gas system per the currently adopted edition of NFPA 55, Standard for the Storage, Use and Handling of Compressed Gases. The standard requires a system with more than 400 cubic feet of flammable gas to be designed as a bulk flammable gas system per Chapter 10.

The project involves construction of a 5-story + basement structure for the College of Engineering and Purdue Polytechnic Institute, including project-based instructional space and teaching labs, design studios, collaborative spaces, and administrative functions. The building is designed as Type IB Construction, nonseparated occupancies - B and A-3 Occupancies.

DEMONSTRATION THAT PUBLIC HEALTH, SAFETY, AND WELFARE ARE PROTECTED:

1=Non-compliance with the rule will not be adverse to the public health, safety or w

[1]

2= Applicant will undertake alternative actions in lieu of compliance with the rule to ensure that granting of the variance will not be adverse to public health, safety, or welfare. Explain why alternative actions would be adequate (be specific).

Facts: 1. The hydrogen gas system will be designed per Sec. 10.1.3 of the 2016 Edition of NFPA 55, which does not require design as a bulk flammable gas system where the quantity is less than 5,000 cubic feet. The 2016 Edition of NFPA 55 is referenced in the 2018 International Fire Code.

2. The proposed system will not exceed 2,250 cubic feet, in compliance with IBC/IFC limits for a control area where the gas is stored in approved gas cabinets. The Powertrain Lab will be separated with 1-hour fire barrier. The system will be closed-container.

3. The building will be protected throughout with a sprinkler system per NFPA 13.

4. Based upon compliance with the provisions of the 2016 Edition of NFPA 55, the proposed design will not be adverse to safety.

DEMONSTRATION OF UNDUE HARDSHIP OR HISTORICALLY SIGNIFICANT STRUCTURE:

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of physical limitations of the construction site or its utility services.

[Y] Imposition of the rule would result in an undue hardship (unusual difficulty) because of major operational problems in the use of the building or structure.

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of excessive costs of additional or altered construction elements.

[ ] Imposition of the rule would prevent the preservation of an architecturally or a historically significant part of the building or structure

Facts: The more recent edition of NFPA 55 recognizes the inherent safety of a closed system, without placing strict quantity limits or design as a bulk flammable gas system. Imposition of the rule would limit quantities to a level that is unrealistic for the needs of lab operations.

Variance Details

Code Name: Other Code (Not in the list provided)

1022.8, 2014 IBC

Conditions: Barriers will not be provided at the level of exit discharge in each of the three (3) enclosed stairs to prevent persons from unintentionally continuing down the separate flight of stairs

stairs to prevent persons from unintentionally continuing down the separate flight of stairs within the stair enclosure to the lower level of the building.

The project involves construction of a 5-story + basement structure for the College of Engineering and Purdue Polytechnic Institute, including project-based instructional space and teaching labs, design studios, collaborative spaces, and administrative functions. The building is designed as Type IB Construction, nonseparated occupancies - B and A-3 Occupancies.

DEMONSTRATION THAT PUBLIC HEALTH, SAFETY, AND WELFARE ARE PROTECTED:

1=Non-compliance with the rule will not be adverse to the public health, safety or w

[1]

2= Applicant will undertake alternative actions in lieu of compliance with the rule to ensure that granting of the variance will not be adverse to public health, safety, or welfare. Explain why alternative actions would be adequate (be specific).

Facts:

1. Large expanses of exterior glazing will be provided at each of the stairs on the 1st floor to make the level of exit discharge obvious to persons descending the flight of stairs from the upper floors. Additionally, in each of the stairs there are openings to the interior of the building which will also make the level of exit discharge obvious.

2. Exit signage will be provided as required at exterior exits for each of the three (3) stairs.

3. The building will be protected throughout with a sprinkler system per NFPA 13.

4. Based upon the provision of significant openings to the exterior and interior at the level of exit discharge, the lack of barriers at stair flights to the lower level will not be adverse to safety.

DEMONSTRATION OF UNDUE HARDSHIP OR HISTORICALLY SIGNIFICANT STRUCTURE:

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of physical limitations of the construction site or its utility services.

[Y] Imposition of the rule would result in an undue hardship (unusual difficulty) because of major operational problems in the use of the building or structure.

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of excessive costs of additional or altered construction elements.

[ ] Imposition of the rule would prevent the preservation of an architecturally or a historically significant part of the building or structure

Facts:

The use of barriers at stairs impedes pedestrian flow up and down stairs as a matter of every day operations. A significant student population use the stairs day to day to access classes. Student movement in between class periods is a significant consideration in the design of buildings of this size.

