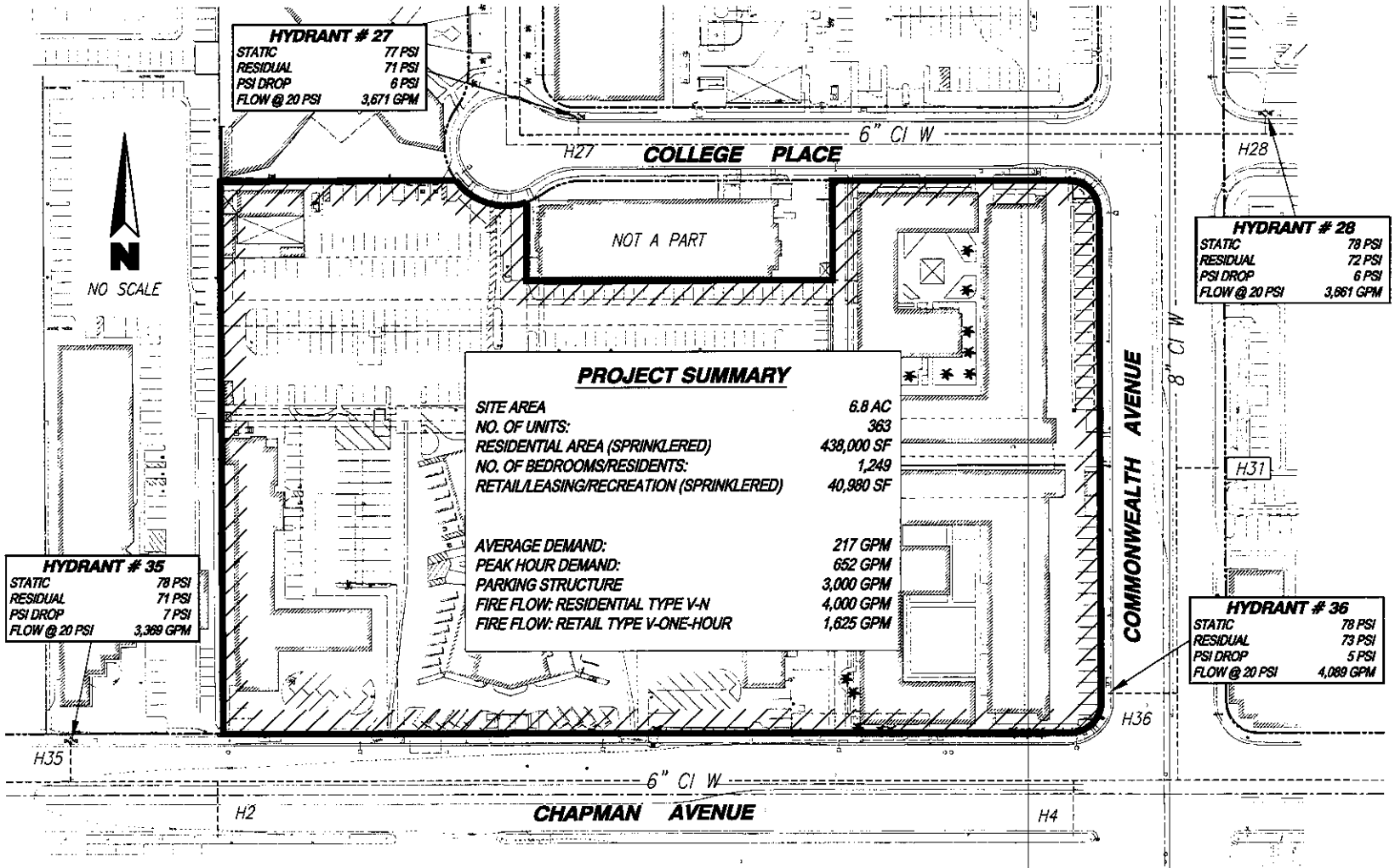


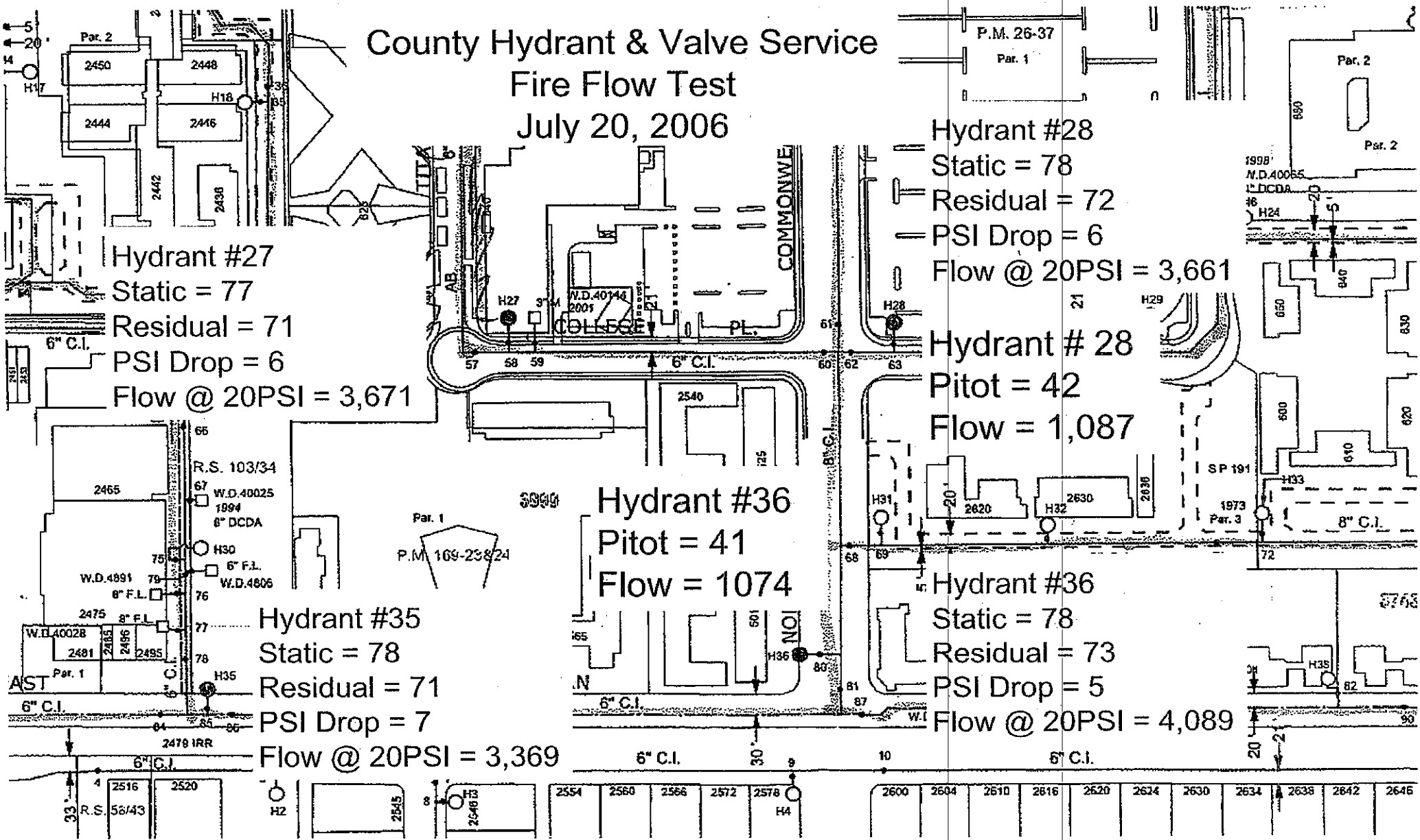
Retail/Leasing/Recreation: 40,980 SF = 0.94 Ac.; Retail Demand = 1,200 Gal./Ac./Day X 0.94 Ac. = 1,128 Gal./Day = 2.35 GPM
Average Residential Demand = 1,249 Residents X 250 Gal./Res./Day = 312,250 Gal./Day = 217 GPM
Maximum Daily Low = 1.5 X Average Demand = 1.5 X 217 GPM = 326 GPM
Peak Hour Demand = 2.0 X Maximum Daily Flow = 2.0 X 326 GPM = 652 GPM
Fire Flow Per 2001 Fire Code Appendix III-A, Table A-III-A-1, "Minimum Required Fire Flow And Flow Duration For Buildings"

