

Traffic Analysis Report

Lodha Acme Ozone

Schindler

1

Summary ____ 3

2

Standards and Recommendations ____ 6

3

Details ____ 7

3.1 Tower E - Option 2 - 2 Units, 10 Pax, 2.5mps ____ 7
3.2 Tower E - Option 2 - 3 Units, 10 Pax, 2.5mps ____ 11
3.3 Tower E - Option 2 - 2 Units, 10 Pax, 3mps ____ 15
3.4 Tower E - Option 2 - 3 Units, 10 Pax, 3mps ____ 19
3.5 Tower E - Option 2 - 2 Units, 10 Pax, 3.5mps ____ 23
3.6 Tower E - Option 2 - 3 Units, 10 Pax, 3.5mps ____ 27
3.7 Tower F - Option 2 - 2 Units, 10 Pax, 2.5mps ____ 31
3.8 Tower F - Option 2 - 3 Units, 10 Pax, 2.5mps ____ 35
3.9 Tower F - Option 2 - 2 Units, 10 Pax, 3mps ____ 39
3.10 Tower F - Option 2 - 3 Units, 10 Pax, 3mps ____ 43
3.11 Tower F - Option 2 - 2 Units, 10 Pax, 3.5mps ____ 47
3.12 Tower F - Option 2 - 3 Units, 10 Pax, 3.5mps ____ 51

4

How Schindler Undertakes Traffic Analyses ____ 55

4.1 Introduction ____ 55
4.2 ISO 8100-32:2020 ____ 55
4.3 Measures and Definitions ____ 55
4.4 Methods of Traffic Analysis ____ 57

5

7

8

9

0

11 August 2022

Kunal Mandlik
E&E Specialist, Mumbai

Mob No: +81-8657956498
kunal.mandlik@schindler.com

Schindler India Pvt. Ltd. |
Schindler House, Main Street,
Hiranandani Gardens, Powai,
Mumbai - 400076, Maharashtra, India

This document has 58 pages.

Created by Traffic Vision 3.0
(Schindler IX Version 1.22.5.1)

Copyright INVENTIO AG, Hergiswil, Switzerland

Summary

The Traffic Analysis as per Simulation method is carried out for Residential Building based on data furnished by customer. This project can be considered under mid-end residential building. Population Consideration is as per data shared by customer. Max Car Max fill is 80 %. Traffic analysis is done for passenger elevators. Fire elevators to be considered extra. Each simulation involves elevators in Duplex/ Triplex arrangement.

Legend

Setup		Abbreviations	
Traffic Situation:	See Section 2	P5:	Persons transported on average within 5 minutes
Floors:	Floors served by elevators	HC5:	P5 relative to group population
Population:	Population served by elevators	WT:	Average waiting time per passenger
		DT:	Average destination time per passenger
		IS:	Average number of intermediate stops per passenger
		LW:	Passengers waiting more than 90 seconds [%]

TOWER - E:-

1 Tower E - Option 2 - 2 Units, 10 Pax, 2.5mps

Elevators: 2 Conventional, 680 kg, 2.50 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	430	22	5.0 %	47.1 s	98.7 s	1.3	13.2 %
			26	6.0 %	56.9 s	114.1 s	1.8	21.3 %
			30	7.0 %	71.4 s	133.8 s	2.2	32.3 %
			34	8.0 %	(excess demand)			

2 Tower E - Option 2 - 3 Units, 10 Pax, 2.5mps

Elevators: 3 Conventional, 680 kg, 2.50 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	430	22	5.0 %	24.7 s	68.0 s	0.6	1.6 %
			26	6.0 %	28.9 s	75.1 s	0.9	2.8 %
			30	7.0 %	33.4 s	83.2 s	1.2	4.7 %
			34	8.0 %	37.9 s	91.4 s	1.5	7.6 %

3 Tower E - Option 2 - 2 Units, 10 Pax, 3mps

Elevators: 2 Conventional, 680 kg, 3.00 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	430	22	5.0 %	41.6 s	88.0 s	1.2	8.9 %
			26	6.0 %	49.9 s	101.8 s	1.6	15.4 %
			30	7.0 %	62.2 s	119.7 s	2.0	24.8 %
			34	8.0 %	(excess demand)			

4 Tower E - Option 2 - 3 Units, 10 Pax, 3mps

Elevators: 3 Conventional, 680 kg, 3.00 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	430	22	5.0 %	21.2 s	59.7 s	0.5	0.7 %
			26	6.0 %	24.8 s	66.0 s	0.8	1.6 %
			30	7.0 %	28.9 s	73.4 s	1.0	3.0 %
			34	8.0 %	33.4 s	81.4 s	1.3	4.6 %

5 Tower E - Option 2 - 2 Units, 10 Pax, 3.5mps

Elevators: 2 Conventional, 680 kg, 3.50 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	430	22	5.0 %	37.4 s	80.3 s	1.1	6.0 %
			26	6.0 %	45.1 s	93.3 s	1.5	11.3 %
			30	7.0 %	56.4 s	110.7 s	1.9	20.3 %
			34	8.0 %	(excess demand)			

6 Tower E - Option 2 - 3 Units, 10 Pax, 3.5mps

Elevators: 3 Conventional, 680 kg, 3.50 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	430	22	5.0 %	19.2 s	54.5 s	0.5	0.6 %
			26	6.0 %	23.0 s	60.7 s	0.7	1.2 %
			30	7.0 %	26.6 s	67.3 s	0.9	2.1 %
			34	8.0 %	30.1 s	74.1 s	1.2	3.4 %

TOWER - F:-

7 Tower F - Option 2 - 2 Units, 10 Pax, 2.5mps

Elevators: 2 Conventional, 680 kg, 2.50 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	862	26	3.0 %	57.5 s	114.8 s	1.8	22.1 %
			30	3.5 %	71.6 s	134.4 s	2.2	33.1 %
			34	4.0 %	(excess demand)			

8 Tower F - Option 2 - 3 Units, 10 Pax, 2.5mps

Elevators: 3 Conventional, 680 kg, 2.50 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	862	43	5.0 %	51.2 s	111.9 s	2.0	16.8 %
			50	5.8 %	66.2 s	131.7 s	2.4	27.5 %
			52	6.0 %	(excess demand)			

9 Tower F - Option 2 - 2 Units, 10 Pax, 3mps

Elevators: 2 Conventional, 680 kg, 3.00 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	862	26	3.0 %	50.9 s	103.3 s	1.6	16.2 %
			33	3.8 %	71.2 s	132.4 s	2.3	31.7 %
			34	4.0 %	(excess demand)			

10 Tower F - Option 2 - 3 Units, 10 Pax, 3mps

Elevators: 3 Conventional, 680 kg, 3.00 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	862	43	5.0 %	44.8 s	100.4 s	1.9	12.3 %
			52	6.0 %	59.6 s	122.0 s	2.4	22.3 %
			60	7.0 %	(excess demand)			

11 Tower F - Option 2 - 2 Units, 10 Pax, 3.5mps

Elevators: 2 Conventional, 680 kg, 3.50 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	862	26	3.0 %	45.7 s	94.2 s	1.5	12.0 %
			33	3.8 %	65.7 s	124.1 s	2.2	27.1 %
			34	4.0 %	(excess demand)			

12 Tower F - Option 2 - 3 Units, 10 Pax, 3.5mps

Elevators: 3 Conventional, 680 kg, 3.50 m/s

Traffic Situation	Floors	Population	P5	HC5	WT	DT	IS	LW
Two-Way Residential	G, P0..34	862	43	5.0 %	39.0 s	91.2 s	1.8	8.0 %
			52	6.0 %	56.0 s	115.5 s	2.3	20.3 %
			53	6.1 %	58.3 s	118.6 s	2.4	22.2 %
			60	7.0 %	(excess demand)			

TA Conclusion:
NBC 2016 Guildelines asks following HC5 & Average Waiting time Criteria to be fulfilled :
High End Building: more than 8% , less than 30 Seconds
Mid End Building : 6-8% , 31-45 Seconds
Low End Building: 5-7% , 45-60 Seconds

Standards and Recommendations

Every analysis covers a full range of traffic intensities, reporting handling capacity HC5 and average waiting time WT as main criteria. As a general guideline, Schindler defines recommendations based on these criteria:

Schindler Traffic Analysis Recommendations (conforming to ISO 8100-32:2020)

	Traffic Definition			Standard Requirements	
Traffic Situation	**Incoming**	**Outgoing**	**Inter-floor**	**HC5**	**WT**
Two-Way Residential	50 %	50 %	0 %	≥ 7 %	≤ 60 s

Details

3.1 Tower E - Option 2 - 2 Units, 10 Pax, 2.5mps

3.1.1 Building and Population

Number of Floors: 41
Building Population: 430

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	13.0 persons	1.0 *	13 persons +
33	3.05 m	98.00 m	Residential	10.0 persons	1.0 *	10 persons +
32	3.05 m	94.95 m	Residential	13.0 persons	1.0 *	13 persons +
31	3.05 m	91.90 m	Residential	13.0 persons	1.0 *	13 persons +
30	3.05 m	88.85 m	Residential	13.0 persons	1.0 *	13 persons +
29	3.05 m	85.80 m	Residential	13.0 persons	1.0 *	13 persons +
28	3.05 m	82.75 m	Residential	10.0 persons	1.0 *	10 persons +
27	3.05 m	79.70 m	Residential	13.0 persons	1.0 *	13 persons +
26	3.05 m	76.65 m	Residential	13.0 persons	1.0 *	13 persons +
25	3.05 m	73.60 m	Residential	13.0 persons	1.0 *	13 persons +
24	3.05 m	70.55 m	Residential	13.0 persons	1.0 *	13 persons +
23	3.05 m	67.50 m	Residential	10.0 persons	1.0 *	10 persons +
22	3.05 m	64.45 m	Residential	13.0 persons	1.0 *	13 persons +
21	3.05 m	61.40 m	Residential	13.0 persons	1.0 *	13 persons +
20	3.05 m	58.35 m	Residential	13.0 persons	1.0 *	13 persons +
19	3.05 m	55.30 m	Residential	13.0 persons	1.0 *	13 persons +
18	3.05 m	52.25 m	Residential	10.0 persons	1.0 *	10 persons +
17	3.05 m	49.20 m	Residential	13.0 persons	1.0 *	13 persons +
16	3.05 m	46.15 m	Residential	13.0 persons	1.0 *	13 persons +
15	3.05 m	43.10 m	Residential	13.0 persons	1.0 *	13 persons +
14	3.05 m	40.05 m	Residential	13.0 persons	1.0 *	13 persons +
13	3.05 m	37.00 m	Residential	10.0 persons	1.0 *	10 persons +
12	3.05 m	33.95 m	Residential	13.0 persons	1.0 *	13 persons +
11	3.05 m	30.90 m	Residential	13.0 persons	1.0 *	13 persons +
10	3.05 m	27.85 m	Residential	13.0 persons	1.0 *	13 persons +
9	3.05 m	24.80 m	Residential	13.0 persons	1.0 *	13 persons +
8	3.05 m	21.75 m	Residential	10.0 persons	1.0 *	10 persons +
7	3.05 m	18.70 m	Residential	13.0 persons	1.0 *	13 persons +
6	3.05 m	15.65 m	Residential	13.0 persons	1.0 *	13 persons +
5	3.05 m	12.60 m	Residential	13.0 persons	1.0 *	13 persons +
4	3.05 m	9.55 m	Residential	13.0 persons	1.0 *	13 persons +
3	3.05 m	6.50 m	Residential	13.0 persons	1.0 *	13 persons +
2	3.05 m	3.45 m	Residential	13.0 persons	1.0 *	13 persons +
1	3.05 m	0.40 m	Residential	13.0 persons	1.0 *	13 persons +
P0	3.40 m	-3.00 m	Residential	6.0 persons	1.0 *	6 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.1.2 Elevators

