

LABORATORY OF TREE-RING RESEARCH
BRYANT BANNISTER TREE-RING BUILDING

University of Arizona - Tucson, Arizona
Department of Planning, Design & Construction
PO Box 210300, Tucson, Arizona 85721-0300

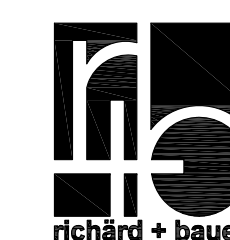
Official Project Address:
Building No. 45B 1215 East Lowell Street, Tucson, Arizona 85719



UA Project No. 08-8826

Construction Documents

August 25, 2011



richard + bauer architecture llc.
1545 w. thomas rd.
phoenix, az. 85015
www.richard-bauer.com

code analysis

applicable codets)

- Jurisdiction: Arizona Department of Fire, Building and Life Safety
- 2006 International Building Code
- 2006 International Fire Code (Arizona State Fire Code)
- 2006 International Plumbing Code
- 2006 International Mechanical Code
- 2006 International Fuel Gas Code
- 2005 National Electric Code
- 2006 International Energy Conservation Code
- 2006 ICC/Ansi A117.1
- 1996 Arizonans with Disabilities Act
- 1994 ADA
- OSHA 1910 regulations 29 CFR 1910 and 1926
- NFPA 13, 2002
- NFPA 70, 2005
- NFPA 72, 2002
- ASHRAE 90.1
- ASHRAE Standard 62
- ANSI/AIHA Laboratory Ventilation
- ACGIH Industrial Ventilation Manual of Recommended Practices.
- OSHA 29 CFR 1919.146 Confined Spaces

general

Occupancy: A-1/ B (New Addition)
B/S-1 (Existing Building)

Construction Type: IIB
Allowable Area: 23,000 sf
Allowable Height: 55 ft - 4 stories + Basement

Existing Math East

Concrete frame with concrete waffle slab floor slabs.

AREA	AREA (S.F.)	OCCUP.
BASEMENT		
EXISTING BASEMENT/ STORAGE	2,888	S-1
EXISTING BASEMENT	4,412	B
BASEMENT ADDITION	685	B
TOTAL BASEMENT	7,985	-
1ST FLOOR		
EXISTING MATH EAST	6,600	B (S-1 FUTURE)
MULTI-PURPOSE ROOM	1,035 (.098)	B
EXHIBIT-SUPPORT	2,886	B
TOTAL 1ST FLOOR	10,521	-
2ND FLOOR		
EXISTING MATH EAST	6,600	B (S-1 FUTURE)
2ND FLOOR ADDITION	1,743	B
TOTAL 2ND FLOOR	8,343	-
3RD FLOOR		
3RD FLOOR ADDITION	10,928	B
4TH FLOOR		
4TH FLOOR ADDITION	10,367	B
OVERALL BUILDING		
	48,144	

B (office and Labs) Educational above the 12th grade.

Table 508.2. -Incidental Use Areas - Storage rooms over 100 s.f. shall have 1hr protection or be protected with a fully automatic fire -extinguishing system

Hazardous Material storage to be less than that allowed in Table 307.7(1) and 307.7(2).

chapter 5 - building heights and areas

Areas:

Section 503 - General Height and Area Limitations

Section 503.1.2 Buildings on same lot. Two or more buildings on the same lot shall be regulated as separate buildings or shall be considered as portions of one building if the height of each building and the aggregate area or buildings are within the limitations of Table 503 as modified by Sections 504 and 506. The provisions of this code applicable to the aggregate building shall be applicable to each building.

Table 503 - Allowable Height and Building Areas
Based on IIB construction type.
Occ. Area Height Stories
A-1 8,500/ft 55' 2

B 23,000/ft 55' 4

Section 504 Height

Height Modification: With automatic Sprinkler System (per section 504.2)

Based on IIB construction type.
Max Height: 75 ft (55 + 20 per section 504.2)
Max Stories A: 3 stories (2 + 1)
Max Stories B: 5 stories (4 + 1)

Section 506 Area Modifications
IIB construction type: A-1 OCCUPANCY
At = 8,500

Section 506.3 Automatic Sprinkler increase:
200% for multi story 8,500+(2x8,500) = 25,500

Section 506.4 Area Determination:
For buildings with 3 or more stories above grade plane, multiply by (3)

25,500 x 3 = 76,500* (A-1 OCCUPANCY)
*Calculation excludes Frontage Area Increase per 506.2

IIB construction type: B OCCUPANCY
At = 23,000

Section 506.3 Automatic Sprinkler increase:
200% for multi story 23,000+(2x23,000) = 69,000

Section 506.4 Area Determination:
For buildings with 3 or more stories above grade plane, multiply by (3)

69,000 x 3 = 207,000* (B OCCUPANCY)
*Calculation excludes Frontage Area Increase per 506.2

chapter 5 - building heights and areas - (continued)

508.3.1: Accessory occupancies. Accessory occupancies are those occupancies subsidiary to the main occupancy of the building or portion thereof. Aggregate accessory occupancies shall not occupy more than 10% of the area of the story in which they are located and shall not exceed the tabular values in Table 503, without height and area increases in accordance with sections 504 and 506 for such accessory occupancies:

