Appendix B

Wastewater Technical Memo

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kpff.com

DATE: June 28th, 2016

TO: Steve Flanagon, LPA, Inc.

FROM: Ali Khamsi P.E., KPFF Consulting Engineers

SUBJECT: Mt. St. Mary's University Wellness Pavilion: Wastewater Service Data

KPFF is conducting a public utility feasibility study and has prepared this memo for your review and support of the project's initial checklist response and NOP. Should you have any questions, please feel free to contact us.

Existing Condition

The Project Site is located within the City of Los Angeles and is currently developed. The project site totals approximately 3.78 acres located on a ridge crest. Currently, the project site is occupied by the existing fitness center, pool, basketball court, and volleyball court, all to be demolished and removed for the proposed Wellness Pavilion and parking structure facility.

Using Los Angeles Bureau of Engineering (LABOE) anticipated sewer generation rate for facilities management building, fitness center, and swimming pool, the existing sewer generation and demand is calculated to be 1,123 gallons per day.

Facility Description	**Building SF**	**SGF[a] in GPD**	**GPD**	**GPM x 3[b]**
Facilities Management Building	4,970	0.15GPD/sf	745	1.6
Fitness Center	1,030	0.25GPD/sf	258	0.5
Swimming Pool	Process Flow	Process Flow	120	0.3
Total			1,123	2.4

a. Sewer Generation Factor per the Department Public Works, Bureau of Engineering (BOE)
b. Peaking factor of 3 to determine the peak demand

Proposed Condition

We understand the proposed development consists of the following:

- Gymnasium
- Offices
- Dance Studio
- Multi-Purpose Rooms/Phys. Therapy Lab
- Other Facility Spaces
- Swimming Pool: Commercial with Backwash

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Using LABOE's (Los Angeles Bureau of Engineering) anticipated sewer generation rate, the anticipated sewer generation and demand for the proposed development is calculated to be 19,718 gallons per day.

Facility Description	Building SF	SGF[a] in GPD	GPD	GPM x 3[b]
Gymnasium	9,500	0.25 GPD/sf	2,375	5.0
Offices	1,000	0.15 GPD/sf	150	0.3
Dance Studio	2,000	0.080 GPD/sf	160	0.3
Multi-Purpose Rooms/Phys. Therapy Lab[c]	2,850	.0.25 GPD/sf	713	1.5
Other Facility Spaces[d,e]	18,250	0.80 GPD/sf	14,600	30.4
Swimming Pool: Commercial with Backwash	Process Flow	Process Flow	120	0.3
Other Wellness/Sports Activities	400 outside guests	4GPD/ Occupant[f]	1,600	3.3
Total			19,718	41.1

a. Sewer Generation Factor per the Department Public Works, Bureau of Engineering (BOE)
b. Peaking factor of 3 to determine the peak demand
c. Assumes generation factor equivalent to medical office category
d. Assumes generation factor for Health Club/Spa category. Health club/spa includes "lobby area, workout floors, aerobic rooms, swimming pools, sauna, locker rooms, showers, and restrooms. If a health club/spa has a gymnasium facility, use the gymnasium rate for that portion. Gymnasiums include basketball courts, volleyball courts, and any other large open space with low occupancy density."
e. Support spaces such as equipment rooms, storage spaces, electrical rooms, stairways which are anticipated to total approximately 4,400 SF would not generate wastewater and are excluded from the proposed conditions.
f. Assumes generation factor equivalent to Community Center category for Outside Guests.

Sewer Capacity Availability Request (SCAR)

The existing 8" public sewer main runs West on Chalon Rd., and continues South to Bundy Dr. Since the sanitary sewer connection from the Project site is anticipated to be 6" connection within the private access road on the Mt. St. Mary's University Campus, a SCAR will not be needed.

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Utility Systems Science and Software, Inc. (US3) Sewer Capacity Study

US3 has conducted a sewer capacity study of two of the sewer manholes serving the Mt. St. Mary's University campus. One of the sewer manholes studied is located within one of the parking areas on campus, West of Grace Ln/Carondelet Center. This manhole was chosen because it observes the behavior and capacity of the upstream 6" sewer pipe, and the downstream 8" sewer pipe. The location of this manhole (manhole #1) is depicted here in figure 1:

Figure 1

The US3 Sewer capacity statistics for manhole #1 can be seen in attachment 1, and summarized here as follows. The upstream sewer pipe size serving this manhole is 6". Its maximum flow observed is 112.85 gallons per minute (GPM) and average flow observed is 53.32 GPM. The maximum velocity observed is 4.98 feet per second (FPS) and average velocity observed is 3.37 FPS. The maximum level observed within this pipe is 1.62 inches (in).