Control: Conventional

		1	2
Elevator		A	B
Rated Load	[kg]	680	680
Weight per Person	[kg]	68	68
Pass./Deck gross		10	10
Max. Car Filling		80 %	80 %
Pass./Deck net		8	8
Drive Type			
Max. Speed	[m/s]	2.50	2.50
Max. Acceleration	[m/s2]	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00
Door Type			
Door Width	[mm]	800	800
Opening Time	[s]	2.3	2.3
Closing Time	[s]	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0
Number of Decks		1	1
Travel Height	[m]	121.65	121.65
34 Residential			
33 Residential			
32 Residential			
31 Residential			
30 Residential			
29 Residential			
28 Residential			
27 Residential			
26 Residential			
25 Residential			
24 Residential			
23 Residential			
22 Residential			
21 Residential			
20 Residential			
19 Residential			
18 Residential			
17 Residential			
16 Residential			
15 Residential			
14 Residential			
13 Residential			
12 Residential			
11 Residential			
10 Residential			
9 Residential			
8 Residential			
7 Residential			
6 Residential			
5 Residential			
4 Residential			
3 Residential			
2 Residential			
1 Residential			
P0 Residential			
P3 Residential			
P2 Residential			
P1 Residential			
G Lobby			
B1 Residential			
B2 Residential			

3.1.3 Two-Way Residential

3.1.3.1 Traffic Definition

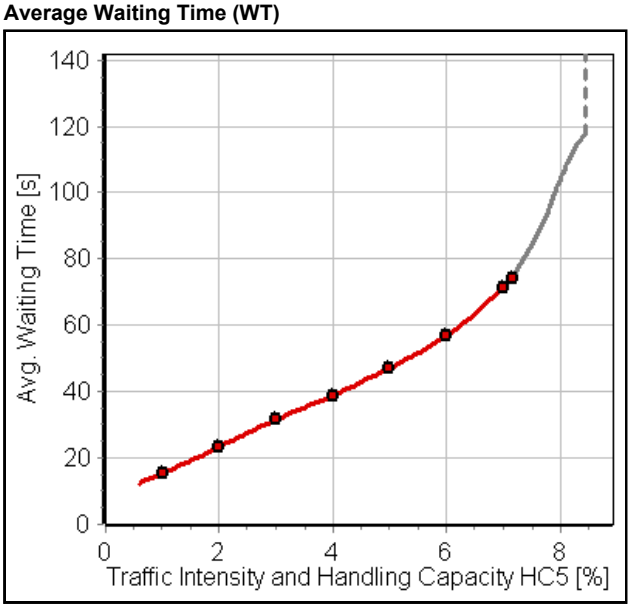
Population served by elevators: 430

Passenger Flows

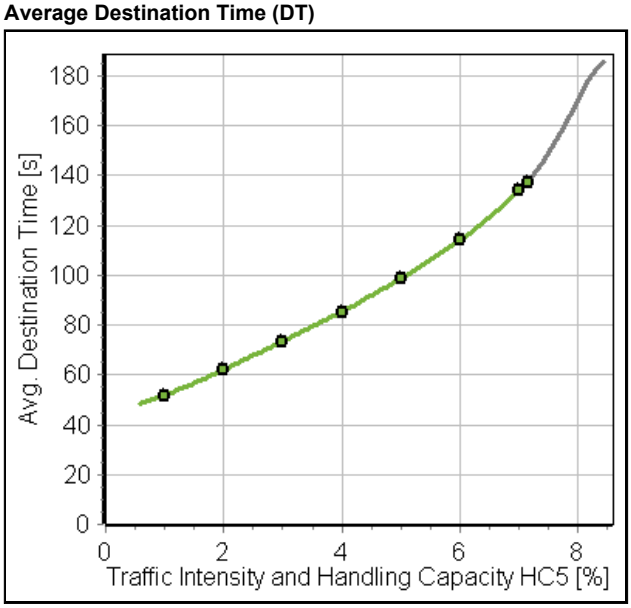
Floor	Description	Incoming 50 %		Outgoing 50 %	
34	Residential		3.0 %	3.0 %	
33	Residential		2.3 %	2.3 %	
32	Residential		3.0 %	3.0 %	
31	Residential		3.0 %	3.0 %	
30	Residential		3.0 %	3.0 %	
29	Residential		3.0 %	3.0 %	
28	Residential		2.3 %	2.3 %	
27	Residential		3.0 %	3.0 %	
26	Residential		3.0 %	3.0 %	
25	Residential		3.0 %	3.0 %	
24	Residential		3.0 %	3.0 %	
23	Residential		2.3 %	2.3 %	
22	Residential		3.0 %	3.0 %	
21	Residential		3.0 %	3.0 %	
20	Residential		3.0 %	3.0 %	
19	Residential		3.0 %	3.0 %	
18	Residential		2.3 %	2.3 %	
17	Residential		3.0 %	3.0 %	
16	Residential		3.0 %	3.0 %	
15	Residential		3.0 %	3.0 %	
14	Residential		3.0 %	3.0 %	
13	Residential		2.3 %	2.3 %	
12	Residential		3.0 %	3.0 %	
11	Residential		3.0 %	3.0 %	
10	Residential		3.0 %	3.0 %	
9	Residential		3.0 %	3.0 %	
8	Residential		2.3 %	2.3 %	
7	Residential		3.0 %	3.0 %	
6	Residential		3.0 %	3.0 %	
5	Residential		3.0 %	3.0 %	
4	Residential		3.0 %	3.0 %	
3	Residential		3.0 %	3.0 %	
2	Residential		3.0 %	3.0 %	
1	Residential		3.0 %	3.0 %	
P0	Residential		1.4 %	1.4 %	
P3	Residential				
P2	Residential				
P1	Residential				
G	Lobby	100.0 %			100.0 %
B1	Residential				
B2	Residential				

3.1.3.2 Performance

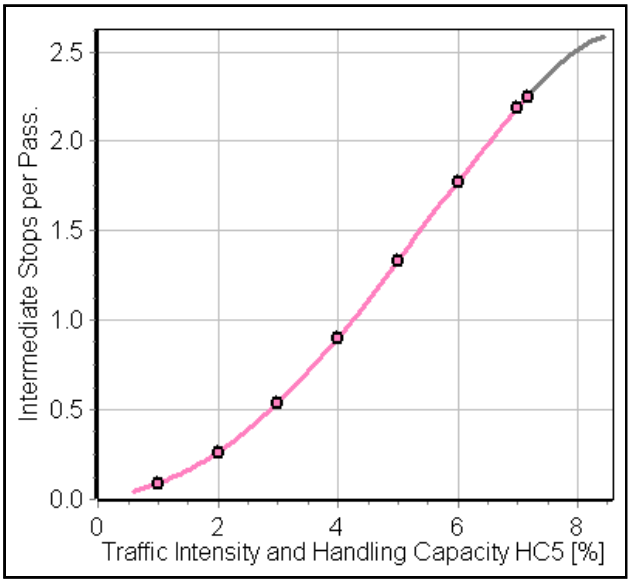
Average Waiting Time (WT)



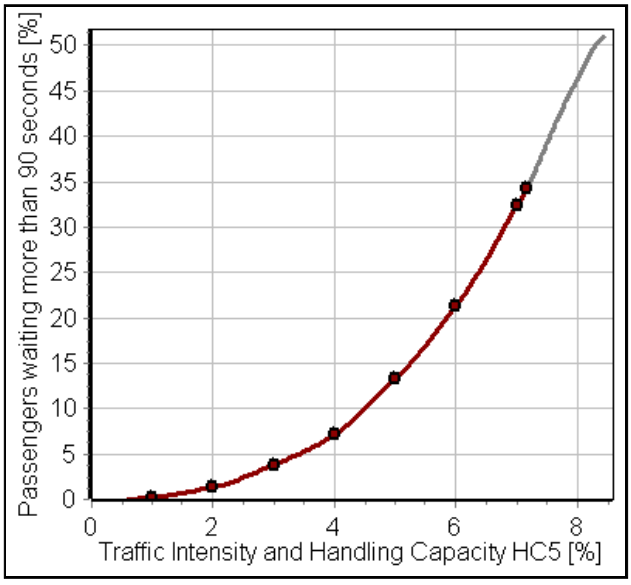
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	1.0	2.0	3.0	4.0	5.0	6.0	7.0	7.2
P5	4.3	8.6	12.9	17.2	21.5	25.8	30.1	30.8
WT [s]	15.2	23.4	31.5	38.8	47.1	56.9	71.4	74.1
DT [s]	51.8	62.0	73.5	85.3	98.7	114.1	133.8	137.4
IS	0.1	0.3	0.5	0.9	1.3	1.8	2.2	2.2
LW [%]	0.2	1.3	3.8	7.1	13.2	21.3	32.3	34.2

3.2 Tower E - Option 2 - 3 Units, 10 Pax, 2.5mps

3.2.1 Building and Population

Number of Floors: 41
Building Population: 430

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	13.0 persons	1.0 *	13 persons +
33	3.05 m	98.00 m	Residential	10.0 persons	1.0 *	10 persons +
32	3.05 m	94.95 m	Residential	13.0 persons	1.0 *	13 persons +
31	3.05 m	91.90 m	Residential	13.0 persons	1.0 *	13 persons +
30	3.05 m	88.85 m	Residential	13.0 persons	1.0 *	13 persons +
29	3.05 m	85.80 m	Residential	13.0 persons	1.0 *	13 persons +
28	3.05 m	82.75 m	Residential	10.0 persons	1.0 *	10 persons +
27	3.05 m	79.70 m	Residential	13.0 persons	1.0 *	13 persons +
26	3.05 m	76.65 m	Residential	13.0 persons	1.0 *	13 persons +
25	3.05 m	73.60 m	Residential	13.0 persons	1.0 *	13 persons +
24	3.05 m	70.55 m	Residential	13.0 persons	1.0 *	13 persons +
23	3.05 m	67.50 m	Residential	10.0 persons	1.0 *	10 persons +
22	3.05 m	64.45 m	Residential	13.0 persons	1.0 *	13 persons +
21	3.05 m	61.40 m	Residential	13.0 persons	1.0 *	13 persons +
20	3.05 m	58.35 m	Residential	13.0 persons	1.0 *	13 persons +
19	3.05 m	55.30 m	Residential	13.0 persons	1.0 *	13 persons +
18	3.05 m	52.25 m	Residential	10.0 persons	1.0 *	10 persons +
17	3.05 m	49.20 m	Residential	13.0 persons	1.0 *	13 persons +
16	3.05 m	46.15 m	Residential	13.0 persons	1.0 *	13 persons +
15	3.05 m	43.10 m	Residential	13.0 persons	1.0 *	13 persons +
14	3.05 m	40.05 m	Residential	13.0 persons	1.0 *	13 persons +
13	3.05 m	37.00 m	Residential	10.0 persons	1.0 *	10 persons +
12	3.05 m	33.95 m	Residential	13.0 persons	1.0 *	13 persons +
11	3.05 m	30.90 m	Residential	13.0 persons	1.0 *	13 persons +
10	3.05 m	27.85 m	Residential	13.0 persons	1.0 *	13 persons +
9	3.05 m	24.80 m	Residential	13.0 persons	1.0 *	13 persons +
8	3.05 m	21.75 m	Residential	10.0 persons	1.0 *	10 persons +
7	3.05 m	18.70 m	Residential	13.0 persons	1.0 *	13 persons +
6	3.05 m	15.65 m	Residential	13.0 persons	1.0 *	13 persons +
5	3.05 m	12.60 m	Residential	13.0 persons	1.0 *	13 persons +
4	3.05 m	9.55 m	Residential	13.0 persons	1.0 *	13 persons +
3	3.05 m	6.50 m	Residential	13.0 persons	1.0 *	13 persons +
2	3.05 m	3.45 m	Residential	13.0 persons	1.0 *	13 persons +
1	3.05 m	0.40 m	Residential	13.0 persons	1.0 *	13 persons +
P0	3.40 m	-3.00 m	Residential	6.0 persons	1.0 *	6 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.2.2 Elevators