Multi-Purpose Accessory to B Occupancy:
1,035 / 10,521 = .098

508.3.1.1: Occupancy Classification: Accessory occupancies shall be individually classified per 302.1. Code requirements shall apply to each portion of the building based on the occupancy classification of that accessory space, except that the most restrictive provisions of section 403 and chapter 9 shall apply to the entire building or portion thereof:

Multi-purpose room to be classified as an A-3 occupancy for purposes of this code analysis per 508.3.1.1 remainder of building to be B/S-1

508.3.1.2. Allowable area and height: the allowable area and height of the building shall be based on the allowable area and height for the main occupancy in accordance w/ section 503.1. The height of any accessory occupancy shall not exceed the tabular values in table 503, without height and area increases in accordance w/ Sections 504 and 506 for such accessory occupancies:

Main occupancy is B w/ a tabular value per 503 of 4/23,000 (unmodified)

Accessory occupancy A-3 w/ a tabular value per 503 of 2/9,500 (unmodified)

508.3.1.3. Separation. No separation is required between accessory occupancies or the main occupancy.

Per table 508.3.3 No separation is required between B and S occupancies.

chapter 6 - types of construction

Proposed Construction Type: IIB

Table 601 - Fire Resistance Rating Requirements Rating	Structural Frame	0
Exterior Bearing Walls	0	
Interior Bearing Walls	0	
Exterior Nonbearing Walls and Partitions	0	
Interior Nonbearing Walls and Partitions	0	
Floor Construction	0	
Roof Construction	0	

Fire Resistance Rating for Exterior walls based on fire separation distance

chapter 6 - types of construction continued

Proposed Construction Type: IIB

Table 602 - Fire Rating for Exterior Walls Rating

Occupancy: B

Less than 5 ft	1
Greater than or equal to 5ft less than 10ft	1
Greater than or equal to 10ft less than 30ft	0
Greater than or equal to 30ft	0

603 - Combustible Material in Type I and II Construction

603.1 - Allowable Materials: Combustible materials shall be permitted in buildings of Type I and II construction in the following applications:

- Interior floor finish, and interior finish, trim and millwork
- Combustible exterior wall coverings
- Light transmitting plastics as permitted by Chapter 26
- Heavy Timber as permitted by Note D Table 601 and Section 602.4.7 and 1406.3

chapter 7 - fire-resistance-rated construction

Section 704 - Exterior Walls

Type II construction: Exterior walls shall be of noncombustible construction with a fire rating per tables 601 and 602 and as outlined in 603.1 allowable combustible materials.

Section 704.8.1
Unprotected openings same as protected openings with approved automatic sprinkler system.

Table 704.8 - Maximum Area of Protected Exterior Wall Openings (Percentage of Wall)

Fire Separation in Feet	Percentage
0 to 3	Not Permitted
Greater than 3 to 5	15%
Greater than 5 to 10	25%
Greater than 10 to 15	45%
Greater than 15 to 20	75%
Greater than 20 to 25	No Limit
Greater than 25 to 30	No Limit
Greater than 30	No Limit

Section 704.11 - Parapet
Not required if wall is not required to be rated.

Section 707 Shaft Enclosures

Section 707.2 Shaft enclosures required. Shaft enclosure is not required when it does not connect more than two stories (exception 7.1).

Section 707.4 - Fire resistance rating. Shaft enclosures shall have a fire resistance rating of not less than 2 hours where connecting four stories or more, and not less than 1 hour where connecting less than four stories. The number of stories connected shall include any basements but not mezzanines.

chapter 8 - interior finishes

Finish Classifications:

Class A: Flame spread 0-25; smoke development 0-450
Class B: Flame spread 26-75; smoke development 0-450
Class C: Flame spread 76-200; smoke development 0-450

Table 803.5 Interior Wall and Ceiling requirements

B Occupancy / Sprinklered
Exit Enclosures and Exit Passageways Class B (note b)
Corridors Class C
Rooms and Enclosed Spaces Class C

chapter 9 - fire protection systems

Designed to meet requirements of the International Fire Code and NFPA 13

Portable Fire Extinguishers shall be provided in accordance with the International Fire Code.

chapter 10 - means of egress

Section 1004 Occupant Load (PROJECT ADDITION)

SPACE TYPE PER TABLE 1004.1.1	AREA (NSF)	OCC. LOAD FACTOR	# OCC.
STORAGE/MECH.	2,013	300 GROSS	7
ASSEM. UNCON.	1,035	15 NET	69
BUSINESS	26,609	100 GROSS	266
OCCUPANT LOAD			345

Section 1005 Egress Width

The means of egress width shall not be less than the total occupant load served by the means of egress multiplied by factors in Table 1005.1

Without Sprinkler System

Stairway .3 (Occupant Load)
Other components .2 (Occupant Load)

With Sprinkler System

Stairway .2 (Occupant Load)
Other components .15 (Occupant Load)

Stairway Minimum Egress Width

10,367(100) = 103 Occupant Load / .2(103) = 20.6"

Per Section 1009.1 minimum stair width to be 44"

Main Egress Door

25,803(100) = 258/2 = 129 Occupant Load/Stair

.15(129) = 19.35"

Per Section 1008.1.1 doors to be 32" width min.

chapter 10 - means of egress continued

Section 1014.3 Common path of egress travel. In occupancies other than Groups H-1, H-2 and H-3, the common path of egress travel shall not exceed 75 feet.

