Development Services

From Concept to Construction

Phone: 503-823-7300 Email: bds@portlandoregon.gov 1900 SW 4th Ave, Portland, OR 97201 More Contact Info (http://www.portlandoregon.gov//bds/article/519984)

APPEAL	SUMMARY
	00101101/0111

Status: Decision Rendered

Appeal ID: 20254	Project Address: 1431 N Church St
Hearing Date: 4/17/19	Appellant Name: Alex Porter
Case No.: B-007	Appellant Phone: 503-234-2945
Appeal Type: Building	Plans Examiner/Inspector: David Bartley
Project Type: commercial	Stories: 7 Occupancy: R-2, A-2, A-3, S-1, S-2, B Construction Type: III-B, I-A
Building/Business Name: Nomad Apartments	Fire Sprinklers: Yes - Throughout
Appeal Involves: Erection of a new structure	LUR or Permit Application No.:
Plan Submitted Option: pdf [File 1] [File 2] [File 3] [File 4] [File 5]	Proposed use: Mixed Use Residential-Commercial

APPEAL INFORMATION SHEET

Appeal item 1

Code Section	OSSC 704.2
Requires	704.2 requires Where columns are required to have protection to be fire-resistance rated, the entire column shall be provided individual encasement protection by protecting it on all sides for the full column length, including connections to other structural members, with materials having the required fire-resistance rating.
Proposed Design	The proposed design will allow for posts and columns occuring in walls to be protected from fire by the fire—resistance rating of the wall, in accordance with forthcoming OSSC 2019 code update.
Reason for alternative	OSSC 2019 will adopt IBC 2018 Section 704 in its entirety, specifically section 704.4.1 which states « Studs, Columns and boundary elements that are integral elements in walls of light-frame construction and are located entirely between the top and bottom plates or tracks shall be permitted to have required fire-resistnace ratings provided by the membrane protection provided for the wall. ». Please refer to attached email correspondence with the State of Oregon Building Codes Division.
Appeal item 2	
Code Section	703.2
Requires	703.2 states "where materials, systems or devices have not been tested as a part of a fire- resistance-rated assembly and are incorporated into the building element, component or

https://www.portlandoregon.gov/bds/appeals/index.cfm?action=entry&appeal_id=20254



Appeals | The City of Portland, Oregon

	required fire-resistance-rating is not reduced"
Proposed Design	The proposed floor-ceiling assembly has been evaluated per OSSC Section 722 for Calculated
	Fire Resistance. The attached Engineering Judgement uses both the Comparison and Additive
	Method for Calcualating fire-resistance to demonstrate the proposed floor-ceiling assembly
	achieves the required 1-hour fire resistance rating.
Reason for alternative	Currently there is no perscriptive path approach for CLT assemblies available for use.

Appeal item 3

Code Section	OSSC 1207.2 / 1207.3
Requires	Section 1207.2 and 1207.3 state "floor/ceiling assemblies separatingdwelling units from other public service areas are required to have a (sound/impact) rating of not less than (50 STC / 50 IIC).
Proposed Design	the proposed floor-ceiling assembly has been evaluated by an Acoustical Engineer to demonstrate compliance with required IIC and STC values

Reason for alternative Currently there is no perscriptive path approach for CLT assemblies available for use.

APPEAL DECISION

1. One hour fire resistance rated column located entirely within light frame construction between the top and bottom plate per 2018 IBC Section 704.4.1: Granted provided column detail(s) are verified at time of building plan review.

2. Alternate 1 hour fire resistance rated floor / ceiling assembly per engineering analysis: Granted as proposed.

3. Alternate Sound Transmission Class and Impact Insulation Class (STC / IIC) rating of floor / ceiling assembly: No decision rendered. Accoustical analysis will be verified as part of building plan review.

Appellant may contact John Butler (503 823-7339) with questions.

The Administrative Appeal Board finds with the conditions noted, that the information submitted by the appellant demonstrates that the approved modifications or alternate methods are consistent with the intent of the code; do not lessen health, safety, accessibility, life, fire safety or structural requirements; and that special conditions unique to this project make strict application of those code sections impractical.

Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 180 calendar days of the date this decision is published. For information on the appeals process and costs, including forms, appeal fee, payment methods and fee waivers, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-7300 or come in to the Development Services Center.