Control: Conventional

		1	2	3
Elevator		A	B	C
Rated Load	[kg]	680	680	680
Weight per Person	[kg]	68	68	68
Pass./Deck gross		10	10	10
Max. Car Filling		80 %	80 %	80 %
Pass./Deck net		8	8	8
Drive Type				
Max. Speed	[m/s]	2.50	2.50	2.50
Max. Acceleration	[m/s2]	1.00	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00	1.00
Door Type				
Door Width	[mm]	800	800	800
Opening Time	[s]	2.3	2.3	2.3
Closing Time	[s]	2.5	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0	1.0
Number of Decks		1	1	1
Travel Height	[m]	121.65	121.65	121.65
34 Residential				
33 Residential				
32 Residential				
31 Residential				
30 Residential				
29 Residential				
28 Residential				
27 Residential				
26 Residential				
25 Residential				
24 Residential				
23 Residential				
22 Residential				
21 Residential				
20 Residential				
19 Residential				
18 Residential				
17 Residential				
16 Residential				
15 Residential				
14 Residential				
13 Residential				
12 Residential				
11 Residential				
10 Residential				
9 Residential				
8 Residential				
7 Residential				
6 Residential				
5 Residential				
4 Residential				
3 Residential				
2 Residential				
1 Residential				
P0 Residential				
P3 Residential				
P2 Residential				
P1 Residential				
G Lobby				
B1 Residential				
B2 Residential				

3.2.3 Two-Way Residential

3.2.3.1 Traffic Definition

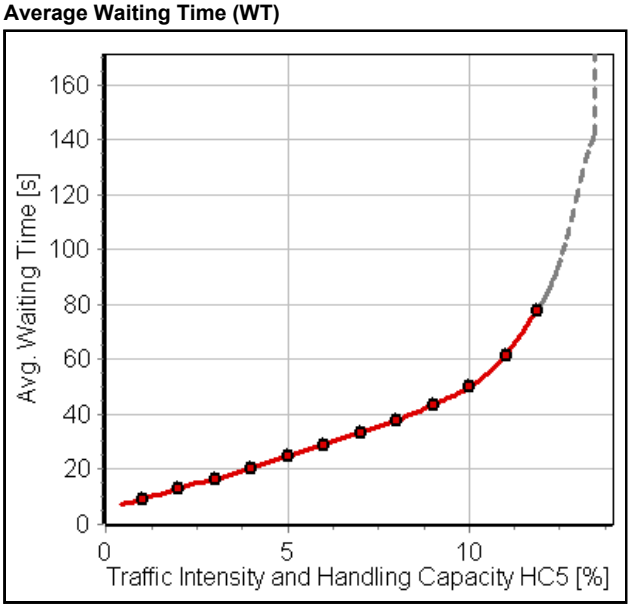
Population served by elevators: 430

Passenger Flows

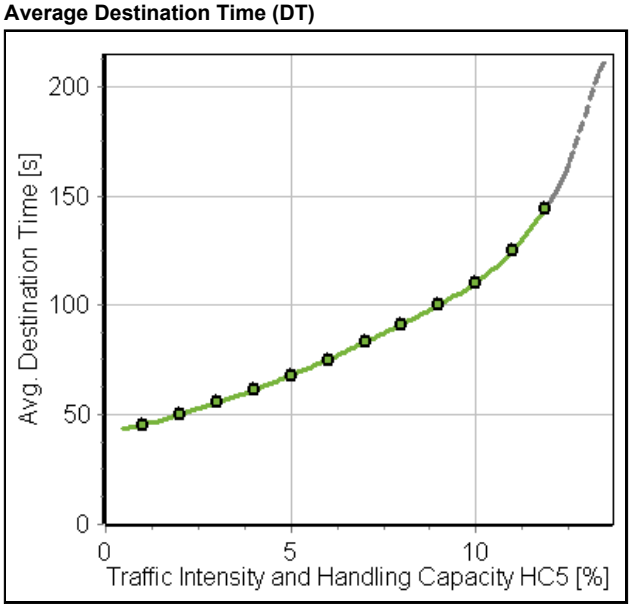
Floor	Description	Incoming 50 %	Outgoing 50 %
34	Residential	3.0 %	3.0 %
33	Residential	2.3 %	2.3 %
32	Residential	3.0 %	3.0 %
31	Residential	3.0 %	3.0 %
30	Residential	3.0 %	3.0 %
29	Residential	3.0 %	3.0 %
28	Residential	2.3 %	2.3 %
27	Residential	3.0 %	3.0 %
26	Residential	3.0 %	3.0 %
25	Residential	3.0 %	3.0 %
24	Residential	3.0 %	3.0 %
23	Residential	2.3 %	2.3 %
22	Residential	3.0 %	3.0 %
21	Residential	3.0 %	3.0 %
20	Residential	3.0 %	3.0 %
19	Residential	3.0 %	3.0 %
18	Residential	2.3 %	2.3 %
17	Residential	3.0 %	3.0 %
16	Residential	3.0 %	3.0 %
15	Residential	3.0 %	3.0 %
14	Residential	3.0 %	3.0 %
13	Residential	2.3 %	2.3 %
12	Residential	3.0 %	3.0 %
11	Residential	3.0 %	3.0 %
10	Residential	3.0 %	3.0 %
9	Residential	3.0 %	3.0 %
8	Residential	2.3 %	2.3 %
7	Residential	3.0 %	3.0 %
6	Residential	3.0 %	3.0 %
5	Residential	3.0 %	3.0 %
4	Residential	3.0 %	3.0 %
3	Residential	3.0 %	3.0 %
2	Residential	3.0 %	3.0 %
1	Residential	3.0 %	3.0 %
P0	Residential	1.4 %	1.4 %
P3	Residential		
P2	Residential		
P1	Residential		
G	Lobby	100.0 %	100.0 %
B1	Residential		
B2	Residential		

3.2.3.2 Performance

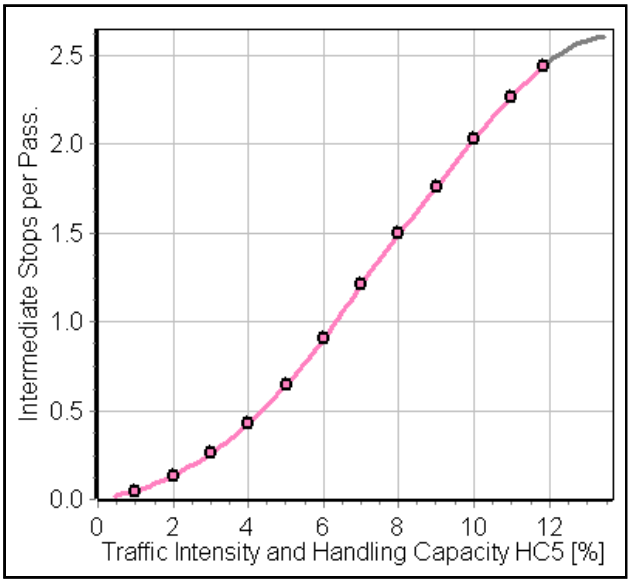
Average Waiting Time (WT)



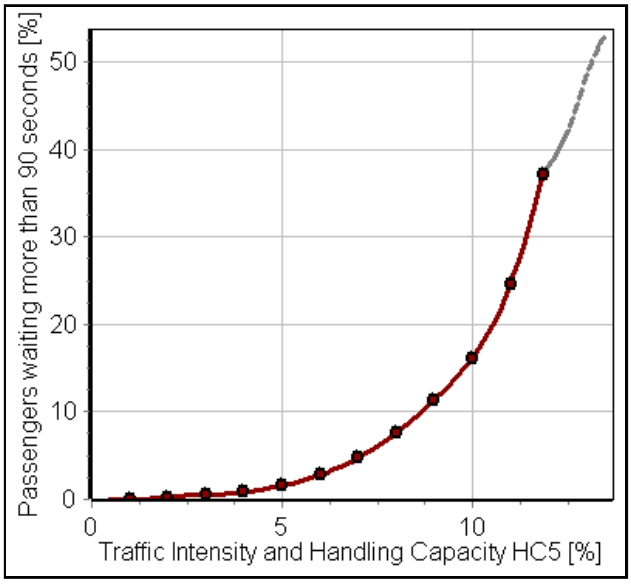
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	11.9
P5	4.3	8.6	12.9	17.2	21.5	25.8	30.1	34.4	38.7	43.0	47.3	51.0
WT [s]	9.1	13.0	16.5	20.3	24.7	28.9	33.4	37.9	43.4	50.1	61.6	77.9
DT [s]	45.4	50.3	55.5	61.2	68.0	75.1	83.2	91.4	100.2	110.4	125.2	144.0
IS	0.0	0.1	0.3	0.4	0.6	0.9	1.2	1.5	1.8	2.0	2.3	2.4
LW [%]	0.0	0.2	0.5	0.8	1.6	2.8	4.7	7.6	11.3	16.2	24.6	37.2

3.3 Tower E - Option 2 - 2 Units, 10 Pax, 3mps

3.3.1 Building and Population

Number of Floors: 41
Building Population: 430

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	13.0 persons	1.0 *	13 persons +
33	3.05 m	98.00 m	Residential	10.0 persons	1.0 *	10 persons +
32	3.05 m	94.95 m	Residential	13.0 persons	1.0 *	13 persons +
31	3.05 m	91.90 m	Residential	13.0 persons	1.0 *	13 persons +
30	3.05 m	88.85 m	Residential	13.0 persons	1.0 *	13 persons +
29	3.05 m	85.80 m	Residential	13.0 persons	1.0 *	13 persons +
28	3.05 m	82.75 m	Residential	10.0 persons	1.0 *	10 persons +
27	3.05 m	79.70 m	Residential	13.0 persons	1.0 *	13 persons +
26	3.05 m	76.65 m	Residential	13.0 persons	1.0 *	13 persons +
25	3.05 m	73.60 m	Residential	13.0 persons	1.0 *	13 persons +
24	3.05 m	70.55 m	Residential	13.0 persons	1.0 *	13 persons +
23	3.05 m	67.50 m	Residential	10.0 persons	1.0 *	10 persons +
22	3.05 m	64.45 m	Residential	13.0 persons	1.0 *	13 persons +
21	3.05 m	61.40 m	Residential	13.0 persons	1.0 *	13 persons +
20	3.05 m	58.35 m	Residential	13.0 persons	1.0 *	13 persons +
19	3.05 m	55.30 m	Residential	13.0 persons	1.0 *	13 persons +
18	3.05 m	52.25 m	Residential	10.0 persons	1.0 *	10 persons +
17	3.05 m	49.20 m	Residential	13.0 persons	1.0 *	13 persons +
16	3.05 m	46.15 m	Residential	13.0 persons	1.0 *	13 persons +
15	3.05 m	43.10 m	Residential	13.0 persons	1.0 *	13 persons +
14	3.05 m	40.05 m	Residential	13.0 persons	1.0 *	13 persons +
13	3.05 m	37.00 m	Residential	10.0 persons	1.0 *	10 persons +
12	3.05 m	33.95 m	Residential	13.0 persons	1.0 *	13 persons +
11	3.05 m	30.90 m	Residential	13.0 persons	1.0 *	13 persons +
10	3.05 m	27.85 m	Residential	13.0 persons	1.0 *	13 persons +
9	3.05 m	24.80 m	Residential	13.0 persons	1.0 *	13 persons +
8	3.05 m	21.75 m	Residential	10.0 persons	1.0 *	10 persons +
7	3.05 m	18.70 m	Residential	13.0 persons	1.0 *	13 persons +
6	3.05 m	15.65 m	Residential	13.0 persons	1.0 *	13 persons +
5	3.05 m	12.60 m	Residential	13.0 persons	1.0 *	13 persons +
4	3.05 m	9.55 m	Residential	13.0 persons	1.0 *	13 persons +
3	3.05 m	6.50 m	Residential	13.0 persons	1.0 *	13 persons +
2	3.05 m	3.45 m	Residential	13.0 persons	1.0 *	13 persons +
1	3.05 m	0.40 m	Residential	13.0 persons	1.0 *	13 persons +
P0	3.40 m	-3.00 m	Residential	6.0 persons	1.0 *	6 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.3.2 Elevators

