WATER DISTRIBUTION SYSTEM

BASIS OF DESIGN REPORT

FOR

HUDSON EAST-MULTI FAMILY PROJECT

3440 & 3450 E. McDonald Drive
SCOTTSDALE, ARIZONA

OWNER:
Porchlight Homes
2915 East Baseline Road,
Suite 118
Gilbert, Arizona 85234
480.813.1324

January 15,2018

PREPARED BY:

JACOBS WALLACE, LLC
2233 W. Bethany Home Rd.
Phoenix, AZ 85015
602.757.5964

JACOBS WALLACE, LLC
ENGINEERING PLANNING MANAGEMENT

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3440 & 3450 E. McDonald Drive
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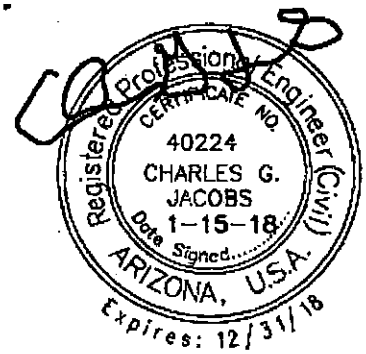
OWNER:
Porchlight Homes
2915 East Baseline Road,
Suite 118
Gilbert, Arizona 85234
480.813.1324

Accepted For:
City of Scottsdale
Water Resources Department
9379 E. San Salvador
Scottsdale, Arizona

By: _____
Date: 11/23/18

January 15,2018



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8-DR-2018

TABLE OF CONTENTS

Appendix:

- Vicinity Map
- Calculations
- Flow Test Results
- City of Scottsdale Quarter Section Map
- Preliminary Design Plan

INTRODUCTION

The proposed project consists of a multi-story multi-family buildings with associated site improvements. The existing conditions include 2-delapidated buildings with associated site improvements sitting on 2 lots. The lots would be combined into one with the proposed project. The 1.085-acre site is located just west of Granite Reef Rd on the north side of McDonald Dr. The site is bordered to the north and west by an existing multi family development, to the east by existing commercial development, to the south by McDonald Drive. The site lies within the Southwest Quarter of Section 12, Township 2 North, Range 4 East of Gila and Salt River Base and Meridian. See the Appendix for a vicinity map.

EXISTING CONDTIONS

There is an existing 6" water line in McDonald Drive that is stubbed approximately 85' west of the western edge of the proposed project. Currently there are 2-1" meters and service connections that service the exiting buildings that will be abandoned. These services extend over to the 6" water main west of the property.

PROPOSED CONDITIONS

The project is proposing to extend an 8" public waterline across the frontage of the property within McDonald Drive and connect to the Granite Reef waterline. Construction of the proposed offsite waterline will include stubs to the property as a part of the water main extension. There will be 2-6" fire hydrant line services, 1 domestic service connection and master meter, and a landscape service connection and meter stubbed to the proposed property. There will be backflow preventers associated with each service. The project will be serviced by private waterlines and private sub meters. There will be a master public meter for the site and then private waterline services to each unit with private sub-meters at each unit.

All water line construction and design will conform to M.A.G. standards and specifications and the latest revision of the City of Scottsdale Design Standards and Policies Manual. All water demands are based on Figure 4.1-3, Average Day Water Demand per Dwelling Unit of the City of Scottsdale Design Standards and Policies Manual. The offsite waterline construction will be reimbursable by agreement with the City after completion of construction.

WATER ANALYSIS

Number of Units: 18
Average Daily Demand: 185.3 gpd/unit
18 units * 185.3gpd/unit = 3,335gpd = **2.3gpm**
Maximum Daily Demand: Average Daily Demand x 23,335gpd*2=6,670gpd = **4.6 gpm**
Peak Demand: Maximum Daily Demand x 3.5
6,670gpd*3.5 = 23,345gpd = **16.2gpm**
Fire Flow Demand: (Per City of Scottsdale DSPM Section 6-1.501)
1,500 gpm @ 30 psi (For commercial, industrial, and multi-family)
Max Daily Demand + Fire Flow = **1,505 gpm use 1,510@ 30 psi (COS requirement)**

WATER MODEL RESULTS

A water model was completed based on the City of Scottsdale requirement of 1,500 gpm + Max daily demand at 30 psi. The water model simulated the design of the proposed waterline using the required flow of 1,510 gpm for the fire analysis scenario and 10gpm for the domestic demand scenario. As shown on the attached modeling results, when a demand of 1,510gpm is placed on the junctions J11 &J13 the available flows are 1,602 gpm and 1,618 gpm respectively with a residual pressure of 30 psi. Both of these flows are greater than the required 1,510 gpm at 30 psi per the City of Scottsdale requirements.

