

WATER UTILITY STUDY
FOR
3774 5TH AVE.
San Diego, CA 92103

Prepared for:
City of San Diego

Prepared by:
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Structural | Shoring | Civil Consulting Engineers
319 Main St.
El Segundo, California 90245
JLA Job # 21814
October 5, 2022



SIGN DATE 10/03/2022

Introduction

This memo describes the results of the existing and proposed water infrastructure analysis and identifies any existing and future constraints with the existing water infrastructure for 3774 5th Avenue development in San Diego, CA.

Existing Water Infrastructure

Domestic and Fire water for this site is served by City of San Diego. It is currently assumed that the water main service is being provided from a 16" PVC water main located in 5th Avenue per as-built 36596-26-D.

A hydrant flow test was submitted to the City of San Diego Development Services Group and the results of the hydrant test can be found in Appendix B. The hydrant test was modeled for the hydrant located at the southeast corner of Robinson Ave and 5th Ave. The static pressure has been noted at 86.33 PSI.

Proposed Water Infrastructure

Proposed water infrastructure will include new water meters and lateral connections to the existing water system in 5th Avenue to provide domestic water, fire water, and irrigation water to the proposed project. The domestic water meter demand was estimated using Section 1.7.1. of the current City of San Diego Water Facility Design Guidelines. The proposed project was estimated to have 1,300 fixture units / 65 EDUs which is the equivalent of a 4-2" services. The project is assumed to have a dedicated fire service which is estimated to be 6". All proposed connections shall adhere to the standards and requirements of the current City of San Diego Water Design Guide.

Existing/Future Water Infrastructure Constraints

To determine the constraints on the existing water infrastructure as a result of the proposed project, water flow requirements for the proposed project were measured against the available water flow from the existing infrastructure. If the existing infrastructure is sufficient to serve the future demand, then there should be no constraints or significant impacts to the existing or future water infrastructure.

The proposed peak hour water demand has been estimated below based on the current City of San Diego Water Design Guidelines Table 2-2 and Figure 2-1. The results are shown below in Table 1.

Table I – Proposed Peak Hour Water Demand

Zone	Area (sf)/ Persons	Area (Acres)	Unit Water Demand (Table 2-2)	Average Annual Demand	Average Annual Demand	Average Annual Demand	Peak Hour Water Demand (Figure 2-1)	
				gallons/day	gallons/year	acre-ft/year	gallons	gpm
Commercial	3,947	0.091	5000	453.1	165364.4	0.5	1835	30.58
Residential	88		150	13200.0	4818000.0	14.8	53460	891.00
					4983364.4	15.3		921.58

* Residential has been calculated based on the following unit count:
(16) studios, (18) 1 bedrooms, (31) 2 bedrooms totaling 88 persons

*See Figure 2-1 for peak hour demand factor (2.7)

