

# **DEXTER WILSON ENGINEERING, INC.**

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CONSULTING ENGINEERS

**WATER SYSTEM ANALYSIS  
FOR THE  
BDM MIXED USE PROJECT  
IN THE CITY OF SAN DIEGO**

October 20, 2022

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10-20-2022

**Prepared by:  
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Job No. 1125-002

## TABLE OF CONTENTS

	<u>PAGE NO.</u>
Introduction. ....	1
Purpose of Study .....	3
Study Area .....	3
Design Criteria and Water Demands.....	3
Existing Water System .....	5
Water Service Overview .....	5
Hydraulic Modeling .....	7
Conclusions and Recommendations .....	9

## APPENDICES

APPENDIX A	PRELIMINARY SITE PLAN
APPENDIX B	CITY OF SAN DIEGO DESIGN CRITERIA
APPENDIX C	COMPUTER MODELING OUTPUT

**LIST OF TABLES**

	<u><b>PAGE NO.</b></u>
TABLE 1	BDM MIXED USE WATER DUTY FACTOR.....4
TABLE 2	BDM MIXED USE PROJECTED WATER DEMANDS.....4

**LIST OF FIGURES**

	<u><b>PAGE NO.</b></u>
FIGURE 1	LOCATION MAP.....2
FIGURE 2	EXISTING WATER FACILITIES.....6
FIGURE 3	PROPOSED WATER FACILITIES .....8

**EXHIBITS**

EXHIBIT A	NODE AND PIPE DIAGRAM
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October 20, 2022

1125-002

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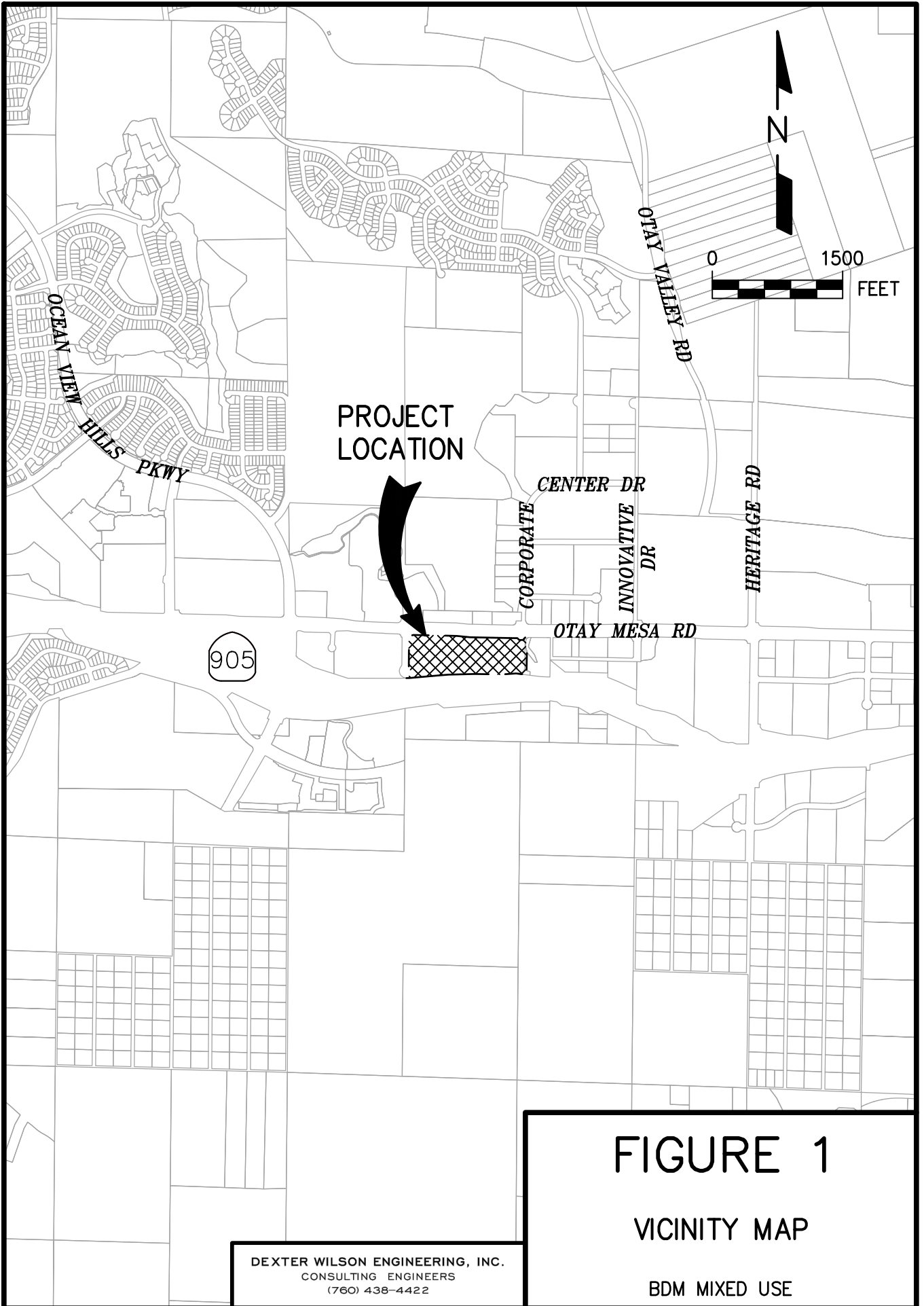
Attention: Michael Shoemaker

Subject: Water System Analysis for the BDM Mixed Use Project in the City of San Diego

**Introduction**

This report provides a water system analysis for the BDM Mixed Use project in the City of San Diego. The project is located in the Otay Mesa area along the south side of Otay Mesa Road between Emerald Crest Court and Corporate Center Drive. Figure 1 provides a location map for the project and Appendix A includes a preliminary site plan.

The project encompasses a total of approximately 14 acres and the existing property is currently vacant. The project proposes to develop the site to include 430 multi-family residential units (378 market rate units and 52 affordable units) and 6,000 square feet of retail commercial. Ground elevations on the project range from approximately 510 feet to 525 feet.



# FIGURE 1

## VICINITY MAP

BDM MIXED USE

DEXTER WILSON ENGINEERING, INC.  
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### **Purpose of Study**

The purpose of this study is to provide recommended water system improvements for the BDM Mixed Use project. These improvements include connections to the public water system to allow adequate domestic and fire protection service to be provided to the project. The project proposes to connect to the existing public water system in Emerald Crest Court and make a new connection via a new public water line at the Corporate Center Drive and Otay Mesa Road intersection; the onsite water improvements are proposed to be private. This report will verify that the recommended public improvements comply with the City of San Diego Water Department water system design standards. Private onsite water system requirements will be addressed outside the scope of this report.

### **Study Area**

The study area for this report is the boundary of the BDM Mixed Use project. The extent of the existing water system which was incorporated into the analysis of the project site was based on the existing Otay Mesa 680 Zone distribution system that serves the area.

### **Design Criteria and Water Demands**

The design criteria utilized in the analysis of the BDM Mixed Use project water system are in accordance with the current City of San Diego Water Facility Design Guidelines, Revised January 2021. The design criteria include a minimum static pressure of 65 pounds per square inch (psi) and maximum static pressure of 120 psi. Residual pressure with all pipes open must be a minimum of 40 psi and pressure loss at any location must not exceed 25 psi below static pressure. For one source out of service, residual pressures at all locations must not be less than 40 psi below static pressure.

For fire flow scenarios, minimum residual pressure must be 20 psi in the area of the fire. The 25 psi and 40 psi maximum pressure drop requirements apply for the remaining portions of the system for all pipes open and one source out of service, respectively. A key criterion is

that velocities in the water mains under maximum day demand plus fire flow demands cannot exceed 15 feet per second.

Table 1 summarizes the water duty factors for the land use encountered on the project from the City Design Guidelines. Residential water duty factors are based on a unit demand of 150 gpd per person.

<b>TABLE 1 BDM MIXED USE WATER DUTY FACTOR</b>			
<b>Land Use</b>	<b>Density DU/Acre</b>	<b>Persons/DU</b>	<b>Average Water Duty Factor</b>
Multi-Family Residential (Market Rate)	32	3.0	450 gpd/DU
Affordable Housing	43	2.6	390 gpd/DU
Commercial	-	-	5,000 gpd/AC

The final fire flow requirement for the project will be based on the California Fire Code Table B105.1 which uses building square footage and construction type to determine the fire flow and duration. At this level of planning, a fire flow of 3,000 gpm is assumed for multi-family residential per the City Design Guidelines. Table 2 presents the projected water demands for the proposed project.

<b>TABLE 2 BDM MIXED USE PROJECTED WATER DEMANDS</b>				
<b>Land Use</b>	<b>Quantity</b>	<b>Density du/ac</b>	<b>Demand Factor</b>	<b>Water Demand, gpd</b>
Multi-Family Residential	378 du	32	450 gpd/DU	170,100
Affordable Housing	51 du	43	390 gpd/DU	19,980
Commercial	0.2 Ac	-	5,000 gpd/Ac	1,000
<b>Total</b>				<b>190,990</b>



From the City of San Diego Guidelines and Standards, Figure 2-2, the maximum day demand to average annual demand ratio is approximately 1.1. This results in an estimated maximum day demand of 210,089 gpd (146 gpm).

From the City of San Diego Guidelines and Standards, Figure 2-1, the peak hour demand to average annual demand ratio is approximately 1.4. Peak Hour Demand is calculated to be 267,386 gpd (186 gpm). Appendix B of this report presents the reference and backup data for determining these peaking factors.

### **Existing Water System**

There are existing public water facilities directly adjacent to the BDM Mixed Use project site. The 24-inch Otay Mesa Pipeline is located in Otay Mesa Road along the north side of the project. A 16-inch water line has been constructed off this line at Emerald Crest Court by the adjacent project to the west. The water lines in this area are supplied by the 680 Zone.

The existing public water facilities in the vicinity of the project are shown on Figure 2.

### **Water Service Overview**

The project proposes to receive water service by extending the existing 16-inch public water line in Emerald Crest Court and extend a new 16-inch public water line from the 24-inch Otay Mesa Pipeline at the Corporate Center Drive and Otay Mesa Road intersection. Per the City's direction, this new 16-inch public water line from the 24-inch Otay Mesa Pipeline at the Corporate Center Drive and Otay Mesa Road intersection will be incorporated into a future City CIP overall replacement of the 24-inch Otay Mesa Pipeline. Blind flanges with valves at the ends of the new water line will be implemented during construction to allow the future CIP project to be integrated more easily.

The fire hydrants onsite will be served by a private fire protection system. The private fire protection system will include a looped 8-inch diameter private line that connects to the public lines in Emerald Crest Court and Corporate Center Drive.



The domestic water systems at the BDM Mixed Use project will be private onsite with separate meters. The sizing of these meters will be evaluated in a separate study once water fixture units for these individual development areas are established. The domestic meter, backflow preventer, and fire sprinkler connection for the commercial site will be provided from connections to the existing water line in Emerald Crest Court. Domestic service for the affordable housing building/area will be supplied by a private sub-meter connected to the main multi-family residential area. Domestic service to the main multi-family residential area will be provided by a connection at both Emerald Crest Court and Corporate Center Drive to ensure a redundant looped water supply. A master meter and backflow preventer will be provided at each connection.

The proposed water facilities in the vicinity of the project are shown on Figure 3.

With service from the 680 Zone, maximum static pressures on the site will range from approximately 67 psi to 74 psi. While these pressures meet City Design Guidelines, it will be up to the building plumbing designer to evaluate the proposed private domestic water systems so that adequate pressures can be provided considering losses through the meters, backflow preventers, and piping systems.

### **Hydraulic Modeling**

To evaluate the ability to meet fire flows on the project, computer hydraulic modeling was performed using KYPIPE computer software developed by the University of Kentucky. The computer model uses the Hazen-Williams equation for determining headloss in pipes. The Hazen-Williams “C” value used for all pipes is 120. The results of the hydraulic modeling are provided as Appendix C and the corresponding node and pipe diagram is provided as Exhibit A.

The results of the analysis confirm that the recommended piping can supply the fire flow requirements for the project. For modeling fire flows within the project, an available hydraulic gradeline of 650 feet was assumed in the vicinity of the project to account for system losses in the 680 Zone.

\\ARTIC\DWG\1125002\REPORT\BMU\_WTR\_FIGURE-3\_PROWTR.DWG 10/20/2022 3:08:58 PM LAYOUT:11x17 USER:donald

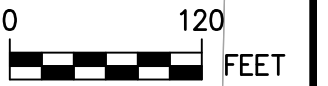
**LEGEND**

- PROJECT BOUNDARY
- EXISTING PUBLIC 680 ZONE FACILITIES
- PROPOSED PUBLIC 680 ZONE FACILITIES
- PROPOSED PRIVATE DOMESTIC SYSTEM
- PROPOSED PRIVATE FIRE PROTECTION SYSTEM
- ⊗ EXISTING PUBLIC FIRE HYDRANT
- ⊗ PROPOSED PUBLIC FIRE HYDRANT
- ⊗ PROPOSED PRIVATE FIRE HYDRANT
- ⊠ PROPOSED METER
- ▢ PROPOSED BACKFLOW

CONNECTION POINT TO EXISTING WATER

CORPORATE CENTER DR

EX.16"



EX.24"

EX.24"

EX.24"

EX.24"

EX.16" PER DWG 41595-32-D

OTAY MESA RD

16"

16"

16" CROSS

PRIVATE RPDA BACKFLOW PREVENTER

COMMERCIAL METER AND BACKFLOW PREVENTER

8" PRIVATE FIRE PROTECTION SYSTEM RPDA BACKFLOW PREVENTER

PROPOSED WATER EASEMENT

MF RESIDENTIAL METER AND BACKFLOW PREVENTER

CONNECTION POINT TO EXISTING WATER

EMERALD CREST CT

16"

MF RESIDENTIAL METER AND BACKFLOW PREVENTER

8"

8"

8"

8"

8"

PRIVATE SUB-METER FOR AFFORDABLE HOUSING (SUPPLIED FROM MF RESIDENTIAL)

8" PRIVATE FIRE PROTECTION SYSTEM RPDA BACKFLOW PREVENTER

OTAY MESA FWY

905

905

**FIGURE 3**

**PROPOSED WATER SYSTEM**

BDM MIXED USE

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The 3,000 gpm fire flow was modeled at several locations within the project site. A fire flow of 3,000 gpm is being met with a minimum residual pressure of greater than 20 psi and a maximum pipeline velocity of 12.3 feet per second (fps) in the existing and proposed water system.