Variance Details

Code Name: Other Code (Not in the list provided)

1022.4, 2014 IBC

Conditions: Convenience openings for pedestrian use will be provided in two (2) of the three (3) enclosed stairs on the 1st floor. The code limits interior openings in stair enclosures to those necessary for exit access to the enclosure. The opening in each case leads to the adjacent corridor/circulation space from the stair.

The project involves construction of a 5-story + basement structure for the College of Engineering and Purdue Polytechnic Institute, including project-based instructional space and teaching labs, design studios, collaborative spaces, and administrative functions. The building is designed as Type IB Construction, nonseparated occupancies - B and A-3 Occupancies.

DEMONSTRATION THAT PUBLIC HEALTH, SAFETY, AND WELFARE ARE PROTECTED:

1=Non-compliance with the rule will not be adverse to the public health, safety or w

[1]

2= Applicant will undertake alternative actions in lieu of compliance with the rule to ensure that granting of the variance will not be adverse to public health, safety, or welfare. Explain why alternative actions would be adequate (be specific).

Facts: 1. The openings will be protected fire assemblies with a minimum 90-minute fire rating, as required - one is a fire shutter, and the other will be a rated side-hinged swinging door on hold-opens. The fire assemblies will each automatically close upon actuation of smoke detectors located at the opening in compliance with Sec. 716.5.9.3, IBC.

2. The opening in each case connects the stair to the adjacent corridor/circulation space, which does not have a fire load.

3. The building will be protected throughout with an automatic sprinkler system per NFPA 13.

4. Based upon the protection provided for the opening, lack of hazard for the area involved, and sprinkler protection, the proposed openings will not be adverse to safety.

DEMONSTRATION OF UNDUE HARDSHIP OR HISTORICALLY SIGNIFICANT STRUCTURE:

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of physical limitations of the construction site or its utility services.

[Y] Imposition of the rule would result in an undue hardship (unusual difficulty) because of major operational problems in the use of the building or structure.

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of excessive costs of additional or altered construction elements.

[ ] Imposition of the rule would prevent the preservation of an architecturally or a historically significant part of the building or structure

Facts: The openings will facilitate student population movement into and out of the building. Students typically use stairs for everyday circulation - the proposed openings will enhance pedestrian movement on the 1st floor of the building. An added bonus is that the openings are available to enhance egress from the building for a fire incident located other than immediately in the vicinity of the fire assemblies - in the event of fire in the vicinity of the stairs, the fire assemblies will close and allow egress from the stair by the normal means of exit doors to the exterior, which are provided for both stairs.

Variance Details

Code Name: Other Code (Not in the list provided)

1022.7, 2014 IBC

Conditions: Nonrated exterior windows and doors will be located within 10 feet of unprotected exterior

Conditions: Nonrated exterior windows and doors will be located within 10 feet of unprotected exterior windows and exterior exit door in Stair 1 on the 1st floor.

The project involves construction of a 5-story + basement structure for the College of Engineering and Purdue Polytechnic Institute, including project-based instructional space and teaching labs, design studios, collaborative spaces, and administrative functions. The building is designed as Type IB Construction, nonseparated occupancies - B and A-3 Occupancies.

DEMONSTRATION THAT PUBLIC HEALTH, SAFETY, AND WELFARE ARE PROTECTED:

1=Non-compliance with the rule will not be adverse to the public health, safety or w

2

2= Applicant will undertake alternative actions in lieu of compliance with the rule to ensure that granting of the variance will not be adverse to public health, safety, or welfare. Explain why alternative actions would be adequate (be specific).

Facts:

1. The building will be protected throughout with a sprinkler system per NFPA 13.

2. Sprinklers will be located at the ceiling level within 12 inches of the exterior openings exposing the stairway to protect the stair from fire exposure. The openings occur in and adjacent to the East Vestibule.

3. This variance has been granted previously, including 20-06-70, 19-10-31f, 18-10-48f, 18-10-22a, 18-06-50d, 17-10-27, 16-12-31d, 16-11-25b, 16-05-73k, and 15-07-53d.

4. Based upon the sprinkler protection provided for the nonrated openings, the location of the proposed openings relative to the stair will not be adverse to safety.

DEMONSTRATION OF UNDUE HARDSHIP OR HISTORICALLY SIGNIFICANT STRUCTURE:

☐ Imposition of the rule would result in an undue hardship (unusual difficulty) because of physical limitations of the construction site or its utility services.

☒ Imposition of the rule would result in an undue hardship (unusual difficulty) because of major operational problems in the use of the building or structure.

☐ Imposition of the rule would result in an undue hardship (unusual difficulty) because of excessive costs of additional or altered construction elements.

☐ Imposition of the rule would prevent the preservation of an architecturally or a historically significant part of the building or structure

Facts: Nonrated openings are desired at the East Entrance to provide the necessary visibility through the entrance.