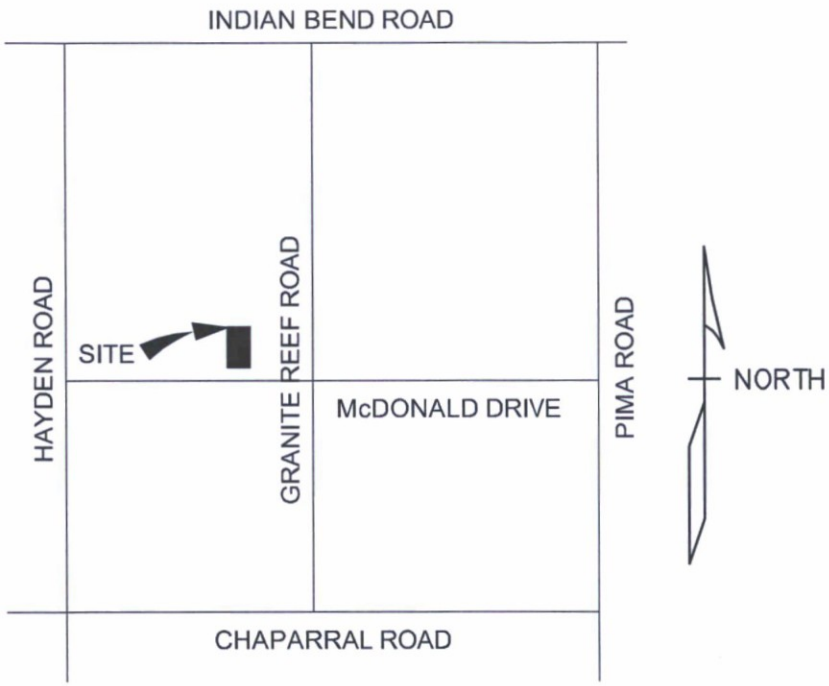
Please note the model is solely based on the current fire flow test. (See attached) The model is built from this point thru the new development. It is not modeled back to the water source, which would give more accurate results. The elevations are negligible on this site as the elevations differences are minimal.

CONCLUSION

Based on the information provided, the flow simulation indicates that the 6" waterline feeding the proposed onsite hydrant provides acceptable velocities, pressures and flows.

It is important to note that the actual available flow can be affected by varying seasonal and diurnal water demands, growth within the City, and system operations. This report solely describes the flow available at a design maximum day condition based on current flow tests.

APPENDIX



VICINITY MAP
NOT TO SCALE

E·J | Flow Test Summary

EJ Project ID:	16060
Project Address:	8355 E McDonald Dr, Scottsdale, AZ, 85250
Date of Flow Test:	2016-03-16
Time of Flow Test:	8:34 AM
Data Reliable Until:	2016-09-16
Conducted By:	Austin Gourley (EJ Flow Test), Eder Cueva (EJ Flow Test), & John Echeverri (EJ Flow Test)
Witnessed By:	Phil Cipolla (City of Scottsdale) 602.828.0847
City Forces Contacted:	City of Scottsdale
Permit Number:	C50025

Raw Flow Test Data:

Static Pressure:	78.0 PSI
Residual Pressure:	50.0 PSI
Flowing GPM:	1,513
GPM @ 20 PSI:	2,242
Pitot Pressure One:	18 PSI
Hydrant Orifice Diameter:	4.0 inches
Coefficient of Discharge:	0.9

extra coefficient of 0.83 factored in for pumper outlet per NFPA-291

Data with a 10 % Safety Factor

Static Pressure:	70.2 PSI
Residual Pressure:	42.2 PSI
Flowing GPM:	1,513
GPM @ 20 PSI:	2,074

Static-Residual Hydrant

Flow Hydrant

Distance Between Hydrants
217 ft (measured linearly)

Static-Residual Elevation
1271 ft (above sea level)

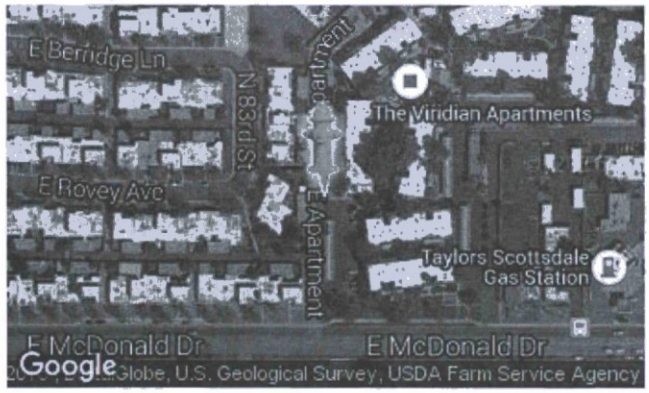
Flow Hydrant Elevation
1274 ft (above sea level)