Control: Conventional

		1	2
Elevator		A	B
Rated Load	[kg]	680	680
Weight per Person	[kg]	68	68
Pass./Deck gross		10	10
Max. Car Filling		80 %	80 %
Pass./Deck net		8	8
Drive Type			
Max. Speed	[m/s]	3.00	3.00
Max. Acceleration	[m/s2]	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00
Door Type			
Door Width	[mm]	800	800
Opening Time	[s]	2.3	2.3
Closing Time	[s]	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0
Number of Decks		1	1
Travel Height	[m]	121.65	121.65
34 Residential			
33 Residential			
32 Residential			
31 Residential			
30 Residential			
29 Residential			
28 Residential			
27 Residential			
26 Residential			
25 Residential			
24 Residential			
23 Residential			
22 Residential			
21 Residential			
20 Residential			
19 Residential			
18 Residential			
17 Residential			
16 Residential			
15 Residential			
14 Residential			
13 Residential			
12 Residential			
11 Residential			
10 Residential			
9 Residential			
8 Residential			
7 Residential			
6 Residential			
5 Residential			
4 Residential			
3 Residential			
2 Residential			
1 Residential			
P0 Residential			
P3 Residential			
P2 Residential			
P1 Residential			
G Lobby			
B1 Residential			
B2 Residential			

3.3.3 Two-Way Residential

3.3.3.1 Traffic Definition

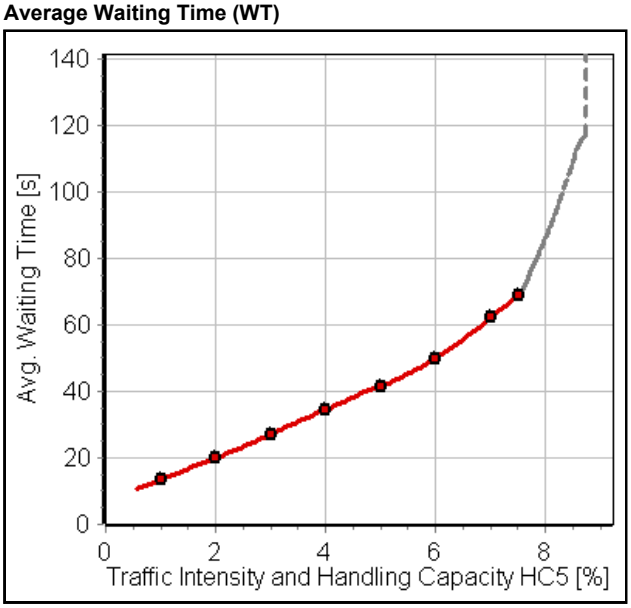
Population served by elevators: 430

Passenger Flows

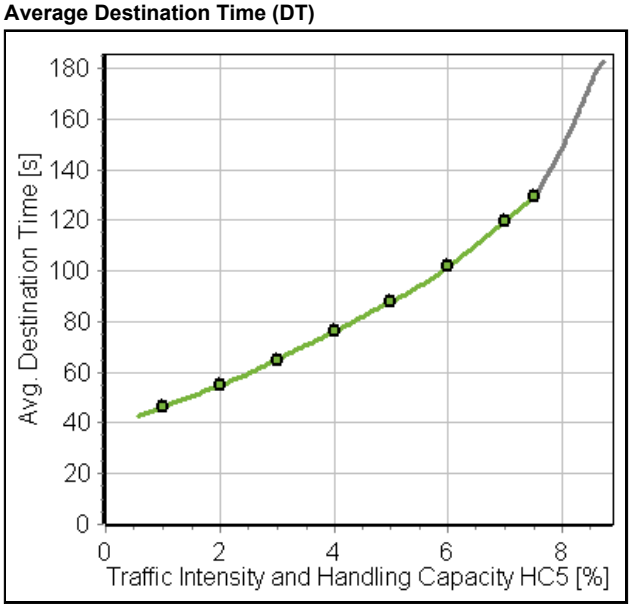
Floor	Description	Incoming 50 %	Outgoing 50 %
34	Residential	3.0 %	3.0 %
33	Residential	2.3 %	2.3 %
32	Residential	3.0 %	3.0 %
31	Residential	3.0 %	3.0 %
30	Residential	3.0 %	3.0 %
29	Residential	3.0 %	3.0 %
28	Residential	2.3 %	2.3 %
27	Residential	3.0 %	3.0 %
26	Residential	3.0 %	3.0 %
25	Residential	3.0 %	3.0 %
24	Residential	3.0 %	3.0 %
23	Residential	2.3 %	2.3 %
22	Residential	3.0 %	3.0 %
21	Residential	3.0 %	3.0 %
20	Residential	3.0 %	3.0 %
19	Residential	3.0 %	3.0 %
18	Residential	2.3 %	2.3 %
17	Residential	3.0 %	3.0 %
16	Residential	3.0 %	3.0 %
15	Residential	3.0 %	3.0 %
14	Residential	3.0 %	3.0 %
13	Residential	2.3 %	2.3 %
12	Residential	3.0 %	3.0 %
11	Residential	3.0 %	3.0 %
10	Residential	3.0 %	3.0 %
9	Residential	3.0 %	3.0 %
8	Residential	2.3 %	2.3 %
7	Residential	3.0 %	3.0 %
6	Residential	3.0 %	3.0 %
5	Residential	3.0 %	3.0 %
4	Residential	3.0 %	3.0 %
3	Residential	3.0 %	3.0 %
2	Residential	3.0 %	3.0 %
1	Residential	3.0 %	3.0 %
P0	Residential	1.4 %	1.4 %
P3	Residential		
P2	Residential		
P1	Residential		
G	Lobby	100.0 %	100.0 %
B1	Residential		
B2	Residential		

3.3.3.2 Performance

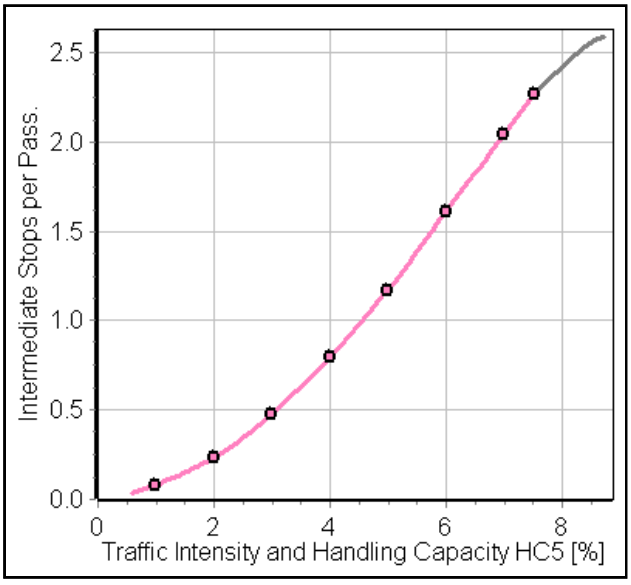
Average Waiting Time (WT)



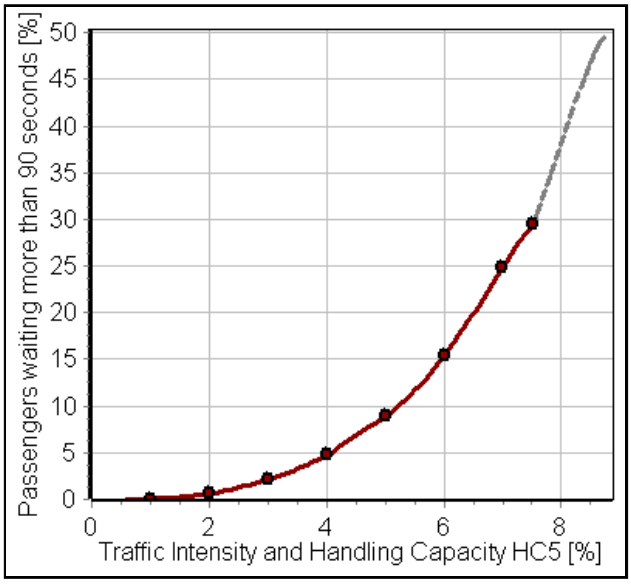
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	1.0	2.0	3.0	4.0	5.0	6.0	7.0	7.5
P5	4.3	8.6	12.9	17.2	21.5	25.8	30.1	32.3
WT [s]	13.3	19.9	27.2	34.4	41.6	49.9	62.2	69.0
DT [s]	46.1	54.7	64.9	76.1	88.0	101.8	119.7	129.5
IS	0.1	0.2	0.5	0.8	1.2	1.6	2.0	2.3
LW [%]	0.1	0.6	2.1	4.7	8.9	15.4	24.8	29.5

3.4 Tower E - Option 2 - 3 Units, 10 Pax, 3mps

3.4.1 Building and Population

Number of Floors: 41
Building Population: 430

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	13.0 persons	1.0 *	13 persons +
33	3.05 m	98.00 m	Residential	10.0 persons	1.0 *	10 persons +
32	3.05 m	94.95 m	Residential	13.0 persons	1.0 *	13 persons +
31	3.05 m	91.90 m	Residential	13.0 persons	1.0 *	13 persons +
30	3.05 m	88.85 m	Residential	13.0 persons	1.0 *	13 persons +
29	3.05 m	85.80 m	Residential	13.0 persons	1.0 *	13 persons +
28	3.05 m	82.75 m	Residential	10.0 persons	1.0 *	10 persons +
27	3.05 m	79.70 m	Residential	13.0 persons	1.0 *	13 persons +
26	3.05 m	76.65 m	Residential	13.0 persons	1.0 *	13 persons +
25	3.05 m	73.60 m	Residential	13.0 persons	1.0 *	13 persons +
24	3.05 m	70.55 m	Residential	13.0 persons	1.0 *	13 persons +
23	3.05 m	67.50 m	Residential	10.0 persons	1.0 *	10 persons +
22	3.05 m	64.45 m	Residential	13.0 persons	1.0 *	13 persons +
21	3.05 m	61.40 m	Residential	13.0 persons	1.0 *	13 persons +
20	3.05 m	58.35 m	Residential	13.0 persons	1.0 *	13 persons +
19	3.05 m	55.30 m	Residential	13.0 persons	1.0 *	13 persons +
18	3.05 m	52.25 m	Residential	10.0 persons	1.0 *	10 persons +
17	3.05 m	49.20 m	Residential	13.0 persons	1.0 *	13 persons +
16	3.05 m	46.15 m	Residential	13.0 persons	1.0 *	13 persons +
15	3.05 m	43.10 m	Residential	13.0 persons	1.0 *	13 persons +
14	3.05 m	40.05 m	Residential	13.0 persons	1.0 *	13 persons +
13	3.05 m	37.00 m	Residential	10.0 persons	1.0 *	10 persons +
12	3.05 m	33.95 m	Residential	13.0 persons	1.0 *	13 persons +
11	3.05 m	30.90 m	Residential	13.0 persons	1.0 *	13 persons +
10	3.05 m	27.85 m	Residential	13.0 persons	1.0 *	13 persons +
9	3.05 m	24.80 m	Residential	13.0 persons	1.0 *	13 persons +
8	3.05 m	21.75 m	Residential	10.0 persons	1.0 *	10 persons +
7	3.05 m	18.70 m	Residential	13.0 persons	1.0 *	13 persons +
6	3.05 m	15.65 m	Residential	13.0 persons	1.0 *	13 persons +
5	3.05 m	12.60 m	Residential	13.0 persons	1.0 *	13 persons +
4	3.05 m	9.55 m	Residential	13.0 persons	1.0 *	13 persons +
3	3.05 m	6.50 m	Residential	13.0 persons	1.0 *	13 persons +
2	3.05 m	3.45 m	Residential	13.0 persons	1.0 *	13 persons +
1	3.05 m	0.40 m	Residential	13.0 persons	1.0 *	13 persons +
P0	3.40 m	-3.00 m	Residential	6.0 persons	1.0 *	6 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.4.2 Elevators

Control: Conventional

		1	2	3
Elevator		A	B	C
Rated Load	[kg]	680	680	680
Weight per Person	[kg]	68	68	68
Pass./Deck gross		10	10	10
Max. Car Filling		80 %	80 %	80 %
Pass./Deck net		8	8	8
Drive Type				
Max. Speed	[m/s]	3.00	3.00	3.00
Max. Acceleration	[m/s2]	1.00	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00	1.00
Door Type				
Door Width	[mm]	800	800	800
Opening Time	[s]	2.3	2.3	2.3
Closing Time	[s]	2.5	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0	1.0
Number of Decks		1	1	1
Travel Height	[m]	121.65	121.65	121.65
34 Residential				
33 Residential				
32 Residential				
31 Residential				
30 Residential				
29 Residential				
28 Residential				
27 Residential				
26 Residential				
25 Residential				
24 Residential				
23 Residential				
22 Residential				
21 Residential				
20 Residential				
19 Residential				
18 Residential				
17 Residential				
16 Residential				
15 Residential				
14 Residential				
13 Residential				
12 Residential				
11 Residential				
10 Residential				
9 Residential				
8 Residential				
7 Residential				
6 Residential				
5 Residential				
4 Residential				
3 Residential				
2 Residential				
1 Residential				
P0 Residential				
P3 Residential				
P2 Residential				
P1 Residential				
G Lobby				
B1 Residential				
B2 Residential				