The results of the computer hydraulic analyses for the BDM Mixed Use project indicate that the existing and proposed public water system can provide sufficient flow and pressure for the projects' domestic and expected fire protection service needs.

### **Conclusions and Recommendations**

The following conclusions and recommendations are summarized based on the water system analysis prepared for the BDM Mixed Use project.

1. The BDM Mixed Use project will be supplied from the Otay Mesa 680 Zone system.
2. Static pressures will be 67 to 74 psi which meets City of San Diego Guidelines. For multi-story structures, the building plumbing designer will need to evaluate if additional pumping will be required to boost building domestic pressures.
3. Public water system improvements for the proposed project include a 16-inch water line extension in Emerald Crest Court as well as a new 16-water line segment in Otay Mesa Road near the Corporate Center Drive intersection.
4. Figure 3 provides the recommended water system layout for the project.
5. A maximum day demand plus fire flow of 3,000 gpm can be met at the project site with existing piping with all residual pressures greater than 20 psi.
6. Peak Hour Demand is met at a residual pressure of 46 psi.
7. The recommended material specification for all new potable water lines is AWWA C900 PVC DR18 Class 235.

8. The final sizing of private domestic lines and water meters to serve the residential parcels will be determined by the Building Department based on the Water Meter Data Card information provided for each building service.
  
9. If any water lines to be constructed by this development are metallic, a California Licensed Corrosion Engineer will be required to perform a soil corrosivity study and to design a Corrosion Control System.

Dexter Wilson Engineering, Inc.



Steven Henderson, P.E.

SH:ah

Attachments

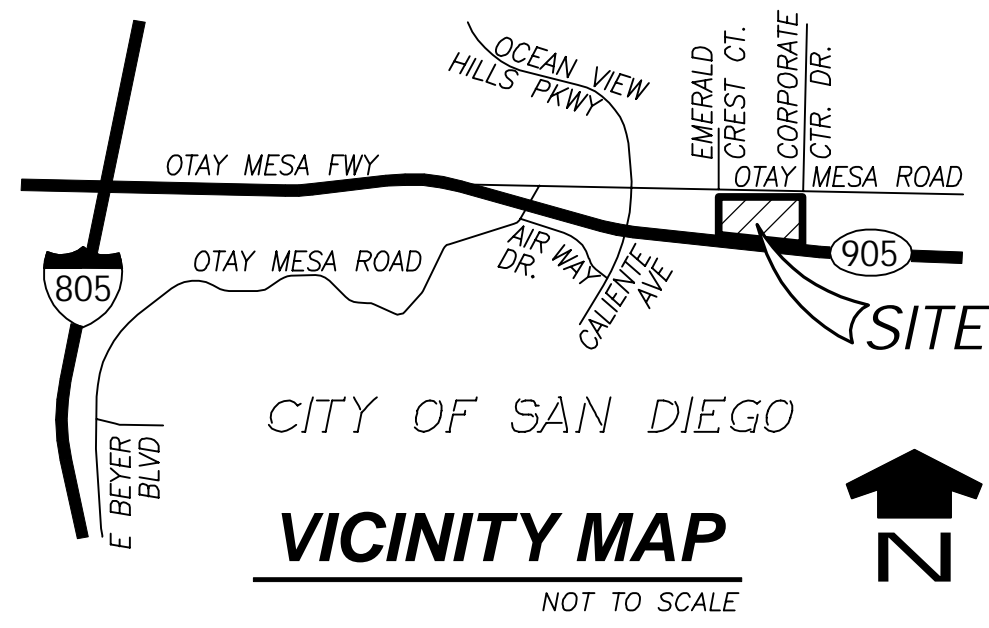
**APPENDIX A**

**PRELIMINARY SITE PLAN**



VESTING TENTATIVE MAP & SITE DEVELOPMENT PERMIT

**BDM MIXED USE**  
CITY OF SAN DIEGO, CALIFORNIA



**LEGEND**

PROPERTY LINE/ TM BOUNDARY	---
PROPOSED BUILDING NUMBER WITH PAD ELEVATION	BLDG 1 FF=521.0 P=520.2
PROPOSED LOT NUMBER	1
PROPOSED LOT LINE	---
PROPOSED EASEMENT LINE	---
EXISTING PUBLIC SEWER MAIN WITH MANHOLE	---
PROPOSED PRIVATE SEWER MAIN WITH MANHOLE	---
PROPOSED SEWER FORCE MAIN (PRIVATE ONSITE, PUBLIC OFFSITE)	FM
EXISTING PUBLIC WATER MAIN W/ FIRE HYDRANT	---
PROPOSED PRIVATE WATER MAIN (12" UNLESS OTHERWISE NOTED)	---
PROPOSED PRIVATE FIRE MAIN W/ FIRE HYDRANT & SERVICE (8" UNLESS OTHERWISE NOTED)	---
PROPOSED PRIVATE WATER LATERAL	---
PROPOSED PRIVATE SEWER LATERAL	---
PROPOSED CENTERLINE STREET ELEVATION	520.0
PROPOSED SLOPE ELEVATION	521.0
EXISTING CONTOURS	522
PROPOSED SLOPE BANK (2:1 MAX)	2:1
PROPOSED RETAINING WALL	---
PROPOSED % OF STREET CENTERLINE GRADE	2%
EXISTING STREET LIGHT	---
PROPOSED STORM DRAIN (PRIVATE UNLESS OTHERWISE NOTED)	---
EXISTING PUBLIC STORM DRAIN SYSTEM	---
PROPOSED TRASH ENCLOSURE	---
LIMITS OF PROPOSED GRADING	---
SWALE	---

**LEGAL DESCRIPTION**

LOTS 1, 2, 3, 4, 5, A AND C OF HANDLER COMMERCIAL, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 16340, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MAY 7, 2019.

**TOPOGRAPHY SOURCE**

THE TOPOGRAPHY COMPILED BY RBF CONSULTING, DATED JULY 27, 2012. SUPPLEMENTAL FIELD SURVEY WAS PERFORMED ON NOVEMBER 7, 2017 BY RICK ENGINEERING COMPANY.

**BENCHMARK**

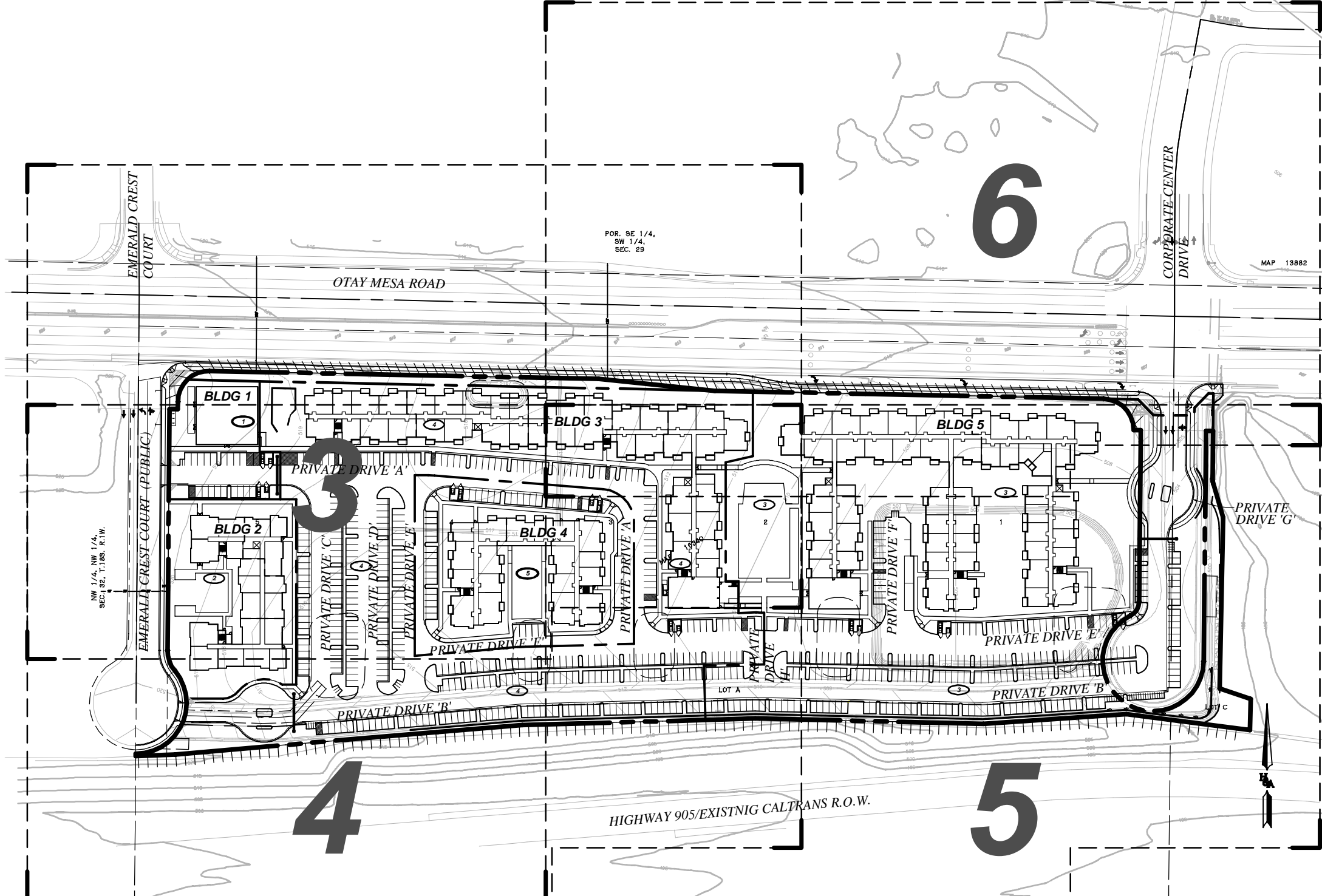
ELEVATIONS SHOWN HEREON ARE IN TERMS OF THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29) BASED LOCALLY UPON THE FOLLOWING STATION AS PUBLISHED BY THE CITY OF SAN DIEGO: CENTERLINE MONUMENT (SECTION CORNER) AT THE INTERSECTION OF OTAY MESA ROAD AND HERITAGE ROAD ELEVATION = 504.568 M.S.L.

**UTILITIES & SERVICES**

ONSITE WATER .....PRIVATE  
OFFSITE WATER .....CITY OF SAN DIEGO (PUBLIC)  
ONSITE SEWER .....PRIVATE  
OFFSITE SEWER .....CITY OF SAN DIEGO (PUBLIC)  
FIRE AND POLICE .....CITY OF SAN DIEGO  
GAS & ELECTRICITY .....SDG&E  
SCHOOL DISTRICT .....SAN DIEGO UNIFIED SCHOOL DIST.

STREET TREES: ALL UTILITIES, HARDSCAPE AND OTHER SITE IMPROVEMENTS (PER LDC TABLE 142-04E "MINIMUM TREE SEPARATION DISTANCE" AND PER LDC 142.0403(b)(6) "MIN 40'-SOFT TREE ROOT ZONE") SHALL BE DESIGNED TO NOT PROHIBIT THE REQUIRED PLACEMENT AND QUANTITY OF REQUIRED STREET TREES.

MINIMUM TREE SEPARATION DISTANCE:  
TRAFFIC SIGNALS / STOP SIGNS - 20 FEET  
UNDERGROUND UTILITY LINE - 5 FEET (10' FOR SEWER)  
ABOVE GROUND UTILITY STRUCTURES - 10 FEET  
DRIVEWAY (ENTRIES) - 10 FEET (5' FOR RESIDENTIAL STREET < 25 MPH)  
INTERSECTIONS (INTERSECTING CURB LINES OF TWO STREETS) - 25 FEET



**CONDOMINIUM NOTE**

THIS IS A MAP OF A CONDOMINIUM PROJECT AS DEFINED IN SECTION 4125 OF THE CIVIL STATE OF CALIFORNIA AND IS FILED PURSUANT TO THE SUBDIVISION MAP ACT. THERE IS A MAXIMUM OF 378 MARKET RATE RESIDENTIAL UNITS (MARKET RATE UNITS: LOTS 3, 4 & 5).

THIS IS ALSO A MAP OF A COMMERCIAL CONDOMINIUM PROJECT AS DEFINED IN SECTION 6531 OF THE CIVIL CODE OF THE STATE OF CALIFORNIA AND IS FILED PURSUANT TO THE SUBDIVISION ACT. THERE IS A MAXIMUM OF 6,000 COMMERCIAL UNITS. (LOT 1).