JPI Hope International Mixed-Use Community - Fullerton, California

FIRE FLOW & WATER DEMAND PRESSURE ANALYSIS

PREPARED BY: KHR ASSOCIATES
CONSULTING ENGINEERS/SURVEYORS/PLANNERS
4100 Newport Place Drive Newport Beach, California 92660
(949) 756-6440 Fax (949) 756-6444
KHR REF:

County Hydrant & Valve Service
Fire Flow Test
July 20, 2006



COUNTY HYDRANT & VALVE SERVICE

P.O. Box 3016 Mission Viejo, CA 92690 • (949) 347-8322

Fire Flow Test Report

Customer: KHR Associates – Brent Richards
4100 Newport Place Dr. Ste. 200, Newport Beach, CA, 92660

Test Location: Univ. Cal State Fullerton
N. Commonwealth – East College Place – East Chapman Ave.

Requested By: Brent Richards
Phone: (949)756-6440

Water Agency: City of Fullerton
Representative Name (Witness): City of Fullerton Fire Dept. Engine #3 C Shift

OCHVS Employees Performing Tests: Ken Ibsen & Roger Fickling

Flow Hydrant Measured With: 2 ½" Hose Monster with built in Pitot and 15ft. 2 ½" hose.
Gauge Accuracy's +/- 1%

Approved For Test By: A. Meacham City of Fullerton Fire Department

Hydrant Identification:

Test Hydrants-

#1 Hydrant # 27 on East College Place- City of Fullerton Water Map Page # 58, Grid 13-E
#2 Hyd rant #36 on North Commonwealth- City of Fullerton Water Map Page # 58, Grid 13-E
#3 Hydrant #35 on East Chapman Ave.- City of Fullerton Water Map Page # 58, Grid 13-E
#4 Hydrant #28 on East College Pl.- City of Fullerton Water Map Page # 58, Grid 13-E

Flow Hydrants -

#1 Hydrant #28 on East College Pl.- City of Fullerton Water Map Page # 58, Grid 13-E
#2 Hydrant #28 on East College Pl.- City of Fullerton Water Map Page # 58, Grid 13-E
#3 Hydrant #36 on N. Commonwealth - City of Fullerton Water Map Page # 58, Grid 13-E
#4 Hydrant #36 on N. Commonwealth - City of Fullerton Water Map Page # 58, Grid 13-E

		Date	Static	Residual	Psi Drop
Test Hydrants	Test #1- Hyd. # 27	07/20/06	77	71	6
	Test #2- Hyd. # 36	07/20/06	78	73	5
	Test #3- Hyd. # 35	07/20/06	78	71	7
	Test #4- Hyd. # 28	07/20/06	78	72	6
		Pitot	Flow Opening	Coefficient	GPM
Flow Hydrants	Test #1- Hyd. # 28	42	2 ½"	0.9	1087
	Test #2- Hyd. # 28	42	2 ½"	0.9	1087
	Test #3- Hyd. # 36	41	2 ½"	0.9	1074
	Test #4- Hyd. # 36	41	2 ½"	0.9	1074

Test #1 Hyd. #27 Residual at 20psi 3,671 GPM
Test #2 Hyd. #36 Residual at 20psi 4,085 GPM
Test #3 Hyd. #35 Residual at 20psi 3,369 GPM
Test #4 Hyd. #28 Residual at 20psi 3,661 GPM

Certificates:
American Water Works Association Water Distribution Operator Grade II #05769
State of California Department of Health Services Water Distribution Operator Grade D-3 #5769
State of California Department of Health Services Water Treatment Operator Grade I #14775
County Hydrant & Valve Service is not a California licensed contractor.

Fullerton Fire Department

FIRE CODE PERMIT

312 E. Commonwealth Ave., Fullerton, CA 92832-2099
(714) 738-6500 fax (714) 738-3392
email: FFPrevention@ci.fullerton.ca.us

COPY

Chapman / St College / Commonwealth
FULLERTON, CA
Brent 949-756-6440 KHR Associates

As required by Article 1 Section 105 of the 2001 California Fire Code, and Fullerton Municipal Code Chapter 13.20, the following materials, processes or operations are permitted:

Fire Code Permit - BR

Permit No.	*Permit Description*	*Issued*	*Expires*
5175	To Use or Operate Fire Hydrant Water Control Valves Intended for Fire Suppression	7/20/06	7/21/06

Fee: $118.00

Conditions:
Fire Hydrant Flow test witnessed by Engine 3 C shift @ 1400 hours

This permit is issued pursuant to the requirements and conditions as set forth in the California Fire Code, and other City, State and Federal Statutes, and nationally recognized standards. Final approval and continuing effort of this permit are subject to compliance with Fullerton Fire Department Rules and Regulation and field inspection.