Exception 1. The length of a common path of egress travel in Group B, F and S occupancies shall not exceed more than 100 feet; provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with section 903.3.1.1

Section 1016 Exit Access Travel Distance

Allowable Exit Access Travel Distance (Table 1016.1)
300' w/ sprinkler system

SW Stair

Total Vertical Travel Distance:
(from T.O. SW Stair @ 4th floor to Exit Discharge DR 101) = 183'
Allowable Travel Distance to SW Stair:
300'-183' = +117'

NE Stair

Total Vertical Travel Distance:
(from T.O. NE Stair @ 4th floor to Exit Discharge DR 100NE) = 178'
Allowable Travel Distance to NE Stair:
300'-178' = +122'

chapter 11 - accessibility

Facility to be designed to meet the ICC A117.1 and the ADA, if conflicts occur, the most restrictive requirement will govern.

chapter 12 - interior environment

Ventilation: Facility ventilation system to comply with the International Mechanical Code

Lighting: All spaces to be provided with natural light or Artificial Light in accordance with this section.

chapter 13 - energy efficiency

Facility to comply with the International Energy Conservation Code.

chapter 15 - roof assemblies

Section 1505 Fire Classification

Table 1505.1 - Type IIB / Class C Classification

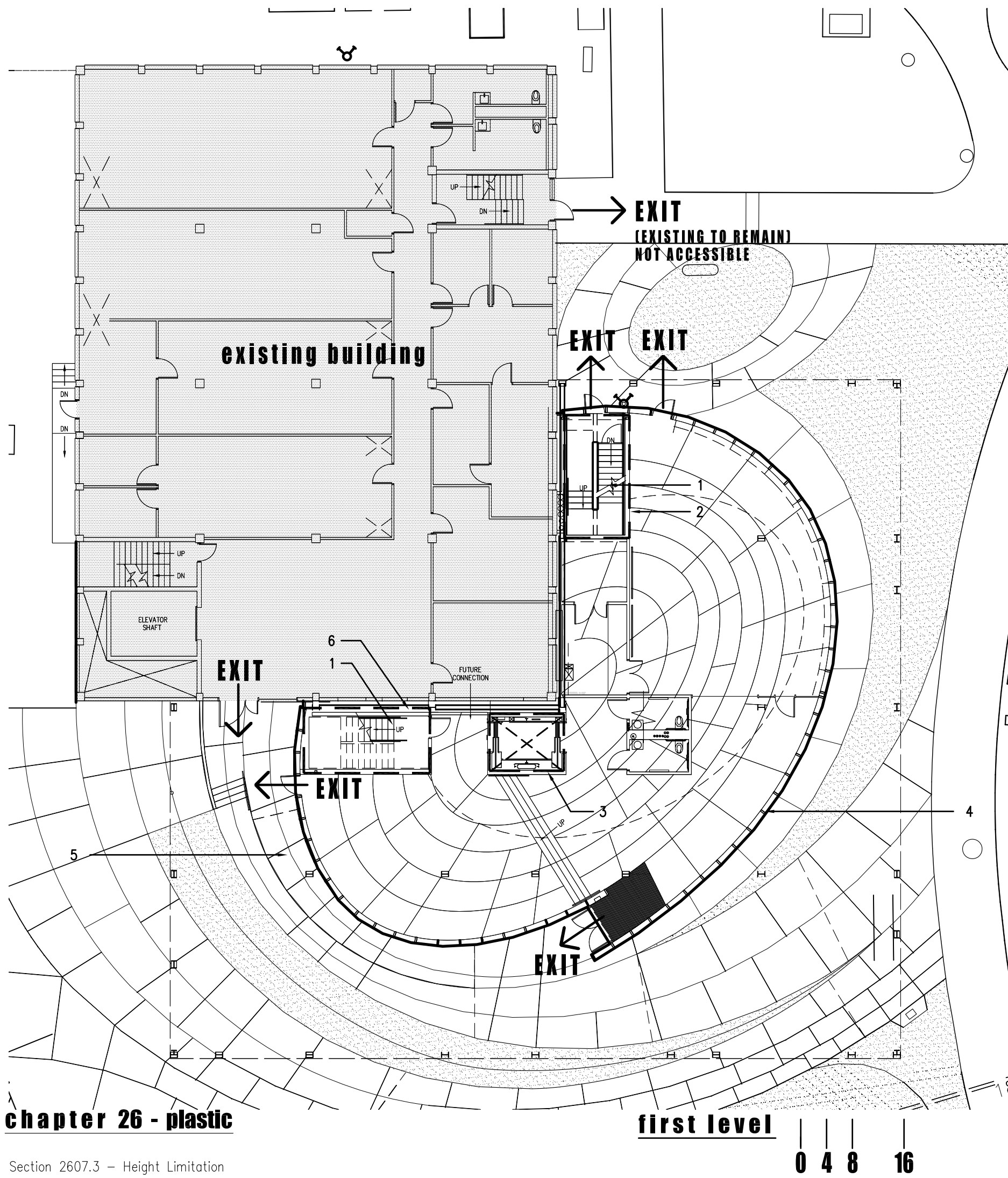
chapter 26 - plastic

Section 2607.1 - Light Transmitting Plastic Wall Panels

Light transmitting plastic shall be permitted as wall panels in exterior walls in all occupancies except A-1, A-2, H-1-2, and I-3, provided that the walls are not required to have a fire resistance rating and the installation conforms to the requirements of this section