Elevation & distance values are approximate

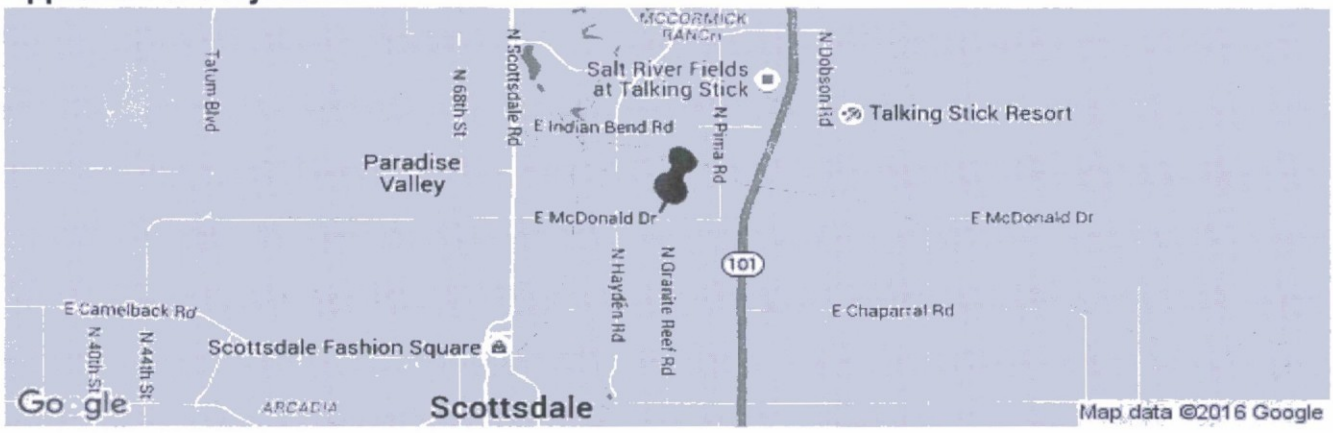
EJ Flow Tests, LLC
21505 North 78th Ave. | Suite 125 | Peoria, Arizona 85382 | (602) 999-7637 | www.ejengineering.com
John L. Echeverri | NICET Level IV 078493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915

Static-Residual Hydrant:

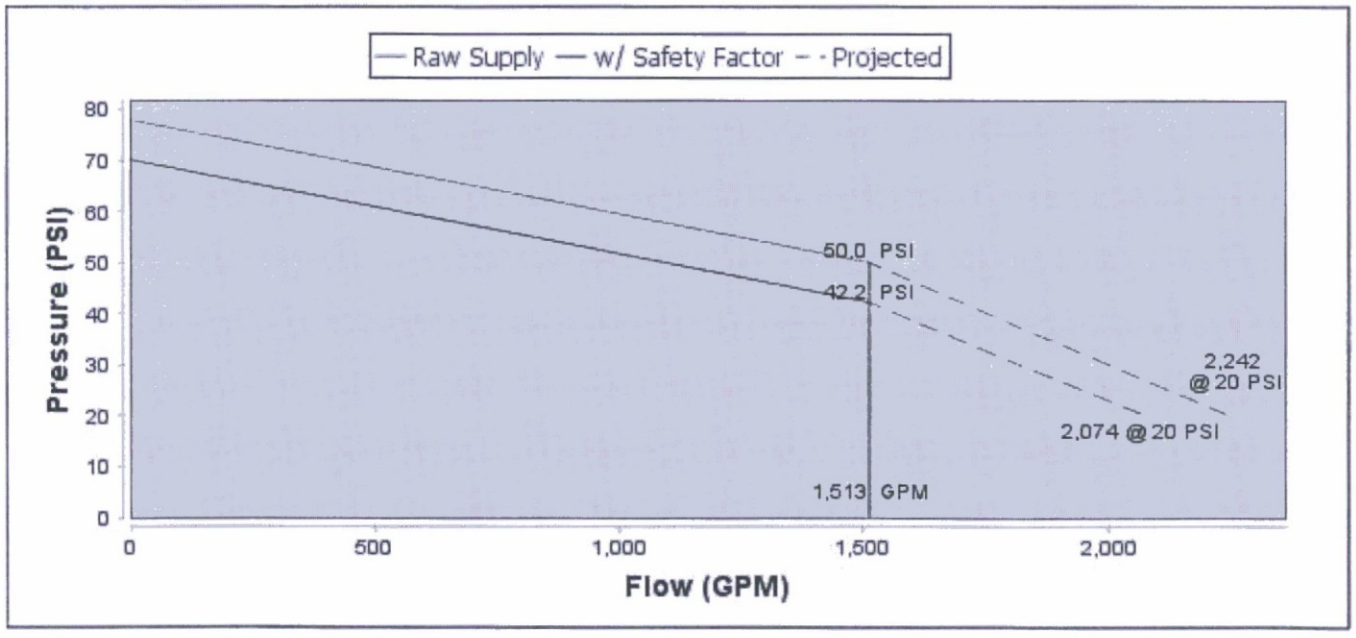
Flow Hydrant:



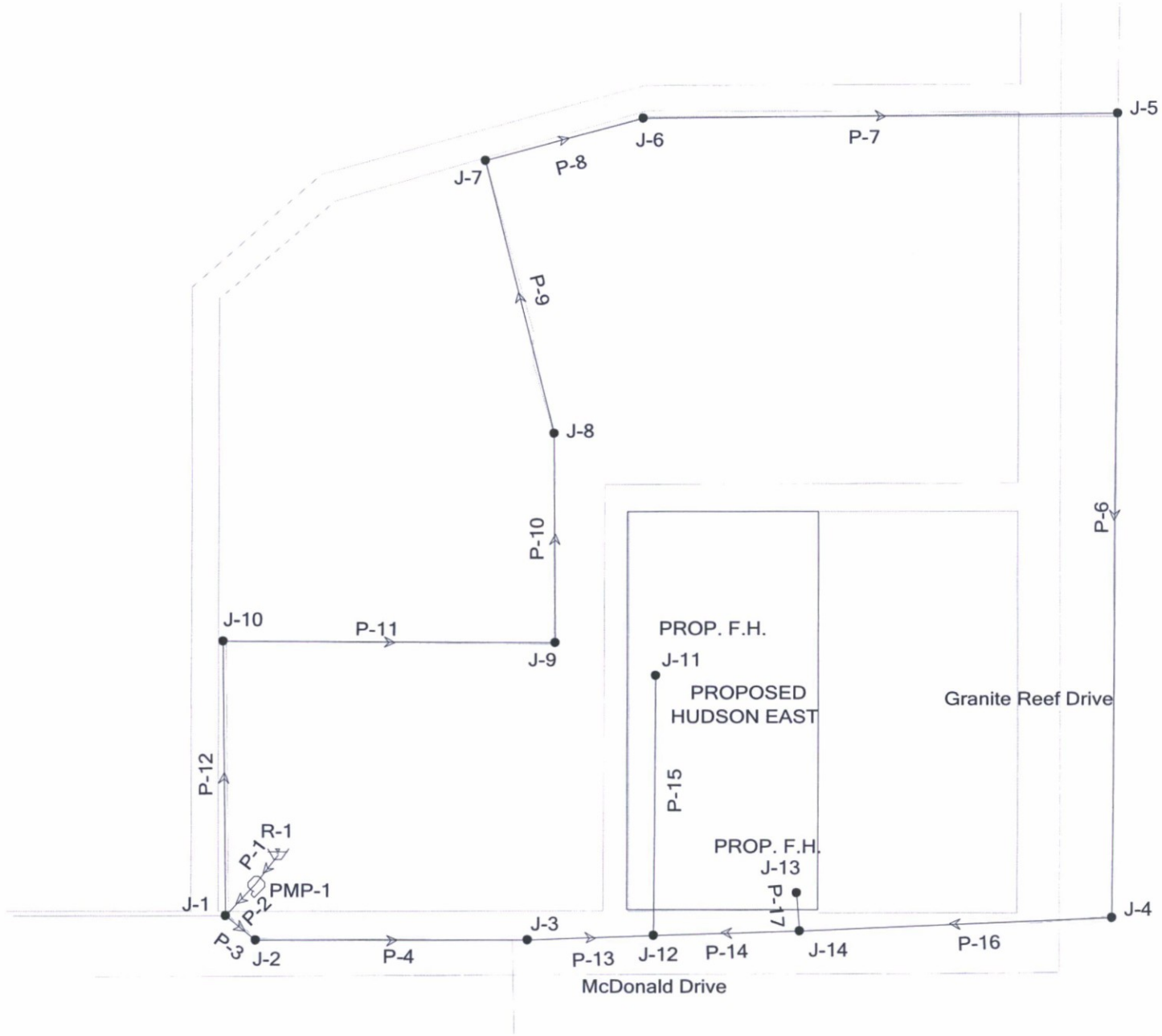
Approximate Project Site:



Water Supply Curve:



Scenario: Base



Sc...o: ...