This permit is subject to revocation for proper cause or when necessary for public safety.

Non-compliance with any provision stipulated herein constitutes a violation of the above code.

This permit does not take the place of any license required by law and is not transferable.

This permit is only VALID UPON RECEIPT OF PAYMENT and when signed by Fullerton Fire Department Fire Marshal or authorized designee.

Fire Marshal Tina Moreno CFI 7-19-06
(or authorized designee) *Inspector* *Date*

Received by Ashley Kawamura

POST IN A CONSPICUOUS PLACE

Permit Fee(s) $ 118.00 To be billed:_____ Payment Received: 6997 AWJ
(check #, cash) Initials

PERMIT RECORD#_____(FFD use only) Original – FFD Copy - Customer

Fullerton Fire Department

FIRE CODE PERMIT

COPY

312 E. Commonwealth Ave., Fullerton, CA 92832-2099
(714) 738-6500 fax (714) 738-3392
email: FFPrevention@ci.fullerton.ca.us

College Pl / Commonwealth
FULLERTON, CA
Brent 949-756-6440 KHR Associates

As required by Article 1 Section 105 of the 2001 California Fire Code, and Fullerton Municipal Code Chapter 13.20, the following materials, processes or operations are permitted:

Fire Code Permit - BR

Permit No.	*Permit Description*	*Issued*	*Expires*
5175	To Use or Operate Fire Hydrant Water Control Valves Intended for Fire Suppression	7/20/06	7/21/06

Fee: $118.00

Conditions:
Fire Hydrant Flow test witnessed by Engine 3 C shift @ 1330 hours

This permit is issued pursuant to the requirements and conditions as set forth in the California Fire Code, and other City, State and Federal Statutes, and nationally recognized standards. Final approval and continuing effort of this permit are subject to compliance with Fullerton Fire Department Rules and Regulation and field inspection.

This permit is subject to revocation for proper cause or when necessary for public safety.

Non-compliance with any provision stipulated herein constitutes a violation of the above code.

This permit does not take the place of any license required by law and is not transferable.

This permit is only VALID UPON RECEIPT OF PAYMENT and when signed by Fullerton Fire Department Fire Marshal or authorized designee.

Fire Marshal Tina Moreno Jr. CFI — 7-19-06
(or authorized designee) *Inspector* *Date*

Received by: Shirley Kawamura

POST IN A CONSPICUOUS PLACE

Permit Fee(s) $ 118.00 To be billed:_____ Payment Received: 6997 (check #, cash) Initials

PERMIT RECORD#_____(FFD use only) Original – FFD Copy - Customer

Division III
FIRE PROTECTION
APPENDIX III-A

FIRE-FLOW REQUIREMENTS FOR BUILDINGS

(See UFC Section 903.3)

SECTION 1 — SCOPE

The procedure determining fire-flow requirements for buildings or portions of buildings hereafter constructed shall be in accordance with Appendix III-A. Appendix III-A does not apply to structures other than buildings.

SECTION 2 — DEFINITIONS

For the purpose of Appendix III-A, certain terms are defined as follows:

FIRE AREA is the floor area, in square feet, used to determine the required fire flow.

FIRE FLOW is the flow rate of a water supply, measured at 20 psi (137.9 kPa) residual pressure, that is available for firefighting.

SECTION 2 — MODIFICATIONS

2.1 Decreases. Fire-flow requirements may be modified downward by the chief for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

2.2 Increases. Fire flow may be modified upward by the chief where conditions indicate an unusual susceptibility to group fires or conflagrations. An upward modification shall not be more than twice that required for the building under consideration.

SECTION 3 — FIRE AREA

3.1 General. The fire area shall be the total floor area of all floor levels except as modified in Section 4

3.2 Area Separation. Portions of buildings which are separated by one or more four-hour area separation walls constructed in accordance with the Building Code, without openings and provided with a 30-inch (762 mm) parapet, are allowed to be considered as separate fire areas.