3.4.3 Two-Way Residential

3.4.3.1 Traffic Definition

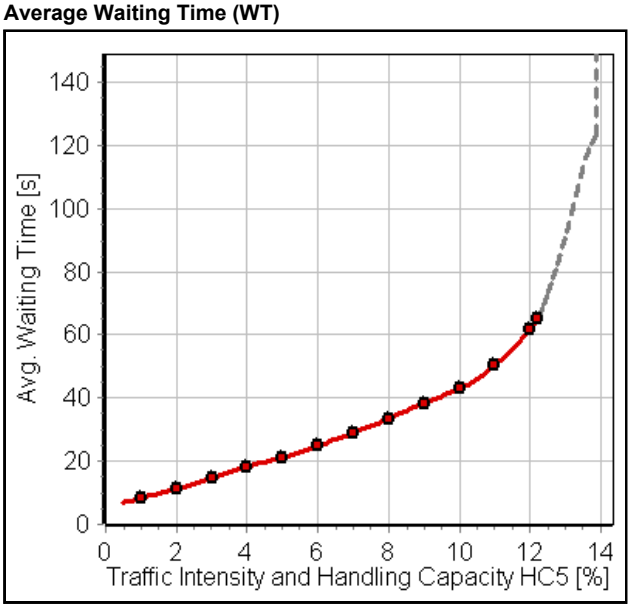
Population served by elevators: 430

Passenger Flows

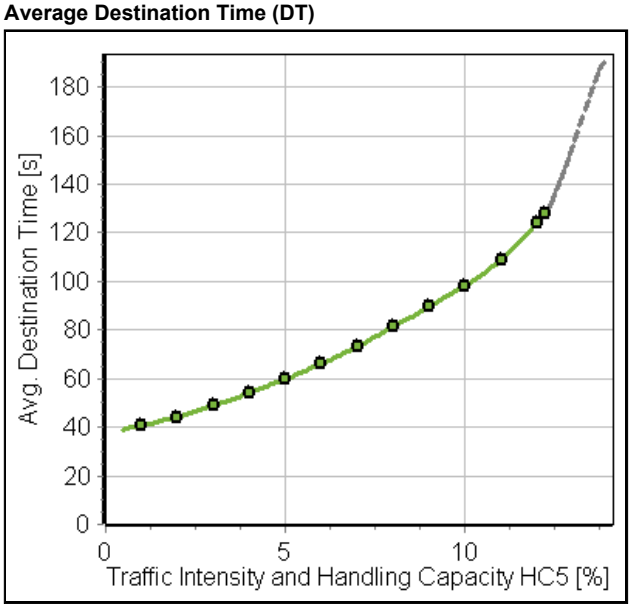
Floor	Description	Incoming 50 %	Outgoing 50 %
34	Residential	3.0 %	3.0 %
33	Residential	2.3 %	2.3 %
32	Residential	3.0 %	3.0 %
31	Residential	3.0 %	3.0 %
30	Residential	3.0 %	3.0 %
29	Residential	3.0 %	3.0 %
28	Residential	2.3 %	2.3 %
27	Residential	3.0 %	3.0 %
26	Residential	3.0 %	3.0 %
25	Residential	3.0 %	3.0 %
24	Residential	3.0 %	3.0 %
23	Residential	2.3 %	2.3 %
22	Residential	3.0 %	3.0 %
21	Residential	3.0 %	3.0 %
20	Residential	3.0 %	3.0 %
19	Residential	3.0 %	3.0 %
18	Residential	2.3 %	2.3 %
17	Residential	3.0 %	3.0 %
16	Residential	3.0 %	3.0 %
15	Residential	3.0 %	3.0 %
14	Residential	3.0 %	3.0 %
13	Residential	2.3 %	2.3 %
12	Residential	3.0 %	3.0 %
11	Residential	3.0 %	3.0 %
10	Residential	3.0 %	3.0 %
9	Residential	3.0 %	3.0 %
8	Residential	2.3 %	2.3 %
7	Residential	3.0 %	3.0 %
6	Residential	3.0 %	3.0 %
5	Residential	3.0 %	3.0 %
4	Residential	3.0 %	3.0 %
3	Residential	3.0 %	3.0 %
2	Residential	3.0 %	3.0 %
1	Residential	3.0 %	3.0 %
P0	Residential	1.4 %	1.4 %
P3	Residential		
P2	Residential		
P1	Residential		
G	Lobby	100.0 %	100.0 %
B1	Residential		
B2	Residential		

3.4.3.2 Performance

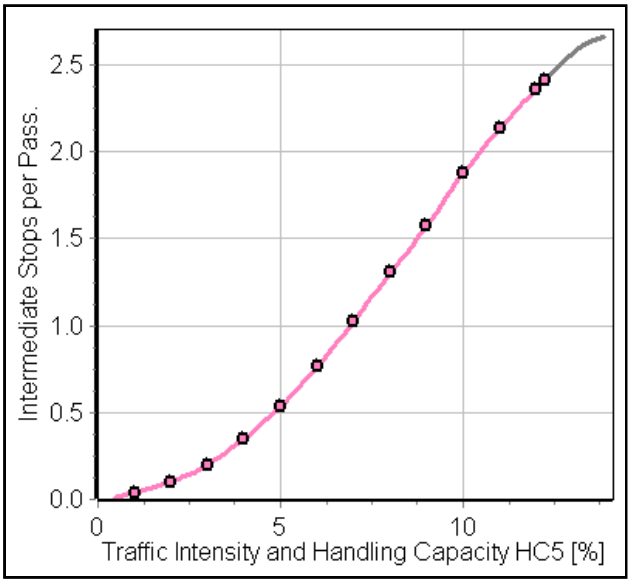
Average Waiting Time (WT)



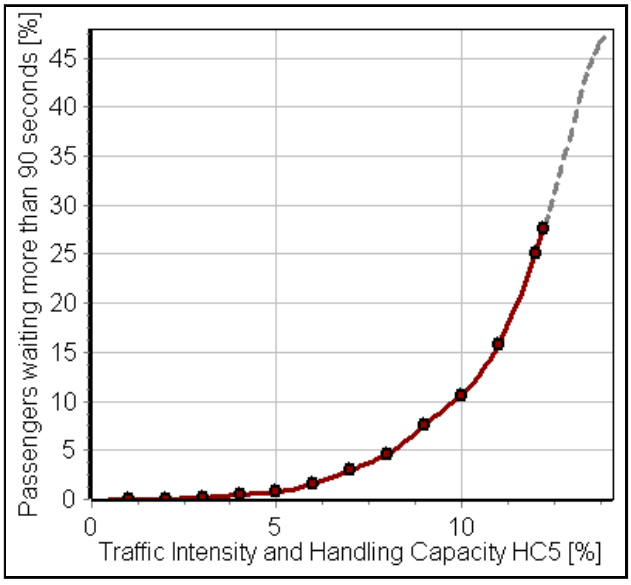
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.2
P5	4.3	8.6	12.9	17.2	21.5	25.8	30.1	34.4	38.7	43.0	47.3	51.6	52.5
WT [s]	8.3	11.2	14.5	18.2	21.2	24.8	28.9	33.4	38.3	42.9	50.3	61.9	65.0
DT [s]	40.7	44.2	48.7	54.2	59.7	66.0	73.4	81.4	89.8	98.3	109.0	123.9	127.6
IS	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.3	1.6	1.9	2.1	2.4	2.4
LW [%]	0.0	0.0	0.2	0.5	0.7	1.6	3.0	4.6	7.5	10.6	15.8	25.0	27.6

3.5 Tower E - Option 2 - 2 Units, 10 Pax, 3.5mps

3.5.1 Building and Population

Number of Floors: 41
Building Population: 430

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	13.0 persons	1.0 *	13 persons +
33	3.05 m	98.00 m	Residential	10.0 persons	1.0 *	10 persons +
32	3.05 m	94.95 m	Residential	13.0 persons	1.0 *	13 persons +
31	3.05 m	91.90 m	Residential	13.0 persons	1.0 *	13 persons +
30	3.05 m	88.85 m	Residential	13.0 persons	1.0 *	13 persons +
29	3.05 m	85.80 m	Residential	13.0 persons	1.0 *	13 persons +
28	3.05 m	82.75 m	Residential	10.0 persons	1.0 *	10 persons +
27	3.05 m	79.70 m	Residential	13.0 persons	1.0 *	13 persons +
26	3.05 m	76.65 m	Residential	13.0 persons	1.0 *	13 persons +
25	3.05 m	73.60 m	Residential	13.0 persons	1.0 *	13 persons +
24	3.05 m	70.55 m	Residential	13.0 persons	1.0 *	13 persons +
23	3.05 m	67.50 m	Residential	10.0 persons	1.0 *	10 persons +
22	3.05 m	64.45 m	Residential	13.0 persons	1.0 *	13 persons +
21	3.05 m	61.40 m	Residential	13.0 persons	1.0 *	13 persons +
20	3.05 m	58.35 m	Residential	13.0 persons	1.0 *	13 persons +
19	3.05 m	55.30 m	Residential	13.0 persons	1.0 *	13 persons +
18	3.05 m	52.25 m	Residential	10.0 persons	1.0 *	10 persons +
17	3.05 m	49.20 m	Residential	13.0 persons	1.0 *	13 persons +
16	3.05 m	46.15 m	Residential	13.0 persons	1.0 *	13 persons +
15	3.05 m	43.10 m	Residential	13.0 persons	1.0 *	13 persons +
14	3.05 m	40.05 m	Residential	13.0 persons	1.0 *	13 persons +
13	3.05 m	37.00 m	Residential	10.0 persons	1.0 *	10 persons +
12	3.05 m	33.95 m	Residential	13.0 persons	1.0 *	13 persons +
11	3.05 m	30.90 m	Residential	13.0 persons	1.0 *	13 persons +
10	3.05 m	27.85 m	Residential	13.0 persons	1.0 *	13 persons +
9	3.05 m	24.80 m	Residential	13.0 persons	1.0 *	13 persons +
8	3.05 m	21.75 m	Residential	10.0 persons	1.0 *	10 persons +
7	3.05 m	18.70 m	Residential	13.0 persons	1.0 *	13 persons +
6	3.05 m	15.65 m	Residential	13.0 persons	1.0 *	13 persons +
5	3.05 m	12.60 m	Residential	13.0 persons	1.0 *	13 persons +
4	3.05 m	9.55 m	Residential	13.0 persons	1.0 *	13 persons +
3	3.05 m	6.50 m	Residential	13.0 persons	1.0 *	13 persons +
2	3.05 m	3.45 m	Residential	13.0 persons	1.0 *	13 persons +
1	3.05 m	0.40 m	Residential	13.0 persons	1.0 *	13 persons +
P0	3.40 m	-3.00 m	Residential	6.0 persons	1.0 *	6 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.5.2 Elevators

Control: Conventional

		1	2
Elevator		A	B
Rated Load	[kg]	680	680
Weight per Person	[kg]	68	68
Pass./Deck gross		10	10
Max. Car Filling		80 %	80 %
Pass./Deck net		8	8
Drive Type			
Max. Speed	[m/s]	3.50	3.50
Max. Acceleration	[m/s2]	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00
Door Type			
Door Width	[mm]	800	800
Opening Time	[s]	2.3	2.3
Closing Time	[s]	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0
Number of Decks		1	1
Travel Height	[m]	121.65	121.65
34 Residential			
33 Residential			
32 Residential			
31 Residential			
30 Residential			
29 Residential			
28 Residential			
27 Residential			
26 Residential			
25 Residential			
24 Residential			
23 Residential			
22 Residential			
21 Residential			
20 Residential			
19 Residential			
18 Residential			
17 Residential			
16 Residential			
15 Residential			
14 Residential			
13 Residential			
12 Residential			
11 Residential			
10 Residential			
9 Residential			
8 Residential			
7 Residential			
6 Residential			
5 Residential			
4 Residential			
3 Residential			
2 Residential			
1 Residential			
P0 Residential			
P3 Residential			
P2 Residential			
P1 Residential			
G Lobby			
B1 Residential			
B2 Residential			