Section 2607.2 - Installation

Exterior wall panels installed as provided herein shall not alter the construction type of the building.



chapter 26 - plastic

Section 2607.3 - Height Limitation

Light transmitting plastics shall not be installed more than 75 feet above grade plane except as allowed by Section 2607.5

Section 2607.4 - Area Limitation and Separation

The maximum area of a single wall panel and min. vertical and horiz. separation requirements for exterior light transmitting plastic wall panels shall be as provided for in Table 2607.4

Section 2607.5 - Automatic Sprinkler System.

Where the building is equipped throughout with an automatic sprinkler system the max. percentage of exterior wall in any one story per table 2607.4 shall be increased 100%

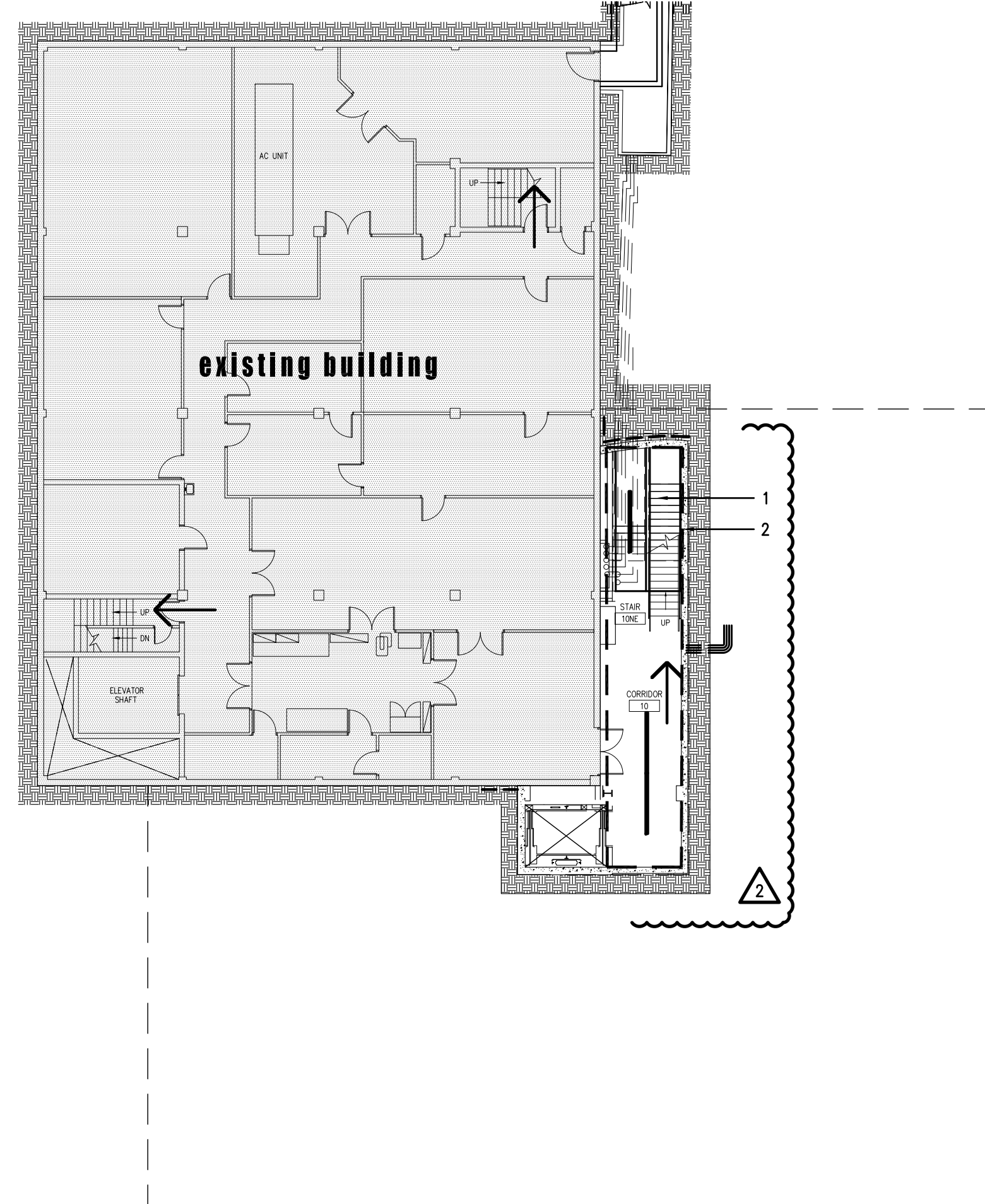
FIRE SEPARATION DISTANCE	CLASS OF PLASTIC	MAX. % AREA OF EXT. WALL	MAX. SINGLE AREA OF PLASTIC WALL PANEL	VERT. SEP.	HORIZ. SEP.
6 >	---	NOT PERMITTED	NOT PERMITTED	---	---
6 < 11	CC1	10	50	8	4
11 < 30	CC1	25	90	6	4
> 30	CC1	50	UNLIMITED	3	0