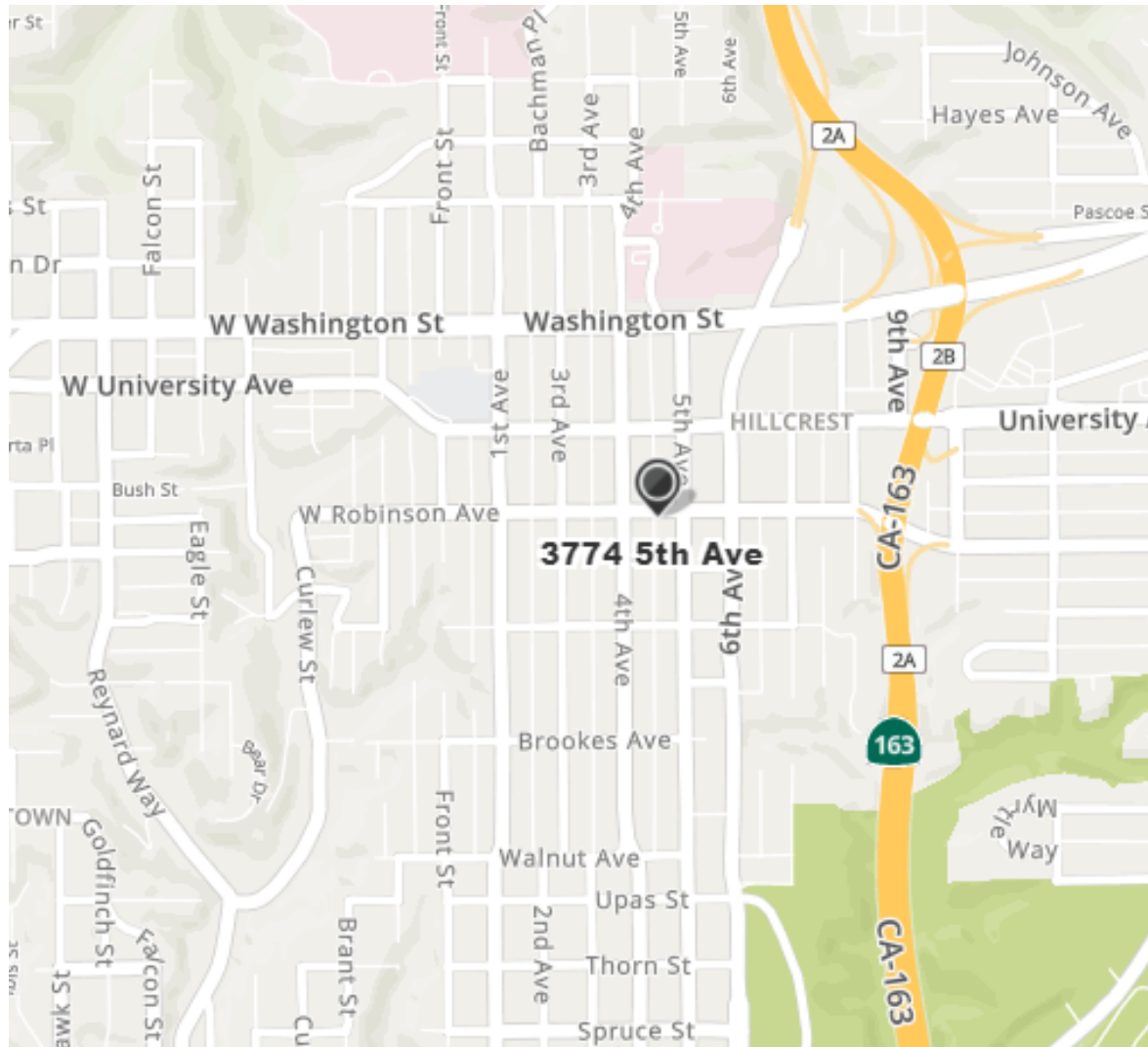
The water flow requirement for the proposed project will be governed by the fire water demand, as this is much larger than the domestic water and irrigation water demand. Fire Flow requirements for the project are 4,000 gpm. These values have been established using the current City of San Diego Water Design Guidelines Table 2-3. The project at 3774 5th St is anticipated to be sprinklered and it is assumed a 50% reduction of fire demand can be applied requiring the project a 2,000 gpm fire flow. As noted in section 2.7.3 in the current City of San Diego Water Design Guidelines, the minimum operating pressure or residual pressure of 20 PSI is required. Using the results from the Hydrant flow test (shown in Appendix C) the hydrant located on the southeast corner of the intersection of Robinson Avenue and 5th Avenue (Approximately 100 feet from the project) that hydrant was able to serve 1,347 gpm with a residual pressure of 75.18 PSI. Additionally, a second hydrant that can service the proposed project is located on the west side of Fifth street located approximately 60 feet south of the proposed project. It is reasonable to conclude that an additional 700 gpm (minimum) can be provided from this hydrant while still maintaining a residual pressure of 20 PSI in the water main located in 5th street.

Conclusion

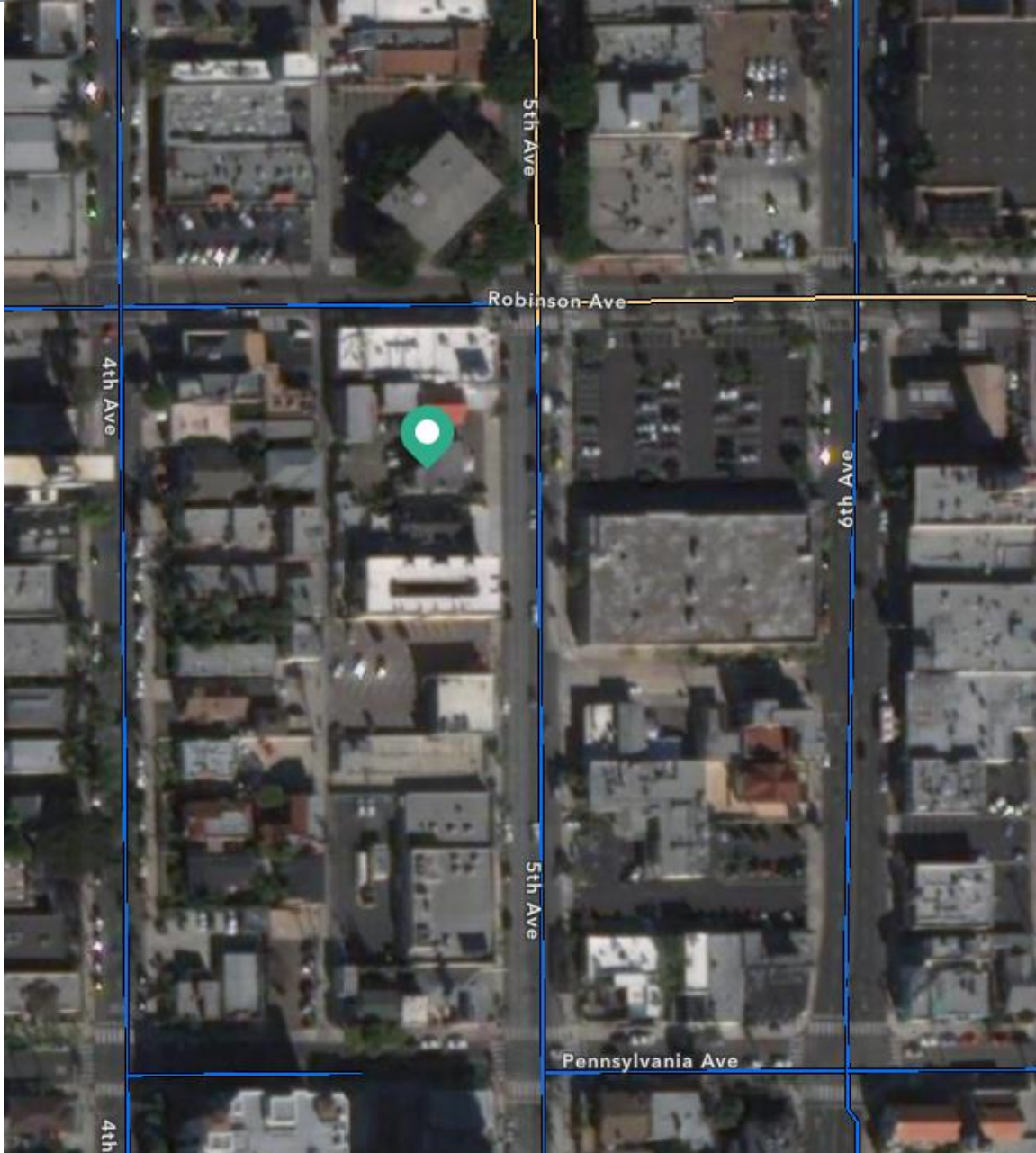
Based on the above stated findings the proposed mixed-use project located at 3774 5th Avenue will have no significant if any impact on the existing water infrastructure. The existing water infrastructure can adequately provide all of the water demands required for the proposed development.