Fire Flow Analysis

Fire Flow Report

ALL JUNCTIONS

Label	Satisfies Fire Flow Constraints?	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Total Flow Available (gpm)	Calculated Residual Pressure (psi)	Minimum Pressure (psi)
J-1	true	1,510.00	1,935.68	1,935.68	30.00	77.95
J-2	true	1,510.00	1,883.95	1,883.95	30.00	77.95
J-10	true	1,510.00	1,712.31	1,712.31	30.00	77.95
J-3	true	1,510.00	1,693.16	1,693.16	30.00	77.95
J-12	true	1,510.00	1,686.97	1,686.97	30.03	77.95
J-14	true	1,510.00	1,661.63	1,661.63	30.00	77.95
J-4	true	1,510.00	1,632.19	1,632.19	30.00	77.95
J-13	true	1,510.00	1,618.45	1,618.45	30.00	77.95
J-11	true	1,510.00	1,602.82	1,602.82	30.00	77.95
J-9	true	1,510.00	1,599.29	1,599.29	30.02	77.95
J-5	true	1,510.00	1,584.21	1,584.21	30.02	77.95
J-8	true	1,510.00	1,562.49	1,562.49	30.01	77.95
J-7	true	1,510.00	1,539.51	1,539.51	30.01	77.95
J-6	true	1,510.00	1,537.98	1,537.98	30.01	77.95

Fire Flow Analysis

Pipe Report

Fire Flow Demand on Junction J-11

Label	From Node	To Node	Length (ft)	Diameter (in)	Hazen-Williams C	Material	Downstream Calculated Pressure (psi)	Upstream Calculated Pressure (psi)	Velocity (ft/s)	Discharge (gpm)
P-1	R-1	PMP-1	1.00	48.0	140.0	Ductile Iron	-0.00	0.00	0.27	1,510.00
P-2	PMP-1	J-1	35.00	6.0	140.0	Asbestos Cement	47.97	50.07	17.13	1,510.00
P-3	J-1	J-2	31.00	6.0	140.0	Asbestos Cement	46.95	47.97	12.43	1,095.17
P-4	J-2	J-3	214.00	6.0	140.0	Asbestos Cement	39.86	46.95	12.43	1,095.17
P-6	J-4	J-5	635.00	8.0	140.0	Asbestos Cement	40.35	39.49	2.65	-414.83
P-7	J-5	J-6	375.00	6.0	140.0	Asbestos Cement	42.40	40.35	4.71	-414.83
P-8	J-6	J-7	129.00	6.0	130.0	Ductile Iron	43.21	42.40	4.71	-414.83
P-9	J-7	J-8	223.00	6.0	140.0	Asbestos Cement	44.44	43.21	4.71	-414.83
P-10	J-8	J-9	167.00	6.0	140.0	Asbestos Cement	45.35	44.44	4.71	-414.83
P-11	J-9	J-10	262.00	6.0	140.0	Asbestos Cement	46.79	45.35	4.71	-414.83
P-12	J-10	J-1	216.00	6.0	140.0	Asbestos Cement	47.97	46.79	4.71	-414.83
P-13	J-3	J-12	100.00	8.0	130.0	Ductile Iron	38.93	39.86	6.99	1,095.17
P-15	J-11	J-12	204.00	8.0	130.0	Ductile Iron	38.93	35.47	9.64	-1,510.00
P-14	J-12	J-14	115.00	8.0	130.0	Ductile Iron	39.11	38.93	2.65	-414.83
P-16	J-14	J-4	247.00	8.0	130.0	Ductile Iron	39.49	39.11	2.65	-414.83
P-17	J-13	J-14	29.00	6.0	130.0	Ductile Iron	39.11	39.11	0.00	0.00