TABLE 2607.4: AREA LIMITATION LTP PER STORY

chapter 29 - minimum plumbing fixtures

Section 2902 Minimum Plumbing Facilities (PROJECT ADDITION)

	WATER CLOSETS		LAVATORIES		DRINKING FOUNTAINS		SERVICE SINK	
	M	F	M	F				
ASSEMBLY A-3 1,036 SF	1/50		1/50		1:100			
TOTAL OCC.=69	34	34	34	34				
REQUIRED	1.47	1.47	.48	.48	.69		1	
OCCUPANCY B 25,803 SF	1:25/1ST 50		1:40/1ST 80		1:100			
TOTAL OCC.=310	133	133	133	133				
REQUIRED	3.6	3.6	2.66	2.66	3		1	
OCCUPANCY S-1 2,013 SF	1:100		1:100		1:1000			
TOTAL OCC.=7	3.5	3.5	3.5	3.5				
REQUIRED	0.04	0.04	0.04	0.04	.01		--	
TOTAL REQUIRED	5	5	3	3	4		2	
TOTAL PROVIDED	4	4	2	2	4		2	
	UNISEX WC 2		UNISEX L 2					



basement level

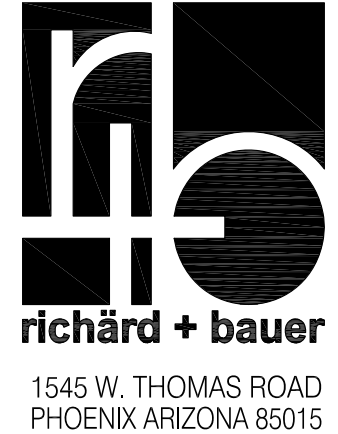
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GENERAL NOTES

- ENTIRETY OF EXISTING MATH EAST BUILDING TO BE FULLY SPRINKLERED AS PART OF THIS PROJECT

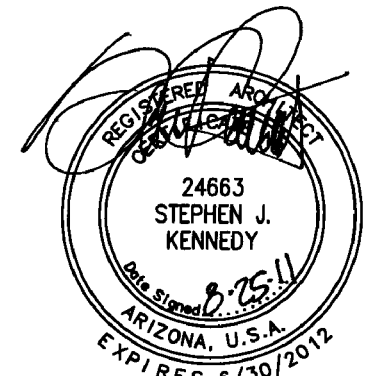
DESCRIPTIVE NOTES

- EXIT ACCESS STAIR (PER SECTION 1016.1)
- STAIR SHAFT ENCLOSURE PROTECTION PER SECTION 707.1. RATING 2-HR PER SECTION 707.4.
- ELEVATOR SHAFT ENCLOSURE PROTECTION PER SECTION 707.1. RATING 2-HR PER SECTION 707.4.
- LIGHT-TRANSMITTING PLASTIC WALL PANEL PER SECTION 2607
- NEW ACCESSIBLE ROUTE TO EXISTING BUILDING
- STAIR SHAFT ENCLOSURE PROTECTION PER SECTION 707.1. RATING 2-HR PER SECTION 707.4
- MECHANICAL SHAFT ENCLOSURE PROTECTION PER SECTION 707.1. RATING 2-HR PER SECTION 707.4