APPENDIX A
Reference Maps

VICINITY MAP



Existing Water Infrastructure Map



Water Utility Study
5th Ave. – 3774 5th Ave, San Diego 92103

319 Main Street
El Segundo, California 90245
t: 213/239 9700

info@labibse.com
www.labibse.com



APPENDIX B
City of San Diego Hydrant Flow Test



City of San Diego
Development Services
Attention: [Hydrant Flow Request](mailto:DSDHydrantFlow@sanidiego.gov)
1222 First Ave., MS-401
San Diego, CA 92101
(619) 446-5000

Hydrant Flow Request

FORM
DS-160
OCTOBER 2016

Fill out the information below completely for all sprinkler system flow requests, including NFPA 13, 13D and 13R systems. E-mail form to: DSDHydrantFlow@sanidiego.gov, or mail request to the above address.

Please print or type legibly.

Company Requesting Hydrant Flow:
Labib Funk & Associates

Telephone No:
213.239.9700

Fax No:

E-mail Address:
kyle.prouty@labibfunk.com

Project Number for the Building Permits:

Location of Hydrants:
3774 5th Ave.

Cross Street:
Robinson Ave.

City:
San Diego

State:
CA

ZIP Code:
92103

FOR CITY USE ONLY

Facility Sequence Number: (FSN): **527132**

Static: **86.33** PSI

Elevation: **295** FEET

Pitot: **-----** PSI

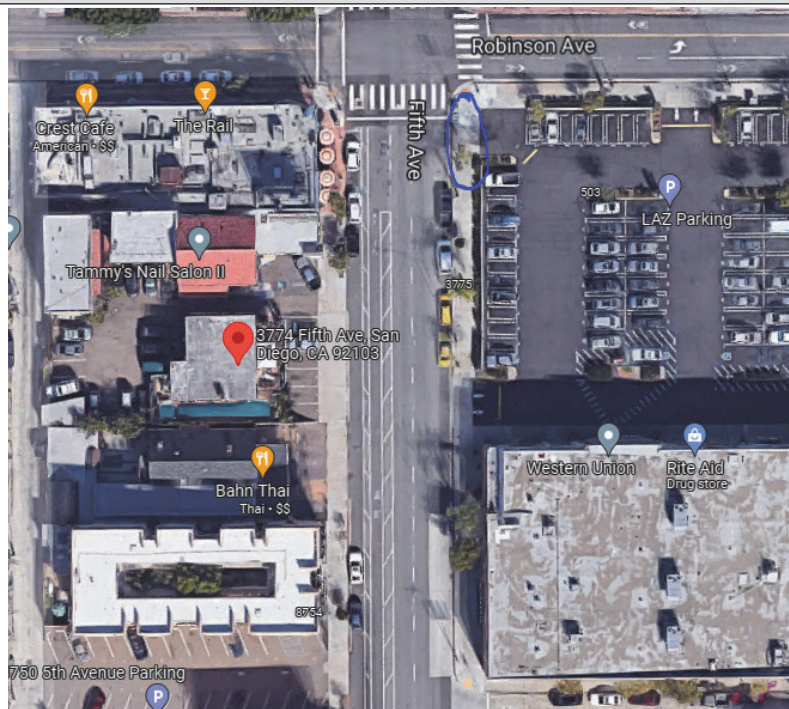
Residual: **75.18** PSI

Date: **12/7/2021**

Flow: **1347** GPM

Researched in database by: **Anthony Larkins**

The information provided above is based upon a water model. It is the contractor's responsibility to confirm the available static pressure at the system point of connection. If a discrepancy is noticed at that time, notify DSDHydrantFlow@sanidiego.gov as soon as possible.



