WATER DEMAND REPORT

THE RITZ-CARLTON RESIDENCES NEWPORT BEACH

Newport Beach, California

Prepared for

Newport Center Hotel, LLC
4901 Birch Street
Newport Beach, CA 92660
949.838.1274

Prepared By:

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STATE OF CALIFORNIA

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Date Prepared: December 2021

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NEWPORT BEACH, CA

December 2021

1112-008-02

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Table of Contents

1.0 INTRODUCTION

1.1 PURPOSE OF STUDY

The purpose of this study is to calculate the domestic water demand and fire suppression flow requirements for the proposed Ritz-Carlton Residences project, located in the City of Newport Beach, California. The water demand estimates that are presented in this report will aid with the water supply analyses. The fire flow calculations will provide information that will determine if the available fire hydrants are sufficient to provide fire suppression flows to the proposed building, or if additional fire hydrants will be required.

1.2 SITE DESCRIPTION

The Newport Beach Marriott Hotel & Spa project site encompasses a total area of approximately 9.53 acres, and is located in the City of Newport Beach. The existing site consists of the hotel & spa with 532 hotel rooms, along with associated parking. The Ritz-Carlton Residences project is in the southerly portion of the property and will encompass 3.95 acres of the total area. Adjacent land uses include other commercial development to the east, a golf course (Newport Beach Country Club) to the west, and residential property to the north and south. The site is located westerly of the intersection of Newport Center Drive and Santa Barbara Drive. Project information along with the Vesting Tentative Tract Map are included as Appendix 1 of this report. A Vicinity Map is shown below.

Vicinity Map

1.3 EXISTING WATER FACILITIES

Water for domestic service and fire protection is provided to the property by the City of Newport Beach. The City of Newport Beach Water GIS Map and Waterline As-Builts are included in the report as Appendix 2, and show an existing 12" ACP waterline and 2 fire hydrants fronting the project along Newport Center Drive. Fire hydrant #1326 was tested for static and residual pressures and fire hydrant #1325 was tested for flow. The results are summarized below:

- Flow FH #1325 test results:
  - Observed flow: 1,300 gpm
  - Calculated flow @ 20 psi: 4,507 gpm

- Static FH #1326 test results:
  - Static Pressure: 120 psi
  - Residual Pressure: 110 psi @ 1,300 gpm

The fire hydrant flow test results are included in this report as Appendix 3.
Based on the City's GIS mapping system, there are no existing recycled water lines in the vicinity of the project.

1.4 PROPOSED DEVELOPMENT

The proposed project development will consist of demolition of one of the existing hotel buildings and construction of a new building. The proposed building will be in the southerly portion of the project site and will consist of 159 hotel-branded residences and 5 levels of subterranean parking. Construction of 35,000 square feet of amenity space is included in the proposed development. A Project Description, prepared by CAA Planning, and an email correspondence from MVE Architects (Appendix 1) describe the construction type, quantity of proposed hotel-branded residences, the number of existing hotel rooms that will remain, and the square footage of proposed amenity space.

The proposed unit type and count will be as follows:

Type	Qty.
1 Bed	26
2 Bed	112
3 Bed	18
4 Bed	2
5 Bed	1
Hotel Room (Remaining from Existing Conditions)	373
Total	532

2.0 METHODOLOGY AND WATER DEMAND ESTIMATES

The proposed water demand is associated with the proposed development provided by MVE Architects (See Appendix 1). The water demand calculations account for the existing hotel rooms that will be remaining and the proposed hotel-branded residences. The calculations are based on the City of Newport Beach Water Supply Assessment (WSA), dated June 13, 2012. For water demand of the proposed amenity area, factors provided by the Irvine Ranch Water District (IRWD) were used. The water demand from the amenity space was then added to the water demand for the proposed hotel-branded residences and remaining existing hotel rooms. (See Appendix 4 for Excerpt from WSA, Appendix 5 for IRWD Design Criteria, and Appendix 6 for Water Demand Calculations.)

Below are the criteria that were used for the water demand calculations.

- Average Daily Flow: 228.1 gallons per capita per day (gpcd) (WSA)
- Average Persons per Dwelling Unit: 2.19 (WSA)
- Average Persons per Hotel Room: 1 (WSA)
- Average Daily Flow (Hotel Rooms): 60 gallons/day/unit (WSA)
- Average Daily Flow (Recreation): 60 gallons/ksf/day (IRWD)

The estimated water demand is summarized below:

- Existing Condition: 136 acre-feet/year
- Proposed Condition: 187 acre-feet/year
- Net New Water Demand: 51 acre-feet/year

3.0 FIRE FLOW CALCULATIONS

The fire flow calculations were prepared using the proposed building areas & types (Appendix 1), and in accordance with City of Newport Beach Guideline B.0.1 – Determination of Fire Flow (Appendix 7). Since the buildings will be fully sprinklered, a 50% reduction has been applied, and is reflected in the results below. In addition, in accordance with the City of Newport Beach Guidelines, the minimum fire flow shall be 1,500 gpm @ 20 psi.

The results of the fire flow calculations for the Ritz-Carlton Residences are as follows:

- 162,105 square feet (Type I-A) using the maximum 3 successive floors per California Fire Code
- Required Fire Flow: 2,125 gpm @ 20 psi
- 2 Hydrants @ 450 feet apart

The fire flow calculations are included in Appendix 8.

4.0 PROPOSED WATER IMPROVEMENTS

The proposed water and fire service connections will be to the existing 12" ACP water line in Newport Center Drive. Based on the results of the fire flow analyses, it appears that no additional hydrants will be required.

5.0 CONCLUSION

The locations of the proposed service lines will be as follows:

- Existing 12" ACP in Newport Center Dr: Proposed domestic service lines

The existing water demand for the project site is 136 acre-feet/year. The proposed water demand is 187 acre-feet/year, which means, the development of the Ritz-Carlton Residences will result in net new water demand of 51 acre-feet/year.

No additional fire hydrants are anticipated to be required.