1545 W. THOMAS ROAD
PHOENIX ARIZONA 85015

PHN 602.264.1955
FAX 602.264.9234

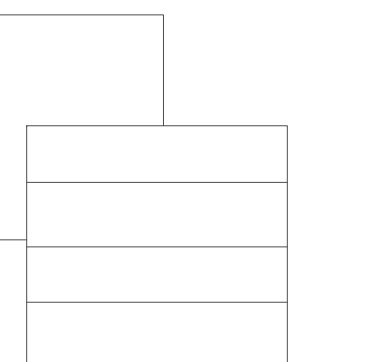


OWNER REVIEW
08/25/11

AUGUST 25, 2011
Construction Documents
r-b job #: 0209
UA #: 08-8826

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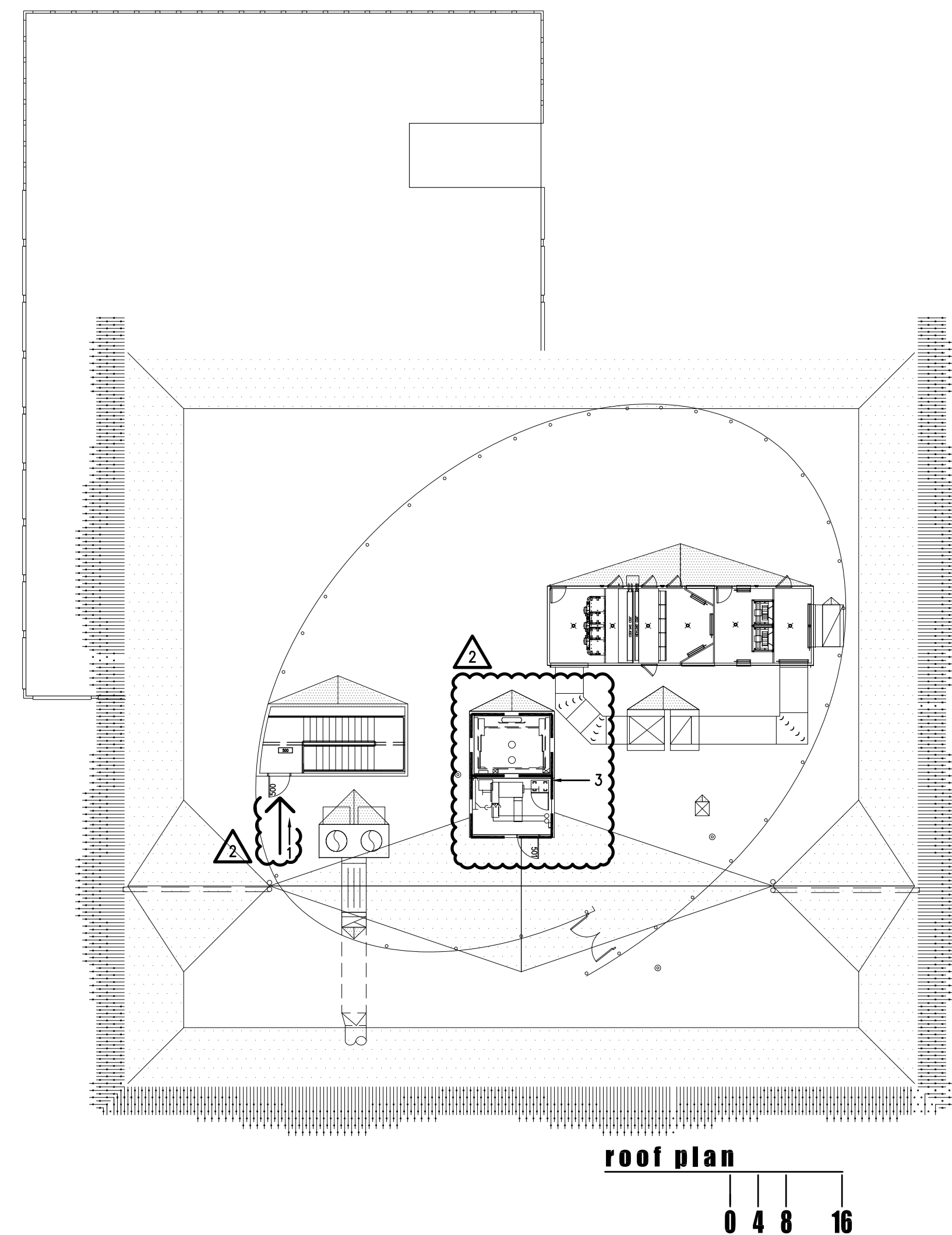
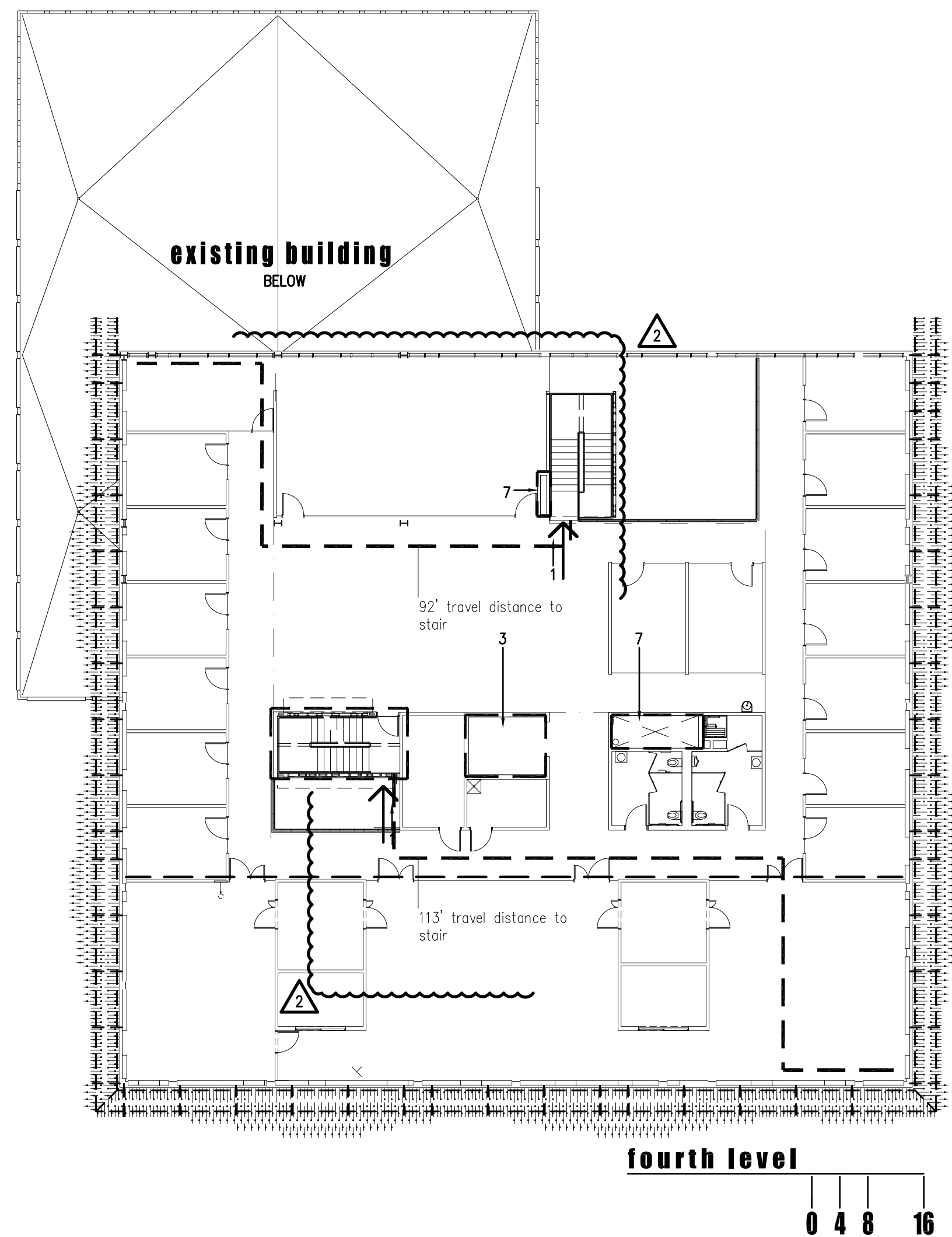
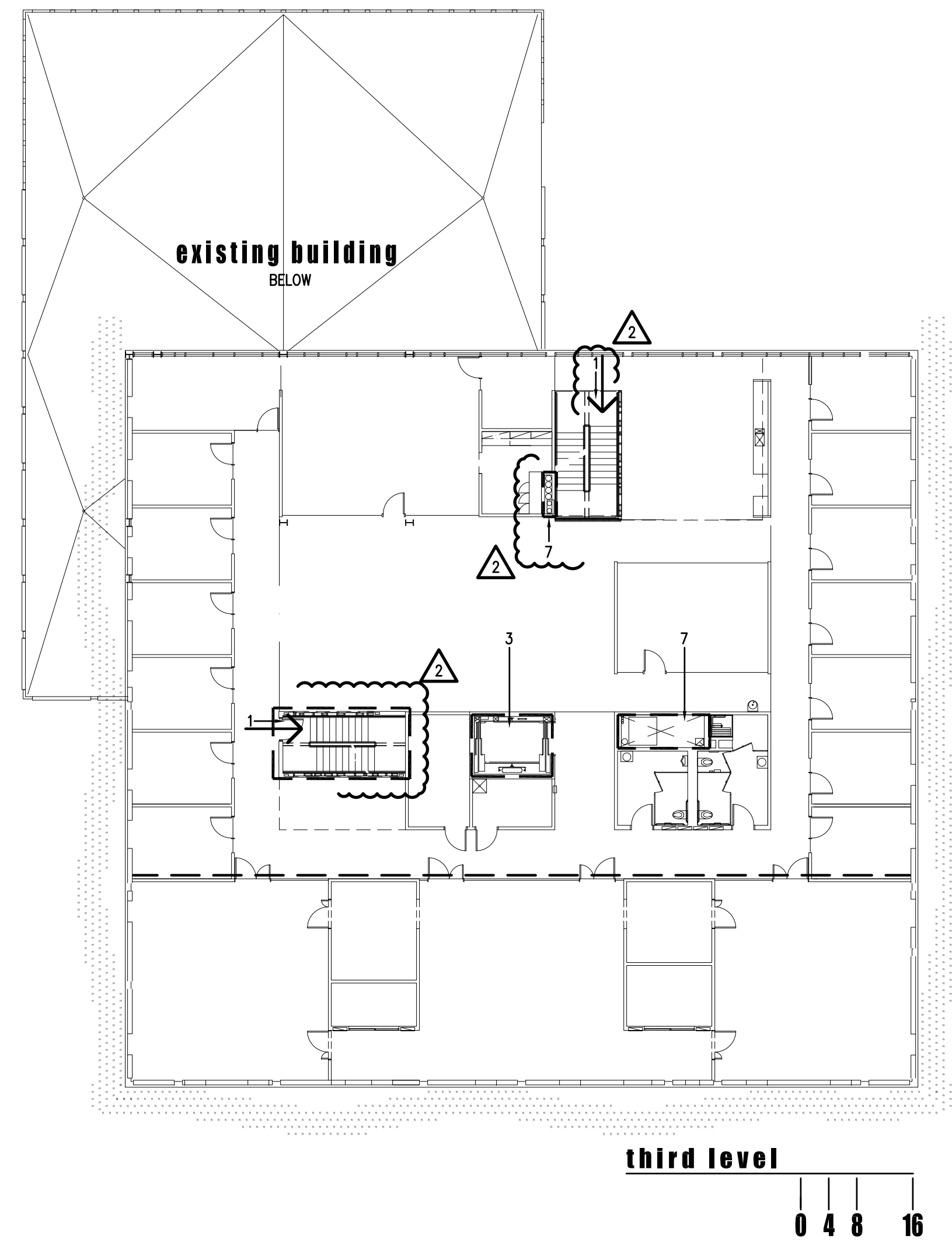
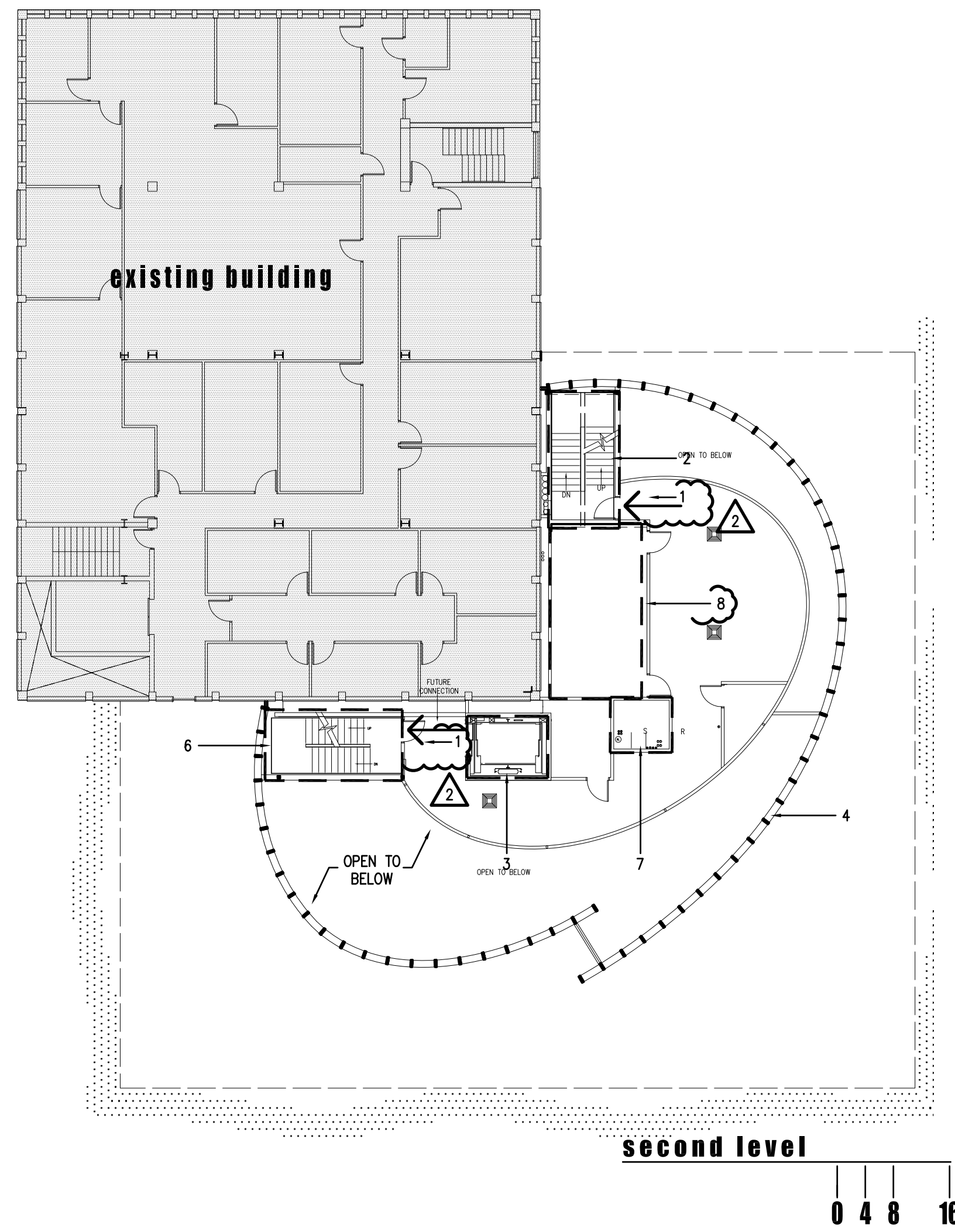
KEYPLAN