Printed on recycled paper. Visit our web site at www.sandiego.gov/development-services.

Upon request, this information is available in alternative formats for persons with disabilities.

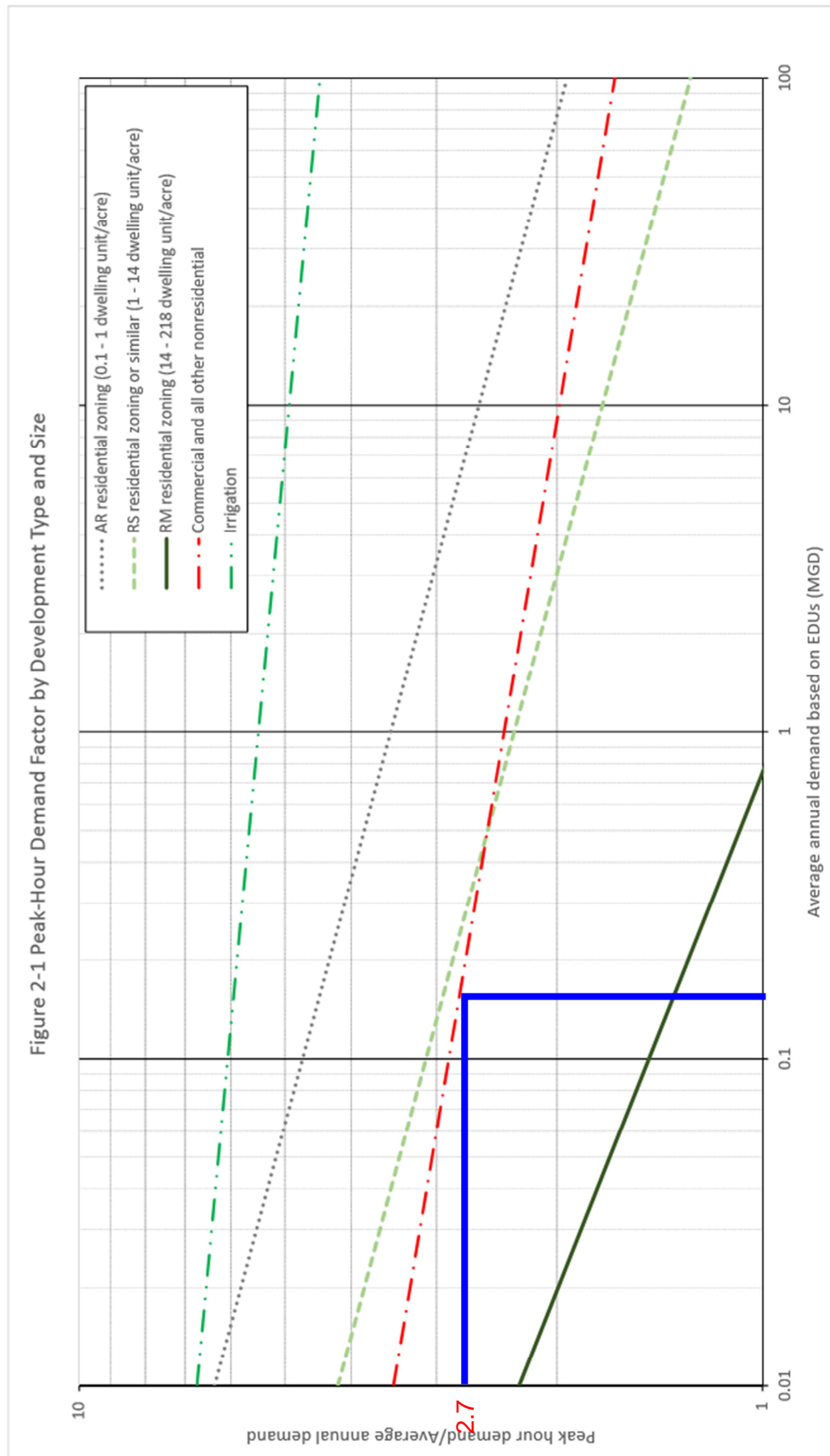
APPENDIX C
Reference Tables and Calculations

Table I – Proposed Peak Hour Water Demand

Zone	Area (sf)/ Persons	Area (Acres)	Unit Water Demand (Table 2-2)	Average Annual Demand gallons/day	Average Annual Demand gallons/year	Average Annual Demand acre-ft/year	Peak Hour Water Demand (Figure 2-1)	
Commercial	3,947	0.091	5000	453.1	165364.4	0.5	1835	30.58
Residential	88		150	13200.0	4818000.0	14.8	53460	891.00
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(16) studios, (18) 1 bedrooms, (31) 2 bedrooms totaling 88 persons

*See Figure 2-1 for peak hour demand factor (2.7)



WATER DEMANDS AND SERVICE CRITERIA

2.1 General

This chapter outlines planning procedures to estimate water demands and fire flows. Water system service requirements are also defined in terms of water pressure and reservoir storage.