**SHEET INDEX**

- C1 TITLE SHEET
- C2 STREET SECTIONS
- C3 PROJECT DESIGN
- C4 PROJECT DESIGN
- C5 PROJECT DESIGN
- C6 PROJECT DESIGN
- C7 FIRE ACCESS PLAN
- C8 BOUNDARY, ENCUMBRANCE & EXISTING TOPO

**BASIS OF BEARINGS**

THE BASIS OF BEARINGS FOR THIS MAP IS THE SOUTHERLY SIDELINE OF OTAY MESA ROAD AS SHOWN ON MAP NO. 16340 (N88°48'54"W)

**EXISTING EASEMENTS**

REFER TO SHEET C8: "BOUNDARY, MONUMENTS, ENCUMBRANCES & EXISTING TOPO"

**PROPOSED EASEMENTS**

REFER TO SHEET C3-C6 FOR THE LOCATION AND LIMITS OF ALL NEW PROPOSED EASEMENTS

**EARTHWORK NOTES**

**TOTAL GRADING VOLUME**  
AMOUNT OF CUT: APPROX. 2,193 CUBIC YARDS  
AMOUNT OF FILL: APPROX. 65,467 CUBIC YARDS  
AMOUNT OF IMPORT: APPROX. 63,274 CUBIC YARDS

**PARKING SUMMARY**

PARKING COUNT	NON-RESIDENTIAL				TOTAL	MOTORCYCLE			BICYCLE		
	COMMERCIAL SPACE	COMMERCIAL SPACE ACCESS	COMMERCIAL CARPOOL/ ZERO-EMISSION	COMMERCIAL EVCS		COMMERCIAL	COMMERCIAL-ST	COMMERCIAL-LT	COMMERCIAL	COMMERCIAL-ST	COMMERCIAL-LT
ON-SITE	10	1	1	1	13	2	8	1			
<b>RESIDENTIAL- Market Rate</b>											
LEVEL	STANDARD	PARALLEL	ACCESSIBLE	EVCS	TOTAL	MOTO	BICYCLE				
ON-SITE	545	4	13	63	625	43	200				
<b>RESIDENTIAL- AFFORDABLE</b>											
LEVEL	STANDARD	PARALLEL	ACCESSIBLE	EVCS	**TOTAL	MOTO	BICYCLE				
ON-SITE	3		1	1	5	0	26				
***9 PARKING SPACES NORTH OF AFFORDABLE BLDG.											
<b>TOTAL: RESIDENTIAL</b>											
**PARKING						43	200				
MOTORCYCLE											
BICYCLE										226	
<b>TOTAL: NON-RESIDENTIAL + RESIDENTIAL</b>											
PARKING					643						
MOTORCYCLE					45						
BICYCLE					235						

**GENERAL DESIGN NOTES**

- CUT/FILL SLOPES ARE 2:1 OR FLATTER UNLESS OTHERWISE SPECIFIED.
- GRADING SHOWN HEREON IS PRELIMINARY AND MAY BE SUBJECT TO MINOR REFINEMENTS IN FINAL DESIGN. FINAL GRADING PLANS WILL CONFORM TO THE APPROVED PERMIT AND EXHIBITS.
- DRAINAGE FACILITIES TO BE CONSTRUCTED PER CITY OF SAN DIEGO STANDARDS.
- PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT THE SUBDIVIDER SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE SATISFACTORY TO THE CITY ENGINEER.
- PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT THE SUBDIVIDER SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS. DRAINAGE EASEMENTS SHALL BE PROVIDED AS REQUIRED.
- ALL LENGTHS, DISTANCES, LOT DIMENSIONS AND CURVE RADII ARE APPROXIMATE.
- ALL UTILITIES SHALL BE UNDERGROUND AND EASEMENTS PROVIDED AS NECESSARY.
- ALL PROPOSED WATER (INCLUDING SERVICES AND METERS) AND SEWER FACILITIES (PUBLIC & PRIVATE, WITHIN THE EXISTING ROW OR PUBLIC EASEMENT MUST BE DESIGNED, CONSTRUCTED, OR ABANDONED IN ACCORDANCE WITH ESTABLISHED CRITERIA WITHIN THE CITY OF SAN DIEGO'S CURRENT WATER & SEWER FACILITY DESIGN GUIDELINES, REGULATIONS, STANDARDS AND PRACTICES PERTAINING THERETO.
- ALL ON-SITE WATER AND SEWER FACILITIES SHOWN ON THIS DRAWING ARE PRIVATE AND SHALL BE DESIGNED TO MEET THE REQUIREMENTS OF THE CALIFORNIA UNIFORM PLUMBING CODE AND SHALL BE REVIEWED AS PART OF THE BUILDING PERMIT PLAN CHECK.
- ANY EXISTING WATER SERVICES TO BE KILLED AT THE MAIN UNLESS OTHERWISE NOTED.
- ANY EXISTING SEWER SERVICES TO BE ABANDONED AT THE PROPERTY LINE.
- THERE ARE NO PROPOSED OR EXISTING BUS/TRANSIT STATIONS OR STOPS.
- COMMUNAL TRASH PICKUP IS PROPOSED AS PART OF THIS PROJECT.
- AN ILLUMINATED DIRECTORY IN ACCORDANCE WITH THE POLICY 00-6, SHALL BE PROVIDED.
- BUILDING ADDRESS NUMBERS SHALL BE VISIBLE AND LEGIBLE FROM THE STREET OR ROAD FRONTING THE PROPERTY. (PER UFC 901.4.4)
- IMPROVEMENTS SUCH AS DRIVEWAYS, UTILITIES, DRAINS AND WATER AND SEWER LATERALS SHALL BE DESIGNED SO AS TO NOT PROHIBIT THE PLACEMENT OF STREET TREES, ALL TO THE SATISFACTION OF THE CITY MANAGER.
- CALIFORNIA BUILDING CODE CONSTRUCTION TYPE: V. FULLY SPRINKLED
- CALIFORNIA BUILDING CODE OCCUPANCY GROUP: R-2, A-2, A-3, M, B.
- MINIMUM 24 INCH OR 36 INCH BOX SIZE TREES SHALL BE INSTALLED WITHIN 10' OF THE FACE OF CURB AND IN OPENINGS BEING A MINIMUM 40 SQUARE FEET OF AIR AND WATER - PERMEABLE AREA AS INDICATED ON THE LANDSCAPE PLAN (SEE LANDSCAPE PLANS FOR DETAILS).
- IMPROVEMENT PLANS SHALL SHOW, LABEL, AND DIMENSION A 40 SQUARE FOOT AREA FOR EACH STREET TREE WHICH IS UNENCUMBERED BY HARDSCAPE AND UTILITIES.
- NO TREES OR SHRUBS EXCEEDING THREE FEET IN HEIGHT AT MATURITY SHALL BE INSTALLED WITHIN TEN FEET OF ANY SEWER FACILITY AND FIVE FEET OF ANY WATER.
- ALL RESIDENTIAL BUILDINGS REQUIRE A FIRE SPRINKLER SYSTEM.
- FIRE ACCESS ROADWAY SIGNS OR RED CURBS WILL BE PROVIDED IN ACCORDANCE WITH BFLS POLICY A-96-1. TEMPORARY STREET SIGNS WILL BE PROVIDED IN ACCORDANCE WITH UFC 901.4.5
- ALL DRAIN SYSTEMS NOT LOCATED IN A PUBLIC STREET SHALL BE PRIVATE.
- WATER EASEMENTS WILL BE PROVIDED ADJACENT TO ALL ONSITE PUBLIC FIRE HYDRANTS, WATER METERS, BLOWOFFS AND VALVES, UPON FINAL LOCATION REVIEW BY THE CITY OF SAN DIEGO ENGINEERING AND FIRE DEPARTMENTS.
- ADJACENT NOISE ATTENUATION WILL BE PROVIDED TO ENSURE AN INTERIOR NOISE LEVEL OF 45 dB CNEL FOR ALL SLEEPING ROOMS AND AN INTERIOR NOISE LEVEL OF 50dB FOR ALL OTHER INDOOR AREAS.
- NO OBSTRUCTION INCLUDING SOLID WALLS IN THE VISIBILITY AREA SHALL EXCEED 3 FEET IN HEIGHT. PLANT MATERIAL, OTHER THAN TREES, WITHIN THE PUBLIC RIGHT-OF-WAY THAT IS LOCATED WITHIN VISIBILITY AREAS SHALL NO EXCEED 24 INCHES IN HEIGHT.
- PRIOR TO THE ISSUANCE OF ANY BUILDING PERMITS, THE SUBDIVIDER SHALL OBTAIN A LETTER OF PERMISSION FROM THE ADJACENT PROPERTY OWNER, FOR ANY PROPOSED OFFSITE GRADING, TO THE SATISFACTION OF THE CITY ENGINEER.
- PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITEE SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE SATISFACTORY TO THE CITY ENGINEER.
- PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER/PERMITEE SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICES NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS OR SPECIFICATIONS. PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE APPLICANT SHALL SUBMIT A TECHNICAL REPORT THAT WILL BE SUBJECT TO FINAL REVIEW AND APPROVAL BY THE CITY ENGINEER, BASED ON THE STORM WATER STANDARDS IN EFFECT AT THE TIME OF THE CONSTRUCTION PERMIT ISSUANCE.
- DEVELOPMENT OF THIS PROJECT SHALL COMPLY WITH ALL STORM WATER CONSTRUCTION REQUIREMENTS OF THE STATE CONSTRUCTION GENERAL PERMIT, ORDER NO. 2009-009DWO, OR SUBSEQUENT ORDER, AND THE MUNICIPAL STORM WATER PERMIT, ORDER NO. R9-2013-0001, OR SUBSEQUENT ORDER. IN ACCORDANCE WITH ORDER NO. 2009-009DWO, OR SUBSEQUENT ORDER, A RISK LEVEL DETERMINATION SHALL BE CALCULATED FOR THE SITE AND A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE IMPLEMENTED CONCURRENTLY WITH THE COMMENCEMENT OF GRADING ACTIVITIES.
- PRIOR TO THE ISSUANCE OF A GRADING OR A CONSTRUCTION PERMIT, A COPY OF THE NOTICE OF INTENT (NOI) WITH A VALID WASTE DISCHARGE ID NUMBER (WID#) SHALL BE SUBMITTED TO THE CITY OF SAN DIEGO AS A PROOF OF THE ENROLLMENT UNDER THE CONSTRUCTION GENERAL PERMIT. WHEN OWNERSHIP OF THE ENTIRE SITE OR PORTIONS OF THE SITE CHANGES PRIOR TO FILING OF THE NOTICE OF TERMINATION (NOT) A REVISED NOI SHALL BE SUBMITTED ELECTRONICALLY TO THE STATE WATER RESOURCES BOARD IN ACCORDANCE WITH THE PROVISIONS AS SET FORTH IN SECTION 11.C OF ORDER NO. 2009-0009-DWO AND A COPY SHALL BE SUBMITTED TO THE CITY.
- ALL BEARINGS AND DISTANCES ARE LOCATED AND SHOWN ON C8.
- NO PRIVATE IMPROVEMENTS (INCLUDING LANDSCAPING, ENHANCED PAVING, PRIVATE UTILITIES, OR STRUCTURES OF ANY KIND) THAT COULD INHIBIT THE MAINTENANCE, REPAIR, OR REPLACEMENT OF PUBLIC UTILITIES, MAY BE INSTALLED, CONSTRUCTED, OR LOCATED WITHIN THE LIMITS OF A PUBLIC WATER, SEWER OR GENERAL UTILITY EASEMENT WITHOUT A CITY APPROVED AND COUNTY RECORDED ENCROACHMENT AND MAINTENANCE REMOVAL AGREEMENT (EMRA).
- ALL WATER LINES SERVING THIS DEVELOPMENT (INCLUDING DOMESTIC, IRRIGATION, AND FIRE) MUST PASS THROUGH A PERMITTED, PRIVATE, ABOVE GROUND, BACKFLOW PREVENTION DEVICE (BFPD).
- THE OWNER/PERMITEE SHALL BE RESPONSIBLE FOR ANY DAMAGE CAUSED TO CITY OF SAN DIEGO WATER AND SEWER FACILITIES IN THE VICINITY OF THE PROJECT SITE, DUE TO THE CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS PROJECT, IN ACCORDANCE WITH MUNICIPAL CODE SECTION 142.0607. IN THE EVENT ANY SUCH FACILITY LOSES INTEGRITY THEN, THE OWNER/PERMITEE SHALL REPAIR OR RECONSTRUCT ANY DAMAGED PUBLIC WATER AND SEWER FACILITY IN A MANNER SATISFACTORY TO THE PUBLIC UTILITIES DIRECTOR AND CITY ENGINEER.
- NO PUBLIC WATER, SEWER OR GENERAL UTILITY EASEMENTS CURRENTLY EXIST ON THE SUBJECT PROPERTY.
- IN NO EVENT SHALL ANY TEMPORARY OR PERMANENT GRADING OR IMPROVEMENTS ASSOCIATED WITH THIS PROJECT EXTEND BEYOND THE PROJECT BOUNDARY INTO THE CITY OPEN SPACE PRESERVE LOCATED ADJACENT TO THE EAST.
- THE PROPOSED PROJECT WILL COMPLY WITH ALL THE REQUIREMENTS OF THE CURRENT CITY OF SAN DIEGO STORM WATER STANDARDS MANUAL BEFORE A GRADING OR BUILDING PERMIT IS ISSUED. IT IS THE RESPONSIBILITY OF THE OWNER/DESIGNER/APPLICANT TO ENSURE THAT THE CURRENT STORM WATER PERMANENT BMP DESIGN STANDARDS ARE INCORPORATED INTO THE PROJECT.
- THIS PROJECT WILL BE REQUIRED TO ADHERE TO THE CITY OF SAN DIEGO STORM WATER STANDARDS IN EFFECT AT THE TIME OF APPROVAL OF MINISTERIAL PERMIT. THE CURRENT STORM WATER DEVELOPMENT REGULATIONS BECAME EFFECTIVE ON FEBRUARY 16, 2016 AND THIS PROJECT WILL BE SUBJECT TO THOSE REGULATIONS.
- ALL STORM WATER RUN-OFF FROM THE PROPOSED DEVELOPMENT SHALL BE DIRECTED TO PROPOSED LANDSCAPE LOW-IMPACT DEVELOPMENT BMPs.
- SEE ARCHITECTURAL SET FOR ADDITIONAL DETAILS REGARDING THE RESIDENTIAL PROJECT.
- EXISTING MAINTENANCE ASSESSMENT DISTRICT (MAD) OWNED IRRIGATION SHALL BE CAPPED AND TERMINATED AT THE PROPERTY LINE TO THE SATISFACTION OF THE PARKS AND RECREATION DEPARTMENT.
- ALL ON-SITE SEWER IS PRIVATE AND AS SUCH PRIVATE SEWER WILL REQUIRE A PRIVATE PLUMBING PERMIT.
- DUAL PERPENDICULAR CURB RAMPS PER CITY SD CURB RAMP DESIGN GUIDELINES (9/10/20).
- A FINAL MAP SHALL BE FILED AT THE COUNTY RECORDER'S OFFICE PRIOR TO THE EXPIRATION OF THE VESTING TENTATIVE MAP. IF APPROVED, A DETAILED PROCEDURE OF SURVEY SHALL BE SHOWN ON THE 4 LOT FINAL MAP AND ALL PROPERTY CORNERS SHALL BE MARKED WITH DURABLE SURVEY MONUMENTS.
- PLEASE REFER TO SHEET C6 FOR A DETAILED DESCRIPTION OF THE LOCATION AND AREAS PROPOSED TO BE VACATED AND TO BE DEDICATED ON THIS MAP.
- EXISTING TRAFFIC SIGNALS AT INTERSECTION OF OTAY MESA ROAD AND CORPORATE CENTER DRIVE TO BE MODIFIED PER PROJECT TRAFFIC REPORT.
- THIS PROJECT IS A MULTIPLE "UNIT" SUBDIVISION. IT IS THE INTENT THAT MULTIPLE FINAL MAPS BE FILED PURSUANT TO SECTION 66456.1 OF THE SUBDIVISION MAP ACT. THE FINAL MAP MAY CONSIST OF ONE OR MORE MULTIPLE LOTS AS SHOWN ON THIS TENTATIVE MAP.
- PRIOR TO RECORDATION, EACH INDIVIDUAL RECORDED UNIT SHALL INSURE THAT ADEQUATE ACCESS AND UTILITY SERVICES ARE PROVIDED EITHER BY FEE OWNERSHIP OR BY COVENANT OF EASEMENT TO THE SATISFACTION OF THE CITY ENGINEER.