5 Egress - Roof 1/16" = 1'-0"





3 Egress - Level 07 1/16" = 1'-0"

General Notes

- All Exit Signs, Egress & Emergency Lighting Per Separate Trade Permit. All Fire Detection, Sprinkler and Alarm Systems Per Separate Trade Permit. Refer To Specifications For Requirements For Sprinkler And Standpipe Systems, Emergency Lighting, Exit Signs And Fire Detection Systems. A Tactle Sign Stating EXIT and complying with ICC A1171 Shal be Provided Adjacent to Each Door to an Egress Statiway, an Exit Passageway and the Exit Discharge. Live backs to be posted in common diming & retail. Reference Sheet g010 for Door Schedule and Occupant Load Summary. Reference Sheet g010 for Door Schedule and Opening Requirements. The General Contractor shall schedule a Firestopping Meeting with the Building Inspector and all Subcontractors that will be installing frestopping materials. Each Subcontractors that will be installing frestopping materials. Each Subcontractors that will be installing frestopping materials. Each Subcontractors that will be installation (i.e. UL, ICC or other approved reportilisting numbers). This information must be submitted to, and approved by, the Building Inspector prior to any installation. (Sec City of Portland Firestopping Program Guide at: http://www.portlandoregon.gov/bds/article/88669) Provide two-way communication at the elevators on each floor above and below the level of discharge.
- 9. discharge.
- ascrarge. Any Installation Details for Fire Protection Systems are for Reference Only, With Final Installation Requirements to be Determined During the Trade Plan Review Process at the Fire Marshal's Office 10.





Exiting Data		Area Designation
↓-	 Exit Discharge 	
# Occs.	- Occupants	Wi 11
32 Inches Min.	Exit Width Required	lev
36 Inches Inches	 Exit Width Provided 	21
Fire Rated Seperations		FE FI
	1/2 Hour Fire Partition	
	1 Hour Fire Partition	Note: See Door Schedule For Fire I
	2 Hour Fire Barrier	
	3 Hour Fire Barrier	"Note: "Total Floor Circulation" Cale and Are Calculated With The Load
	2 Hour Exterior Load Bearing Wall	Occupancy Classification for Each



Alex Porter

From:	MCMULLEN Eric T * DCBS <eric.t.mcmullen@oregon.gov></eric.t.mcmullen@oregon.gov>
Sent:	Thursday, April 4, 2019 3:48 PM
То:	Alex Porter
Cc:	David Sheerin; Jennifer Dzienis; Adam Hostetler; ROCCO Anthony J * DCBS; WILLIAMS Jeremy G *
	DCBS; RAMOS Francisco M * DCBS
Subject:	RE: 2019 OSSC - IBC Section 704 Adoption

Hi Alex,

Yes, the sections indicated below will be included as a part of the 2019 Oregon Structural Specialty Code. The 2019 OSSC is scheduled for adoption on October 1, 2019.

I've copied our program team on this correspondence for consistent communication purposes.

Regards,

Eric T. McMullen

Senior Building Code Specialist Oregon Building Codes Division 1535 Edgewater St. Northwest, Salem OR 97304 Direct: 503.373.7418 www.oregon.gov/bcd

From: Alex Porter <alex@worksarchitecture.net>
Sent: Thursday, April 4, 2019 3:37 PM
To: MCMULLEN Eric T * DCBS <Eric.T.McMullen@oregon.gov>
Cc: David Sheerin <david@worksarchitecture.net>; Jennifer Dzienis <jennifer@worksarchitecture.net>; Adam Hostetler
<adam@worksarchitecture.net>
Subject: 2019 OSSC - IBC Section 704 Adoption

Eric,

I understand the State of Oregon will soon be releasing the 2019 OSSC.

Can you reply to this email to confirm the state will directly adopt Section 704 of the 2018 IBC, inclusive of the passages below:

704.2 Column protection.

Where columns are required to have protection to achieve a *fire-resistance rating*, the entire column shall be provided individual encasement protection by protecting it on all sides for the full column height, including connections to other structural members, with materials having the required *fire-resistance rating*. Where the column extends through a ceiling, the encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

Exception: Columns that meet the limitations of Section 704.4.1.

704.4 Protection of secondary members.

Secondary members that are required to have protection to achieve a *fire-resistance rating* shall be protected by individual encasement protection.

704.4.1 Light-frame construction.

Studs, columns and boundary elements that are integral elements in *walls* of light-frame construction and are located entirely between the top and bottom plates or tracks shall be permitted to have required *fire-resistance ratings* provided by the membrane protection provided for the *wall*.