Variance Details

Code Name: Other Code (Not in the list provided)

1007.8, 2014 IBC

Conditions: A 2-way communication system will not be provided at the elevator landing on the lower level, 2nd, 3rd, 4th ,and 5th floors. The system is required on each accessible floor that is one story above or below the level of exit discharge.

The project involves construction of a 5-story + basement structure for the College of Engineering and Purdue Polytechnic Institute, including project-based instructional space and teaching labs, design studios, collaborative spaces, and administrative functions. The building is designed as Type IB Construction, nonseparated occupancies - B and A-3 Occupancies.

DEMONSTRATION THAT PUBLIC HEALTH, SAFETY, AND WELFARE ARE PROTECTED:

1=Non-compliance with the rule will not be adverse to the public health, safety or w

[1]

2= Applicant will undertake alternative actions in lieu of compliance with the rule to ensure that granting of the variance will not be adverse to public health, safety, or welfare. Explain why alternative actions would be adequate (be specific).

Facts: 1. Cell phones are widely used for communication, and will provide a more readily available means of communication for the purpose intended.

2. This variance has been approved numerous times previously; 20-04-32b, 20-02-54e, 20-01-57b, 19-09-69c, 19-09-68a, 19-09-47a, 19-07-45d, 19-07-23, 19-06-54d, 19-06-51c, 19-05-68, 18-08-43a, 18-06-60a, 18-03-32a, 17-10-13, 17-03-82d, 17-06-38d, 16-09-71d, 15-09-73, 17-02-52a, 17-06-52e, 17-09-62f, and others.

3. The building will be protected throughout with an automatic sprinkler system per NFPA 13.

DEMONSTRATION OF UNDUE HARDSHIP OR HISTORICALLY SIGNIFICANT STRUCTURE:

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of physical limitations of the construction site or its utility services.

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of major operational problems in the use of the building or structure.

[Y] Imposition of the rule would result in an undue hardship (unusual difficulty) because of excessive costs of additional or altered construction elements.

[ ] Imposition of the rule would prevent the preservation of an architecturally or a historically significant part of the building or structure

Facts: Hardship is the cost for a 2-way communication system that would likely never be used.

Variance Details

Code Name: Other Code (Not in the list provided)

21.3.6, NFPA 72 2010 Edition

Conditions: A smoke detector will be provided in the elevator hoistways, which is not permitted by the currently adopted edition (2010) of NFPA 72, based upon the conditions present in the building. Installation of the smoke detector is permitted only for nonsprinklered hoistways where the detector is used to actuate elevator venting. The hoistway is not sprinklered as permitted by IBC exception based upon a 2-hour enclosure. Elevator venting is not provided in the building, as it is not required by Sec. 3004.1, exc. 1, IBC.

The project involves construction of a 5-story + basement structure for the College of Engineering and Purdue Polytechnic Institute, including project-based instructional space and teaching labs, design studios, collaborative spaces, and administrative functions. The building is designed as Type IB Construction, nonseparated occupancies - B and A-3

building is designed as Type IB Construction, nonseparated occupancies - B and A-3 Occupancies.

DEMONSTRATION THAT PUBLIC HEALTH, SAFETY, AND WELFARE ARE PROTECTED:

1=Non-compliance with the rule will not be adverse to the public health, safety or w

[1]

2= Applicant will undertake alternative actions in lieu of compliance with the rule to ensure that granting of the variance will not be adverse to public health, safety, or welfare. Explain why alternative actions would be adequate (be specific).

Facts:

1. The smoke detector is permitted by Sec. 21.3.6, of the 2016 Edition of NFPA 72, based upon its function to initiate Phase I emergency recall operations. The updated edition permits a smoke detector in the hoistway based upon its function as either initiation of venting, or for initiation of Phase I recall operations.
2. This variance has been approved previously, including 19-01-21b and 18-06-51e.

DEMONSTRATION OF UNDUE HARDSHIP OR HISTORICALLY SIGNIFICANT STRUCTURE:

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of physical limitations of the construction site or its utility services.

[Y] Imposition of the rule would result in an undue hardship (unusual difficulty) because of major operational problems in the use of the building or structure.

[ ] Imposition of the rule would result in an undue hardship (unusual difficulty) because of excessive costs of additional or altered construction elements.

[ ] Imposition of the rule would prevent the preservation of an architecturally or a historically significant part of the building or structure

Facts:

Imposition of the rule would prevent the installation of a smoke detector required by another rule of the Commission (Elevator Code). The smoke detector is required where the elevator machinery is located in the hoistway (MRL elevator), based upon the Elevator Code requirement to have a detector in the machine space to initiate Phase I recall. With the use of MRL elevators, there is an inherent conflict between the 2010 Edition of NFPA 72 and the Elevator Code for placement of the detector. The 2016 Edition of NFPA 72 resolves that conflict in the cited section.