3.5.3 Two-Way Residential

3.5.3.1 Traffic Definition

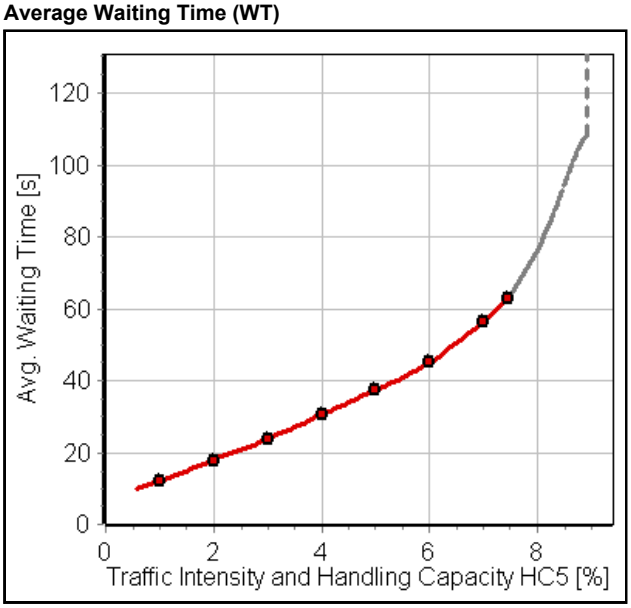
Population served by elevators: 430

Passenger Flows

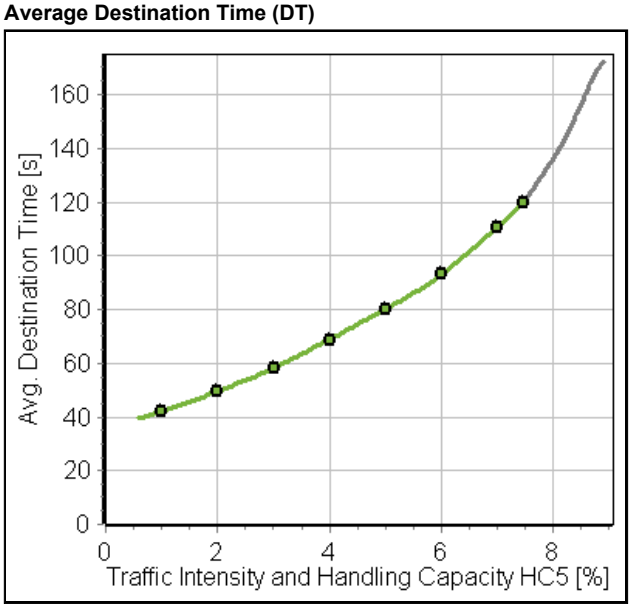
Floor	Description	Incoming 50 %	Outgoing 50 %
34	Residential	3.0 %	3.0 %
33	Residential	2.3 %	2.3 %
32	Residential	3.0 %	3.0 %
31	Residential	3.0 %	3.0 %
30	Residential	3.0 %	3.0 %
29	Residential	3.0 %	3.0 %
28	Residential	2.3 %	2.3 %
27	Residential	3.0 %	3.0 %
26	Residential	3.0 %	3.0 %
25	Residential	3.0 %	3.0 %
24	Residential	3.0 %	3.0 %
23	Residential	2.3 %	2.3 %
22	Residential	3.0 %	3.0 %
21	Residential	3.0 %	3.0 %
20	Residential	3.0 %	3.0 %
19	Residential	3.0 %	3.0 %
18	Residential	2.3 %	2.3 %
17	Residential	3.0 %	3.0 %
16	Residential	3.0 %	3.0 %
15	Residential	3.0 %	3.0 %
14	Residential	3.0 %	3.0 %
13	Residential	2.3 %	2.3 %
12	Residential	3.0 %	3.0 %
11	Residential	3.0 %	3.0 %
10	Residential	3.0 %	3.0 %
9	Residential	3.0 %	3.0 %
8	Residential	2.3 %	2.3 %
7	Residential	3.0 %	3.0 %
6	Residential	3.0 %	3.0 %
5	Residential	3.0 %	3.0 %
4	Residential	3.0 %	3.0 %
3	Residential	3.0 %	3.0 %
2	Residential	3.0 %	3.0 %
1	Residential	3.0 %	3.0 %
P0	Residential	1.4 %	1.4 %
P3	Residential		
P2	Residential		
P1	Residential		
G	Lobby	100.0 %	100.0 %
B1	Residential		
B2	Residential		

3.5.3.2 Performance

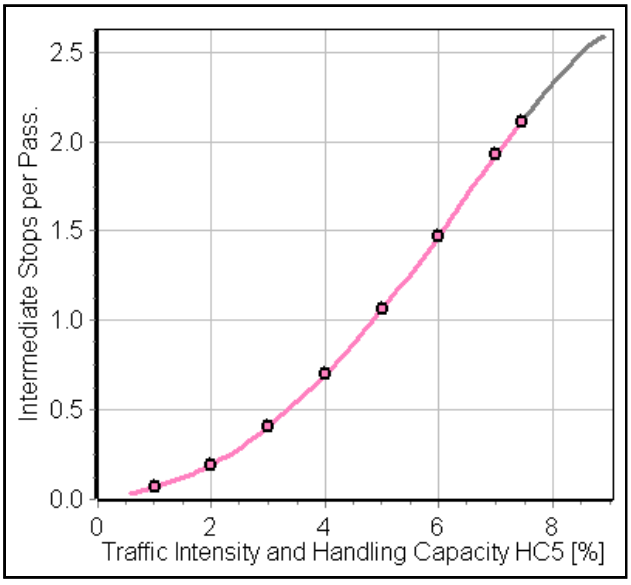
Average Waiting Time (WT)



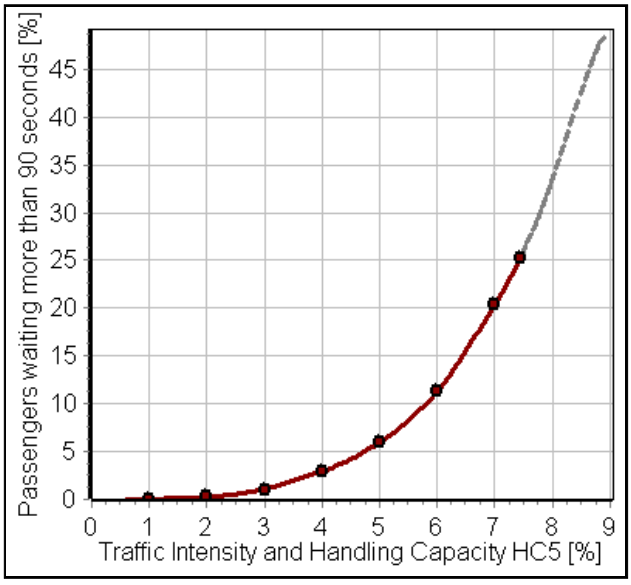
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	1.0	2.0	3.0	4.0	5.0	6.0	7.0	7.5
P5	4.3	8.6	12.9	17.2	21.5	25.8	30.1	32.1
WT [s]	12.0	17.8	23.7	30.5	37.4	45.1	56.4	62.8
DT [s]	42.0	49.5	58.1	68.8	80.3	93.3	110.7	119.7
IS	0.1	0.2	0.4	0.7	1.1	1.5	1.9	2.1
LW [%]	0.0	0.3	1.0	3.0	6.0	11.3	20.3	25.2

3.6 Tower E - Option 2 - 3 Units, 10 Pax, 3.5mps

3.6.1 Building and Population

Number of Floors: 41
Building Population: 430

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	13.0 persons	1.0 *	13 persons +
33	3.05 m	98.00 m	Residential	10.0 persons	1.0 *	10 persons +
32	3.05 m	94.95 m	Residential	13.0 persons	1.0 *	13 persons +
31	3.05 m	91.90 m	Residential	13.0 persons	1.0 *	13 persons +
30	3.05 m	88.85 m	Residential	13.0 persons	1.0 *	13 persons +
29	3.05 m	85.80 m	Residential	13.0 persons	1.0 *	13 persons +
28	3.05 m	82.75 m	Residential	10.0 persons	1.0 *	10 persons +
27	3.05 m	79.70 m	Residential	13.0 persons	1.0 *	13 persons +
26	3.05 m	76.65 m	Residential	13.0 persons	1.0 *	13 persons +
25	3.05 m	73.60 m	Residential	13.0 persons	1.0 *	13 persons +
24	3.05 m	70.55 m	Residential	13.0 persons	1.0 *	13 persons +
23	3.05 m	67.50 m	Residential	10.0 persons	1.0 *	10 persons +
22	3.05 m	64.45 m	Residential	13.0 persons	1.0 *	13 persons +
21	3.05 m	61.40 m	Residential	13.0 persons	1.0 *	13 persons +
20	3.05 m	58.35 m	Residential	13.0 persons	1.0 *	13 persons +
19	3.05 m	55.30 m	Residential	13.0 persons	1.0 *	13 persons +
18	3.05 m	52.25 m	Residential	10.0 persons	1.0 *	10 persons +
17	3.05 m	49.20 m	Residential	13.0 persons	1.0 *	13 persons +
16	3.05 m	46.15 m	Residential	13.0 persons	1.0 *	13 persons +
15	3.05 m	43.10 m	Residential	13.0 persons	1.0 *	13 persons +
14	3.05 m	40.05 m	Residential	13.0 persons	1.0 *	13 persons +
13	3.05 m	37.00 m	Residential	10.0 persons	1.0 *	10 persons +
12	3.05 m	33.95 m	Residential	13.0 persons	1.0 *	13 persons +
11	3.05 m	30.90 m	Residential	13.0 persons	1.0 *	13 persons +
10	3.05 m	27.85 m	Residential	13.0 persons	1.0 *	13 persons +
9	3.05 m	24.80 m	Residential	13.0 persons	1.0 *	13 persons +
8	3.05 m	21.75 m	Residential	10.0 persons	1.0 *	10 persons +
7	3.05 m	18.70 m	Residential	13.0 persons	1.0 *	13 persons +
6	3.05 m	15.65 m	Residential	13.0 persons	1.0 *	13 persons +
5	3.05 m	12.60 m	Residential	13.0 persons	1.0 *	13 persons +
4	3.05 m	9.55 m	Residential	13.0 persons	1.0 *	13 persons +
3	3.05 m	6.50 m	Residential	13.0 persons	1.0 *	13 persons +
2	3.05 m	3.45 m	Residential	13.0 persons	1.0 *	13 persons +
1	3.05 m	0.40 m	Residential	13.0 persons	1.0 *	13 persons +
P0	3.40 m	-3.00 m	Residential	6.0 persons	1.0 *	6 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.6.2 Elevators

Control: Conventional

		1	2	3
Elevator		A	B	C
Rated Load	[kg]	680	680	680
Weight per Person	[kg]	68	68	68
Pass./Deck gross		10	10	10
Max. Car Filling		80 %	80 %	80 %
Pass./Deck net		8	8	8
Drive Type				
Max. Speed	[m/s]	3.50	3.50	3.50
Max. Acceleration	[m/s2]	1.00	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00	1.00
Door Type				
Door Width	[mm]	800	800	800
Opening Time	[s]	2.3	2.3	2.3
Closing Time	[s]	2.5	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0	1.0
Number of Decks		1	1	1
Travel Height	[m]	121.65	121.65	121.65
34 Residential				
33 Residential				
32 Residential				
31 Residential				
30 Residential				
29 Residential				
28 Residential				
27 Residential				
26 Residential				
25 Residential				
24 Residential				
23 Residential				
22 Residential				
21 Residential				
20 Residential				
19 Residential				
18 Residential				
17 Residential				
16 Residential				
15 Residential				
14 Residential				
13 Residential				
12 Residential				
11 Residential				
10 Residential				
9 Residential				
8 Residential				
7 Residential				
6 Residential				
5 Residential				
4 Residential				
3 Residential				
2 Residential				
1 Residential				
P0 Residential				
P3 Residential				
P2 Residential				
P1 Residential				
G Lobby				
B1 Residential				
B2 Residential				