6.0 APPENDICES

Appendix 1 Project Information

Appendix 2 Water GIS Map & Waterline As-Built

Appendix 3 Fire Hydrant Test Results

Appendix 4 Design Criteria

Appendix 5 Excerpt from City of Newport Beach Water Supply Assessment

Appendix 6 Water Demand Calculations

Appendix 7 City of Newport Beach Fire Flow Criteria

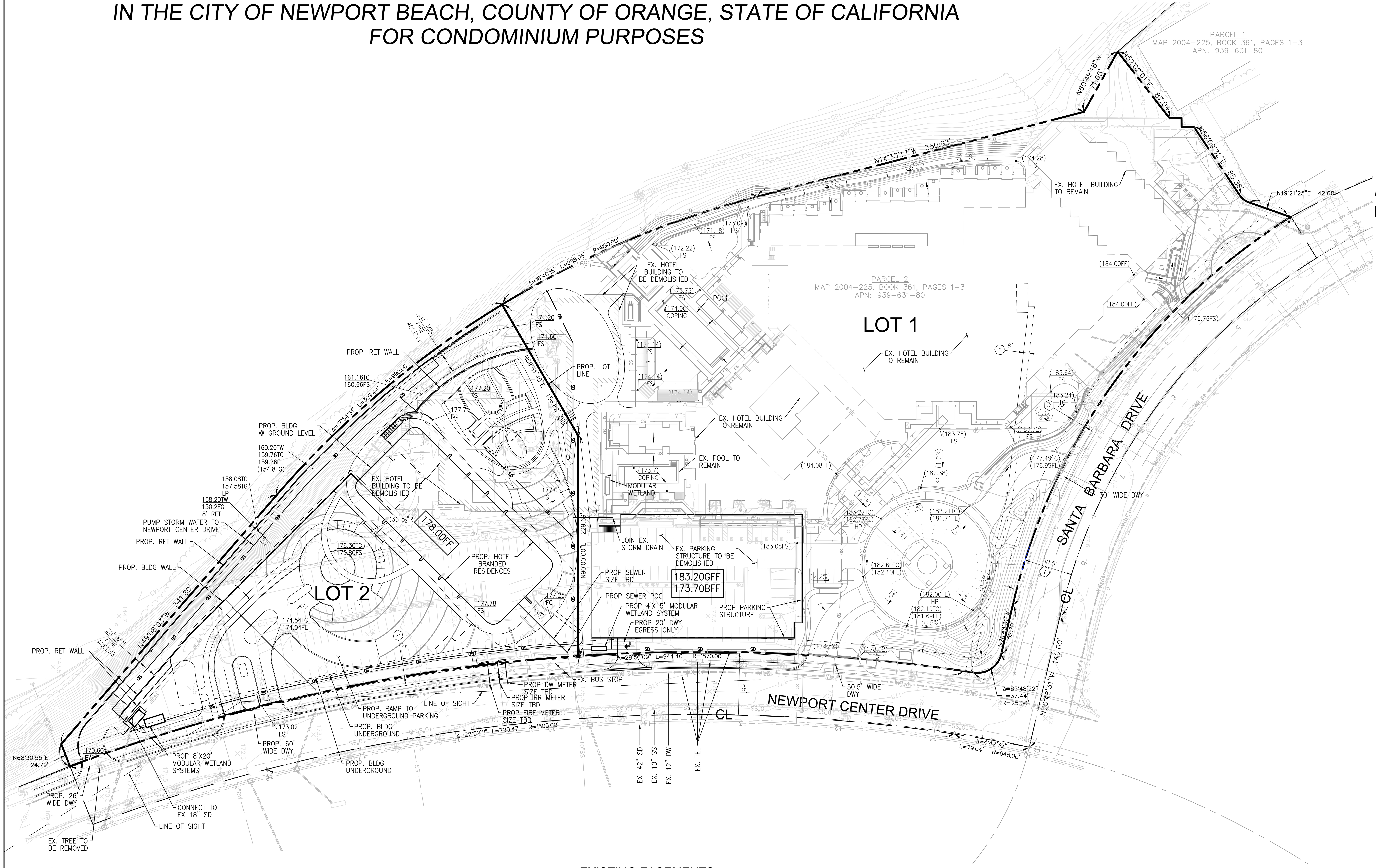
Appendix 8 Fire Flow Calculations

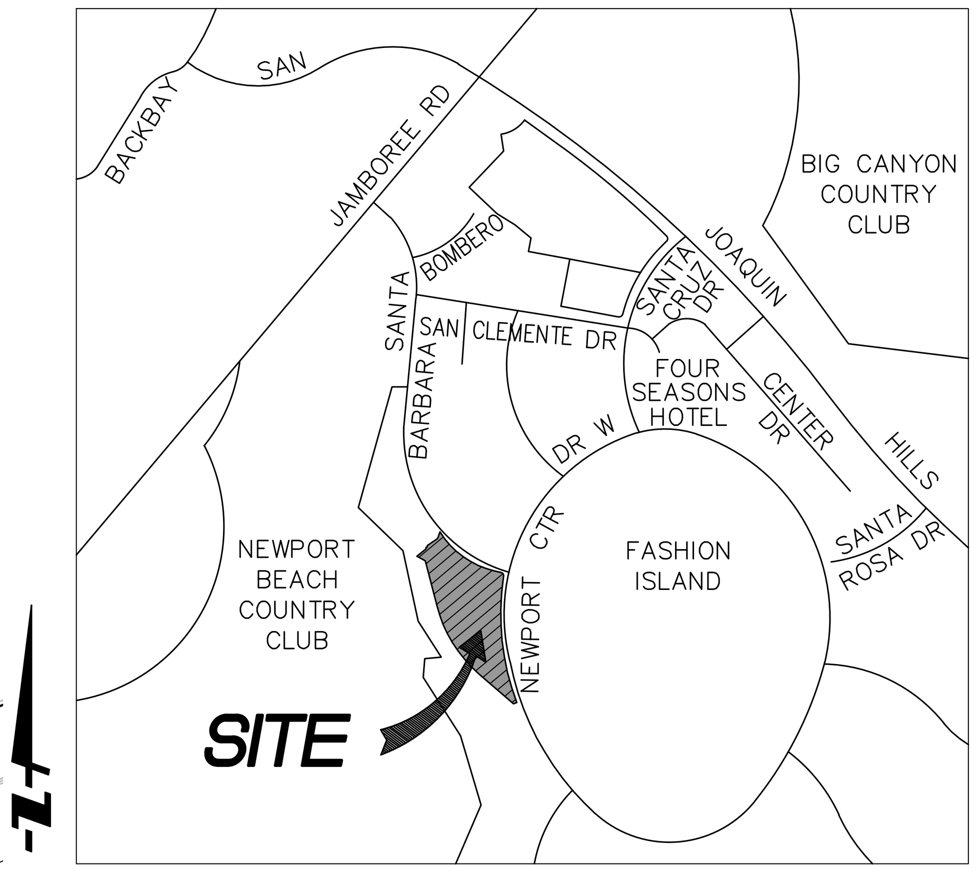
Appendix 1

Project Information

VESTING TENTATIVE TRACT MAP NO. 19222

IN THE CITY OF NEWPORT BEACH, COUNTY OF ORANGE, STATE OF CALIFORNIA
FOR CONDOMINIUM PURPOSES





LOCATION MAP
NTS

GENERAL NOTES

1. EXISTING LAND USE: HOTEL
2. PROPOSED LAND USE: HOTEL & HOTEL BRANDED RESIDENCES
3. NO PUBLIC UTILITIES ARE PROPOSED FOR THIS PROJECT
4. SEWAGE DISPOSAL SERVICE IS PROVIDED BY CITY OF NEWPORT BEACH
5. WATER SERVICE IS PROVIDED BY CITY OF NEWPORT BEACH
6. NO PUBLIC AREAS ARE PROPOSED
7. SEE LANDSCAPE PLANS FOR TREE PLANTING
8. SEE CONCEPTUAL GRADING PLAN FOR DIRECTION OF FLOW OF WATER COURSES
9. NO EASEMENT IS PROPOSED

AREAS

GROSS AREA = 415,004 SF (9.527 AC)

LOT 1 = 294,137 SF (6.752 AC)
LOT 2 = 120,868 SF (2.775 AC)

FLOOD ZONE

THE AREA OF LAND SHOWN HEREON LIES ENTIRELY WITHIN FLOOD ZONE "AE", AS DEFINED ON INFORMATION PUBLISHED BY U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT AS REFLECTED BY FLOOD INSURANCE RATE MAP PANEL NO. 06059C0382K, EFFECTIVE 3/21/2019

OWNER

NEWPORT CENTER HOTEL, LLC
4901 BIRCH ST
NEWPORT BEACH, CA 92660
CONTACT: KEVIN MARTIN
PHONE: (949) 838-1274

SITE ADDRESS

900 NEWPORT CENTER DRIVE
NEWPORT BEACH, CA 92660

CIVIL ENGINEER

ORIANA SLASOR, P.E.
FUSCOE ENGINEERING, INC.
16795 VON KARMAN, SUITE 100
IRVINE, CA 92606
PHONE: (949) 474-1960
FAX: (949) 474-5315

REGISTERED PROFESSIONAL ENGINEER
NO. C63451
Exp. 09/30/20
CIVIL
STATE OF CALIFORNIA

LEGAL DESCRIPTION

PARCEL 2, IN THE CITY OF NEWPORT BEACH, COUNTY OF ORANGE, STATE OF CALIFORNIA, AS PER MAP 2004-225 FILED IN BOOK 361, PAGES 1, 2, AND 3 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AS MODIFIED BY THE PARCEL MAP CERTIFICATE OF CORRECTION RECORDED APRIL 23, 2008 AS INSTRUMENT NO. 2008-190230 OF OFFICIAL RECORDS.

BASIS OF BEARINGS

BEARINGS HEREON ARE IN TERMS OF THE CALIFORNIA COORDINATE SYSTEM OF 1983 (CCS-83) ZONE VI, 2017.50 EPOCH, AS DERIVED LOCALLY BY ORANGE COUNTY HORIZONTAL GPS CONTROL STATIONS TRAK AND SACY, BEING N30°42'07"W AS PUBLISHED BY THE ORANGE COUNTY SURVEYOR. ALL DISTANCES WERE SCALED TO GROUND BY APPLYING THE COMPUTED COMBINATION FACTOR (CF) 0.99996333.