**DEVELOPMENT SUMMARY**

THE BDM MIXED-USE PROJECT IS PROPOSED FOR A 13.45-ACRE SITE, LOCATED ON THE SOUTH SIDE OF OTAY MESA ROAD, EAST OF EMERALD CREST COURT, WEST OF CORPORATE CENTER DRIVE AND NORTH OF STATE ROUTE 905, WITHIN THE OTAY MESA COMMUNITY PLAN AREA IN THE CITY OF SAN DIEGO. THE PROJECT SITE HAS BEEN GRADED IN ACCORDANCE WITH A PREVIOUSLY APPROVED VESTING TENTATIVE MAP.

THE PROJECT PROPOSES 430 TOTAL MULTI-FAMILY RESIDENTIAL DWELLING UNITS AND APPROXIMATELY 6,000 SQUARE FEET OF COMMERCIAL USE. THE MULTI-FAMILY RESIDENTIAL USE INCLUDES 378 MARKET-RATE DWELLING UNITS, SITUATED IN THE NORTHERN PORTION OF THE SITE, AND 52 AFFORDABLE DWELLING UNITS (AFFORDABLE TO LOW-INCOME HOUSEHOLDS) SITUATED IN THE WESTERN PORTION OF THE SITE. COMMERCIAL USES WOULD BE LOCATED IN THE NORTHWESTERN PORTION OF THE SITE. ACCESS TO THE PROJECT WOULD BE PROVIDED OFF EMERALD CREST COURT AND BY A NEW PRIVATE DRIVE OFF OTAY MESA ROAD. PARKING WOULD BE PROVIDED IN SURFACE PARKING AREAS LOCATED THROUGHOUT THE PROJECT. THE PROJECT REQUIRES AN AMENDMENT TO THE OTAY MESA PLAN TO CHANGE THE LAND USE DESIGNATION FROM COMMUNITY COMMERCIAL - RESIDENTIAL PROHIBITED TO COMMUNITY COMMERCIAL - RESIDENTIAL PERMITTED, REZONE FROM THE EXISTING CC-2-3 ZONE TO CC-3-6, VESTING TENTATIVE MAP, SITE DEVELOPMENT PERMIT, NEIGHBORHOOD DEVELOPMENT PERMIT, AND PUBLIC RIGHT-OF-WAY VACATION TO VACATE CORPORATE CENTER DRIVE SOUTH OF OTAY MESA ROAD.

**GENERAL NOTES**

- SITE AREA DATA:  
GROSS SITE AREA: 12.74 ACRES  
NET SITE AREA: 13.45 ACRES (GROSS + VACATION - DEDICATION)
- TOTAL NUMBER OF EXISTING/PROPOSED LOTS:  
EXISTING LOTS: 7  
PROPOSED LOTS: 5 (LOT 1: COMMERCIAL, LOT 2: AFFORDABLE RESIDENTIAL, LOTS 3, 4 & 5: MARKET-RATE RESIDENTIAL)
- TOTAL NUMBER OF PROPOSED UNITS: 430 (378 MARKET RATE & 52 AFFORDABLE)
- COMMUNITY PLAN: OTAY MESA  
EXISTING COMMUNITY PLAN LAND USE:  
COMMUNITY COMMERCIAL - RESIDENTIAL PROHIBITED (0 DU/AC)  
PROPOSED COMMUNITY PLAN LAND USE:  
RESIDENTIAL: COMMUNITY COMMERCIAL - RESIDENTIAL PERMITTED
- ZONING: EXISTING: CC-2-3  
PROPOSED: CC-3-6  
SITE IS ALSO WITHIN THE AIRPORT LANDUSE COMPATIBILITY OVERLAY ZONE; THE AIRPORT INFLUENCE AREAS OVERLAY ZONE, THE RESIDENTIAL TANDEM PARKING OVERLAY ZONE, THE PARKING STANDARDS TRANSIT PRIORITY AREAS, THE TRANSIT PRIORITY AREAS OVERLAY ZONE, AND CPIOZ-A OVERLAY ZONE.
- DENSITY PROPOSED:  
GROSS SITE DENSITY: 31.97/AC (430 UNITS/13.45 AC)
- APN #: 645-410-03 THRU 09.
- AVERAGE DAILY TRIPS: 4,497
- GEO HAZARD ZONE: 53 & 12
- TOTAL FLOOR AREA: 442,230 FLOOR AREA RATIO: 0.75
- NO TRANSIT STOPS ARE PROPOSED WITH THIS PROJECT.
- LAMBERT COORDINATES: 146-1765
- CCS83 COORDINATES 1786-6325

**PROJECT TEAM**

ENGINEER	ARCHITECT
HUNSAKER & ASSOCIATES SD, INC. CONTACT: DAN REHM 9707 MAPLES STREET SAN DIEGO, CA 92121 (858) 558-4500 EMAIL: DREHM@HUNSAKERSD.COM	JOSEPH WONG DESIGN ASSOC. CONTACT: SOPHIA DEL - MAR ENGLISH 3259 FOURTH AVE SAN DIEGO, CA, 92101 (619) 233-6777 EMAIL: SDELMAREENGLISH@JWDAINC.COM
LANDSCAPE ARCHITECT	LAND USE
IN-SITE LANDSCAPE ARCHITECTURE CONTACT: TIM JACHLEWSKI 2850 WOMBLE RD SUITE 100-403 SAN DIEGO, CA 92106 (619) 795-7605 EMAIL: TIM@INSITELANDARCH.COM	ATLANTIS GROUP CONTACT: STEVE BOSSI (619) 523-1930 SBOSSI@ATLANTISSD.COM
DRY UTILITIES	ENVIRONMENTAL CONSULTANT
ENGINEERING PARTNERS INC. CONTACT: JANY STALEY 10159 MEANLEY DR. SUITE 200 SAN DIEGO, CA, 92131 (858) 824-1761 JANY@ENGINEERINGPARTNERS.COM	KLR PLANNING CONTACT: KAREN RUGGELS (619) 578-9505 KAREN@KLRPLANNING.COM
OWNER	APPLICANT
BDM INVESTMENTS, LLC CONTACT: MICHAEL SHOEMAKER (858) 245-5258 M.H.SHOEMAKER55@GMAIL.COM	BDM MIXED USE CONTACT: MICHAEL SHOEMAKER (858) 245-5258 M.H.SHOEMAKER55@GMAIL.COM

PREPARED BY:	#	REVISIONS	DATE	BY
HUNSAKER & ASSOCIATES SAN DIEGO, INC. PLANNING: 9707 Maple Street ENGINEERING: San Diego, Ca 92121 SURVEYING: PH080558-4500 - PH080558-1414	1.	1st SUBMITTAL	09/14/20	H&A
	2.	2nd SUBMITTAL	05/27/21	H&A
	3.	3rd SUBMITTAL	09/28/21	H&A
	4.	4th SUBMITTAL	01/17/22	H&A
PROJECT ADDRESS: 5400 OTAY MESA ROAD SAN DIEGO, CA 92154				
PROJECT: PTS # 673818				

**ENGINEER**  
ALISA S. VIALPANDO R.C.E. 47945 DATE

**VESTING TENTATIVE MAP & SITE DEVELOPMENT PERMIT**  
**BDM MIXED USE**  
CITY OF SAN DIEGO, CALIFORNIA

**SHEET C1 OF C8**



**APPENDIX B**

**CITY OF SAN DIEGO DESIGN CRITERIA**

# 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:

$$\text{Residential Water Demand (gallons/day)} = \text{Residential Population} \times 150 \text{ gallons/person-day}$$