Fire Flow Analysis

Pipe Report

Fire Flow Demand on Junction J-13

Label	From Node	To Node	Length (ft)	Diameter (in)	Hazen-Williams C	Material	Downstream Calculated Pressure (psi)	Upstream Calculated Pressure (psi)	Velocity (ft/s)	Discharge (gpm)
P-1	R-1	PMP-1	1.00	48.0	140.0	Ductile Iron	-0.00	0.00	0.27	1,510.00
P-2	PMP-1	J-1	35.00	6.0	140.0	Asbestos Cement	47.97	50.07	17.13	1,510.00
P-3	J-1	J-2	31.00	6.0	140.0	Asbestos Cement	46.99	47.97	12.18	1,073.35
P-4	J-2	J-3	214.00	6.0	140.0	Asbestos Cement	40.16	46.99	12.18	1,073.35
P-6	J-4	J-5	635.00	8.0	140.0	Asbestos Cement	39.59	38.64	2.79	-436.65
P-7	J-5	J-6	375.00	6.0	140.0	Asbestos Cement	41.85	39.59	4.95	-436.65
P-8	J-6	J-7	129.00	6.0	130.0	Ductile Iron	42.74	41.85	4.95	-436.65
P-9	J-7	J-8	223.00	6.0	140.0	Asbestos Cement	44.08	42.74	4.95	-436.65
P-10	J-8	J-9	167.00	6.0	140.0	Asbestos Cement	45.09	44.08	4.95	-436.65
P-11	J-9	J-10	262.00	6.0	140.0	Asbestos Cement	46.67	45.09	4.95	-436.65
P-12	J-10	J-1	216.00	6.0	140.0	Asbestos Cement	47.97	46.67	4.95	-436.65
P-13	J-3	J-12	100.00	8.0	130.0	Ductile Iron	39.26	40.16	6.85	1,073.35
P-15	J-11	J-12	204.00	8.0	130.0	Ductile Iron	39.26	39.26	0.00	0.00
P-14	J-12	J-14	115.00	8.0	130.0	Ductile Iron	38.22	39.26	6.85	1,073.35
P-16	J-14	J-4	247.00	8.0	130.0	Ductile Iron	38.64	38.22	2.79	-436.65
P-17	J-13	J-14	29.00	6.0	130.0	Ductile Iron	38.22	36.23	17.13	-1,510.00

PORCHLIGHT HOMES
MULTI-FAMILY RESIDENTIAL
CONCEPTUAL G&D AND UTILITY PLAN
8340 &8350 E. MCDONALD DRIVE
OF
A PORTION OF THE SW 1/4 OF SECTION 12, T.2N., R.4E.
MARICOPA COUNTY, ARIZONA.

DRAINAGE STATEMENT
THE EXISTING SITE DRAINAGE CONSISTS OF MOSTLY SHEET FLOW FROM NORTH TO SOUTH EVENTUALLY MAKING ITS WAY TO MCDONALD DRIVE. THE SITE IS MOSTLY IMPERVIOUS AREA IN ITS EXISTING CONDITION. A SMALL AREA DRAINS WESTERLY ONTO AN EXISTING CITY OF SCOTTSDALE OWNED PAVED ACCESS DRIVE. THIS DRIVE IS CONTINUOUS ALONG THE WESTERN AND NORTHERN BOUNDARIES OF THE PROJECT. THERE IS CURRENTLY NO RETENTION PROVIDED ON THE PROPERTY. NO OFFSITE RUNOFF AFFECTS THIS PROPERTY.

THE PROPOSED IMPROVEMENTS WILL NOT INCREASE THE IMPERVIOUS AREA. THE IMPERVIOUS SURFACE AREA IS REDUCED WITH THE PROPSOED DEVELOPMENT. SEE CALCULATIONS BELOW. SEEING AS THE PRE VS. POST CONDITIONS ARE DECREASED WITH THE PROPOSED IMPROVEMENTS WE ARE PROPOSING TO PROVIDE NO RETENTION FOR THE PROJECT. THE DRAINAGE WILL BE DIRECTED TO THE CITY OF SCOTTSDALE RIGHTS OF WAY VIA SHEET FLOW WITHIN THE PARKING AREAS. THE ROOF DRAINAGE WILL BE SPLASH BLOCK AND DIRECTED TO THE PAVED PARKING AREAS. THERE WILL BE A SMALL PAVED PORTION ALONG THE WEST SIDE OF THE PROJECT THAT WILL DISCHARGE INTO THE ACCESS DRIVE AS IT CURRENTLY DOES TODAY. THE PRE VS. POST RETENTION CALCULATIONS ARE SHOWN BELOW.

THE SITE OUTFALL OCCURS AT THE SOUTHWEST CORNER OF THE PROJECT AT AN ELEVATION OF 1268.8 WELL BELOW THE FFE OF THE PROPOSED STRUCTURES. THE BUILDINGS ARE SAFE FROM THE 100-YR STORM EVENT.