3.6.3 Two-Way Residential

3.6.3.1 Traffic Definition

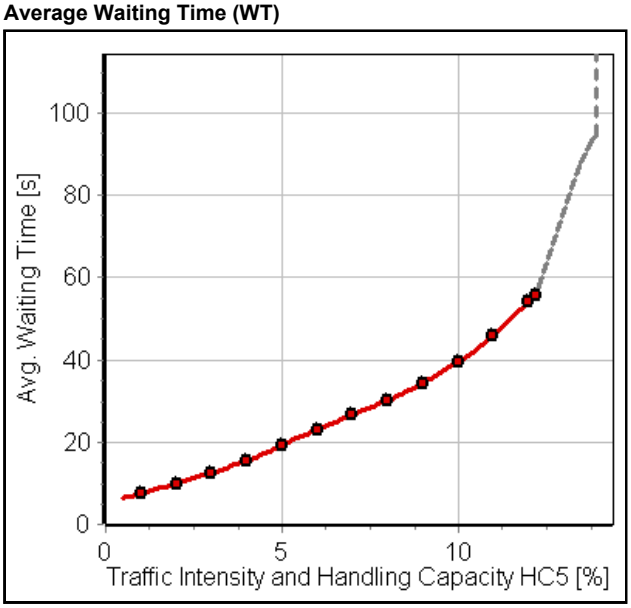
Population served by elevators: 430

Passenger Flows

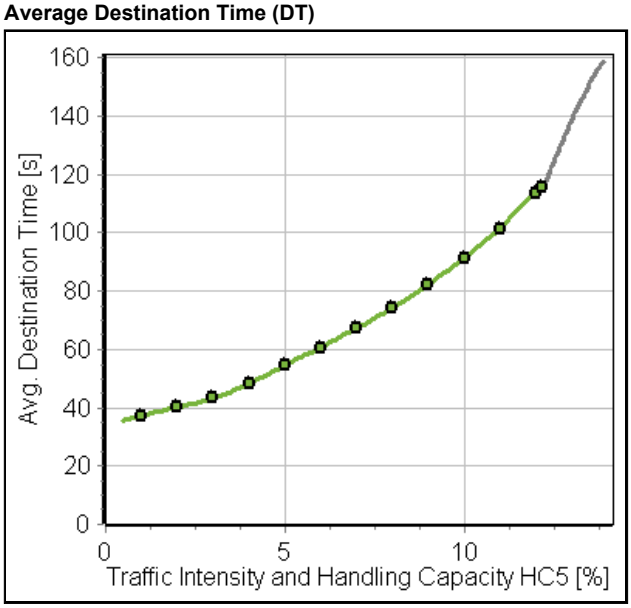
Floor	Description	Incoming 50 %		Outgoing 50 %	
34	Residential		3.0 %	3.0 %	
33	Residential		2.3 %	2.3 %	
32	Residential		3.0 %	3.0 %	
31	Residential		3.0 %	3.0 %	
30	Residential		3.0 %	3.0 %	
29	Residential		3.0 %	3.0 %	
28	Residential		2.3 %	2.3 %	
27	Residential		3.0 %	3.0 %	
26	Residential		3.0 %	3.0 %	
25	Residential		3.0 %	3.0 %	
24	Residential		3.0 %	3.0 %	
23	Residential		2.3 %	2.3 %	
22	Residential		3.0 %	3.0 %	
21	Residential		3.0 %	3.0 %	
20	Residential		3.0 %	3.0 %	
19	Residential		3.0 %	3.0 %	
18	Residential		2.3 %	2.3 %	
17	Residential		3.0 %	3.0 %	
16	Residential		3.0 %	3.0 %	
15	Residential		3.0 %	3.0 %	
14	Residential		3.0 %	3.0 %	
13	Residential		2.3 %	2.3 %	
12	Residential		3.0 %	3.0 %	
11	Residential		3.0 %	3.0 %	
10	Residential		3.0 %	3.0 %	
9	Residential		3.0 %	3.0 %	
8	Residential		2.3 %	2.3 %	
7	Residential		3.0 %	3.0 %	
6	Residential		3.0 %	3.0 %	
5	Residential		3.0 %	3.0 %	
4	Residential		3.0 %	3.0 %	
3	Residential		3.0 %	3.0 %	
2	Residential		3.0 %	3.0 %	
1	Residential		3.0 %	3.0 %	
P0	Residential		1.4 %	1.4 %	
P3	Residential				
P2	Residential				
P1	Residential				
G	Lobby	100.0 %			100.0 %
B1	Residential				
B2	Residential				

3.6.3.2 Performance

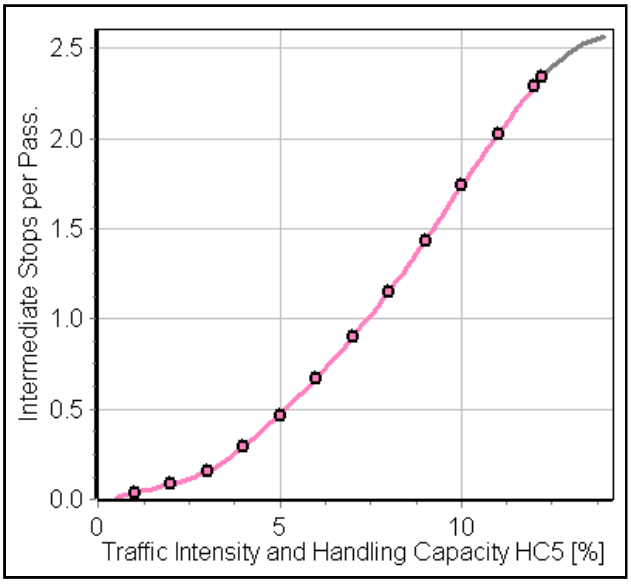
Average Waiting Time (WT)



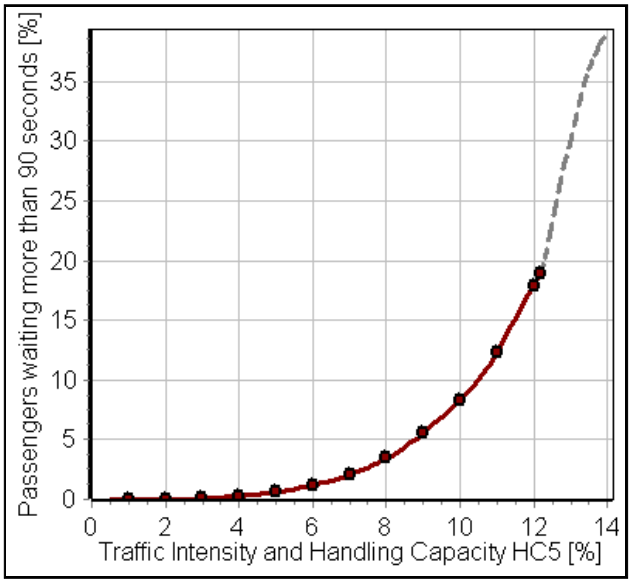
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.2
P5	4.3	8.6	12.9	17.2	21.5	25.8	30.1	34.4	38.7	43.0	47.3	51.6	52.4
WT [s]	7.5	9.9	12.5	15.5	19.2	23.0	26.6	30.1	34.4	39.5	45.8	54.0	55.5
DT [s]	37.2	40.2	43.3	48.3	54.5	60.7	67.3	74.1	82.1	91.3	101.5	113.5	115.7
IS	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.2	1.4	1.7	2.0	2.3	2.3
LW [%]	0.0	0.0	0.1	0.3	0.6	1.2	2.1	3.4	5.5	8.3	12.3	17.9	18.9

3.7 Tower F - Option 2 - 2 Units, 10 Pax, 2.5mps

3.7.1 Building and Population

Number of Floors: 41
Building Population: 862

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	25.0 persons	1.0 *	25 persons +
33	3.05 m	98.00 m	Residential	25.0 persons	1.0 *	25 persons +
32	3.05 m	94.95 m	Residential	25.0 persons	1.0 *	25 persons +
31	3.05 m	91.90 m	Residential	25.0 persons	1.0 *	25 persons +
30	3.05 m	88.85 m	Residential	25.0 persons	1.0 *	25 persons +
29	3.05 m	85.80 m	Residential	25.0 persons	1.0 *	25 persons +
28	3.05 m	82.75 m	Residential	25.0 persons	1.0 *	25 persons +
27	3.05 m	79.70 m	Residential	25.0 persons	1.0 *	25 persons +
26	3.05 m	76.65 m	Residential	25.0 persons	1.0 *	25 persons +
25	3.05 m	73.60 m	Residential	25.0 persons	1.0 *	25 persons +
24	3.05 m	70.55 m	Residential	25.0 persons	1.0 *	25 persons +
23	3.05 m	67.50 m	Residential	25.0 persons	1.0 *	25 persons +
22	3.05 m	64.45 m	Residential	25.0 persons	1.0 *	25 persons +
21	3.05 m	61.40 m	Residential	25.0 persons	1.0 *	25 persons +
20	3.05 m	58.35 m	Residential	25.0 persons	1.0 *	25 persons +
19	3.05 m	55.30 m	Residential	25.0 persons	1.0 *	25 persons +
18	3.05 m	52.25 m	Residential	25.0 persons	1.0 *	25 persons +
17	3.05 m	49.20 m	Residential	25.0 persons	1.0 *	25 persons +
16	3.05 m	46.15 m	Residential	25.0 persons	1.0 *	25 persons +
15	3.05 m	43.10 m	Residential	25.0 persons	1.0 *	25 persons +
14	3.05 m	40.05 m	Residential	25.0 persons	1.0 *	25 persons +
13	3.05 m	37.00 m	Residential	25.0 persons	1.0 *	25 persons +
12	3.05 m	33.95 m	Residential	25.0 persons	1.0 *	25 persons +
11	3.05 m	30.90 m	Residential	25.0 persons	1.0 *	25 persons +
10	3.05 m	27.85 m	Residential	25.0 persons	1.0 *	25 persons +
9	3.05 m	24.80 m	Residential	25.0 persons	1.0 *	25 persons +
8	3.05 m	21.75 m	Residential	25.0 persons	1.0 *	25 persons +
7	3.05 m	18.70 m	Residential	25.0 persons	1.0 *	25 persons +
6	3.05 m	15.65 m	Residential	25.0 persons	1.0 *	25 persons +
5	3.05 m	12.60 m	Residential	25.0 persons	1.0 *	25 persons +
4	3.05 m	9.55 m	Residential	25.0 persons	1.0 *	25 persons +
3	3.05 m	6.50 m	Residential	25.0 persons	1.0 *	25 persons +
2	3.05 m	3.45 m	Residential	25.0 persons	1.0 *	25 persons +
1	3.05 m	0.40 m	Residential	25.0 persons	1.0 *	25 persons +
P0	3.40 m	-3.00 m	Residential	12.0 persons	1.0 *	12 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.7.2 Elevators

Control: Conventional

		1	2
Elevator		A	B
Rated Load	[kg]	680	680
Weight per Person	[kg]	68	68
Pass./Deck gross		10	10
Max. Car Filling		80 %	80 %
Pass./Deck net		8	8
Drive Type			
Max. Speed	[m/s]	2.50	2.50
Max. Acceleration	[m/s2]	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00
Door Type			
Door Width	[mm]	800	800
Opening Time	[s]	2.3	2.3
Closing Time	[s]	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0
Number of Decks		1	1
Travel Height	[m]	121.65	121.65
34 Residential			
33 Residential			
32 Residential			
31 Residential			
30 Residential			
29 Residential			
28 Residential			
27 Residential			
26 Residential			
25 Residential			
24 Residential			
23 Residential			
22 Residential			
21 Residential			
20 Residential			
19 Residential			
18 Residential			
17 Residential			
16 Residential			
15 Residential			
14 Residential			
13 Residential			
12 Residential			
11 Residential			
10 Residential			
9 Residential			
8 Residential			
7 Residential			
6 Residential			
5 Residential			
4 Residential			
3 Residential			
2 Residential			
1 Residential			
P0 Residential			
P3 Residential			
P2 Residential			
P1 Residential			
G Lobby			
B1 Residential			
B2 Residential			