BENCH MARK

ELEVATIONS HEREON ARE IN TERMS OF THE NATIONAL VERTICAL DATUM (NAVD88), BASED LOCALLY ON THE COUNTY OF ORANGE BENCHMARK:
3K-46-91 = 95.484 FEET (1991 LEVELED)

LEGEND

RIGHT OF WAY/PROPERTY LINE
CENTER LINE
EX. EASEMENT
PROPOSED LOT LINE
PROPOSED RETAINING WALL
EXISTING RETAINING WALL
EXISTING CONTOUR
EXISTING DOMESTIC WATER
EXISTING FIRE WATER
EXISTING SEWER MAIN
EXISTING STORM DRAIN
EXISTING CABLE TV LINE
EXISTING ELECTRIC LINE
EXISTING TRAFFIC SIGNAL CONDUIT
EXISTING STREET LIGHT CONDUIT
EXISTING GAS LINE
EXISTING TELEPHONE LINE
EXISTING STREET LIGHT
PRIVATE STORM DRAIN LINE
LINE OF SIGHT

BF	BACKFLOW
BLDG	BUILDING
CB	CATCH BASIN
CL	CENTER LINE
DW	DOMESTIC WATER
ESMT	EASEMENT
EX.	EXISTING
FH	FIRE HYDRANT
FW	FIRE WATER
L	LENGTH
P/L	PROPERTY LINE
R	RADIUS
R/W	RIGHT OF WAY
SD	STORM DRAIN

EXISTING EASEMENTS

1. PUBLIC UTILITY EASEMENT, BOOK 11301, PAGE 1203 (TO REMAIN)
2. WATERLINE EASEMENT, BOOK 11318, PAGE 1747 (TO REMAIN)
3. 15' UTILITY EASEMENT 93-3805 (TO REMAIN)
4. SOUTHERN CALIFORNIA EDISON COMPANY PUBLIC UTILITIES EASEMENT INST. 85-149874

50' 0' 25' 50'
SCALE: 1" = 50'

NO.	DATE	REVISION	DESCRIPTION

FUSCOE ENGINEERING
full circle thinking

VESTING TENTATIVE TRACT MAP NO. 19222
FOR CONDOMINIUM PURPOSES
CITY OF NEWPORT BEACH

DATE:	12/07/2021
SCALE:	AS SHOWN
JOB NO.:	1112-008
DRAWN:	MI
CHECKED:	OS
SHEET 1 OF 1	

F:\Projects\1112\008\Plans\Entitlements\Tentative Tract Map\1112-008-VTTM.dwg (12/7/2021 10:09 AM) Plotted by: Denisse Tadillo

Susan Williams

From:	Pieter Berger <pberger@mve-architects.com>
Sent:	Wednesday, September 15, 2021 3:26 PM
To:	Susan Williams; Oriana Slasor
Cc:	01112-008@fuscoe.tonicdm.com
Subject:	RE: Newport Beach View Analysis
Categories:	01112-008 NB Marriot, Filed in TonicDM

The construction is all going be Type IA.

The mix is still very much being debated however it currently stands as follows:

1BR	26DU
2BR	112 DU
3BR	18 DU
4BR	2
5BR	1
TOTAL	**159 DU**

There is no commercial program for the project. However the amenity program is substantial and is roughly 35,000 SF. Still all conceptual but this will include: Club Rooms, Fitness, Spa, Lockers, Private Meeting Rooms, Kitchen Area, Viewing Terrace, Etc.

I am not sure how many keys are being demolished. Kevin Martin from Lyon should be able to provide that information.

Hope this helps.
Thank you.

Pieter Berger
Senior Associate Partner

MVE + PARTNERS
www.mve-architects.com

From: Susan Williams <SWilliams@fuscoe.com>
Sent: Wednesday, September 15, 2021 3:13 PM
To: Pieter Berger <pberger@mve-architects.com>; Oriana Slasor <oslasor@fuscoe.com>
Cc: 01112-008@fuscoe.tonicdm.com
Subject: RE: Newport Beach View Analysis

Hello Pieter,
Thank you for sending. We are preparing sewer capacity and water demand studies, the calculations of which include construction building types, residential unit mix, along with commercial square footages. Do you have this information at this time? Also if the number of hotel rooms that will be demolished is known, would you please also send that information?
Thank you,
Sue
(714) 642-7510

Proposed Ritz-Carlton Residences

…

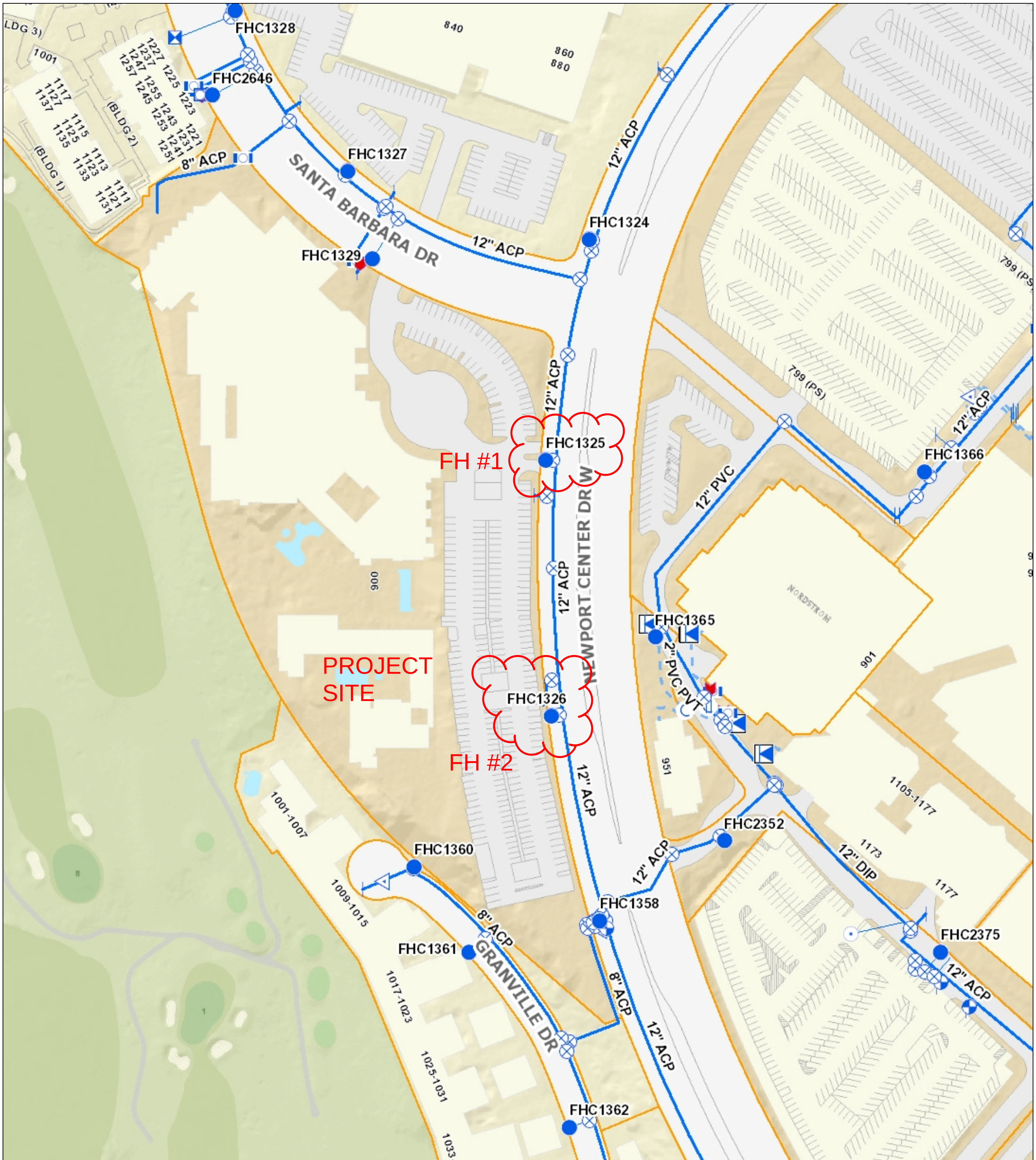
The new 21-story structure will accommodate up to 159 hotel-branded residences, representing 30% of the total units at the Newport Beach Marriott Resort Hotel. The total units at the Newport Beach Marriott Resort Hotel will remain unchanged at 532, with 373 traditional hotel rooms and up to 159 hotel-branded residences.

