Appendix 7.2 Sewage Peak Flow Estimations - Method (ii)

Table 1.1 - Development Paramters of NOL Mainline - Non Station Lobby Areas

Floor Uses	Floor Area (m^2)												
	KSR(NOL)	AUT	NTM	NTD	SAT	KTU(NOL)	SMA	PWA	LHA	SNA	KLA	KTA	PAA
Non-public E&M Rooms	9648	6582	11898	7107	10157	6912	637	491	336	2464	1305	2872	1057
Concession (Retail Area)	130	48	338	N/A	242	309	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concession (Food & Beverage)	130	139	100	N/A	242	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Non-public Operation Room	10254	9115	5225	12026	6800	1154	445	445	113	1403	645	990	543

Table 1.2 - Population Factor and Unit Flow Factor of Non Station Lobby Areas

Floor Uses	Population factor		Category	Unit Flow Factor (m³/employee/day)
Non-public E&M Rooms	35	m^2/worker	J2	0.33
Concession (Retail Area)	25	m^2/worker	J4	0.28
Concession (Food & Beverage)	5.1	worker/100m²	J10	1.58
Non-public Operation Room	25	m^2/worker	Territorial Average	0.28

Table 1.3 - Estimated Popualtion

Floor Uses	Estimated Population												
	KSR(NOL)	AUT	NTM	NTD	SAT	KTU(NOL)	SMA	PWA	LHA	SNA	KLA	KTA	PAA
Non-public E&M Rooms	280	190	340	210	300	200	20	20	10	80	40	90	40
Concession (Retail Area)	10	10	20	0	10	20	0	0	0	0	0	0	0
Concession (Food & Beverage)	10	10	10	0	20	0	0	0	0	0	0	0	0
Non-public Operation Room	420	370	210	490	280	50	20	20	10	60	30	40	30

Table 1.4 - Estimated Peak Flow

Floor Uses	Discharge Rate of Populations (L/s)												
	KSR(NOL)	AUT	NTM	NTD	SAT	KTU(NOL)	SMA	PWA	LHA	SNA	KLA	KTA	PAA
ADWF (m³/day)	228.6	184.9	192.4	206.5	211.8	85.6	12.2	12.2	6.1	43.2	21.6	40.9	21.6
Contributing Population	847	685	713	765	784	317	45	45	23	160	80	151	80
Peaking Factor[1]	6	6	6	6	6	6	6	6	6	6	6	6	6
Peak Flow Sub-total (L/s)	**15.9**	**12.8**	**13.4**	**14.3**	**14.7**	**5.9**	**0.8**	**0.8**	**0.4**	**3.0**	**1.5**	**2.8**	**1.5**

Notes:

[1] A peaking factor of 6 was deemed appropriated and is adopted for calculations considering the contributing factor would be < 1000 and stormwater allowance is excluded.

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Table 2.1 - Discharge Unit for Various Appliances

Sanitary Fitments at Toilet	Discharge unit (L/s)[2]	Discharge Unit (m³/day)[3]
Wash Basin	0.300	0.282
Urinal with Basin	0.400	0.257
Washing Closet with 6L Cistern	1.500	0.342
Shower	0.500	0.450
Cleaner's Sink	0.300	0.684
Cleansing Point	0.500	0.150

Notes:

[2] The discharge units (L/s) for Wash Basin, Urinal with basin, and Washing Closet with 6L Cistern are adopted from Table 5 of Section 6 - Sanitary and plumbing and drainage in Plumbing Engineering Services Design Guide. Whereas the discharge units (L/s) for Shower, Cleaner's Sink, and Cleansing Point are adopted from Table 14 of Section 2 - Hot and cold water supplies in Plumbing Engineering Services Design Guide.

[3] The discharge units (m³/day) for all appliances are adopted from Table 14 of Section 2 - Hot and cold water supplies in Plumbing Engineering Services Design Guide with assumptions based on normal station operations of 19 hours.