2.2 Service Area

The DESIGN CONSULTANT defines the project's service area and identifies the pressure zones in which it is located. The Senior Civil Engineer in charge of either Water Planning or new development approves the service area boundaries.

2.3 Land Use and Residential Population

The DESIGN CONSULTANT develops present and future land use maps for the service area to define the following land use categories: residential (by zone in accordance with **Table 2-1**), central business district, commercial and institutional, parks, hospitals, hotels, industrial, office, and schools.

The DESIGN CONSULTANT estimates the residential population in the service area based on present and future allowable land use. Unless more accurate population density estimates are available, the residential population in the service area is estimated based on the figures presented in **Table 2-1**.

Table 2-1
Residential Population Density

Zone	Dwelling Unit Density (dwelling unit/ net acre)	Unit Density (persons/ dwelling unit)	Population Density (persons/ net acre)
AR-1-1	0.1	3.5	0.4
AR-1-1	0.2	3.5	0.7
AR-1-2	1	3.5	3.5
RS-1-1/RS-1-8	1	3.5	3.5
RS-1-2/RS-1-9	2	3.5	7.0
RS-1-4/RS-1-11	4	3.5	14

Zone	Dwelling Unit Density (dwelling unit/ net acre)	Unit Density (persons/ dwelling unit)	Population Density (persons/ net acre)
RS-1-7/RS-1-14	9	3.5	32
RM-1-1	14	3.2	45
RM-2-5	29	3.0	87
RM-3-7	43	2.6	112
RM-3-9	73	2.2	161
RM-4-10	109	1.8	196
RM-4-11	218	1.5	327

Dwelling unit density in **Table 2-1** is based on net area. The net area is measured in acres, and is 80% of the gross area for each residential zone.

2.4 Average Annual Water Demands

For most projects, average annual water demands are determined based on the unit water demand criteria presented in **Table 2-2**.

Table 2-2
Unit Water Demands

Land Use Category	Unit Water Demand
Residential	150 gallons/person-day
Central Business District	6000 gallons/net acre-day
Commercial and Institutional	5000 gallons/net acre-day
Fully Landscaped Park	4000 gallons/net acre-day
Hospitals	22500 gallons/net acre-day
Hotels	6555 gallons/net acre-day
Industrial	6250 gallons/net acre-day
Office	5730 gallons/net acre-day
Schools	4680 gallons/net acre-day

Average annual water demands are calculated as the sum of: (1) the residential water demand, and (2) other water demands for each land use category as follows:

Residential Water Demand (gallons/day) = Residential Population x 150 gallons/person-day

Chapter 2: Water Demands and Service Criteria

Other Water Demand (gallons/day) = Land Use Area by Category (net acres) x Unit Water Demand for Each Land Use Category (gallons/net acre-day)

Average Annual Water Demand (gallons/day) = Residential Water Demand + Other Water Demands

On some projects, particularly large residential developments, using the unit water demands in **Table 2-2** may generate unrealistically high estimates of water requirements. For these large projects, the DESIGN CONSULTANT or developer may request that the Senior Civil Engineer consider an alternative approach, making use of the City's water demand distribution data developed for macroscale planning purposes. Similarly, the Senior Civil Engineer may also consider alternative unit water demand estimates for specific land use types where such estimates are based on detailed demand evaluations. Recent projects of similar size, nearby location and similar character may be used for comparative demand analysis.