…

Appendix 2

Water GIS Map

& Waterline As-Built



NBGIS
NEWPORT BEACH

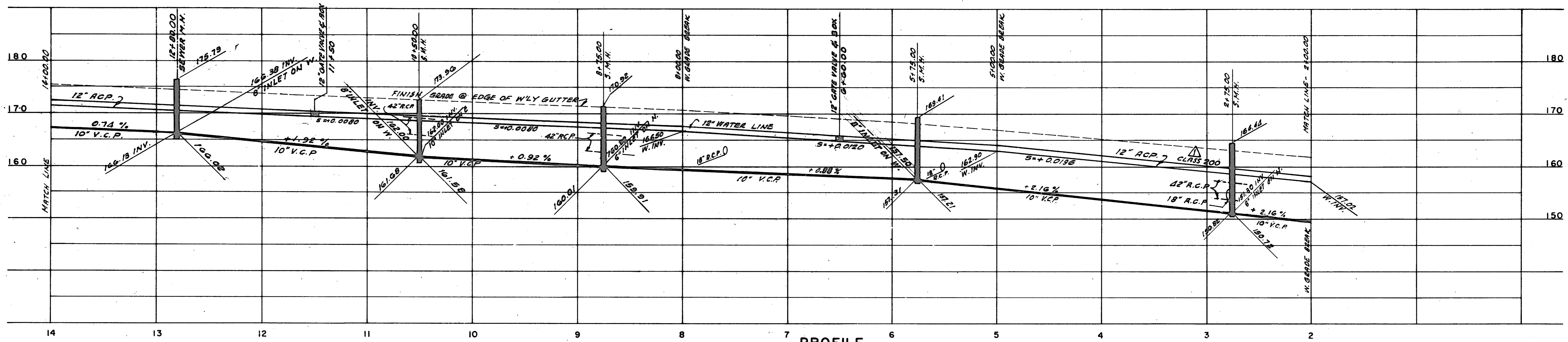
CITY OF NEWPORT BEACH CALIFORNIA

0 200 400

Feet

Disclaimer:
Every reasonable effort has been made to assure the accuracy of the data provided, however, The City of Newport Beach and its employees and agents disclaim any and all responsibility from or relating to any results obtained in its use.

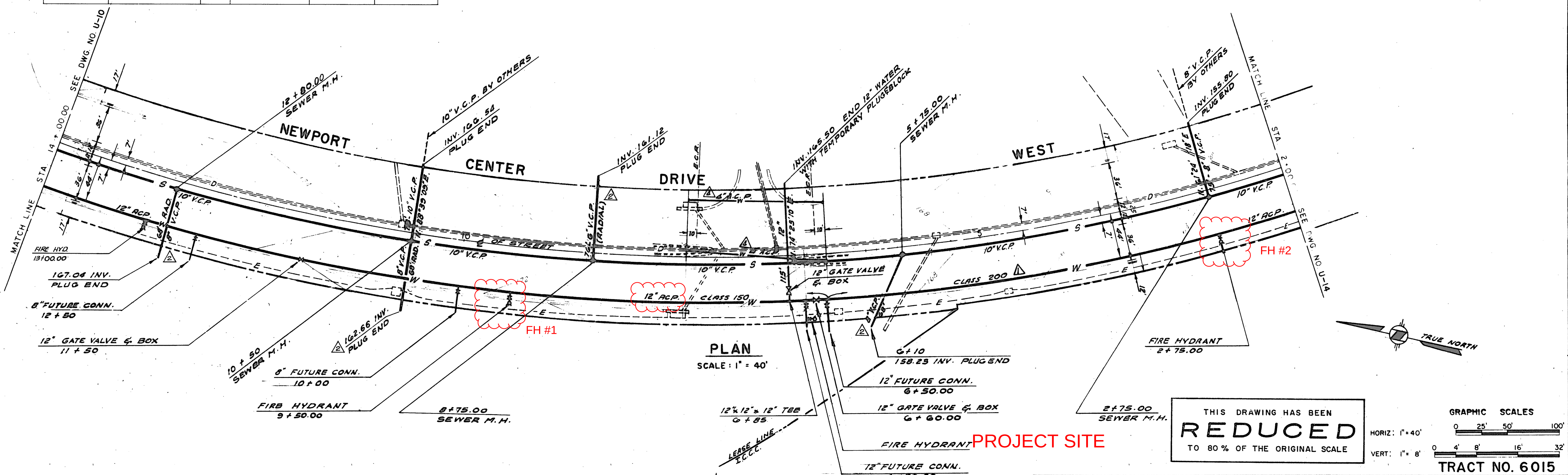
7/29/2021



PROFILE

SCALE: HORIZ. 1" = 40'
VERT. 1" = 8'

TYPE OF LINE	STATION : FROM	TO	SIZE	WALL THICKNESS CLASS / D-LOAD (AS APPLICABLE)	TRUE LENGTH	TRUE SLOPE
WATER	2+00	5+00	12"		307.3'	+ 0.0191
	5+00	8+00	12"		307.31'	+ 0.0117
	8+00	14+00	12"		614.63'	+ 0.0078
SEWER	2+00	2+75	10"		75.29'	+ 0.0215
	2+75	5+75	10"		301.16'	+ 0.0215
	5+75	8+75	10"		301.16'	+ 0.00875
	8+75	10+50	10"		175.68	+ 0.00914
	10+50	12+80	10"		230.89	+ 0.191
	12+80	14+00	10"		120.47	+ 0.00742



PLAN

SCALE : 1" = 40'

THIS DRAWING HAS BEEN
REDUCED
TO 80 % OF THE ORIGINAL SCALE

GRAPHIC SCALES
HORIZ: 1" = 40' — 0, 25', 50', 100'
VERT: 1" = 8' — 0, 4', 8', 16', 32'

TRACT NO. 6015

CHKD.	BY	REVISIONS	DATE	REV. NO.
A.I.M.	G.W.	AS BUILT	9-23-69	4
	D.I.	AS-BUILT	3-7-68	3
	H.W.	ADDED 4" A.C.P. FOR SPRINKLER SYSTEM	3-28-67	2
BDW	LDI	REV. CLASS OF PIPE STA 2+00 To 6+00	10-28-66	1

QE

812 WEST EIGHTH STREET, LOS ANGELES, CALIFORNIA
QUINTON ENGINEERS, LTD.
PLANNING · ENGINEERING · ARCHITECTURE

NEWPORT CENTER
THE IRVINE COMPANY

WATER AND SEWER

APPROVED B. B. Nolan
ASST. PUBLIC WORKS DIRECTOR
R.E. NO. 12806 DATE 10-20-66

PLAN AND PROFILE
OF
NEWPORT CENTER DRIVE WEST
STA. 2+00.00 TO STA. 14+00.00

CITY OF NEWPORT BEACH
PUBLIC WORKS DEPARTMENT

DESIGNED C. JOHNSON	APPROVED H W Fonner	JOB NO. 65852
DRAWN C.A. & H.W.	DATE OCT 14 1966	DWG. NO. U-9
CHECKED J. G. PURDY	SHEET NO. 9 OF 20	REV. NO.