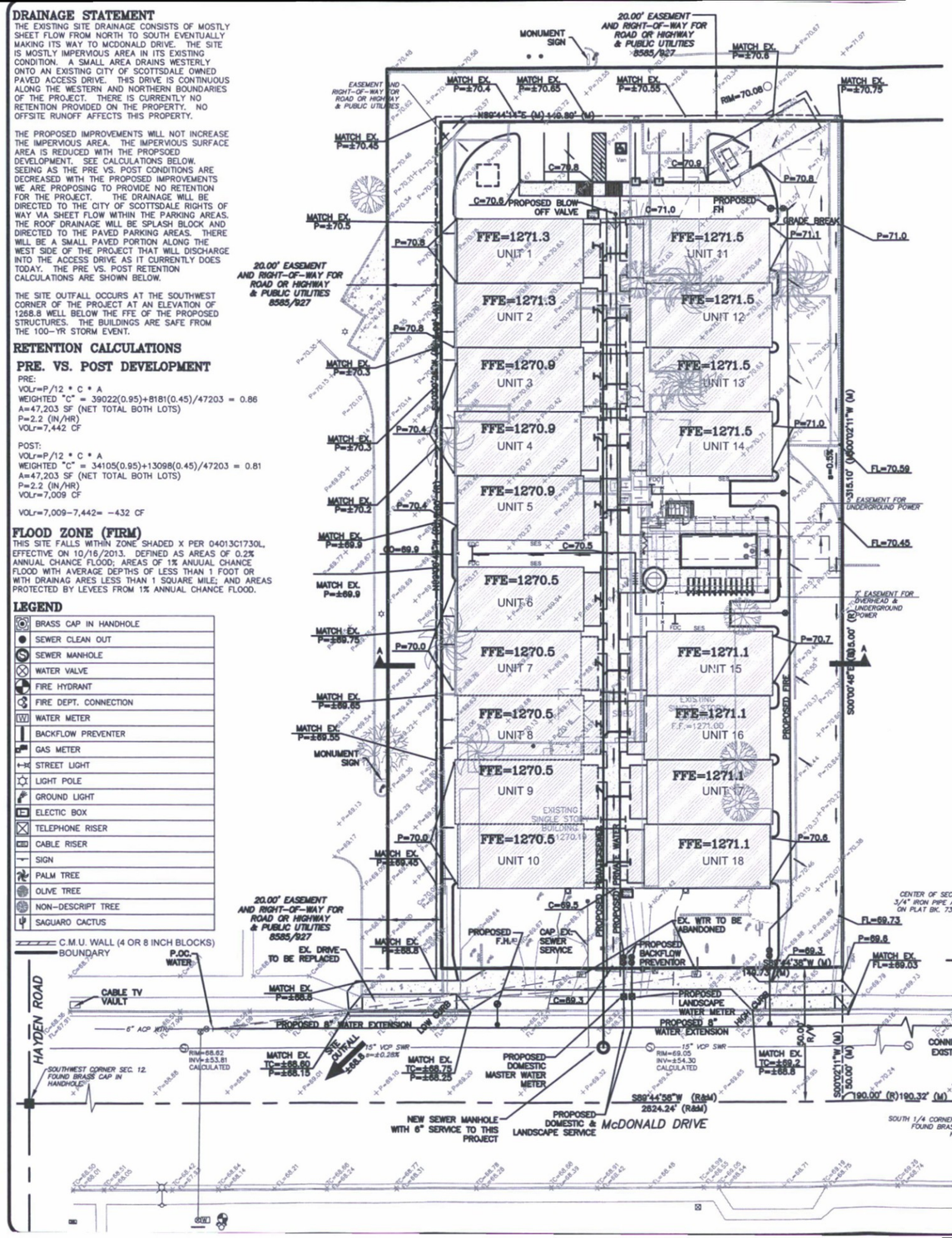
RETENTION CALCULATIONS
PRE. VS. POST DEVELOPMENT
PRE:
VOLr=P/12 * C * A
WEIGHTED "C" = 39022(0.95)+8181(0.45)/47203 = 0.86
A=47,203 SF (NET TOTAL BOTH LOTS)
P=2.2 (IN/HR)
VOLr=7,442 CF

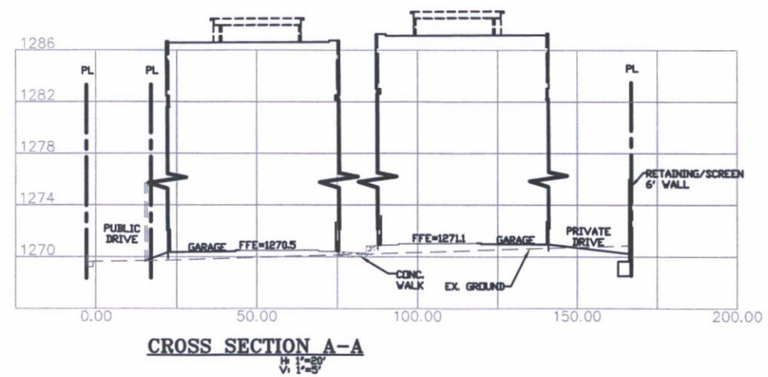
POST:
VOLr=P/12 * C * A
WEIGHTED "C" = 34105(0.95)+13098(0.45)/47203 = 0.81
A=47,203 SF (NET TOTAL BOTH LOTS)
P=2.2 (IN/HR)
VOLr=7,009 CF