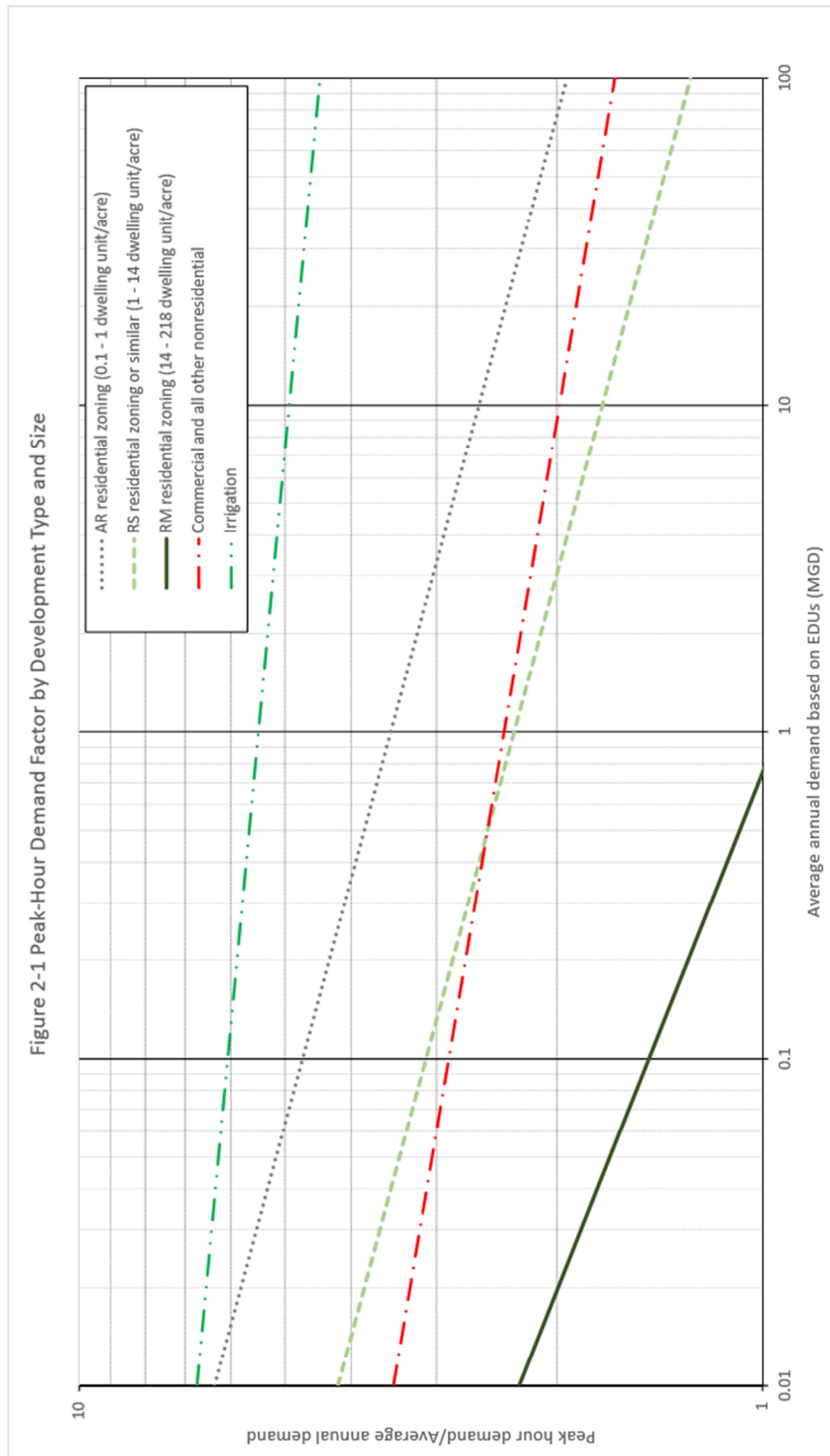
2.5 Peak Water Demands

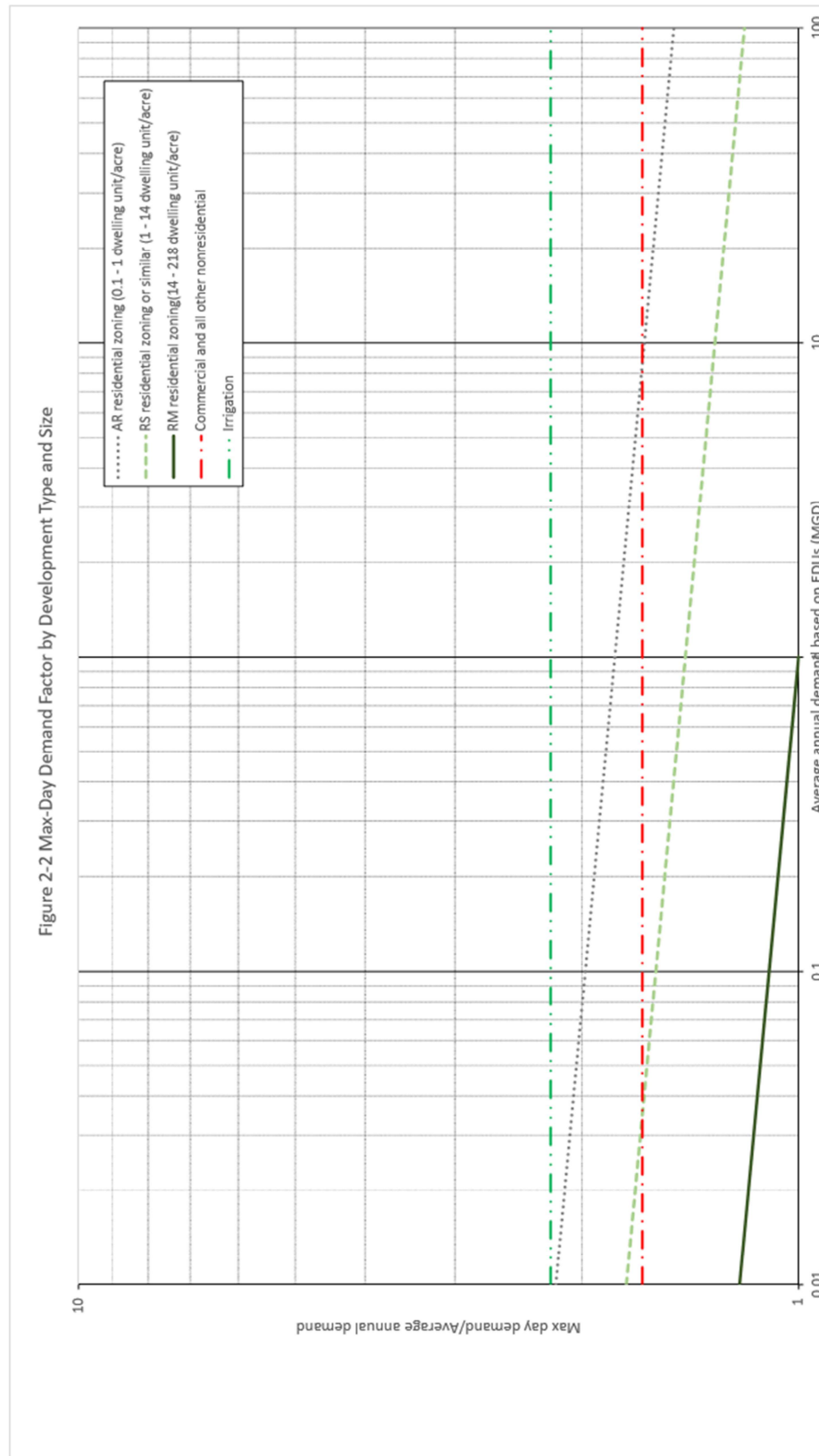
Unless the project involves a large development that calls for an alternative approach, peak hour and maximum day water demands are estimated using the peaking factors presented in **Figures 2-1 and 2-2**. Peaking day factors correspond to the zones identified in the Public Utilities Department [Water System HGL Zones](#).

Peak water demands are estimated as follows:

Peak Hour Demand = Average Annual Water Demand * Peak Day Factor * 1.5

Maximum Day Demand = Average Annual Water Demand * Peak Day Factor





2.6 Fire Demands

The DESIGN CONSULTANT shall use the minimum required fire demands for design shown in **Table 2-3**. The fire flow duration for planning purposes is at least five hours. Note that the values in **Table 2-3** are the minimum design criteria for public infrastructure. Privately owned facilities shall follow the guidelines described in Appendix B of the California Fire Code (CFC).

Table 2-3
Fire Demands for Design Purposes

Development Type	Fire Demand (gpm)
Single family residential up to Fourplexes	1,500
Condominiums and apartments	3,000
Commercial	4,000
Industrial	6,000

Should application of the CFC Appendix B result in figures lower than those shown in **Table 2-3**, the firm or Civil Engineer, in consultation with the fire department, CIP City Project Manager may approve the CFC figures on a case-by-case basis following submittal of supporting calculations. In no case shall the approved fire flow rate and flow duration be less than the flow rate and duration values required by Appendix B of the CFC based on the anticipated or proposed type of building construction and total building floor area.

The required fire demand must be supplied from public and private on-site fire hydrants located as required by CFC Appendix C.

2.7 Pressure Criteria

2.7.1 Design Pressures