DRAWING NO :

Appendix 3

Fire Hydrant Test Results

CITY OF NEWPORT BEACH
UTILITIES DEPARTMENT

FIRE HYDRANT FLOW TEST

AMOUNT PAID: $449.00

CHECK NO: ____________

TEST NO: ____________

DATE: 09/28/2021

TIME: 6:00 AM

WEATHER: CLOUDY

PROJECT: ____________

PROJECT LOCATION: 900 NEWPORT CENTER DR

TEST CONDUCTED FOR: SUE WILLIAMS FUSCOE ENGINEERING

TEST PERFORMED BY: AMAN, AUGER

TEST WITNESSED BY: ____________

FIELD OBSERVATIONS AND FLOW DATA

STATIC HYDRANT # : 1326 LOCATION: 900 NEWPORT CENTER DR

F/H MANUFACTURER: JONES NUMBER & SIZE OF OUTLETS: 2- 2.5" / 1- 4"

STATIC PRESSURE, (Ps , psi), PRE-FLOW: 120

RESIDUAL PRESSURE, (Pr , psi) FLOWING: 110

FLOW HYDRANT # : 1325 LOCATION: 900 NEWPORT CENTER DR

F/H MANUFACTURER: JONES NUMBER & SIZE OF OUTLETS: 2-2.5" / 1-4"

STATIC PRESSURE, PRE-FLOW (INFO ONLY, NOT FOR TEST CALCS) : ____________

F/H OUTLET SIZE (2.5 or 4.0): 2.5 (d, inches)

FLOW LOSS COEFFICIENT - TUBE C=1.0 / BUTT C=0.9 0.9

PITOT GAUGE READING (p, psi): 60

OBSERVED FLOW: THE OBSERVED FLOW FROM A HYDRANT OUTLET IS CALCULATED FROM THE FOLLOWING EQUATION:

$$Q_s = 29.83\left(Cd^2\right)\sqrt[2]{p}$$

WHERE; Q IS THE OBSERVED FLOW IN GPM; d IS THE OUTLET DIAMETER IN INCHES; p IS THE PITOT GAUGE PRESSURE IN PSI; AND C IS THE FLOW LOSS COEFFICIENT (C = 1.0 FOR FLOW TUBES AND C = 0.9 FOR BUTT FLOW READINGS).

OBSERVED FLOW (Qs, gpm): 1300 GPM

DISCHARGE CALCS: THE DISCHARGE FOR A GIVEN FIRE HYDRANT CAN BE DETERMINED FROM THE FOLLOWING EQUATION USING THE INITIAL (STATIC) WATER PRESSURE AND THE RESIDUAL (DYNAMIC) WATER PRESSURE:

$$Q_r = Q_s\left(\frac{P_s - 20}{P_s - P_r}\right)^{0.54}$$

WHERE; Q (STATIC OR RESIDUAL) IS THE FLOW IN GPM; AND P (STATIC OR RESIDUAL) IS THE PRESSURE IN PSI. NOTE: A 10 PSI DROP IS REQUIRED FOR VALID TEST!

CALCULATED FLOW AT 20 psi (Qr, gpm): 4507 GPM

Appendix 4

Excerpt from City of Newport Beach

Water Supply Assessment (WSA)

Analysis and Conclusions

The proposed Project evaluated in this Water Supply Assessment is a request to convert permitted development intensity associated with 79 un-built hotel rooms in the City of Newport Beach's Statistical Area L1 from "hotel rooms" to "multi-family residential units" and transfer those units to the San Joaquin Plaza portion of the NNCPC. The proposed Project also involves assigning previously unassigned development intensity for 15 un-built multi-family residential units permitted by the General Plan in MU-H3 designated areas to the NNCPC in San Joaquin Plaza. If the requested development intensity conversion, transfer, and assignment is approved by the City of Newport Beach, a total of 524 units would be permitted in San Joaquin Plaza (94 additional residential units and 430 units already permitted by the General Plan and NNCPC Development Plan).

Buildout of the City of Newport Beach's General Plan was considered in the water demand projections calculated by Metropolitan, MWDOC and OCWD. Therefore, Metropolitan's Regional Urban Water Management Plan. (2010), MWDOC's Regional Urban Water Management Plan (2011), and OCWD's Groundwater Management Plan 2009 Update evaluate the supply that would be required to service the 430 residential units already permitted in San Joaquin Plaza and the 15 un-built units allowed by the General Plan that are proposed to be assigned to San Joaquin Plaza. Metropolitan, MWDOC and OCWD all conclude that there will be adequate supplies in the average year, dry year, and multiple dry year scenarios through 2035. Therefore, Metropolitan's Regional Urban Water Management Plan (2010), MWDOC's Regional Urban Water Management Plan (2011), and OCWD's Groundwater Management Plan 2009 Update evaluate the supply that would be required to service the 430 residential units already permitted in San Joaquin Plaza and the 15 un-built units allowed by the General Plan that are proposed to be assigned to San Joaquin Plaza. Thus, the focus of this Assessment primarily involves the proposed conversion of 79 hotel units to 79 multi-family residential units, and whether supplies are sufficient to service 524 units of multi-family residential development that would be vested to the location of San Joaquin Plaza.

The water demand for this Project is calculated below for planning purposes only. This estimate is for planning purposes and shall not be construed as guaranteed water rights for the project. Actual water use would likely be reduced through water conservation programs being implemented in the City of Newport Beach and the continued use of recycled water where possible. The demand calculation is based on 228.1 GPCD, which is the City's target goal for year 2015. Because no specific development project is proposed as part of the Project, this Assessment assumes that the number of persons expected to reside in each multi-family residential is 2.19 persons per household, which is the average number of persons per household cited in the General Plan EIR.

Table 9, Water Demand for 79 Multi-Family Residential Units (not considered by the General Plan)

	Units/Population	Gallons/Day/Capita	Gallons/Day	Acre-Feet/Year
Multi-Family Residential Units	79 units/173 persons	228.1	39,463	44.20

Table 10, Water Demand for 15 Multi-Family Residential Units (considered by the General Plan)

	Units/Population	Gallons/Day/Capita	Gallons/Day	Acre-Feet/Year
Multi-Family Residential Units	15 units/33 persons	228.1	7,527	8.43

Table 11, Water Demand for 430 Multi-Family Residential Units (considered by the General Plan)

	Units/Population	Gallons/Day/Capita	Gallons/Day	Acre-Feet/Year
Multi-Family Residential Units	430 units/942 persons	228.1	214,870	240.58

Table 12, Total Residential Water Demand Projected in San Joaquin Plaza

	Units	Gallons/Day/Capita	Gallons/Day	Acre-Feet/Year
Multi-Family Residential Units	524/1,148 persons	228.1	261,858	293.2

As mentioned above, the proposed Project involves a request to convert permitted development intensity associated with 79 un-built hotel rooms in Statistical Area L1 from "hotel rooms" to "multi-family residential units" and transfer those units to the San Joaquin Plaza portion of the NNCPC. Therefore, this analysis also calculates the projected demand reduction associated with the elimination of 79 hotel rooms. Water use in hotels is highly dependent on occupancy rate, the number of persons occupying each room, the water conservation features incorporated into the hotel building, the water conservation operational practices of the hotel's management and the amount of water conservation practiced by hotel guests. In the City of Newport Beach, the MWDOC encourages water use reduction conservation programs for hotels in its service area, which has some effect on water use reduction. For purposes of this analysis, it is assumed that the water demand of a hotel room equates to the same demand as a residential unit housing one (1) person.

Table 13, Anticipated Water Demand Eliminated from Hotel Rooms (considered by the General Plan)

	Rooms	Gallons/Day/Unit	Gallons/Day	Acre-Feet/Year
Hotel Rooms	-79/-79 persons	228.1	-18,019	-20.18

Comparing Table 9 and Table 13, the proposed Project would result in an increased water demand of 24.02 acre-feet per year (AFY), which is less than one-tenth of one percent of the City's projected year 2035 total demand of 17,474 AFY. Based on the information contained in this Water Supply Assessment regarding the existing and future availability and reliability of imported water supplies as surmised from the Urban Water Management Plans of Metropolitan (2010), MWDOC (2011) and the City of Newport Beach (2010), and the OCWD Groundwater Management Plan (2009), there is an availability of sufficient supplies from imported water, local groundwater, and recycled water to service the proposed Project and other existing and projected development in the City of Newport Beach in normal year, single dry year and multiple dry year conditions. Additionally, there has been a trend of per capita water use reduction since 2005 and that trend is expected to continue to reach the City's water usage reduction goal of 202.8 GPCD by year 2020. These further reductions are not reflected in the calculated water demands above.