VOLr=7,009-7,442= -432 CF

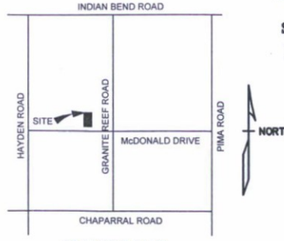
FLOOD ZONE (FIRM)
THIS SITE FALLS WITHIN ZONE SHADED X PER 04013C1730L, EFFECTIVE ON 10/16/2013. DEFINED AS AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAG ARES LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD.

LEGEND
- BRASS CAP IN HANDHOLE
- SEWER CLEAN OUT
- SEWER MANHOLE
- WATER VALVE
- FIRE HYDRANT
- FIRE DEPT. CONNECTION
- WATER METER
- BACKFLOW PREVENTER
- GAS METER
- STREET LIGHT
- LIGHT POLE
- GROUND LIGHT
- ELECTIC BOX
- TELEPHONE RISER
- CABLE RISER
- SIGN
- PALM TREE
- OLIVE TREE
- NON-DESCRIPT TREE
- SAGUARO CACTUS
- C.M.U. WALL (4 OR 8 INCH BLOCKS)
- BOUNDARY





CROSS SECTION A-A
H: 1"=20'
V: 1"=5'



VICINITY MAP
NOT TO SCALE

SITE AREA
1.085 AC (NET)
1.257 AC (GROSS)

LEGAL DESCRIPTION
PARCEL NO.1:
THE EAST 340.00 FEET OF THE SOUTH 365.00 FEET AT THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 2 NORTH, RANGE 4 EAST OF GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA; EXCEPT THE EAST OF 265.00 FEET THEREOF.

PARCEL NO.2:
THE EAST 340.00 FEET OF THE SOUTH 365.00 FEET AT THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 12, TOWNSHIP 2 NORTH, RANGE 4 EAST OF GILA AND SALTRIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA; EXCEPT THE EAST OF 190.00 FEET; AND EXCEPT THE WEST 75.00 FEET.

ENGINEER
JACOBS WALLACE, LLC
2233 W. BETHANY HOME RD
PHOENIX, AZ 85015
CHUCK JACOBS
602.757.5964

ARCHITECT
FELTEN GROUP
18325 N ALLIED WAY #200
PHOENIX, AZ 85054
602.867.2500

OWNER
PORCHLIGHT HOMES
2915 E. BASELINE ROAD #118
GILBERT, AZ 85234
RYAN LARSEN
480.813.1324

BENCH MARK
BRASS CAP IN HANDHOLE LOCATED IN THE INTERSECTION OF McDONALD DRIVE AND GRANITE REEF ROAD. GDACS ID # 11028
EL.=1269.425 (NAVD 88 DATUM)

PROJECT DESCRIPTION
DEMO EXISTING BUILDINGS AND SITE IMPROVEMENTS AND CONSTRUCT PROPOSED MULT-STORY MULTI-FAMILY DEVELOPMENT WITH ASSOCIATED SITE IMPROVEMENTS.

APN
174-12-001S & 174-12-001T

ZONING
R-5

CONSTRUCTION TYPE
VB

RELEASE	DATE	BY	APP.	DESCRIPTION
C	1-25-18	CSJ	CSJ	PR_SUBMITTAL
B	3-29-17	CSJ	CSJ	PRELIMINARY_RE-SUBMITTAL
A	8-29-16	CSJ	CSJ	PRELIMINARY_SUBMITTAL

PORCHLIGHT HOMES
MULTI-FAMILY PROJECT
8340 &8350 E. MCDONALD DRIVE
SCOTTSDALE, AZ

CONCEPTUAL G & D
AND
UTILITY PLAN

JACOBS WALLACE, LLC
ENGINEERING - PLANNING - MANAGEMENT
2233 W. BETHANY HOME ROAD
PHOENIX, AZ. 85015
602.757.5964

Registered Professional Engineer
40224
CHARLES G. JACOBS
1-15-18
ARIZONA, U.S.A.
Expires: 12/31/18

TRUE NORTH

JAN 2018

DRAWING NO.
C1.0

JOB: 0068