Water systems must be designed to provide the minimum residual pressures under:

- Maximum day demands plus fire demand conditions, or
- Peak hour demand conditions.

In analyzing the supply to a pressure zone, the minimum hydraulic grade line elevation available from the water source is used, a level that typically occurs during dry weather conditions. A water supply source is defined as a treatment plant clearwell, flow control facility, pump station, pressure regulating station or reservoir. Supply sources occur at discrete points in a system of

water mains and control both flow and pressure at the supply point. Water mains are not supply sources but rather conveyance facilities. The maximum static pressure in gravity systems is determined from reservoir overflow elevations and/or the discharge control setting on pressure reducing valves, whichever is greater. The maximum static pressure in pumped systems is determined from reservoir overflow elevations or pump shutoff levels, whichever is greater. There are two important pressure criteria used in water system design: Domestic Pressure and Fire Pressure. For systems supplying only domestic demand, only the Domestic Pressure criteria will apply. Similarly, for systems providing only fire demand, only the Fire Pressure criteria will apply. Systems supplying both types of demand, both criteria will apply and must be independently checked.

2.7.2 Domestic Pressure Criteria

The domestic pressure criteria for water system design are shown in **Figure 2-3**. Every water main in each pressure zone must be capable of supplying a minimum static pressure of 65 psi. Domestic pressures must fall no more than 25 psi below the static pressure, and residual water main pressure must be at least 40 psi. Domestic pressures are determined in the distribution system pipelines, excluding losses through service connections and building plumbing, and are measured relative to adjacent building pad elevations.