3.3 Type I and Type II-F.R. Construction. The fire area of buildings constructed of Type I and Type II-F.R. construction shall be the area of the three largest successive floors.

SECTION 4 — FIRE-FLOW REQUIREMENTS FOR BUILDINGS

4.1 One- and Two-Family Dwellings. The minimum fire flow and flow duration requirements for one- and two-family dwellings having a fire area which does not exceed 3,600 square feet (344.5 m^2) shall be 1,000 gallons per minute (3785.4 L/min.). Fire flow and flow duration for dwellings having a fire area in excess of 3,600 square feet (344.5 m^2) shall not be less than that specified in Table A-III-A-1.

> **EXCEPTION:** A reduction in required fire flow of 50 percent, as approved, is allowed when the building is provided with an approved automatic sprinkler system.

4.2 Buildings other than One- and Two-Family Dwellings. The minimum fire flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in Table A-III-A-1.

> **EXCEPTION:** A reduction in required fire flow of up to 75 percent, as approved, is allowed when the building is provided with an approved automatic sprinkler system, The resulting fire flow shall not be less than 1,500 gallons per minute (5677.5 L/min.).

TABLE A-III-A-1—MINIMUM REQUIRED FIRE FLOW AND FLOW DURATION FOR BUILDINGS

FIRE AREA (square feet) × 0.0929 for m²					FIRE FLOW (gallons per minute)[2] × 3.785 for L/min.	FLOW DURATION (hours)
Type I-F.R. II-F.R.[1]	Type II One-HR. III One-HR.[1]	Type IV-H.T. V-One-HR.[1]	Type II-N III-N[1]	Type V-N[1]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
"	"	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
"	"	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
"	"	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
"	"	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
"	"	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
"	"	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
"	"	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
"	"	191,401-Greater	128,301-Greater	85,101-Greater	8,000	

[1]Types of construction are based upon the Building Code.
[2]Measured at 20 psi (137.9 kPa). See Appendix III-A, Section NO TAG.

member; roof decks, where supported by a wall, shall be anchored to such wall at intervals not exceeding 20 feet (6096 mm); every monitor and every sawtooth construction shall be anchored to the main roof construction. Such anchors shall consist of steel or iron bolts of sufficient strength to resist vertical uplift of the roof.

605.6.8 Mechanically laminated floors and roof decks. Mechanically laminated floors and roof decks conforming to Section 2313 may be used as heavy-timber floors or roof decks, provided the minimum thickness and other applicable requirements of the section are followed.

605.6.9 Partitions. Partitions shall be of solid wood construction formed by not less than two layers of 1-inch (25 mm) matched boards or laminated construction of 4-inch (102 mm) thickness, or of one-hour fire-resistive construction.

SECTION 606 — TYPE V BUILDINGS

606.1 Definition. Type V buildings may be of any materials allowed by this code.

Type V One-hour buildings shall be of one-hour fire-resistive construction throughout.

Materials of construction and fire-resistive requirements shall be as specified in Section 601.

For requirements due to occupancy, see Chapter 3.

606.2 Structural Framework. Structural framework shall be of steel or iron as specified in Chapter 22, concrete as specified in Chapter 19, masonry as specified in Chapter 21, or wood as specified in Chapter 23 and this chapter.

606.3 Exterior Walls and Openings. Exterior walls shall comply with fire-resistive requirements set forth in Section 503 and Tables 5-A and 6-A. Openings in exterior walls shall conform to requirements of Section 503.2 and Table 5-A.

606.4 Stairway Construction.

606.4.1 General. Stairways shall comply with the requirements of Chapter 10.

606.4.2 Interior. Interior stairways may be constructed of any materials permitted by this code.

606.4.3 Exterior. Exterior stairways shall be constructed of wood not less than 2 inches (51 mm) in nominal thickness, or may be of noncombustible materials.

606.5 Roofs. Roof coverings shall be as specified in Chapter 15.

Except in retail sales and storage areas classified as Group M or S, Division 1 Occupancies and in Group H Occupancies, roofs and their members other than the structural frame may be of unprotected noncombustible materials when every part of the roof framing, including the structural frame, is 25 feet (7620 mm) or more above the floor, balcony or gallery immediately below. Heavy-timber members in accordance with Section 605.6 may be used for such unprotected members in one-story buildings.