Thank you,

-Alex

Alex Porter

Works Progress Architecture LLP worksarchitecture.net 811 SE Stark Street, S210 Portland, OR 97214 (503) 234-2945





811 SE Stark Street, Suite 210 Portland OR, 97214 (503) 234-2945

© 2017 Works Progress Architecture, LLP ALL RIGHTS RESERVED All drawings are the property of Works Progress Architecture LLP and are not to be used or reproduced in any manner without prior written permission. ISSUE: 04/11/19

BY: Author

Nomad;

1431 N. Church Street W.PA Job Number 1246 CLT Assembly



A ACOUSTICS 9324 SW CAMILLE TER. PORTLAND, OR. 97223 - 7043 (503) 977 - 2690 elki@aacoustics.com www.acousticalengineering.net

April 10, 2019

Alex Porter Works Progress Architecture LLP 811 SE Stark Street, S210 Portland, OR 97214 (503) 234-2945 alex@worksarchitecture.net

Calculated STC and IIC level for the Nomad CLT Roof/Ceiling Assembly Re:

Introduction

Per Alex Porter request, AAcoustics provide an evaluation of a Roof/ceiling assembly design with STC-50 and IIC-50 or greater.





Room Isolation

The degree of acoustical isolation between two rooms is determined by the level of speech privacy that can be achieved within the limitations of acceptable construction costs. Normal conversation occurs at about 60 dBA at 3 feet. A teacher's projected voice is about 70 dBA at 3 feet. Since speech sound levels vary +/-10 dB from these average levels, 80 dBA is therefore generally accepted as the isolation requirement for most rooms. Sound generated by television sets or loudspeakers can reach higher levels. Most walls are not designed to prevent transmission of these sounds.

A wall and Floor/Ceiling Assemblies should provide noise buffering sufficient to ascertain that all normal sounds generated in any one unit will reach adjacent units or the corridor at sound levels well below the ambient sound pressure level. The following table illustrates how sound transmission class (STC) ratings apply to rooms. A higher STC rating means more sound isolation and less transmission of noise.

Table 1 SOUND TRANSMISSION CLASS (STC) AND VOICE ISOLATION

<u>STC</u>	VOICE ISOLATION
25	Normal speech is easily heard and understood.
30	Loud speech (teacher's projected voice) can be heard and understood.
35	Loud speech can be heard but not easily understood.
42	Loud speech can be heard but not understood.
45	Loud speech can just be heard.
48	Shouting can be heard but not understood.
50	Loud speech cannot be heard. Shouting is barely audible.
55	Shouting is not audible.

Regulations

Section 1207 in Chapter 12 of the 2014 Oregon Structural Specialty Code, Sound Transmission.

Scope: This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent dwelling units or between dwelling units and adjacent public areas such as halls, corridors, stairs or service areas.

Air-borne sound. Walls, partitions and floor/ceiling assemblies separating dwelling units From each other or from public or service areas shall have a sound transmission class (STC) of not less than 50 (45 if field tested) for air-borne noise when tested in accordance with ASTM E 90. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings. This requirement shall not apply to dwelling unit entrance doors; however, such doors shall be tight fitting to the frame and sill.

1207.2.1 Masonry. The sound transmission class of concrete masonry and clay masonry assemblies shall be calculated in accordance with TMS 0302 or determined through testing in accordance with ASTM 90.

Structure-borne sound. Floor/ceiling assemblies between dwelling units or between a dwelling unit and a public or service area within the structure shall have an impact insulation class (IIC) rating of not less than 50 (45 if field tested) when tested in accordance with ASTM E 492.

Analysis

We started looking for a similar assembly with CLT 5 Ply that was laboratory tested for STC and IIC.





The tested floor/ceiling assembly A1-006070-21F shown in Figure 2 has an STC rating above STC-50 (STC-53). However, the IIC rating is only IIC-47. They both have 1-1/2" Concrete on the top and CLT 5 ply., with resilient membrane in between.

The proposed Roof/Ceiling assembly shown in Figure 1 provides a better STC and IIC value than the tested assembly. It has also two layers of $\frac{1}{2}$ " thick gypsum board on resilient channels at the bottom of the assembly that adds 10 points to both the STC and the IIC Value. The calculated STC and IIC value for the proposed Roof/Ceiling assembly is STC-63 and IIC-57.

The roofing insulation and the air gap between the top concrete pavers will add additional points to the STC and IIC value. However, we have not provided calculation for this addition.

Findings

The Proposed Nomad CLT Roof/Ceiling Assembly, shown in Figure 1 shall have STC rating and IIC ratings well above STC-50 and IIC-50. This Roof/Ceiling Assembly shall comply with the Section 1207 in Chapter 12 of the 2014 Oregon Structural Specialty Code for Sound Transmission level.