Table 2.2 - Development Paramters of NOL Mainline - Sanitary Fitments at Toilet

	Nos. of Sanitary Fitments												
Sanitary Fitments at Toilet	KSR(NOL)	AUT	NTM	NTD	SAT	KTU(NOL)	SMA	PWA	LHA	SNA	KLA	KTA	PAA
Wash Basin	11	17	11	23	15	1	1	1	2	1	1	1	1
Urinal with Basin	2	2	2	4	4	0	0	0	0	0	0	0	0
Washing Closet with 6L Cistern	14	11	12	28	15	1	1	1	1	1	1	1	1
Shower	0	0	0	10	0	0	0	0	0	0	0	0	0
Cleaner's Sink	15	2	2	8	4	0	0	0	0	0	0	0	0
Cleansing Point	64	58	63	94	76	0	15	17	11	21	21	22	18
Peak Flow (L/s)[4]	**41.5**	**34.3**	**36.8**	**61.5**	**44.5**	**1.3**	**8.8**	**9.8**	**6.9**	**11.8**	**11.8**	**12.3**	**10.3**
ADWF (m³/day)[5]	**28.3**	**19.1**	**18.5**	**41.2**	**24.5**	**0.6**	**2.9**	**3.2**	**2.6**	**3.8**	**3.8**	**3.9**	**3.3**

Notes:

[4] The peak flows of Wash Basin, Urinal with Basin, Washing Closet with 6L Cistern are estimated based on the method stated in Section "Sanitary plumbing and drainage" in Plumbing Engineering Services Design Guide using the formula Peak Flow = K √ ΣDU, where K = frequency of use factor = 1, ΣDU = sum of discharge units. The peak flows of Shower, Cleaner's sink, and Cleansing Point are estimated based on the method stated in Section "Hot and Cold Water Supplies" in Plumbing Engineering Services Design Guide using the formula Peak Flow = ΣDU.

[5] The ADWF of all appliances are estimated based on the method stated in Section 2 - Hot and Cold Water Supplies in Plumbing Engineering Services Design Guide using the formula Peak Flow = ΣDU.

Table 3.1 - Total Discharge Rate

	Discharge Rates (L/s)												
Location	KSR(NOL)	AUT	NTM	NTD	SAT	KTU(NOL)	SMA	PWA	LHA	SNA	KLA	KTA	PAA
Peak Flow Sub-total (From Population)	15.9	12.8	13.4	14.3	14.7	5.9	0.8	0.8	0.4	3.0	1.5	2.8	1.5
Peak Flow Sub-total (Sanitary Fitments)	41.5	34.3	36.8	61.5	44.5	1.3	8.8	9.8	6.9	11.8	11.8	12.3	10.3
Total Peak Flow (L/s)	**57.4**	**47.2**	**50.2**	**75.8**	**59.3**	**7.3**	**9.7**	**10.7**	**7.4**	**14.8**	**13.3**	**15.2**	**11.8**

Table 3.2 - Total Averaged Dry Weather Flow (ADWF)

	ADWF (m³/day)												
Location	KSR(NOL)	AUT	NTM	NTD	SAT	KTU(NOL)	SMA	PWA	LHA	SNA	KLA	KTA	PAA
ADWF (From Population)	228.6	184.9	192.4	206.5	211.8	85.6	12.2	12.2	6.1	43.2	21.6	40.9	21.6
ADWF (Sanitary Fitments)	28.3	19.1	18.5	41.2	24.5	0.6	2.9	3.2	2.6	3.8	3.8	3.9	3.3
Total ADWF (m³/day)	**256.9**	**204.0**	**210.9**	**247.7**	**236.3**	**86.2**	**15.1**	**15.4**	**8.7**	**47.0**	**25.4**	**44.8**	**24.9**

Grand Total Peak Flow (L/s)	**384.4**
Grand Total ADWF (m³/day)	**1466.5**

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