Sewer manhole #2 is located within the intersection of Chalon Rd. and the MSMU private access road (Grace Lane). This location was chosen because it observes the behavior and capacity at the connection to the public sewer main. Its location can be depicted here in figure 2:

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Figure 2

The US3 Sewer Capacity Statistics for manhole #2 can be seen in attachment 2, and summarized here as follows. The upstream sewer pipe size is 8" and downstream public sewer main is 8". Its maximum flow observed is 165.07 GPM and average flow observed is 67.89 GPM. The maximum velocity observed is 7.30 FPS and average velocity observed is 4.45 FPS.

From the sewer generation factors provided by City of Los Angeles, Bureau of Engineering, the total proposed sewage flow is 34.68 GPM. The existing sewage flow from existing buildings currently on site is 2.32 GPM. Therefore, the total additional sewage capacity flow is equal to 32.36 GPM. The maximum flow that the existing sewer pipes would encounter would be equal to 32.36 GPM plus the maximum observed flow from the US3 sewer capacity study (165.07 GPM). This equals 197.43 GPM.

Using Bentley FlowMaster V8i, a PVC pipe with a slope of 8%, a diameter of 6", and a normal depth of 3", the max discharge is equal to 462 GPM (attachment 3), which is much greater than 197.43 GPM. It is determined that the existing sewer pipes and sewer mains serving the project would have adequate capacity to accommodate the project. The availability of additional capacity can be attributed to the steep average slope of the university in the North to South direction. The average slope is within the range of 8-12%, creating large flow velocities within the existing sewer pipes.

Utility Systems Science and Software

Report Date: 04/20/2016
Customer: MSMU
Group: Flow Monitoring
SiteID: 2419

Statistics from MSMU Parking Area MH: 04/06/2016 thru 04/18/2016

	Flow (GPM)			Flow (MGD)			Velocity (FPS)			Level (inches)				
Date	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Total Gal**	**Rain**
4/6/16	62.89	95.42	12.08	0.09	0.14	0.02	3.76	4.98	1.12	1.27	1.48	0.97	90,562	
4/7/16	57.90	89.65	12.36	0.08	0.13	0.02	3.56	4.80	1.16	1.24	1.48	0.96	83,382	
4/8/16	45.88	82.01	10.62	0.07	0.12	0.02	3.16	4.42	0.99	1.15	1.44	0.94	66,068	
4/9/16	37.52	67.71	8.26	0.05	0.10	0.01	2.73	4.14	0.76	1.11	1.32	0.94	54,023	
4/10/16	48.97	87.22	19.79	0.07	0.13	0.03	3.19	4.35	1.65	1.20	1.53	1.04	70,511	
Week:	**50.63**	**95.42**	**8.26**	**0.07**	**0.14**	**0.01**	**3.28**	**4.98**	**0.76**	**1.20**	**1.53**	**0.94**	**364,546**	
4/11/16	65.94	94.93	10.00	0.10	0.14	0.01	3.75	4.81	0.93	1.31	1.48	0.97	94,951	
4/12/16	60.79	94.31	9.72	0.09	0.14	0.01	3.68	4.77	0.99	1.26	1.47	0.91	87,545	
4/13/16	66.25	100.28	13.75	0.10	0.14	0.02	3.78	4.89	1.25	1.31	1.53	0.98	95,397	
4/14/16	60.23	91.46	11.94	0.09	0.13	0.02	3.63	4.70	1.12	1.26	1.51	0.94	86,732	
4/15/16	48.55	86.25	9.72	0.07	0.12	0.01	3.26	4.68	0.94	1.16	1.43	0.94	69,907	
4/16/16	37.00	66.25	14.37	0.05	0.10	0.02	2.82	4.19	1.35	1.08	1.33	0.96	53,282	
4/17/16	39.72	112.85	9.17	0.06	0.16	0.01	2.87	4.97	0.89	1.10	1.62	0.91	57,202	
Week:	**54.07**	**112.85**	**9.17**	**0.08**	**0.16**	**0.01**	**3.40**	**4.97**	**0.89**	**1.21**	**1.62**	**0.91**	**545,015**	
4/18/16	61.55	97.50	12.85	0.09	0.14	0.02	3.64	4.62	1.21	1.27	1.54	0.96	88,634	
Week:	**61.55**	**97.50**	**12.85**	**0.09**	**0.14**	**0.02**	**3.64**	**4.62**	**1.21**	**1.27**	**1.54**	**0.96**	**88,634**	
Totals:	**53.32**	**112.85**	**8.26**	**0.08**	**0.16**	**0.01**	**3.37**	**4.98**	**0.76**	**1.21**	**1.62**	**0.91**	**998,195**	