Appendix 5

IRWD Design Criteria

Code	Land Use description	Land Use: Agency	Land Use: Average Density	Local Demands: Local Interior	Local Demands: Local Exterior	Local Demands: Total	Irrigation Demands: % Irrigated Area	Irrigation Demands: Irrigation Factor
1100	***Residential***		*DU/Ac*		*Gal/DU/Day*			*Gal/Ac/Day*
1111	Res - Rural Density	Orange	0.30	300	750	1,050	5	2,800
1121	Res - Estate Density	Orange	1.20	300	300	600	8	2,900
1131	Res - Low Density	Orange	4.00	300	300	600	15	2,900
1141	Res - Low-Medium Density	Orange	10.50	200	100	300	22	3,300
1161	Res - Medium Density	Orange	19.50	225	185	410	17	3,100
1122	Res - Estate Density	Irvine	0.50	300	600	900	7	2,800
1132	Res - Low Density	Irvine	3.00	225	180	405	16	3,000
1162	Res - Medium Density	Irvine	7.50	200	110	310	20	3,100
1172	Res - Medium-High Density	Irvine	17.50	165	15	180	25	3,600
1182	Res - High Density	Irvine	32.50	180	20	200	20	3,300
1192	Res - High-Rise Density	Irvine	40	180	20	200	20	3,300
1133	Res - Low Density	Newport Beach	1.00	250	190	440	17	3,100
1153	Res - Medium-Low Density	Newport Beach	2.75	250	200	450	10	2,800
1163	Res - Medium Density	Newport Beach	5.00	190	60	250	22	3,300
1183	Res - High Density	Newport Beach	12.25	155	20	175	25	3,600
1134	Res - Low Density PC	Tustin	4.50	225	185	410	17	3,100
1164	Res - Medium Density PC	Tustin	11.80	155	15	170	25	3,600
1184	Res - High Density PC	Tustin	17.40	135	15	150	15	3,700
1115	Res - Rural Density	County	0.26	300	750	1,050	5	2,800
1135	Res - Suburban Density	County	9.25	225	180	405	16	3,000
1175	Res - Urban Density	County	29.00	165	15	180	25	3,600
1126	Res - Estate Density	Lake Forest	0.50	300	600	900	7	2,800
1136	Res - Low Density	Lake Forest	3.00	225	180	405	16	3,000
1166	Res - Medium Density	Lake Forest	7.50	200	110	310	20	3,100
1176	Res - Medium-High Density	Lake Forest	17.50	165	15	180	25	3,600
1186	Res - High Density	Lake Forest	32.50	180	20	200	20	3,300
1200	***Commercial***		*KSF/Ac*		*Gal/KSF/Day*			*Gal/Ac/Day*
1210	Comm - General Office		25.00	56	4	60	30	4,000
1221	Comm - Community		9.09	209	11	220	30	3,500
1222	Comm - Regional		10.53	180.5	9.5	190	20	5,000
1230	Comm - Recreation		8.33	54	6	60	30	4,500
1240	Comm - Institutional		8.88	39.38	5.62	45	50	2,750
1244	Comm - Hospital		8.70	218.50	11.50	230	25	2,850
1260	Comm - School		13.33	14.25	0.75	15	50	2,500
1273	Comm - Military Air Field							
1300	***Industrial***		*KSF/Ac*		*Gal/KSF/Day*			*Gal/Ac/Day*
1310	Industrial - Light		25.00	56	4	60	25	4,000
1320	Industrial - Heavy		25.00	4,500	500	5,000	25	4,000
	Open Space & Other							*Gal/Ac/Day*
1820	Park - Community						90	3,400
1830	Park - Regional						85	2,100
2100	AG - Low-Irrigated						100	1,800
2110	AG - Low-Irrigated (TIC)						100	1,800
2200	AG - High-Irrigated						100	3,100
2210	AG - High-Irrigated (TIC)						100	3,100

Note: The database includes the following land use codes that do not use set factors or do not generate water demands: 0 = area not served by IRWD; 1411 = Airports; 1413 = Freeway and Major Roads; 1850 = Park-Wildlife Preserve; 1880 = Park-Open Space (Rec); 1900 = Vacant; 4100 = Water Body; 9100-9199 = Mixed Use (uses a combination of factors)

Appendix 6

Water Demand Calculations

The Ritz-Carlton Residences
Newport Beach
Dec 2021

Water Demand

Proposed Condition (Hotel Branded Residences)

Land Use	Number Of Units	Avg Daily Flow (gpcd) *	Avg Persons Per DU	Daily Average Demand (gpd)	Annual Water Demand ac-ft/year
Residences	159	228.1	2.19	79,427	89.0
Hotel Rooms	373	228.1	1	85,081	95.3

* 228.1 gpcd is representative of residential use per City of Newport Beach WSA (See Appendix 4)
gpcd = gallons per capita (person) per day

Proposed Amenities

Land Use	Size (SF)	Avg Daily Flow (gal/ksf/day or Gal/Ac/Day)**	Avg Water Demand (gpd)	Annual Water Demand ac-ft/year
Amenties	35,000	60	2,100	2.4

**Avg Daily Flow Per IRWD Water Resources Master Plan (See Appendix 5)

Total Proposed Condition Water Demand
187
ac-ft/yr

Existing Condition Hotel Rooms

Land Use	Number of Rooms	Avg Daily Flow (gpcd) *	Avg Persons Per DU	Avg Water Demand (gpd)	Annual Water Demand ac-ft/year
Hotel	532	228.1	1	121,349	**136**

* 228.1 gpcd is representative of hotel use per City of Newport Beach WSA (See Appendix 4)
gpcd = gallons per capita (person) per day

Net New Water
51
ac-ft/yr

Appendix 7

City of Newport Beach Fire Flow Guidelines

CITY OF NEWPORT BEACH
COMMUNITY DEVELOPMENT DEPARTMENT
LIFE SAFETY SERVICES
GUIDELINES AND STANDARDS

GUIDELINE B.01 - Determination of Required Fire Flow

B.01.1 PURPOSE

The purpose of this guideline is to provide assistance to architects, builders and engineers in determining the adequate fire flow requirements for buildings and complexes. This guideline is in accordance with the California Fire Code, Appendix B and Appendix C.

B.01.2 SCOPE

All buildings built within the City of Newport Beach are required to comply with the California Fire Code Appendix B, Fire Flow Requirements for Buildings and Appendix C, Fire Hydrant Locations and Distribution.

B.01.3 PROCEDURE

Determine the total square footage of all floor levels:
Line 1 ______________________sq. ft.

Determine the type of Construction:
Line 2 ___________________________

Using Table B105.1, determine the fire flow.
(If the building has full sprinkler system, deduct 50%)
Line 3 ______________________ gpm. [1, 2]

Using Table C105.1, use the determined fire flow from line 3 to determine the required number of fire hydrants required and their spacing:
Line 4 _______Hydrants_______ft. apart.

Existing fire hydrants on public streets within 500′of the building are allowed to be considered as available. The aggregate flow from existing hydrants, at no less than 20 pounds residual pressure, may be credited toward the total flow required. Existing hydrants on adjacent property may not be considered unless the hydrant and main are owned by a public water company or public utility and the road serving those hydrants is of appropriate construction and width. An easement for the roadway must be recorded.

New hydrants shall provide a minimum flow of 1250 gpm at 20 pounds residual pressure.

1. The fire sprinkler demand is permitted to be included within this value as long as the sprinkler demand does not exceed the minimum required fire flow.

2. Thee minimum fire flow shall not be less than 1500 gpm.

TABLE B105.1
MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
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	138,301-Greater	85,101-Greater	8,000	

TABLE C105.1
NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d]
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180
5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 or more	8 or more[e]	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers which cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.

Appendix B: Fire-Flow Requirements for Buildings

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

General Comments

The availability of water is essential for fire-fighting operations. The amount of water required to fight a fire depends on many things, including the type of construction, the location of the fire, the contents of the building, response time and the capabilities of the fire department. Fires will increase in size very quickly from the time of ignition to the arrival of the fire department. Couple these unknowns with the fact that the actual water available varies significantly from one jurisdiction to another and, in many cases, from one location to another in the same jurisdiction, and it is easy to see that determining the necessary water supply is not an exact science. The fire-flow rates given in this appendix are a simplified version of the method previously published by the Insurance Services Office (ISO), *Guide for Determination of Required Fire Flow* (ISO 1972). This particular method took several factors into account that included construction type, size and location of the building. The actual equation used with the ISO guide was as follows:

$$F = 18\,C(A)^{0.5}$$

where:

F = Required fire flow (gpm).

C = Coefficient related to the type of construction.

A = Total floor area (including all stories but excluding the basement).