## 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.

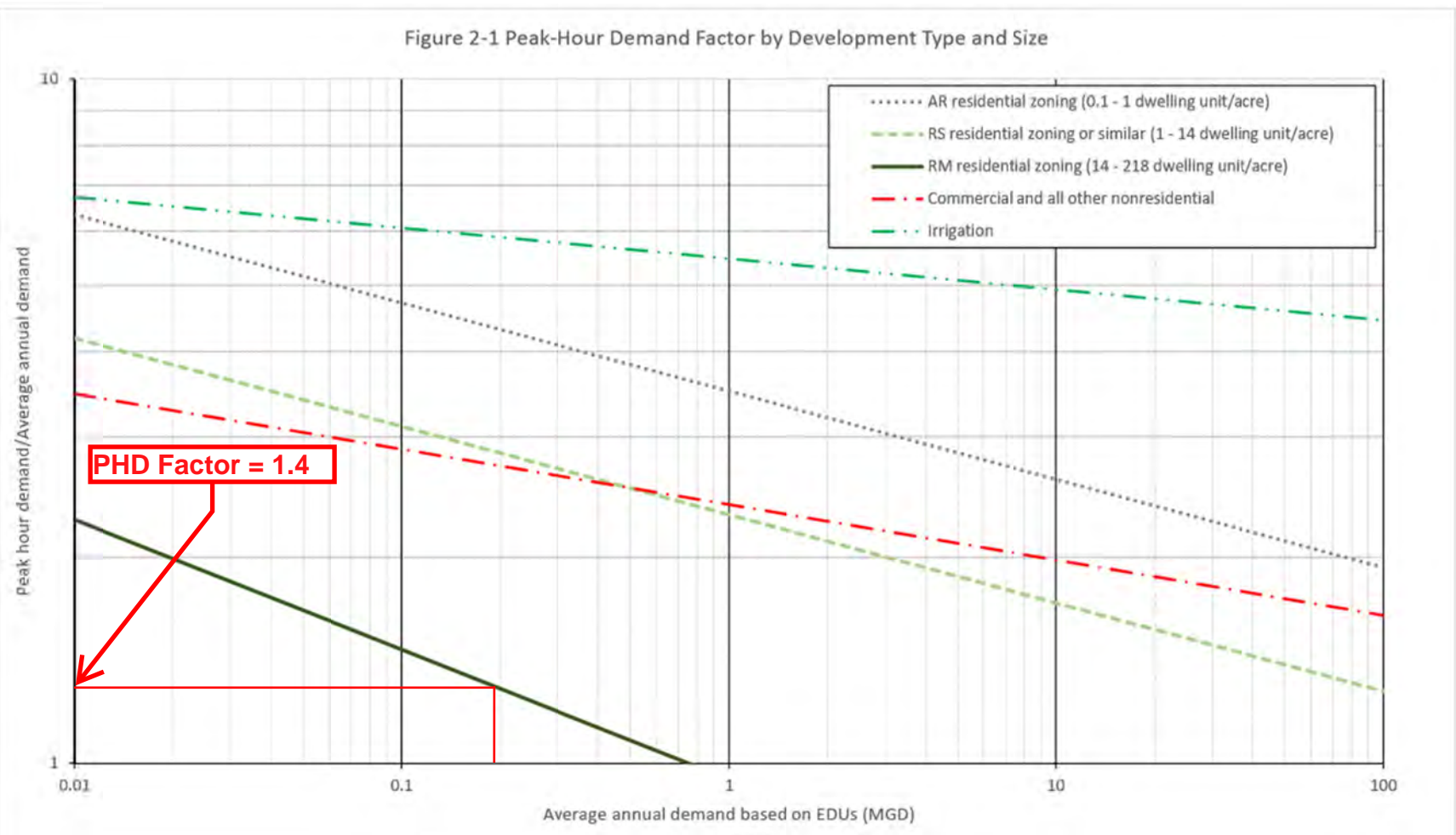
### 2.5 Peak Water Demands

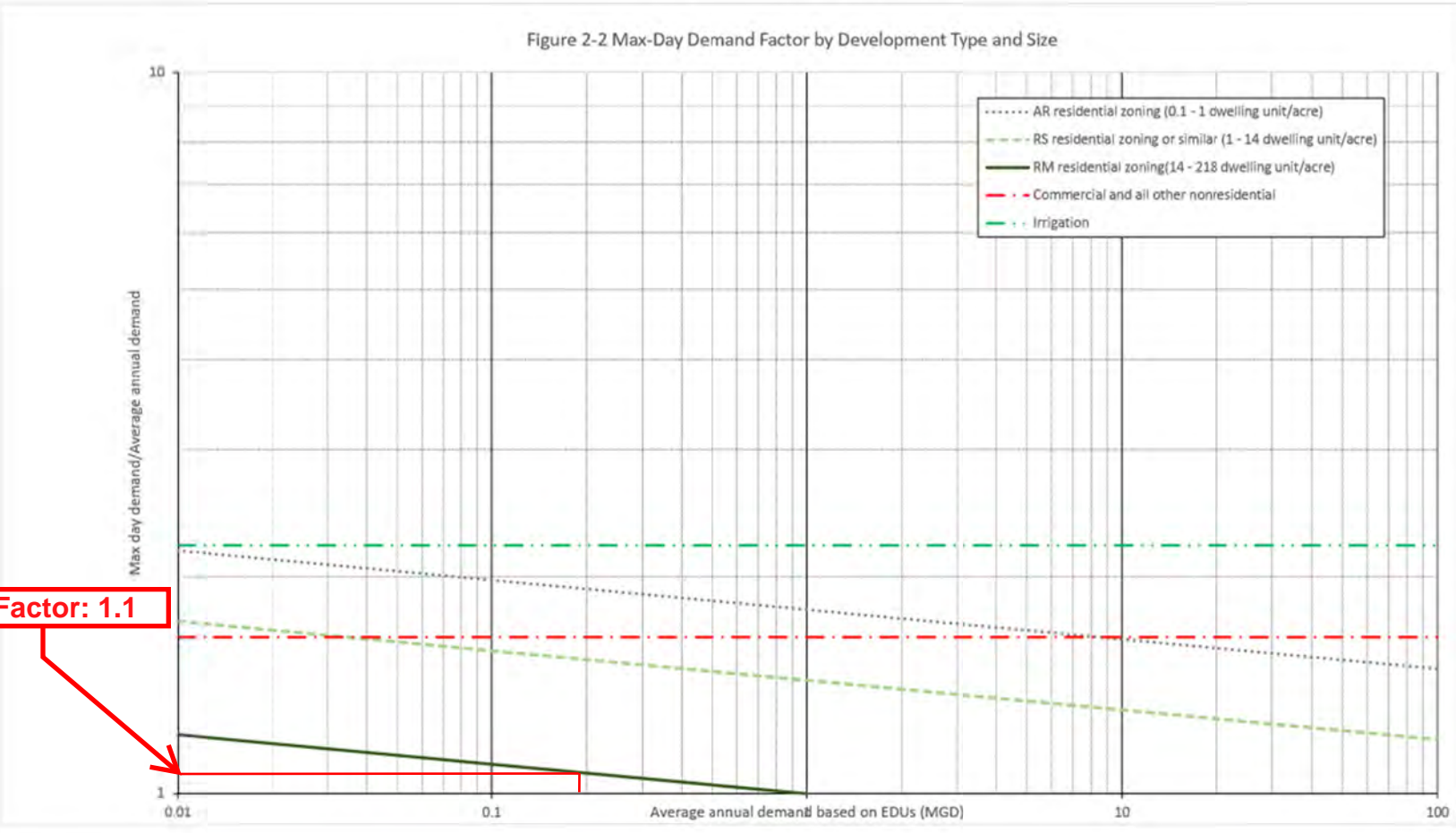
Unless the project involves a large development that calls for an alternative approach, peak hour and maximum day water demands are estimated using the peaking factors presented in **Figures 2-1 and 2-2**. Peaking day factors correspond to the zones identified in the Public Utilities Department [Water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





MDD Factor: 1.1



## 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

## Chapter 2: Water Demands and Service Criteria

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



## Chapter 2: Water Demands and Service Criteria

out of service. Water mains must be designed so that no more than one, average-sized city block (approximately 30 homes) is out of service at any time, and no more than two fire hydrants (excluding fire services) are on a dead end or are out of service at any time. These provisions do not apply under earthquake conditions.

Water mains serving more than two hydrants or more than 30 homes must be looped, fed from two sources, or provided with a reservoir of sufficient capacity to supply the emergency needs (contingency and fire storage) as described below in **subsection 2.9**.

All water mains relied upon for looping and source redundancy shall be in separate streets. Dual mains in the same street or alignment require the DESIGN ENGINEER to prepare a request for deviation using the format of ATTACHMENT 1, which is included as a part of this document. Where dual mains are relied upon for looping or source redundancy, the mains shall be spaced at least 10 feet apart from outer edge to outer edge.

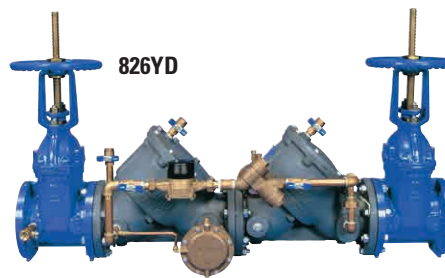
For City CIP work in already-built-out areas, where looping of mains or connection to two sources of supply is not feasible, water mains may be constructed require the DESIGN ENGINEER to prepare a request for deviation using the format of ATTACHMENT 1, which is included as a part of this document. Additional design considerations shall be made to minimize the chance of pipe breakage, such as use of a higher class of pipe.

**SPECIFICATION SHEET** **FEBCO®**

# Series 826YD

## Reduced Pressure Detector Assemblies

Size: 2½" - 10" (65mm - 250mm)



The FEBCO Series 826YD Reduced Pressure Detector Assemblies designed for use in used applications with Automatic fire sprinkler systems containing toxic substances.

### Features

- The DuraCheck, features all stainless steel check assemblies for corrosion resistance, reduced fouling and longer valve life.
- DuraCast, ductile iron body for superior strength, corrosion resistance and lighter weight. By-pass line has water meter in series with an approved reduced pressure assembly.
- Low Head Loss
- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.
- End Detail is Flanged

### Operation

In a nonflow condition, check valves on the by-pass and mainline units are closed with pressure between the checks, called the zone, being maintained at least 5psi (35 kPa) lower than the inlet pressure and the relief valve is maintained closed. If the differential between the zone and the upstream pressure drops to 2psi (14kPa), the differential relief valve will open, maintaining proper zone differential. The by-pass reduced pressure backflow preventer will operate identically to the mainline assembly.

The by-pass opens to detect initial flow and the mainline opens for all other flows.

### Models

- Less Gates
- Left hand by-pass
- Meter CFM/GPM

### Approvals

- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at the University of Southern California.\*



\* Valves must be supplied with resilient seated shutoff valves for USC and FM approvals to be in effect. UL and FM Listings only applicable with approved OS&Y gates.

### ⚠ WARNING

It is illegal to use this product in any plumbing system providing water for human consumption, such as drinking or dishwashing, in the United States. Before installing standard material product, consult your local water authority, building and plumbing codes.

### Specifications

Reduced pressure detector assembly shall consist of a mainline reduced pressure configured backflow assembly in parallel with a reduced pressure by-pass assembly.

Flow curves shall be documented by independent laboratory testing. Mainline valve bodies and covers shall be manufactured of ductile iron ASTM A-536, Grade 65-45-12 and shall be flanged, ANSI B 16.1, Class 125, internal and external fusion epoxy coating.

The by-pass shall consist primarily of a bronze water meter in series with a bronze reduced pressure backflow preventer.

All low flow demands up to a minimum of 3 gpm (0.189 L/s) are to pass only through the by-pass meter and meter-size reduced pressure assembly and be accurately recorded. All flows above that of 3 gpm will pass through both the line-size reduced pressure assembly and by-pass without accurate registration by or damage to the meter.

Shutoff valves and testcocks shall be resilient seated with full flow characteristics and are to be considered integral to the assembly. The mainline shut-offs are also to be OS&Y, UL/FM for fireline service.

Reduced pressure detector assemblies shall be rated 175psi CWWP (32°F to 140°F), factory assembled and tested to assure proper mainline/by-pass balance and cross over performance. Reduced pressure detector assemblies shall be FEBCO Series 826YD or prior approved equal.

**NOTICE** The gap drain is not designed to catch the maximum discharge possible from the relief valve. The installation of FEBCO air gap with the drain line terminating above a floor drain will handle any normal discharge or nuisance spitting through the relief valve. However, floor drain size may need to be designed to prevent water damage caused by a catastrophic failure condition. Do not reduce the size of the drain line from the air gap fitting.

### Pressure – Temperature

Maximum Working Pressure:	175psi (12.1 bar)
Hydrostatic Test Press:	350psi (24.1 bar)
Temperature Range:	32°F to 140°F (0°C to 60°C)

### Materials

Main Valve Body:	Ductile iron grade 65-45-12 epoxy coated internal 10-20 mils
Internal Check Assembly:	Stainless Steel
Trim:	Bronze
By-Pass Valve Body:	Bronze
By-Pass Meter:	Totalizing, 1 to 20 gpm, size 5/8" x 3/4"
Main Valve Shutoffs:	OS&Y, UL/FM
Elastomers:	Nitrile and Nitrile/ fabric reinforced

Remote reading flow meters available.

Job Name \_\_\_\_\_

Job Location \_\_\_\_\_

Engineer \_\_\_\_\_

Approval \_\_\_\_\_

Contractor \_\_\_\_\_

Approval \_\_\_\_\_

Contractor's P.O. No. \_\_\_\_\_

Representative \_\_\_\_\_

## Installation

The Reduced Pressure Detector Assembly should be installed horizontally with a suggested minimum clearance of 12" (300mm) between the assembly and the floor or grade. They must be installed where discharge from the relief valve will not be objectionable and can be positively drained away. They should be installed where easily accessible for testing and maintenance and must be protected from freezing. Thermal water expansion and/or water hammer downstream of the backflow preventer can cause excessive pressure. Excessive pressure situations should be eliminated to avoid possible damage to the system and assembly.

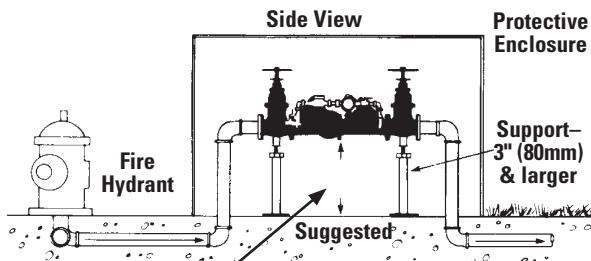
## Dimensions – Weights

Size: 2½" - 10" (65 - 250mm)

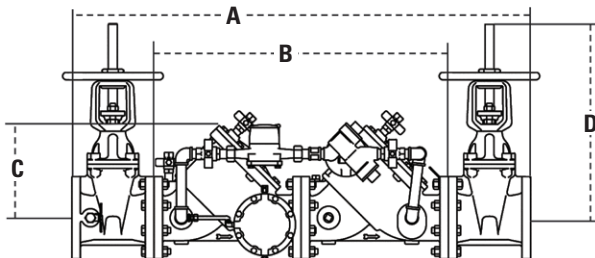
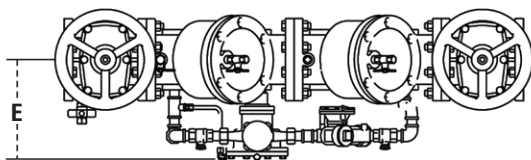
SIZE (DN)		DIMENSIONS										WEIGHT			
		A		B		C		D		E		gates		less gates	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kgs.	lbs.	kgs.
2½	65	37¼	946	22½	562	7½	191	16¾	416	10¼	260	243	534.6	134	294.8
3	80	41¾	1061	25½	651	8½	216	22¼	565	10½	267	298	655.6	154	338.8
4	100	50⅞	1281	32¾	822	11	279	23¼	591	11	279	469	1031.8	194	426.8
6	150	59¾	1518	38¾	981	14	356	30¼	765	12	305	752	1654.4	397	873.4
8	200	69⅞	1757	46¾	1172	18	457	37¼	959	13	330	1207	2655.4	537	1181.4
10	250	84¼	2140	58¾	1476	22	559	48	1219	14	356	1617	3557.4	957	2105.4

Dimensions shown are nominal, allowance must be made for normal manufacturing tolerances.

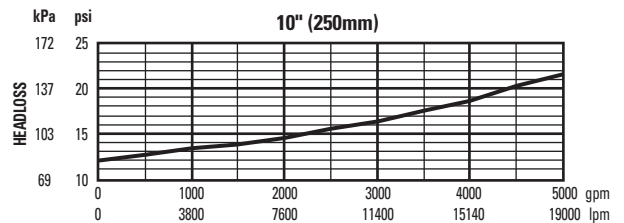
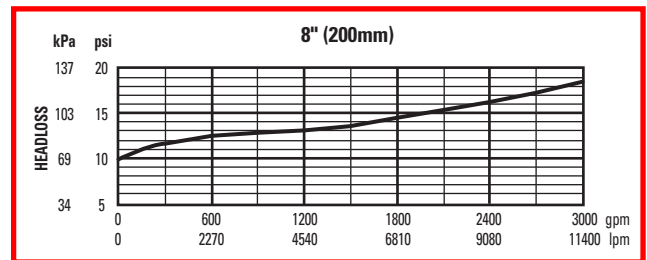
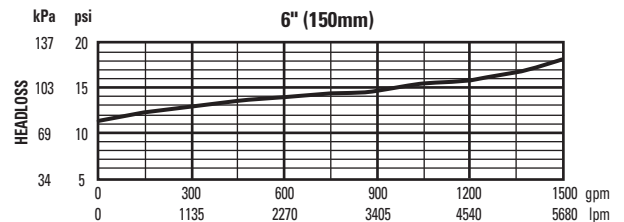
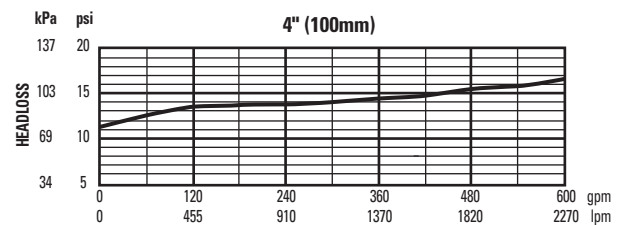
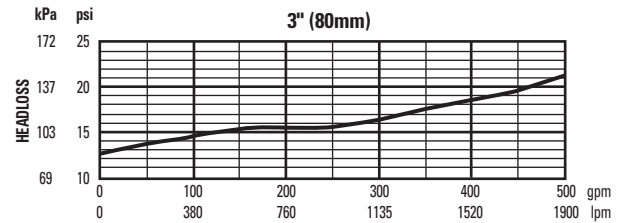
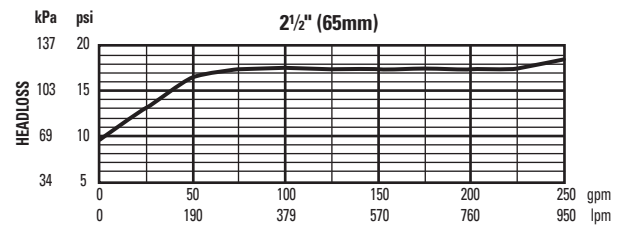
### FEBCO MODEL 826YD