ATTACHMENT 2

Utility Systems Science and Software

Report Date: 04/20/2016
Customer: MSMU
Group: Flow Monitoring
SiteID: 2418

Statistics from Chalon Rd MH: 04/06/2016 thru 04/18/2016

	Flow (GPM)			Flow (MGD)			Velocity (FPS)			Level (inches)				
Date	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Avg**	**Max**	**Min**	**Total Gal**	**Rain**
4/6/16	71.39	119.51	26.39	0.10	0.17	0.04	4.45	5.87	2.55	1.25	1.53	0.94	102,797	
4/7/16	72.52	140.83	23.47	0.10	0.20	0.03	4.64	6.76	2.27	1.22	1.57	0.94	104,424	
4/8/16	61.69	110.14	25.83	0.09	0.16	0.04	4.31	6.34	2.49	1.16	1.37	0.94	88,836	
4/9/16	56.65	79.93	20.69	0.08	0.12	0.03	4.26	5.29	2.13	1.10	1.22	0.90	81,573	
4/10/16	66.82	112.29	35.56	0.10	0.16	0.05	4.47	6.06	2.81	1.20	1.47	1.01	96,219	
Week:	**65.81**	**140.83**	**20.69**	**0.09**	**0.20**	**0.03**	**4.42**	**6.76**	**2.13**	**1.19**	**1.57**	**0.90**	**473,849**	
4/11/16	73.84	141.94	21.32	0.11	0.20	0.03	4.46	6.90	2.15	1.26	1.55	0.91	106,324	
4/12/16	70.82	122.64	27.01	0.10	0.18	0.04	4.43	6.13	2.55	1.25	1.48	0.96	101,987	
4/13/16	80.83	129.24	28.19	0.12	0.19	0.04	4.84	6.38	2.61	1.28	1.58	0.97	116,395	
4/14/16	78.35	155.97	39.03	0.11	0.22	0.06	4.84	7.30	3.30	1.26	1.55	1.03	112,822	
4/15/16	63.12	113.40	26.11	0.09	0.16	0.04	4.33	5.74	2.45	1.17	1.47	0.96	90,896	
4/16/16	55.58	81.81	28.89	0.08	0.12	0.04	4.17	5.51	2.64	1.11	1.21	0.97	80,031	
4/17/16	60.75	165.07	23.19	0.09	0.24	0.03	4.26	7.08	2.24	1.14	1.65	0.94	87,477	
Week:	**69.04**	**165.07**	**21.32**	**0.10**	**0.24**	**0.03**	**4.48**	**7.30**	**2.15**	**1.21**	**1.65**	**0.91**	**695,931**	
4/18/16	70.17	115.97	24.24	0.10	0.17	0.03	4.38	6.06	2.29	1.25	1.51	0.96	101,046	
Week:	**70.17**	**115.97**	**24.24**	**0.10**	**0.17**	**0.03**	**4.38**	**6.06**	**2.29**	**1.25**	**1.51**	**0.96**	**101,046**	
Totals:	**67.89**	**165.07**	**20.69**	**0.10**	**0.24**	**0.03**	**4.45**	**7.30**	**2.13**	**1.20**	**1.65**	**0.90**	**1,270,825**	

ATTACHMENT 3

Worksheet for Circular Pipe - 1

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.08000	ft/ft
Normal Depth	0.25	ft
Diameter	0.50	ft

Results

Discharge	1.03	ft^3/s
Flow Area	0.10	ft^2
Wetted Perimeter	0.79	ft
Hydraulic Radius	0.13	ft
Top Width	0.50	ft
Critical Depth	0.48	ft
Percent Full	50.0	%
Critical Slope	0.01733	ft/ft
Velocity	10.51	ft/s
Velocity Head	1.72	ft
Specific Energy	1.97	ft
Froude Number	4.18	
Maximum Discharge	2.22	ft^3/s
Discharge Full	2.06	ft^3/s
Slope Full	0.02000	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	50.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for Circular Pipe - 1

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.25	ft
Critical Depth	0.48	ft
Channel Slope	0.08000	ft/ft
Critical Slope	0.01733	ft/ft