Type of Construction	Coefficient
Wood-frame construction	1.5
For ordinary construction	1.0
Noncombustible construction	0.8
Fire-resistive construction	0.6

This equation came with various increases and decreases that will be discussed throughout this commentary. The simplified version of this method is included here for two reasons. First, the guidelines were difficult to obtain; and second, the methodology was considered overly complex for the degree of accuracy it gave.

Fire-flow determination is not an exact science. Several methods beyond the one presented by ISO have been available over the years and none is able to provide a correct answer for all situations. Fires grow quickly during their initial stages and the amount of water necessary increases as the fire grows. The larger the fire, the larger the water supply necessary. This is why sprinklers require, comparably, much less water as they can attack the fire at a very early stage. For these reasons, this appendix does not provide a single answer to solve the problem of determining the amount of fire flow required. It is a decision that must involve many factors.

This appendix was developed independent of the sprinkler standards NFPA 13, 13R and 13D. These standards sometimes have requirements for inside and outside hose streams that are independent of the fire-flow requirements.

Purpose

This appendix provides a tool for jurisdictions to establish a policy for fire-flow requirements. The determination of required fire flow is not an exact science, but having some level of information provides a consistent way of choosing the appropriate fire flow for buildings throughout a jurisdiction.

The primary tool used in this appendix is Table B105.1, which presents fire flows based on construction type and building area. This table is based on the correlation of the ISO method and the construction types used in the *International Building Code*® (IBC®). Because of the wide variations in water availability and the application of fire flow in different communities, these provisions are presented in this appendix.

The important message sent by this appendix is that some sort of policy should be in place to provide requirements that are consistent within a jurisdiction. Fire-flow requirements have the tendency to be somewhat controversial for the simple reasons that the facilities needed to provide them can be very costly to construct and install and appear to the building owners, in many cases, to yield little benefit.

B104.2 Area separation. Portions of buildings which are separated by *fire walls* without openings, constructed in accordance with the *International Building Code*, are allowed to be considered as separate fire-flow calculation areas.

❖ To reduce the amount of fire flow required, fire walls without openings can be constructed to create separate fire-flow calculation areas. Fire barriers or fire partitions cannot be used to create separate fire-flow calculation areas. It should be noted that IBC Section 706 regulates the construction of fire walls and would generally allow properly protected openings in them (see IBC Section 706.8). However, consistent with Section 102.10 of the code, this section would supercede the IBC fire wall opening provisions since this section is a specific prohibition on any openings in fire walls that are used to reduce the fire-flow calculation area.

B104.3 Type IA and Type IB construction. The fire-flow calculation area of buildings constructed of Type IA and Type IB construction shall be the area of the three largest successive floors.

Exception: Fire-flow calculation area for open parking garages shall be determined by the area of the largest floor.

❖ Type IA and IB construction are essentially noncombustible and have the tendency to limit fire spread within the buildings more so than other construction types. Therefore, the fire-flow calculation area needs to include only the three largest successive floors. Successive floors are specified because of the logical progression of a fire. The concept of three largest successive floors appears to come from the ISO guide. These guidelines allowed the fire-flow calculation area for fire-resistive construction to only include six successive floors if vertical openings were not protected, and three successive floors if the vertical openings were protected. Taking the three largest floors when they are separated from one another may be overly conservative.

The exception to this section allows open parking garages to count only the largest floor for the fire-flow calculation area. This is probably related to the facts that fires in such facilities tend to be limited to one or two cars and that such facilities have large openings through which the hot gases and smoke from a fire can dissipate quickly, limiting the intensity of the fire.

SECTION B105
FIRE-FLOW REQUIREMENTS FOR BUILDINGS

B105.1 One- and two-family dwellings, Group R-3 and R-4 buildings and townhouses. The minimum fire-flow and flow duration requirements for one- and two-family *dwellings*, Group R-3 and R-4 buildings and townhouses shall be as specified in Tables B105.1(1) and B105.1(2).

❖ This section establishes fire-flow requirements for one- and two-family dwellings, in two distinct categories. The first category is one- and two-family dwellings, Group R3 and R4 buildings and townhouses through reference to Tables B105.1(1) and B105.1(2). Table B105.1(1) essentially addresses two different area ranges and whether automatic sprinkler systems are installed. Where the area is 3,600 square feet or greater, reference is made to Table B105.1(2). It should be noted that automatic sprinkler systems shall comply with either NFPA 13D or IRC Section 2904. Buildings addressed by Section B105.2 allow a larger decrease in fire flow but require an NFPA 13 or NFPA 13R system.

TABLE B105.1(1). See below.

❖ This table sets out the requirements for one- and two-family dwellings, Group R3 and R4 buildings and townhouses. The criteria for fire flow is based on two major factors. The first is the area of the building. The table addresses buildings up to 3,600 square feet and greater than 3,600 square feet. The second is whether a sprinkler system is provided. The type of sprinkler system is either that required by NFPA 13D or IRC P2904. The assumption would be that more restrictive systems, such as those required by NFPA13R or 13, would also be permitted.

Essentially, for less than 3,600 square feet, the fire flow is reduced by 50 percent. This is consistent with exceptions present in past editions of the code. Once 3,600 square feet has been reached, compliance with Table B105.1(2) is required. Note that a 50-percent reduction is allowed by Table B105.1(2) for these buildings.

The original ISO guide provided a simplified approach for one- and two-family dwellings. That approach stated that fire flows should be based on a limitation of two stories and a relationship to proximity of exposures. The fire-flow requirements based on proximity to exposures in the ISO guide were as follows:

EXPOSURE DISTANCE (ft)	FIRE-FLOW REQUIREMENT (gpm)
Over 100	500
31-100	750-1000
11-30	1000-1500
10 or less	1500-2000

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

This appendix uses 1,000 gpm (3785 L/min), which would be equivalent to a 30-foot (9144 mm) distance from exposures. This was taken as an average to provide a reasonable number for a majority of one- and two-family dwellings. Also, as discussed in the beginning of this appendix, based on the amount of variability involved with fighting fires, taking an average and applying it to all one- and two-family dwellings may be the most reasonable approach.

This appendix also does not use the two-story limitation but, rather, uses an area limitation of 3,600 square feet (345 m²) for the 1,000-gpm (3785 L/min) requirement. This is a more realistic approach because the ISO guide probably did not anticipate the larger floor area of today's houses and the large number of townhouses.

The table recognizes the efficacy of automatic sprinkler systems in reducing the amount of water needed to suppress fires and allows a reduction in fire flow of 50 percent where sprinklers are installed. This allowance for sprinklers does not amount to a requirement that a sprinkler system be installed. Rather, it allows a design alternative to be utilized in the event that there is insufficient water available to meet the required fire flow for a building established by this appendix. Table B105.2 allows a similar reduction for all other types of buildings.

A review of the original ISO guide reveals that there was no reduction for sprinklers in one- and two-family dwellings. However, in 1972 sprinklers were extremely uncommon within homes, and since that time sprinkler technology has changed dramatically. Section B105.2 contains more discussion on the application of this concept of reductions for sprinklers. Generally, the reduction is intended to encourage installation of an automatic sprinkler system because it is easier to control a fire that is attacked during the incipient stages.

TABLE B105.1(2). See page B-6.

❖ Table B105.1(2) establishes the fire-flow and duration requirements based on the fire-flow calculation area, as defined by the definition in this appendix and Section B103, and the construction types defined in the IBC. As the construction type becomes more combustible, the fire-flow requirements increase. Likewise, as the area of the building increases, the fire-flow requirements increase. The last column also specifies a minimum duration of fire flow. The duration of fire flow varies from a minimum of 2 hours to 4 hours. Flow duration may be an issue that each jurisdiction may need to consider when assessing the capabilities of the department, the hazards presented and the availability of water supply (see commentary, Section B105.1).

Applying this table, for example, a 50,000-square-foot (4546 m²) Type IV construction building would require a fire flow of 4,000 gpm (15 140 L/min) with a duration of 4 hours. If the building was sprinklered in accordance with NFPA 13, the required fire flow would only be 25 percent or 1,000 gpm (5678 L/min).

This table does not address use and occupancy classifications. A Type IA construction building housing a Group A occupancy would be treated the same as a Type IA construction building housing a Group H or F occupancy. Again, this table was formed based on the approaches presented by the ISO guide, which focus on construction types.