30" Max (750mm)  
12" Min (300mm)



## Capacity



A Watts Water Technologies Company

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## **APPENDIX C**

### **COMPUTER MODELING OUTPUT**

Reference: Exhibit A (Node and Pipe Diagram)

The following conditions were modeled:

0. Average Day Demand
1. Peak Hour Demand
2. Maximum Day Demand plus 3,000 gpm Fire Flow split between Node 14 and Node 16
3. Maximum Day Demand plus 3,000 gpm Fire Flow split between Node 18 and Node 20
4. Maximum Day Demand plus 3,000 gpm Fire Flow split between Node 24 and Node 16

Project: BDM Mixed Use  
Date: 10/6/2022  
Job Number: 1125-002

Scenario: Average Day Demand

Node No.	Node El. Ft.	HGL Zone Ft. (Static)*	Static P psi	Model Run P, psi	Delta P from Static
J-1	507	680	74.96	61.97	12.99
J-2	522	680	68.46	55.47	12.99
J-4	522	680	68.46	55.46	13.00
J-6	522	680	68.46	55.46	13.00
J-8	523	680	68.02	55.02	13.00
J-12	517	680	70.62	48.27	22.35
J-14	520	680	69.32	46.97	22.35
J-16	516	680	71.06	48.71	22.35
J-17	514	680	71.92	48.31	23.61
J-18	513	680	72.36	48.75	23.61
J-20	510	680	73.66	50.06	23.60
J-24	511	680	73.22	49.61	23.61
J-26	507	680	74.96	61.97	12.99
R-1	523	680	68.02	55.03	12.99
I-RPDA-1	505	680	75.82	62.83	12.99
O-RPDA-2	520	680	69.32	46.96	22.36
O-RPDA-1	505	680	75.82	52.23	23.59
I-RPDA-2	520	680	69.32	56.33	12.99

Project: BDM Mixed Use  
Date: 10/6/2022  
Job Number: 1125-002

Scenario: Peak Hour Demand

Node No.	Node El. Ft.	HGL Zone Ft. (Static)*	Static P psi	Model Run P, psi	Delta P from Static
J-1	507	680	74.96	61.96	13.00
J-2	522	680	68.46	55.46	13.00
J-4	522	680	68.46	55.46	13.00
J-6	522	680	68.46	55.45	13.01
J-8	523	680	68.02	55.01	13.01
J-12	517	680	70.62	48.3	22.32
J-14	520	680	69.32	47	22.32
J-16	516	680	71.06	48.74	22.32
J-17	514	680	71.92	48.25	23.67
J-18	513	680	72.36	48.69	23.67
J-20	510	680	73.66	50	23.66
J-24	511	680	73.22	49.55	23.67
J-26	507	680	74.96	61.96	13.00
R-1	523	680	68.02	55.03	12.99
I-RPDA-1	505	680	75.82	62.83	12.99
O-RPDA-2	520	680	69.32	46.99	22.33
O-RPDA-1	505	680	75.82	52.18	23.64
I-RPDA-2	520	680	69.32	56.32	13.00

Project: BDM Mixed Use  
Date: 10/6/2022  
Job Number: 1125-002

Scenario: Maximum Day Demand plus 3,000 gpm Fire Flow at Node 14 and Node 16

Node No.	Node El. Ft.	HGL Zone Ft. (Static)*	Static P psi	Model Run P, psi	Delta P from Static
J-1	507	680	74.96	61.44	13.52
J-2	522	680	68.46	55.04	13.42
J-4	522	680	68.46	54.42	14.04
J-6	522	680	68.46	53.06	15.40
J-8	523	680	68.02	52.16	15.86
J-12	517	680	70.62	27.94	42.68
J-14	520	680	69.32	21.13	48.19
J-16	516	680	71.06	28.22	42.84
J-17	514	680	71.92	32.65	39.27
J-18	513	680	72.36	35.94	36.42
J-20	510	680	73.66	42.09	31.57
J-24	511	680	73.22	33.95	39.27
J-26	507	680	74.96	61.45	13.51
R-1	523	680	68.02	55.03	12.99
I-RPDA-1	505	680	75.82	60.24	15.58
O-RPDA-2	520	680	69.32	35.75	33.57
O-RPDA-1	505	680	75.82	47.11	28.71
I-RPDA-2	520	680	69.32	49.88	19.44

Project: BDM Mixed Use  
Date: 10/6/2022  
Job Number: 1125-002

Scenario: Maximum Day Demand plus 3,000 gpm Fire Flow at Node 18 and Node 20

Node No.	Node El. Ft.	HGL Zone Ft. (Static)*	Static P psi	Model Run P, psi	Delta P from Static
J-1	507	680	74.96	61.31	13.65
J-2	522	680	68.46	55.04	13.42
J-4	522	680	68.46	54.76	13.70
J-6	522	680	68.46	54.16	14.30
J-8	523	680	68.02	53.52	14.50
J-12	517	680	70.62	38.17	32.45
J-14	520	680	69.32	36.87	32.45
J-16	516	680	71.06	36.09	34.97
J-17	514	680	71.92	34.35	37.57
J-18	513	680	72.36	32.71	39.65
J-20	510	680	73.66	34.65	39.01
J-24	511	680	73.22	35.65	37.57
J-26	507	680	74.96	61.33	13.63
R-1	523	680	68.02	55.03	12.99
I-RPDA-1	505	680	75.82	57.68	18.14
O-RPDA-2	520	680	69.32	40.58	28.74
O-RPDA-1	505	680	75.82	43.03	32.79
I-RPDA-2	520	680	69.32	53.35	15.97



Project: BDM Mixed Use  
Date: 10/6/2022  
Job Number: 1125-002

Scenario: Maximum Day Demand plus 3,000 gpm Fire Flow at Node 24 and Node 16

Node No.	Node El. Ft.	HGL Zone Ft. (Static)*	Static P psi	Model Run P, psi	Delta P from Static
J-1	507	680	74.96	61.4	13.56
J-2	522	680	68.46	55.04	13.42
J-4	522	680	68.46	54.54	13.92
J-6	522	680	68.46	53.45	15.01
J-8	523	680	68.02	52.64	15.38
J-12	517	680	70.62	31.63	38.99
J-14	520	680	69.32	30.33	38.99
J-16	516	680	71.06	27.2	43.86
J-17	514	680	71.92	28.06	43.86
J-18	513	680	72.36	32.27	40.09
J-20	510	680	73.66	40.02	33.64
J-24	511	680	73.22	22.65	50.57
J-26	507	680	74.96	61.42	13.54
R-1	523	680	68.02	55.03	12.99
I-RPDA-1	505	680	75.82	59.53	16.29
O-RPDA-2	520	680	69.32	37.5	31.82
O-RPDA-1	505	680	75.82	45.97	29.85
I-RPDA-2	520	680	69.32	51.12	18.20

**Project: BDM Mixed Use**

**Date: 10/6/2022**

**Job Number: 1125-002**

**Scenario: All Pipes Open - Average Day Demand**

<b>Pipe No.</b>	<b>Pipe Size (inches)</b>	<b>Model Run Flow (gpm)</b>	<b>Model Run Velocity (fps)</b>
1	24	140	0.1
2	16	47.14	0.08
3	12	92.86	0.26
5	12	92.86	0.26
7	12	92.86	0.26
9	8	-42.14	0.27
11	8	-42.14	0.27
13	8	0	0
15	8	-47.14	0.3
16	8	47.14	0.3
17	8	47.14	0.3
19	8	47.14	0.3
21	8	47.14	0.3
23	8	0	0
25	8	47.14	0.3
27	24	-47.14	0.03

**Project: BDM Mixed Use**  
**Date: 10/6/2022**  
**Job Number: 1125-002**

**Scenario: Peak Hour Demand**

<b>Pipe No.</b>	<b>Pipe Size (inches)</b>	<b>Model Run Flow (gpm)</b>	<b>Model Run Velocity (fps)</b>
1	24	196	0.14
2	16	55.34	0.09
3	12	140.66	0.4
5	12	140.66	0.4
7	12	140.66	0.4
9	8	-48.34	0.31
11	8	-48.34	0.31
13	8	0	0
15	8	-55.34	0.35
16	8	55.34	0.35
17	8	55.34	0.35
19	8	55.34	0.35
21	8	55.34	0.35
23	8	0	0
25	8	55.34	0.35
27	24	-55.34	0.04

**Project: BDM Mixed Use**  
**Date: 10/6/2022**  
**Job Number: 1125-002**

**Scenario: Maximum Day Demand plus 3,000 gpm Fire Flow at Node 14 and Node 16**

<b>Pipe No.</b>	<b>Pipe Size (inches)</b>	<b>Model Run Flow (gpm)</b>	<b>Model Run Velocity (fps)</b>
1	24	3154	2.24
2	16	1267.91	2.02
3	12	1886.09	5.35
5	12	1886.09	5.35
7	12	1886.09	5.35
9	8	1737.59	11.09
11	8	1737.59	11.09
13	8	1500	9.57
15	8	232.09	1.48
16	8	1267.91	8.09
17	8	1267.91	8.09
19	8	1267.91	8.09
21	8	1267.91	8.09
23	8	0	0
25	8	1267.91	8.09
27	24	-1267.91	0.9

**Project: BDM Mixed Use**  
**Date: 10/6/2022**  
**Job Number: 1125-002**

**Scenario: Maximum Day Demand plus 3,000 gpm Fire Flow at Node 18 and Node 20**

<b>Pipe No.</b>	<b>Pipe Size (inches)</b>	<b>Model Run Flow (gpm)</b>	<b>Model Run Velocity (fps)</b>
1	24	3154	2.24
2	16	1930.18	3.08
3	12	1223.82	3.47
5	12	1223.82	3.47
7	12	1223.82	3.47
9	8	1075.32	6.86
11	8	1075.32	6.86
13	8	0	0
15	8	1069.82	6.83
16	8	-1069.82	6.83
17	8	-1069.82	6.83
19	8	430.18	2.75
21	8	1930.18	12.32
23	8	0	0
25	8	1930.18	12.32
27	24	-1930.18	1.37

**Project: BDM Mixed Use**  
**Date: 10/6/2022**  
**Job Number: 1125-002**

**Scenario: Maximum Day Demand plus 3,000 gpm Fire Flow at Node 24 and Node 16**

<b>Pipe No.</b>	<b>Pipe Size (inches)</b>	<b>Model Run Flow (gpm)</b>	<b>Model Run Velocity (fps)</b>
1	24	3154	2.24
2	16	1476.31	2.36
3	12	1677.69	4.76
5	12	1677.69	4.76
7	12	1677.69	4.76
9	8	1529.19	9.76
11	8	1529.19	9.76
13	8	0	0
15	8	1523.69	9.72
17	8	-23.69	0.15
19	8	1476.31	9.42
21	8	1476.31	9.42
23	8	1476.31	9.42
25	8	1500	9.57
27	24	1476.31	9.42
		-1476.31	1.05

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

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* * * * * K Y P I P E * * * * *
*
* Pipe Network Modeling Software
*
* CopyRighted by KYPIPE LLC (www.kypipe.com)
* Version: 10.009 10/01/2019
* Company: Dexter Serial #: 592169
* Interface: Classic
* Licensed for Pipe2018
*
* * * * *

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Date & Time: Thu Oct 06 09:47:03 2022

Master File : \\artic\eng\1125002\bdm mixed use ky pipe oct 2022.KYP\bdm mixed use ky pipe oct 2022.P2K

\*\*\*\*\*  
SUMMARY OF ORIGINAL DATA  
\*\*\*\*\*

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute  
HEAD (HGL) ..... = feet  
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES		LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
	#1	#2				
P-1	R-1	J-2	75.00	24.00	120.0000	11.80
P-2	J-26	J-1	20.00	16.00	120.0000	0.00
P-3	J-2	J-4	125.00	12.00	120.0000	0.57
P-5	J-4	J-6	310.00	12.00	120.0000	0.40
P-7	J-6	J-8	70.00	12.00	120.0000	0.92
P-9	J-8	I-RPDA-2	140.00	8.00	120.0000	0.00
P-11	O-RPDA-2	J-12	300.00	8.00	120.0000	1.75
P-13	J-12	J-14	230.00	8.00	120.0000	1.67
P-15	J-12	J-16	230.00	8.00	120.0000	0.40
P-16	J-17	J-16	250.00	8.00	120.0000	0.00
P-17	J-18	J-17	200.00	8.00	120.0000	0.00
P-19	J-20	J-18	305.00	8.00	120.0000	1.15
P-21	O-RPDA-1	J-20	200.00	8.00	120.0000	0.00
P-23	J-17	J-24	345.00	8.00	120.0000	0.00
P-25	J-1	I-RPDA-1	145.00	8.00	120.0000	0.00
P-27	J-26	J-2	1330.00	24.00	120.0000	1.04

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

P U M P / L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE        RPDA-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
-23.00	0.00	75.00 (Default)
-28.00	600.00	75.00 (Default)
-30.00	1200.00	75.00 (Default)
-33.00	1800.00	75.00 (Default)
-37.00	2400.00	75.00 (Default)
-43.00	3000.00	75.00 (Default)