Sincerely

A ACOUSTICS

Chi M. Jahov

Elki M. Lahav P.E.





3115 NW 132nd Place, Portland, OR 97229-7037 Phone 503-531-8717 email djgessert@gmail.com

Letter

Date:	April 11, 2019	D DDo
To:	Works Progress Architecture 811 SE Stark Street, S210 Portland, OR 97214	STERED FROME SUD STERED FROME SUD HIGHNER POLICE HIGHNER POLICE HI
Attention:	Alex Porter	ON GON 27 26 16. 1988
From:	David Gessert, P. E. Fire Protection Engineer	EXPIRES:06/30/19
Subject/Project:	Nomad – CLT Assembly Fire Resistance Rating	
Job No.:	2019-15	

Total Pages: 3

Introduction/Executive Summary

Two methods of determining the fire resistance from the underside of the Nomad Cross Laminated Timber (CLT) Assembly are used in the following analysis. Both show at least 1-hour (60 minutes) of fire resistance. The two methods used are:

- > Comparison
- > Calculation or Component Additive Method

Nomad – CLT Assembly Fire Rating

From top to bottom the Nomad CLT Assembly shows:

Concrete Pavers Pedestal Support/Air Gap ¹/₂" DensGlass Rigid Tapered Insulation, 4" Minimum Modified Bitumen Roofing Membrane ¹/₂" Plywood Sheathing 5-Ply CLT (6-7/8 inches actual) ¹/₂" Drywall Furring Channel (2) Layers ¹/₂" Interior GYB, Type 'X' Letter to Alex Porter April 11, 2019 Page **2** of **3**

See Appendix – Nomad CLT Assembly In some areas 7-ply CLT panels will be used. The 5-ply CLT panel is the controlling design.

Fire Resistance Based on Comparison

Oregon Structural Specialty Code (OSSC) (2014) 703.3 4. allows fire resistance to be determined by engineering analysis based on a comparison of an assembly having its fire-resistance rating determined by ASTM E 119. OSSC (OSSC) (2014) Table 721.1(3) Item Numbers 26-1.1 and 27-1.1 both use two layers of ½-inch Type X gypsum wallboard being supported by wood I-joists. Both of these designs provide at least 1-hour of fire resistance. By comparison from a fire protection standpoint the Nomad CLT Assembly has similar construction on the bottom. The 5-ply CLT panel (6 7/8 inches actual) provides more fire resistance than the wood I-joists after the gypsum wallboard burns through. Based on comparison the Nomad CLT Assembly has at least one hour of fire resistance.

Fire Resistance Based on Calculations

OSSC (2014) 703.3 3. allows fire resistance to be determined by calculations in accordance with Section 722. OSSC (2014) 722.6 provides a procedure for determine the fire resistance for wood assemblies by calculations. A similar method is described in the *SFPE Handbook of Fire Protection Engineering* as the Component Additive Method (CAM).

Component	Fire Resistance (minutes)
1/2-inch Type X gypsum wallboard	$2 \times 25 = 50^{1, 2}$
Wood roof joints 16 inches o.c.	10 ^{3, 4}
Total Fire Resistance	60

Component Additive Method

Table Notes:

- 1. OSSC (2014) Table 722.6.2(1)
- 2. Harmathy's Rule 1 of fire endurance shows that the two layers in construction have more fire resistance than the layers exposed separately to fire. See Appendix Harmathy's Rule 1 of Fire Endurance.
- 3. OSSC (2014) Table 722.6.2(2)
- 4. The 5-ply CLT panel (6 7/8 inches actual) has substantially more fire resistance than wood joists.

Based on calculations the Nomad CLT Assembly has at least one hour of fire resistance

Letter to Alex Porter April 11, 2019 Page **3** of **3**

Conclusion

The Nomad CLT assembly has at least one hour of fire resistance. Two analysis methods show this.



Appendix – Nomad CLT Assembly

Appendix – Harmathy's Rule 1 of Fire Endurance

The "thermal" fire endurance of a construction consisting of a number of parallel layers is greater than the sum of the "thermal" fire endurances characteristic of the individual layers when exposed separately to fire.

References

Oregon Structural Specialty Code, 2014 Edition, International Code Council, Country Club Hills, Illinois

SFPE Handbook of Fire Protection Engineering, Fifth Edition, 2016, Springer Science+ Business Media LLC, New York

End of Report