A common question when applying this table is how to deal with a building that incorporates multiple construction types. Such scenarios would be better addressed through a percentage approach. For example, in a building that has two construction types, Types IA and VA, having areas of 25,000 square feet (2323 m²) and 10,000 square feet (929 m²), respectively, the fire flow would be calculated as follows:

Total building area

25,000 square feet (Type IA) + 10,000 square feet (Type VA) = 35,000 square feet (3252 m²)

Fire flow per construction type

Type IA at 35,000 square feet = 2,000 gpm (7370 L/min)

Type VA at 35,000 square feet = 3,250 gpm (12 112 L/min)

Percentage of building

IA = 25,000/35,000 × 100 = 71.4 percent

VA = 10,000/35,000 × 100 = 28.6 percent

Therefore

0.714 (2,000 gpm) + 0.286 (3,250 gpm) = 2,357.5 = Approximately 2,350 gpm (8894 L/min)

B105.2 Buildings other than one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses. The minimum fire-flow and flow duration for buildings other than one- and two-family *dwellings*, Group R-3 and R-4 buildings and townhouses shall be as specified in Tables B105.2 and B105.1(2).

❖ This section refers all buildings that are not one- and two-family dwellings to Tables B105.1(2) and B105.2 for the minimum fire-flow and duration requirements. Table B105.1(2) provides the fire flow and Table B105.2 provides the reductions allowed for having either an NFPA 13 or NFPA 13R automatic sprinkler system. In such buildings, the reduction is 75 percent versus the 50-percent reduction allowed for one- and two-family dwellings in Table B105.1(1).

The tabular fire flows, based on the 1972 ISO

TABLE B105.1(1)
REQUIRED FIRE-FLOW FOR ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

FIRE-FLOW CALCULATION AREA (square feet)	AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE-FLOW (gallons per minute)	FLOW DURATION (hours)
0-3,600	No automatic sprinkler system	1,000	1
3,601 and greater	No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2) at the required fire-flow rate
0-3,600	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	500	$^{1}/_{2}$
3,601 and greater	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	$^{1}/_{2}$ value in Table B105.1(2)	1

For SI: 1 square foot = 0.0929 m², 1 gallon per minute = 3.785 L/m.

guide, are extremely high and it is doubtful that many water supply systems and fire departments can develop them. Also, it should be noted that the current ISO guide on this topic for sprinklered buildings requires providing only the calculated sprinkler demand plus hose stream allowances, calling the continued validity of this appendix into question. The updated ISO publication, *Guide for the Determination of Needed Fire Flows*, as with its predecessor, is a tool for the development of fire insurance ratings and is not intended to be used for legislating an individual sprinklered building's fire flow. That document states, "ISO does not determine a needed fire flow for buildings rated and coded by ISO as protected by an automatic sprinkler system meeting applicable National Fire Protection Association standards."

The allowance for buildings equipped with an automatic sprinkler system is intended to encourage the use of sprinklers. It does not link to any other portions of the code or the IBC in terms of height and area requirements and limitations. Therefore, it can be used in addition to any trade-offs for sprinklers. Keep in mind that as the area of the building increases so do the fire-flow requirements. Therefore, even though a reduction may be given to a building that has already increased its area based on sprinklers, the overall fire flow will be larger because of this area increase.

The original ISO guide allowed only a 25-percent reduction for sprinklers. As mentioned in Section B105.1, sprinkler technology has changed dramatically since the guidelines were developed in the early 1970s. Also, the ISO guide allowed reduction in fire flow for buildings with light fire loads that this appendix does not.

TABLE B105.1(2)
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
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	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.
a. Types of construction are based on the *International Building Code*.
b. Measured at 20 psi residual pressure.

TABLE 105.2. See below.

❖ This table provides allowances for reduced fire flow based on the installation of an automatic sprinkler system. More specifically, the fire flow obtained from Table B105.1(2) can be reduced to 25 percent where an NFPA 13 or NFPA 13R system is installed. The only major difference in the allowance given for both sprinkler systems is the minimum flow permitted. NFPA 13 systems can have a fire flow as low as 1,000 gpm, whereas an NFPA 13R system will allow a reduction to a minimum of 1,500 gpm. This is related to the relative performance of the type of sprinkler system. More credit was deemed necessary for NFPA 13 systems. Note with the reductions in this table and also Table B105.1(1) for one- and two-family dwellings, Group R3 and R4 Buildings and townhouses that there is no specific approval required by the fire official to apply these reductions. In the past, this approach has led to confusion as to how to differentiate situations where such an allowance was appropriate and where a lesser reduction was necessary.

B105.3 Water supply for buildings equipped with an automatic sprinkler system. For buildings equipped with an approved *automatic sprinkler system*, the water supply shall be capable of providing the greater of:

1. The *automatic sprinkler system* demand, including hose stream allowance.
2. The required fire-flow.

❖ This section clarifies that the fire-flow requirements are not in addition to the sprinkler demand. What is required is determining which needs a larger water supply. The greater of the sprinkler demand or the demand developed in accordance with Appendix B will be the required fire flow.

SECTION B106
REFERENCED STANDARDS

ICC	IBC—15	International Building Code	B104.2,
ICC	IFC—15	International Fire Code	Tables B105.1(1) and B105.2
ICC	IWUIC—15	International Wildland-Urban Interface Code	B103.3
ICC	IRC—15	International Residential Code	Table B105.1(1)
NFPA	1142—12	Standard on Water Supplies for Suburban and Rural Fire Fighting	B103.3

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TABLE B105.2
REQUIRED FIRE-FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE-FLOW (gallons per minute)	FLOW DURATION (hours)
No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2)
Section 903.3.1.1 of the *International Fire Code*	25% of the value in Table B105.1(2)[a]	Duration in Table B105.1(2) at the reduced flow rate
Section 903.3.1.2 of the *International Fire Code*	25% of the value in Table B105.1(2)[b]	Duration in Table B105.1(2) at the reduced flow rate

For SI: 1 gallon per minute = 3.785 L/m.
a. The reduced fire-flow shall be not less than 1,000 gallons per minute.
b. The reduced fire-flow shall be not less than 1,500 gallons per minute.

Appendix 8

Fire Flow Calculations

CITY OF NEWPORT BEACH
COMMUNITY DEVELOPMENT DEPARTMENT
LIFE SAFETY SERVICES
GUIDELINES AND STANDARDS

GUIDELINE B.01 - Determination of Required Fire Flow

B.01.1 PURPOSE

The purpose of this guideline is to provide assistance to architects, builders and engineers in determining the adequate fire flow requirements for buildings and complexes. This guideline is in accordance with the California Fire Code, Appendix B and Appendix C.

B.01.2 SCOPE

All buildings built within the City of Newport Beach are required to comply with the California Fire Code Appendix B, Fire Flow Requirements for Buildings and Appendix C, Fire Hydrant Locations and Distribution.

B.01.3 PROCEDURE Entire building is Type 1A construction.

Determine the total square footage of all floor levels:
Line 1 162,105 (max 3 floors Type 1A construction) sq. ft.

Determine the type of Construction:
Line 2 1A

Using Table B105.1, determine the fire flow.
(If the building has full sprinkler system, deduct 50%)
Line 3 2,125 gpm. [1, 2]

Using Table C105.1, use the determined fire flow from line 3 to determine the required number of fire hydrants required and their spacing:
Line 4 2 Hydrants 450 ft. apart.

Existing fire hydrants on public streets within 500′ of the building are allowed to be considered as available. The aggregate flow from existing hydrants, at no less than 20 pounds residual pressure, may be credited toward the total flow required. Existing hydrants on adjacent property may not be considered unless the hydrant and main are owned by a public water company or public utility and the road serving those hydrants is of appropriate construction and width. An easement for the roadway must be recorded.

New hydrants shall provide a minimum flow of 1250 gpm at 20 pounds residual pressure.

1. The fire sprinkler demand is permitted to be included within this value as long as the sprinkler demand does not exceed the minimum required fire flow.

2. Thee minimum fire flow shall not be less than 1500 gpm.

TABLE B105.1
MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	
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	2
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	
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	3
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	
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	4
—	—	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	138,301-Greater	85,101-Greater	8,000	

50% of 4,250 gpm = 2,125 gpm

TABLE C105.1
NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d]
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180
5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 or more	8 or more[e]	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers which cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.