THERE IS A DEVICE AT NODE        RPDA-2 .....> (ID= 1)

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		0.00	507.00	
J-2		0.00	522.00	
J-4		0.00	522.00	
J-6		0.00	522.00	
J-8		135.00	523.00	
J-12		5.00	517.00	
J-14		0.00	520.00	
J-16		0.00	516.00	
J-17		0.00	514.00	
J-18		0.00	513.00	
J-20		0.00	510.00	
J-24		0.00	511.00	
J-26		0.00	507.00	
R-1		----	523.00	650.00
I-RPDA-1		0.00	505.00	
O-RPDA-2		0.00	520.00	
O-RPDA-1		0.00	505.00	
I-RPDA-2		0.00	520.00	

O U T P U T   O P T I O N   D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT  
MAXIMUM AND MINIMUM PRESSURES        =    3  
MAXIMUM AND MINIMUM VELOCITIES        =    3

S Y S T E M   C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 16  
NUMBER OF END NODES .....(J) = 15  
NUMBER OF PRIMARY LOOPS .....(L) = 1  
NUMBER OF SUPPLY NODES .....(F) = 1  
NUMBER OF SUPPLY ZONES .....(Z) = 1



**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

=====  
Case: 0

RESULTS OBTAINED AFTER 200 TRIALS: ACCURACY = 0.10224E+01

**AVERAGE DAY DEMAND**

S I M U L A T I O N   D E S C R I P T I O N   ( L A B E L )

**P I P E L I N E   R E S U L T S**

STATUS CODE:    XX -CLOSED PIPE    CV -CHECK VALVE

P I P E N A M E	N O D E   N U M B E R S		F L O W R A T E gpm	H E A D L O S S ft	M I N O R L O S S ft	L I N E V E L O . ft/s	H L + M L / 1 0 0 0 ft/f	H L / 1 0 0 0 ft/f
	#1	#2						
P-1	R-1	J-2	140.00	0.00	0.00	0.10	0.03	0.00
P-2	J-26	J-1	47.14	0.00	0.00	0.08	0.00	0.00
P-3	J-2	J-4	92.86	0.00	0.00	0.26	0.04	0.04
P-5	J-4	J-6	92.86	0.01	0.00	0.26	0.04	0.04
P-7	J-6	J-8	92.86	0.00	0.00	0.26	0.05	0.04
P-9	J-8	I-RPDA-2	-42.14	0.01	0.00	0.27	0.06	0.06
P-11	O-RPDA-2	J-12	-42.14	0.02	0.00	0.27	0.07	0.06
P-13	J-12	J-14	0.00	0.00	0.00	0.00	0.00	0.00
P-15	J-12	J-16	-47.14	0.02	0.00	0.30	0.08	0.07
P-16	J-17	J-16	47.14	0.02	0.00	0.30	0.07	0.07
P-17	J-18	J-17	47.14	0.01	0.00	0.30	0.07	0.07
P-19	J-20	J-18	47.14	0.02	0.00	0.30	0.08	0.07
P-21	O-RPDA-1	J-20	47.14	0.01	0.00	0.30	0.07	0.07
P-23	J-17	J-24	0.00	0.00	0.00	0.00	0.00	0.00
P-25	J-1	I-RPDA-1	47.14	0.01	0.00	0.30	0.07	0.07
P-27	J-26	J-2	-47.14	0.00	0.00	0.03	0.00	0.00

**P U M P / L O S S   E L E M E N T   R E S U L T S**

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC- ENCY %	USEFUL POWER Hp	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft	Case
RPDA-1	47.14	144.99	120.53	-24.5	75.00	0.	0.0	0.0	**	**	178.2	0.0000
RPDA-2	-42.14	129.99	108.36	-21.6	75.00	0.	0.0	0.0	**	**	163.2	0.0000

**N O D E   R E S U L T S**

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		0.00	650.00	507.00	143.00	61.97
J-2		0.00	650.00	522.00	128.00	55.47
J-4		0.00	649.99	522.00	127.99	55.46
J-6		0.00	649.98	522.00	127.98	55.46
J-8		135.00	649.98	523.00	126.98	55.02
J-12		5.00	628.38	517.00	111.38	48.27
J-14		0.00	628.38	520.00	108.38	46.97
J-16		0.00	628.40	516.00	112.40	48.71

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

J-17	0.00	625.48	514.00	111.48	48.31
J-18	0.00	625.49	513.00	112.49	48.75
J-20	0.00	625.52	510.00	115.52	50.06
J-24	0.00	625.48	511.00	114.48	49.61
J-26	0.00	650.00	507.00	143.00	61.97
R-1	----	650.00	523.00	127.00	55.03
I-RPDA-1	0.00	649.99	505.00	144.99	62.83
O-RPDA-2	0.00	628.36	520.00	108.36	46.96
O-RPDA-1	0.00	625.53	505.00	120.53	52.23
I-RPDA-2	0.00	649.99	520.00	129.99	56.33

M A X I M U M   A N D   M I N I M U M   V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
I-RPDA-1	62.83	O-RPDA-2	46.96
J-26	61.97	J-14	46.97
J-1	61.97	J-12	48.27

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-15	0.30	P-27	0.03
P-16	0.30	P-2	0.08
P-17	0.30	P-1	0.10

S U M M A R Y   O F   I N F L O W S   A N D   O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES  
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	140.00	

NET SYSTEM INFLOW = 140.00  
NET SYSTEM OUTFLOW = 0.00  
NET SYSTEM DEMAND = 140.00

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

=====  
Case: 1

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 1 )

**BDM Mixed Use Project  
Peak Hour Demand**

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 200 TRIALS: ACCURACY = 0.79257E+00

**P I P E L I N E R E S U L T S**

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N U M B E R S		F L O W R A T E gpm	H E A D L O S S ft	M I N O R L O S S ft	L I N E V E L O . ft/s	H L + M L / 1000 ft/f	H L / 1000 ft/f
	#1	#2						
P-1	R-1	J-2	196.00	0.00	0.00	0.14	0.05	0.00
P-2	J-26	J-1	55.34	0.00	0.00	0.09	0.00	0.00
P-3	J-2	J-4	140.66	0.01	0.00	0.40	0.09	0.08
P-5	J-4	J-6	140.66	0.02	0.00	0.40	0.08	0.08
P-7	J-6	J-8	140.66	0.01	0.00	0.40	0.11	0.08
P-9	J-8	I-RPDA-2	-48.34	0.01	0.00	0.31	0.08	0.08
P-11	O-RPDA-2	J-12	-48.34	0.02	0.00	0.31	0.09	0.08
P-13	J-12	J-14	0.00	0.00	0.00	0.00	0.00	0.00
P-15	J-12	J-16	-55.34	0.02	0.00	0.35	0.10	0.10
P-16	J-17	J-16	55.34	0.02	0.00	0.35	0.10	0.10
P-17	J-18	J-17	55.34	0.02	0.00	0.35	0.10	0.10
P-19	J-20	J-18	55.34	0.03	0.00	0.35	0.11	0.10
P-21	O-RPDA-1	J-20	55.34	0.02	0.00	0.35	0.10	0.10
P-23	J-17	J-24	0.00	0.00	0.00	0.00	0.00	0.00
P-25	J-1	I-RPDA-1	55.34	0.01	0.00	0.35	0.10	0.10
P-27	J-26	J-2	-55.34	0.00	0.00	0.04	0.00	0.00

**P U M P / L O S S E L E M E N T R E S U L T S**

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC- ENCY %	USEFUL POWER Hp	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft	Case
RPDA-1	55.34	144.98	120.41	-24.6	75.00	0.	0.0	0.0	**	**	178.2	1.0000
RPDA-2	-48.34	129.96	108.44	-21.5	75.00	0.	0.0	0.0	**	**	163.2	1.0000

**N O D E R E S U L T S**

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		0.00	650.00	507.00	143.00	61.96
J-2		0.00	650.00	522.00	128.00	55.46
J-4		0.00	649.98	522.00	127.98	55.46
J-6		0.00	649.96	522.00	127.96	55.45

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

J-8	189.00 (1.40)	649.95	523.00	126.95	55.01
J-12	7.00 (1.40)	628.46	517.00	111.46	48.30
J-14	0.00	628.46	520.00	108.46	47.00
J-16	0.00	628.48	516.00	112.48	48.74
J-17	0.00	625.34	514.00	111.34	48.25
J-18	0.00	625.36	513.00	112.36	48.69
J-20	0.00	625.39	510.00	115.39	50.00
J-24	0.00	625.34	511.00	114.34	49.55
J-26	0.00	650.00	507.00	143.00	61.96
R-1	----	650.00	523.00	127.00	55.03
I-RPDA-1	0.00	649.98	505.00	144.98	62.83
O-RPDA-2	0.00	628.44	520.00	108.44	46.99
O-RPDA-1	0.00	625.41	505.00	120.41	52.18
I-RPDA-2	0.00	649.96	520.00	129.96	56.32

M A X I M U M   A N D   M I N I M U M   V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
I-RPDA-1	62.83	O-RPDA-2	46.99
J-26	61.96	J-14	47.00
J-1	61.96	J-17	48.25

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-3	0.40	P-27	0.04
P-5	0.40	P-2	0.09
P-7	0.40	P-1	0.14

S U M M A R Y   O F   I N F L O W S   A N D   O U T F L O W S

- (+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES  
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	196.00	

NET SYSTEM INFLOW = 196.00  
NET SYSTEM OUTFLOW = 0.00  
NET SYSTEM DEMAND = 196.00

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

=====  
Case: 2

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 2 )

**BDM Mixed Use Project  
3,000 gpm Fire Flow split between Node 14 and Node 16**

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 6 TRIALS: ACCURACY = 0.14660E-05

**P I P E L I N E R E S U L T S**

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N U M B E R S		F L O W R A T E gpm	H E A D L O S S ft	M I N O R L O S S ft	L I N E V E L O . ft/s	H L + M L / 1000 ft/f	H L / 1000 ft/f
	#1	#2						
P-1	R-1	J-2	3154.00	0.06	0.92	2.24	13.06	0.84
P-2	J-26	J-1	1267.91	0.02	0.00	2.02	1.12	1.12
P-3	J-2	J-4	1886.09	1.19	0.25	5.35	11.55	9.52
P-5	J-4	J-6	1886.09	2.95	0.18	5.35	10.10	9.52
P-7	J-6	J-8	1886.09	0.67	0.41	5.35	15.37	9.52
P-9	J-8	I-RPDA-2	1737.59	8.25	0.00	11.09	58.95	58.95
P-11	O-RPDA-2	J-12	1737.59	17.68	3.34	11.09	70.08	58.95
P-13	J-12	J-14	1500.00	10.33	2.38	9.57	55.23	44.89
P-15	J-12	J-16	232.09	0.33	0.01	1.48	1.48	1.42
P-16	J-17	J-16	1267.91	8.22	0.00	8.09	32.88	32.88
P-17	J-18	J-17	1267.91	6.58	0.00	8.09	32.88	32.88
P-19	J-20	J-18	1267.91	10.03	1.17	8.09	36.72	32.88
P-21	O-RPDA-1	J-20	1267.91	6.58	0.00	8.09	32.88	32.88
P-23	J-17	J-24	0.00	0.00	0.00	0.00	0.00	0.00
P-25	J-1	I-RPDA-1	1267.91	4.77	0.00	8.09	32.88	32.88
P-27	J-26	J-2	-1267.91	0.21	0.01	0.90	0.17	0.16

**P U M P / L O S S E L E M E N T R E S U L T S**

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC- ENCY %	USEFUL POWER Hp	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft	Case
RPDA-1	1267.91	139.01	108.70	-30.3	75.00	-10.	0.0	0.0	**	**	171.2	2.0000
RPDA-2	1737.59	115.12	82.49	-32.6	75.00	-14.	0.0	0.0	**	**	146.4	2.0000

**N O D E R E S U L T S**

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		0.00	648.78	507.00	141.78	61.44
J-2		0.00	649.02	522.00	127.02	55.04
J-4		0.00	647.58	522.00	125.58	54.42
J-6		0.00	644.45	522.00	122.45	53.06

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

J-8	148.50 (1.10)	643.37	523.00	120.37	52.16
J-12	5.50 (1.10)	581.47	517.00	64.47	27.94
J-14	1500.00	568.77	520.00	48.77	21.13
J-16	1500.00	581.13	516.00	65.13	28.22
J-17	0.00	589.35	514.00	75.35	32.65
J-18	0.00	595.93	513.00	82.93	35.94
J-20	0.00	607.13	510.00	97.13	42.09
J-24	0.00	589.35	511.00	78.35	33.95
J-26	0.00	648.80	507.00	141.80	61.45
R-1	----	650.00	523.00	127.00	55.03
I-RPDA-1	0.00	644.01	505.00	139.01	60.24
O-RPDA-2	0.00	602.49	520.00	82.49	35.75
O-RPDA-1	0.00	613.70	505.00	108.70	47.11
I-RPDA-2	0.00	635.12	520.00	115.12	49.88

M A X I M U M   A N D   M I N I M U M   V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-26	61.45	J-14	21.13
J-1	61.44	J-12	27.94
I-RPDA-1	60.24	J-16	28.22

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-9	11.09	P-27	0.90
P-11	11.09	P-15	1.48
P-13	9.57	P-2	2.02

S U M M A R Y   O F   I N F L O W S   A N D   O U T F L O W S

- (+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES  
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	3154.00	

NET SYSTEM INFLOW = 3154.00  
NET SYSTEM OUTFLOW = 0.00  
NET SYSTEM DEMAND = 3154.00

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

=====  
Case: 3

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 3 )