When analyzing a system with one source of supply out of service, domestic pressures may fall more than 25 psi below static pressure, but the domestic pressure shall not fall below 40 psi.

2.7.3 Pressure Requirements During Fires

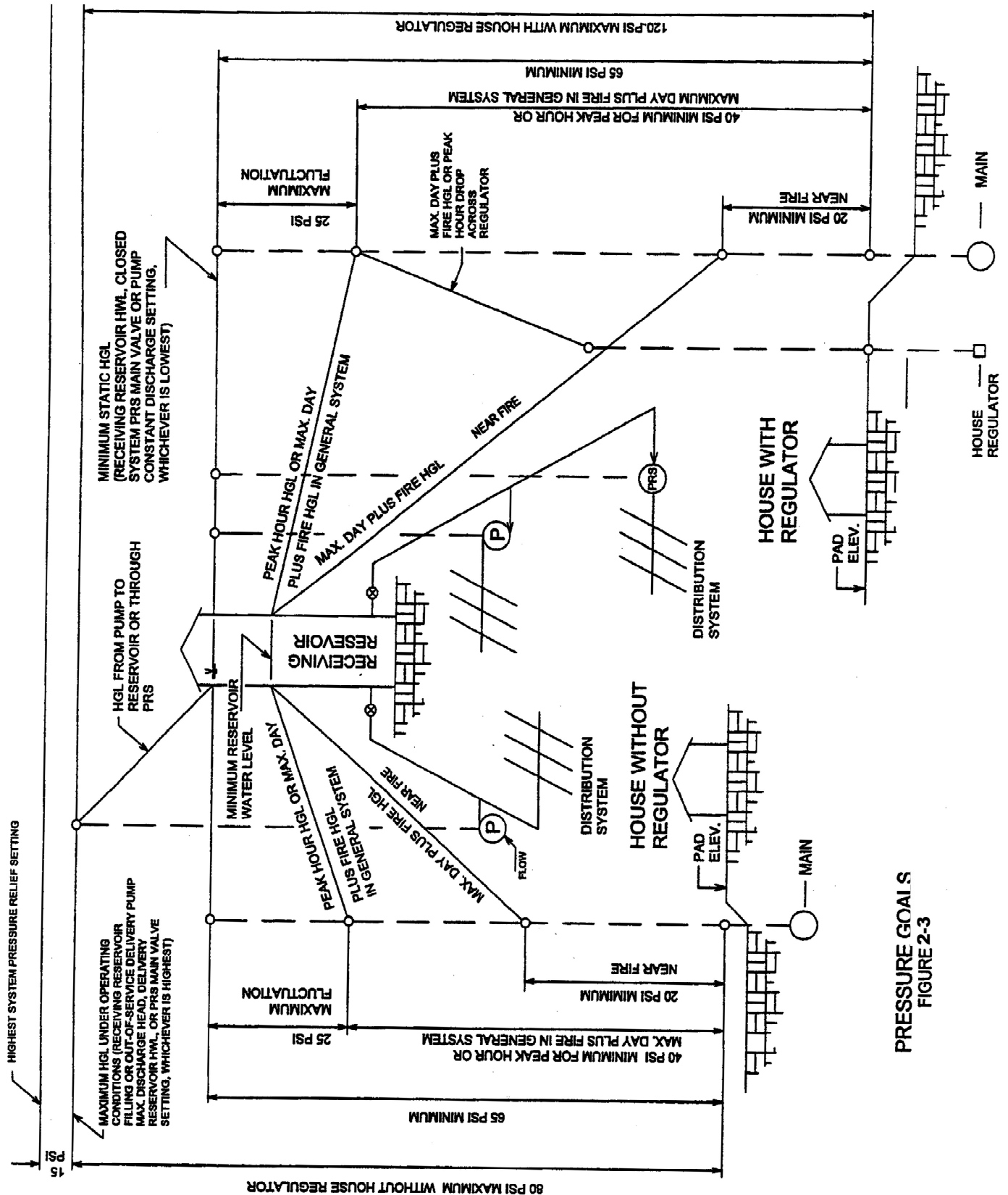
For the simulation of fire conditions, a minimum operating pressure of 20 psi is required at the fire hydrant locations.. The residual pressure is determined given the fire demand among one or more hydrants and with the simultaneous water consumption occurring at the maximum day demand. The hydrants considered in this simulation must be sufficiently near to the fire location to be classified as “available” to that location as defined by the California Fire Code.

For water systems with available storage, the residual pressures in the distribution system during a fire are maintained given the following conditions:

- The water level in the storage facility at the time of the fire is at or near the minimum operating level
- The prescribed fire duration set by the California Fire Code, occurring under maximum day conditions.

2.8 System Reliability

Water systems must be designed to meet the operating pressure criteria with one critical source



PRESSURE GOALS
FIGURE 2-3