CODE SHEET



NTS



GENERAL NOTES

- 1. ENTIRETY OF EXISTING MATH EAST BUILDING TO BE FULLY SPRINKLERED AS PART OF THIS PROJECT

DESCRIPTIVE NOTES

- 1. EXIT ACCESS STAIR (PER SECTION 1016.1)
- 2. STAIR SHAFT ENCLOSURE PROTECTION PER SECTION 707.1. RATING 2-HR PER SECTION 707.4.
- 3. ELEVATOR SHAFT ENCLOSURE PROTECTION PER SECTION 707.1. RATING 2-HR PER SECTION 707.4.
- 4. LIGHT-TRANSMITTING PLASTIC WALL PANEL PER SECTION 2607
- 5. NOT USED
- 6. STAIR SHAFT ENCLOSURE PROTECTION PER SECTION 707.1. RATING 2-HR PER SECTION 707.4.
- 7. MECHANICAL SHAFT ENCLOSURE PROTECTION PER SECTION 707.1. RATING 2-HR PER SECTION 707.4.
- 8. ELECTRICAL ROOM ENCLOSURE 1-HR RATING

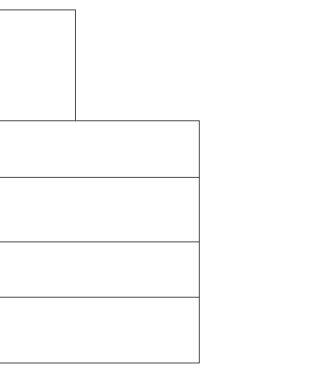


GMP-ADDENDUM 1
05/13/11
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KEYPLAN



CODE SHEET
- CONT.

G1.2