**BDM Mixed Use Project  
3,000 gpm Fire Flow split between Node 18 and Node 20**

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.14556E-04

**P I P E L I N E R E S U L T S**

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N U M B E R S		F L O W R A T E gpm	H E A D L O S S ft	M I N O R L O S S ft	L I N E V E L O . ft/s	H L + M L / 1000 ft/f	H L / 1000 ft/f
	#1	#2						
P-1	R-1	J-2	3154.00	0.06	0.92	2.24	13.06	0.84
P-2	J-26	J-1	1930.18	0.05	0.00	3.08	2.45	2.45
P-3	J-2	J-4	1223.82	0.53	0.11	3.47	5.13	4.28
P-5	J-4	J-6	1223.82	1.33	0.07	3.47	4.52	4.28
P-7	J-6	J-8	1223.82	0.30	0.17	3.47	6.73	4.28
P-9	J-8	I-RPDA-2	1075.32	3.39	0.00	6.86	24.24	24.24
P-11	O-RPDA-2	J-12	1075.32	7.27	1.28	6.86	28.50	24.24
P-13	J-12	J-14	0.00	0.00	0.00	0.00	0.00	0.00
P-15	J-12	J-16	1069.82	5.52	0.29	6.83	25.27	24.01
P-16	J-17	J-16	-1069.82	6.00	0.00	6.83	24.01	24.01
P-17	J-18	J-17	-1069.82	4.80	0.00	6.83	24.01	24.01
P-19	J-20	J-18	430.18	1.35	0.13	2.75	4.88	4.44
P-21	O-RPDA-1	J-20	1930.18	14.32	0.00	12.32	71.61	71.61
P-23	J-17	J-24	0.00	0.00	0.00	0.00	0.00	0.00
P-25	J-1	I-RPDA-1	1930.18	10.38	0.00	12.32	71.61	71.61
P-27	J-26	J-2	-1930.18	0.45	0.03	1.37	0.36	0.34

**P U M P / L O S S E L E M E N T R E S U L T S**

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC- ENCY %	USEFUL POWER Hp	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft	Case
RPDA-1	1930.18	133.10	99.29	-33.8	75.00	-16.	-0.5	-0.5	**	**	163.9	3.0000
RPDA-2	1075.32	123.11	93.64	-29.5	75.00	-8.	-0.7	-0.7	**	**	155.6	3.0000

**N O D E R E S U L T S**

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		0.00	648.49	507.00	141.49	61.31
J-2		0.00	649.02	522.00	127.02	55.04
J-4		0.00	648.38	522.00	126.38	54.76
J-6		0.00	646.98	522.00	124.98	54.16

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

J-8	148.50 (1.10)	646.51	523.00	123.51	53.52
J-12	5.50 (1.10)	605.09	517.00	88.09	38.17
J-14	0.00	605.09	520.00	85.09	36.87
J-16	0.00	599.28	516.00	83.28	36.09
J-17	0.00	593.28	514.00	79.28	34.35
J-18	1500.00	588.48	513.00	75.48	32.71
J-20	1500.00	589.97	510.00	79.97	34.65
J-24	0.00	593.28	511.00	82.28	35.65
J-26	0.00	648.54	507.00	141.54	61.33
R-1	----	650.00	523.00	127.00	55.03
I-RPDA-1	0.00	638.10	505.00	133.10	57.68
O-RPDA-2	0.00	613.64	520.00	93.64	40.58
O-RPDA-1	0.00	604.29	505.00	99.29	43.03
I-RPDA-2	0.00	643.11	520.00	123.11	53.35

M A X I M U M   A N D   M I N I M U M   V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
-----		-----	
J-26	61.33	J-18	32.71
J-1	61.31	J-17	34.35
I-RPDA-1	57.68	J-20	34.65

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
-----		-----	
P-25	12.32	P-27	1.37
P-21	12.32	P-1	2.24
P-9	6.86	P-19	2.75

S U M M A R Y   O F   I N F L O W S   A N D   O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES  
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
-----		
R-1	3154.00	

NET SYSTEM INFLOW = 3154.00  
NET SYSTEM OUTFLOW = 0.00  
NET SYSTEM DEMAND = 3154.00



**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

=====  
Case: 4

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 4 )

**BDM Mixed Use Project  
3,000 gpm Fire Flow split between Node 24 and Node 16**

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 4 TRIALS: ACCURACY = 0.14086E-06

**P I P E L I N E R E S U L T S**

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	N O D E N U M B E R S		F L O W R A T E gpm	H E A D L O S S ft	M I N O R L O S S ft	L I N E V E L O . ft/s	H L + M L / 1000 ft/f	H L / 1000 ft/f
	#1	#2						
P-1	R-1	J-2	3154.00	0.06	0.92	2.24	13.06	0.84
P-2	J-26	J-1	1476.31	0.03	0.00	2.36	1.49	1.49
P-3	J-2	J-4	1677.69	0.96	0.20	4.76	9.27	7.67
P-5	J-4	J-6	1677.69	2.38	0.14	4.76	8.12	7.67
P-7	J-6	J-8	1677.69	0.54	0.32	4.76	12.29	7.67
P-9	J-8	I-RPDA-2	1529.19	6.51	0.00	9.76	46.53	46.53
P-11	O-RPDA-2	J-12	1529.19	13.96	2.59	9.76	55.15	46.53
P-13	J-12	J-14	0.00	0.00	0.00	0.00	0.00	0.00
P-15	J-12	J-16	1523.69	10.63	0.59	9.72	48.77	46.22
P-16	J-17	J-16	-23.69	0.01	0.00	0.15	0.02	0.02
P-17	J-18	J-17	1476.31	8.72	0.00	9.42	43.59	43.59
P-19	J-20	J-18	1476.31	13.29	1.59	9.42	48.79	43.59
P-21	O-RPDA-1	J-20	1476.31	8.72	0.00	9.42	43.59	43.59
P-23	J-17	J-24	1500.00	15.49	0.00	9.57	44.89	44.89
P-25	J-1	I-RPDA-1	1476.31	6.32	0.00	9.42	43.59	43.59
P-27	J-26	J-2	-1476.31	0.28	0.02	1.05	0.22	0.21

**P U M P / L O S S E L E M E N T R E S U L T S**

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC- ENCY %	USEFUL POWER Hp	INCREMTL COST \$	TOTAL COST \$	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft	Case
RPDA-1	1476.31	137.38	106.08	-31.3	75.00	-12.	-0.8	-1.3	**	**	169.2	4.0000
RPDA-2	1529.19	117.97	86.53	-31.4	75.00	-12.	-0.4	-1.1	**	**	149.7	4.0000

**N O D E R E S U L T S**

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		0.00	648.70	507.00	141.70	61.40
J-2		0.00	649.02	522.00	127.02	55.04
J-4		0.00	647.86	522.00	125.86	54.54
J-6		0.00	645.34	522.00	123.34	53.45

**BDM Mixed Use Project  
City of San Diego  
Hydraulic Computer Model**

**October 6, 2022  
Dexter Wilson Eng., Inc.  
Job 1125-002**

J-8	148.50 (1.10)	644.48	523.00	121.48	52.64
J-12	5.50 (1.10)	589.98	517.00	72.98	31.63
J-14	0.00	589.98	520.00	69.98	30.33
J-16	1500.00	578.77	516.00	62.77	27.20
J-17	0.00	578.76	514.00	64.76	28.06
J-18	0.00	587.48	513.00	74.48	32.27
J-20	0.00	602.36	510.00	92.36	40.02
J-24	1500.00	563.27	511.00	52.27	22.65
J-26	0.00	648.73	507.00	141.73	61.42
R-1	----	650.00	523.00	127.00	55.03
I-RPDA-1	0.00	642.38	505.00	137.38	59.53
O-RPDA-2	0.00	606.53	520.00	86.53	37.50
O-RPDA-1	0.00	611.08	505.00	106.08	45.97
I-RPDA-2	0.00	637.97	520.00	117.97	51.12

M A X I M U M   A N D   M I N I M U M   V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-26	61.42	J-24	22.65
J-1	61.40	J-16	27.20
I-RPDA-1	59.53	J-17	28.06

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-9	9.76	P-16	0.15
P-11	9.76	P-27	1.05
P-15	9.72	P-1	2.24

S U M M A R Y   O F   I N F L O W S   A N D   O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES  
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	3154.00	

NET SYSTEM INFLOW = 3154.00  
NET SYSTEM OUTFLOW = 0.00  
NET SYSTEM DEMAND = 3154.00

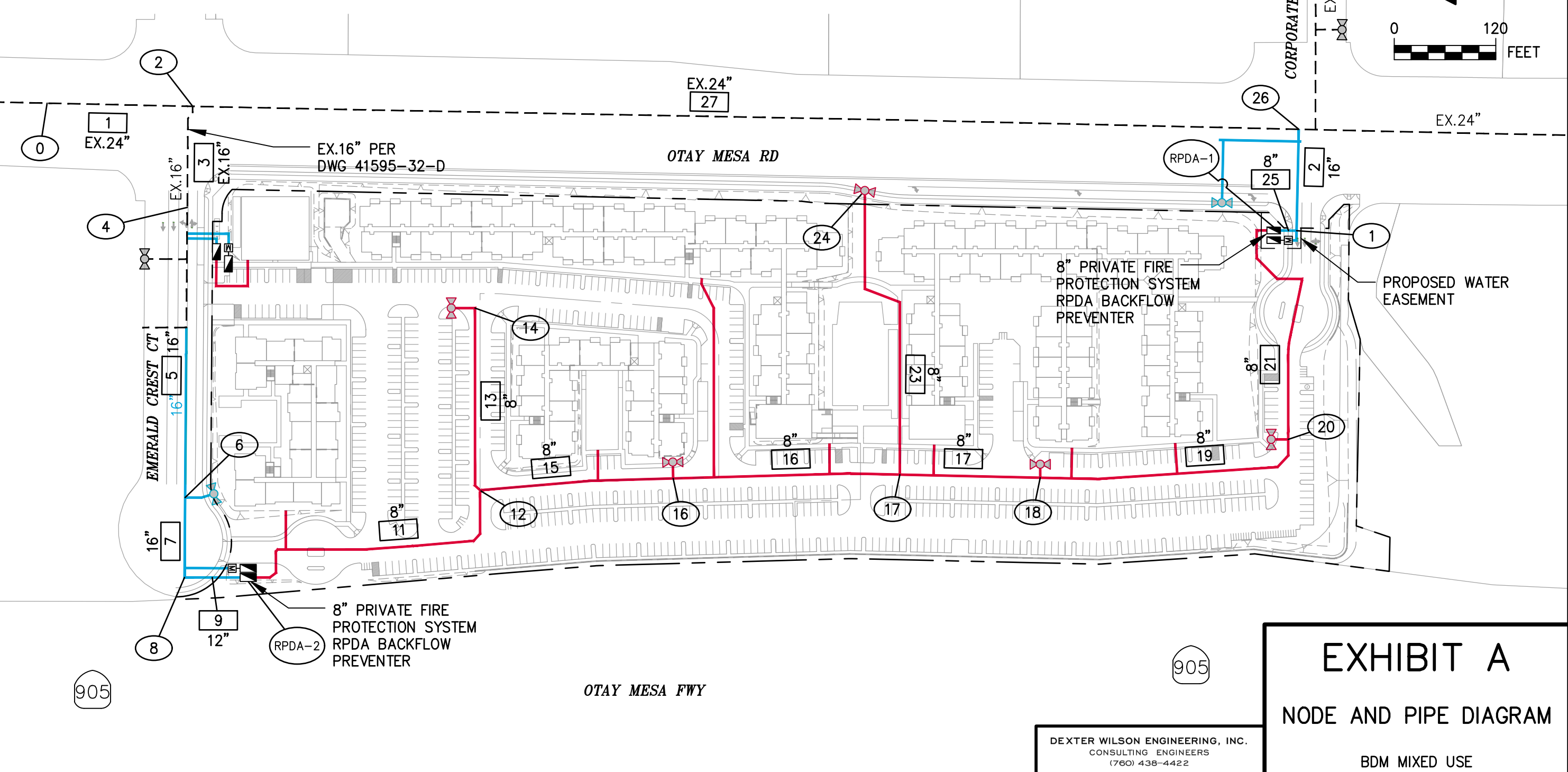
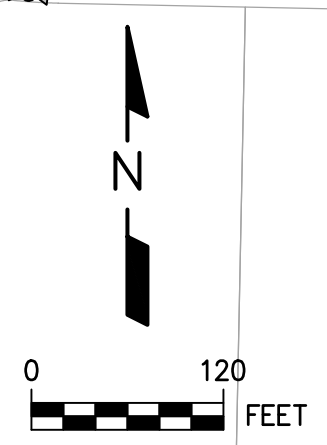
\*\*\*\*\* HYDRAULIC ANALYSIS COMPLETED \*\*\*\*\*

Exhibit A (Node and Pipe Diagram)

\\ARTIC\DWG\1125002\REPORT\BMU\_WTR\_EXHIBIT-A\_NP.DWG 10/20/2022 3:54:17 PM LAYOUT:11x17 USER:donald

**LEGEND**

- PROJECT BOUNDARY
- - - EXISTING PUBLIC 680 ZONE FACILITIES
- PROPOSED PUBLIC 680 ZONE FACILITIES
- PROPOSED PRIVATE FIRE PROTECTION SYSTEM
- ⊗ EXISTING PUBLIC FIRE HYDRANT
- ⊗ PROPOSED PUBLIC FIRE HYDRANT
- ⊗ PROPOSED PRIVATE FIRE HYDRANT
- ⊠ PROPOSED METER
- ▣ PROPOSED BACKFLOW
- ② COMPUTER MODEL NODE NUMBER
- ③ COMPUTER MODEL PIPE NUMBER



**EXHIBIT A**

**NODE AND PIPE DIAGRAM**

BDM MIXED USE

DEXTER WILSON ENGINEERING, INC.  
 CONSULTING ENGINEERS  
 (760) 438-4422

905

905

OTAY MESA FWY

OTAY MESA RD

EMERALD CREST CT

CORPORATE CENTER DR

EX.16" PER DWG 41595-32-D

8" PRIVATE FIRE PROTECTION SYSTEM RPDA BACKFLOW PREVENTER

8" PRIVATE FIRE PROTECTION SYSTEM RPDA BACKFLOW PREVENTER

PROPOSED WATER EASEMENT