3.7.3 Two-Way Residential

3.7.3.1 Traffic Definition

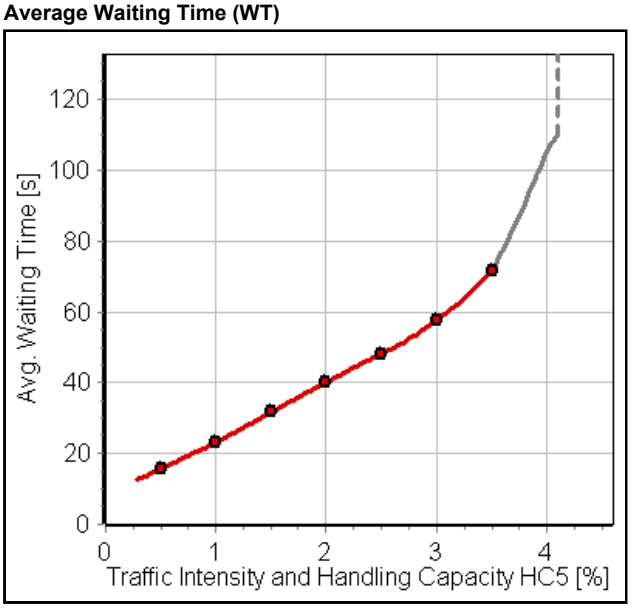
Population served by elevators: 862

Passenger Flows

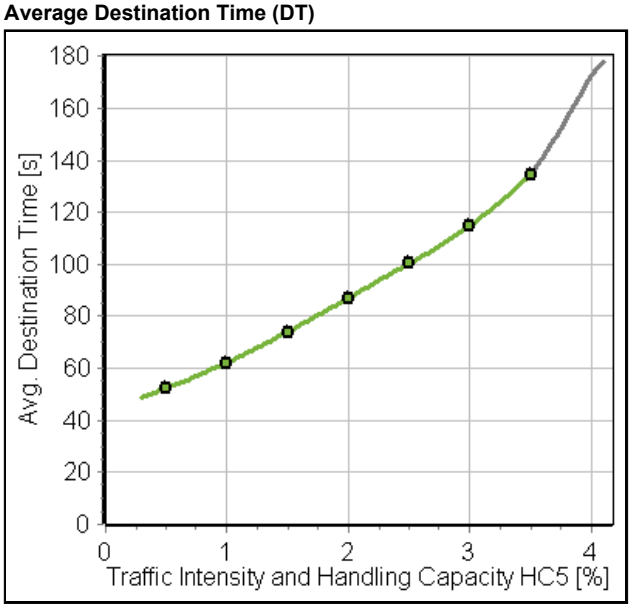
Floor	Description	Incoming 50 %		Outgoing 50 %	
34	Residential		2.9 %	2.9 %	
33	Residential		2.9 %	2.9 %	
32	Residential		2.9 %	2.9 %	
31	Residential		2.9 %	2.9 %	
30	Residential		2.9 %	2.9 %	
29	Residential		2.9 %	2.9 %	
28	Residential		2.9 %	2.9 %	
27	Residential		2.9 %	2.9 %	
26	Residential		2.9 %	2.9 %	
25	Residential		2.9 %	2.9 %	
24	Residential		2.9 %	2.9 %	
23	Residential		2.9 %	2.9 %	
22	Residential		2.9 %	2.9 %	
21	Residential		2.9 %	2.9 %	
20	Residential		2.9 %	2.9 %	
19	Residential		2.9 %	2.9 %	
18	Residential		2.9 %	2.9 %	
17	Residential		2.9 %	2.9 %	
16	Residential		2.9 %	2.9 %	
15	Residential		2.9 %	2.9 %	
14	Residential		2.9 %	2.9 %	
13	Residential		2.9 %	2.9 %	
12	Residential		2.9 %	2.9 %	
11	Residential		2.9 %	2.9 %	
10	Residential		2.9 %	2.9 %	
9	Residential		2.9 %	2.9 %	
8	Residential		2.9 %	2.9 %	
7	Residential		2.9 %	2.9 %	
6	Residential		2.9 %	2.9 %	
5	Residential		2.9 %	2.9 %	
4	Residential		2.9 %	2.9 %	
3	Residential		2.9 %	2.9 %	
2	Residential		2.9 %	2.9 %	
1	Residential		2.9 %	2.9 %	
P0	Residential		1.4 %	1.4 %	
P3	Residential				
P2	Residential				
P1	Residential				
G	Lobby	100.0 %			100.0 %
B1	Residential				
B2	Residential				

3.7.3.2 Performance

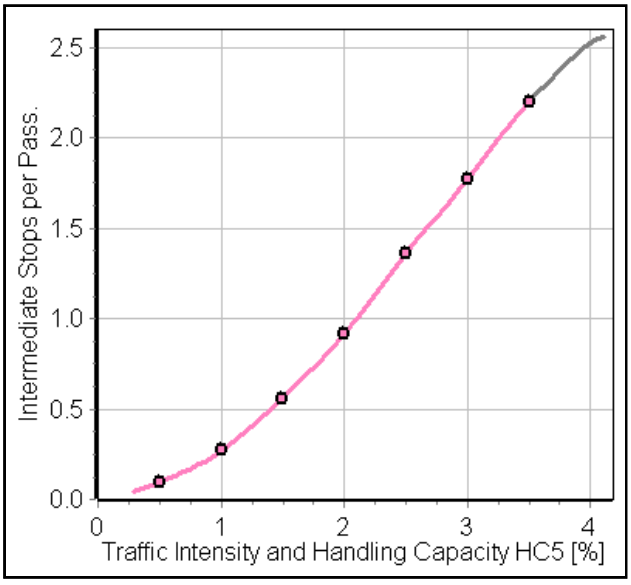
Average Waiting Time (WT)



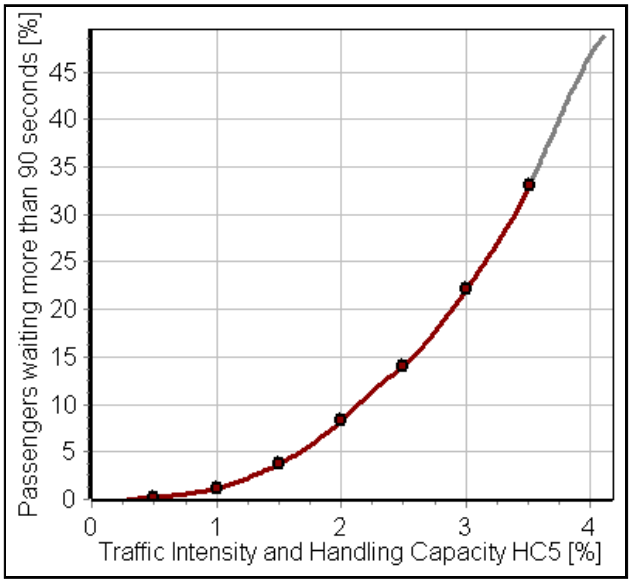
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	0.5	1.0	1.5	2.0	2.5	3.0	3.5
P5	4.3	8.6	12.9	17.2	21.6	25.9	30.2
WT [s]	15.7	23.2	31.7	40.1	48.1	57.5	71.6
DT [s]	52.5	62.1	74.0	86.8	100.2	114.8	134.4
IS	0.1	0.3	0.6	0.9	1.4	1.8	2.2
LW [%]	0.2	1.1	3.8	8.2	14.1	22.1	33.1

3.8 Tower F - Option 2 - 3 Units, 10 Pax, 2.5mps

3.8.1 Building and Population

Number of Floors: 41
Building Population: 862

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	25.0 persons	1.0 *	25 persons +
33	3.05 m	98.00 m	Residential	25.0 persons	1.0 *	25 persons +
32	3.05 m	94.95 m	Residential	25.0 persons	1.0 *	25 persons +
31	3.05 m	91.90 m	Residential	25.0 persons	1.0 *	25 persons +
30	3.05 m	88.85 m	Residential	25.0 persons	1.0 *	25 persons +
29	3.05 m	85.80 m	Residential	25.0 persons	1.0 *	25 persons +
28	3.05 m	82.75 m	Residential	25.0 persons	1.0 *	25 persons +
27	3.05 m	79.70 m	Residential	25.0 persons	1.0 *	25 persons +
26	3.05 m	76.65 m	Residential	25.0 persons	1.0 *	25 persons +
25	3.05 m	73.60 m	Residential	25.0 persons	1.0 *	25 persons +
24	3.05 m	70.55 m	Residential	25.0 persons	1.0 *	25 persons +
23	3.05 m	67.50 m	Residential	25.0 persons	1.0 *	25 persons +
22	3.05 m	64.45 m	Residential	25.0 persons	1.0 *	25 persons +
21	3.05 m	61.40 m	Residential	25.0 persons	1.0 *	25 persons +
20	3.05 m	58.35 m	Residential	25.0 persons	1.0 *	25 persons +
19	3.05 m	55.30 m	Residential	25.0 persons	1.0 *	25 persons +
18	3.05 m	52.25 m	Residential	25.0 persons	1.0 *	25 persons +
17	3.05 m	49.20 m	Residential	25.0 persons	1.0 *	25 persons +
16	3.05 m	46.15 m	Residential	25.0 persons	1.0 *	25 persons +
15	3.05 m	43.10 m	Residential	25.0 persons	1.0 *	25 persons +
14	3.05 m	40.05 m	Residential	25.0 persons	1.0 *	25 persons +
13	3.05 m	37.00 m	Residential	25.0 persons	1.0 *	25 persons +
12	3.05 m	33.95 m	Residential	25.0 persons	1.0 *	25 persons +
11	3.05 m	30.90 m	Residential	25.0 persons	1.0 *	25 persons +
10	3.05 m	27.85 m	Residential	25.0 persons	1.0 *	25 persons +
9	3.05 m	24.80 m	Residential	25.0 persons	1.0 *	25 persons +
8	3.05 m	21.75 m	Residential	25.0 persons	1.0 *	25 persons +
7	3.05 m	18.70 m	Residential	25.0 persons	1.0 *	25 persons +
6	3.05 m	15.65 m	Residential	25.0 persons	1.0 *	25 persons +
5	3.05 m	12.60 m	Residential	25.0 persons	1.0 *	25 persons +
4	3.05 m	9.55 m	Residential	25.0 persons	1.0 *	25 persons +
3	3.05 m	6.50 m	Residential	25.0 persons	1.0 *	25 persons +
2	3.05 m	3.45 m	Residential	25.0 persons	1.0 *	25 persons +
1	3.05 m	0.40 m	Residential	25.0 persons	1.0 *	25 persons +
P0	3.40 m	-3.00 m	Residential	12.0 persons	1.0 *	12 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.8.2 Elevators

Control: Conventional

		1	2	3
Elevator		A	B	C
Rated Load	[kg]	680	680	680
Weight per Person	[kg]	68	68	68
Pass./Deck gross		10	10	10
Max. Car Filling		80 %	80 %	80 %
Pass./Deck net		8	8	8
Drive Type				
Max. Speed	[m/s]	2.50	2.50	2.50
Max. Acceleration	[m/s2]	1.00	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00	1.00
Door Type				
Door Width	[mm]	800	800	800
Opening Time	[s]	2.3	2.3	2.3
Closing Time	[s]	2.5	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0	1.0
Number of Decks		1	1	1
Travel Height	[m]	121.65	121.65	121.65
34 Residential				
33 Residential				
32 Residential				
31 Residential				
30 Residential				
29 Residential				
28 Residential				
27 Residential				
26 Residential				
25 Residential				
24 Residential				
23 Residential				
22 Residential				
21 Residential				
20 Residential				
19 Residential				
18 Residential				
17 Residential				
16 Residential				
15 Residential				
14 Residential				
13 Residential				
12 Residential				
11 Residential				
10 Residential				
9 Residential				
8 Residential				
7 Residential				
6 Residential				
5 Residential				
4 Residential				
3 Residential				
2 Residential				
1 Residential				
P0 Residential				
P3 Residential				
P2 Residential				
P1 Residential				
G Lobby				
B1 Residential				
B2 Residential				

3.8.3 Two-Way Residential

3.8.3.1 Traffic Definition

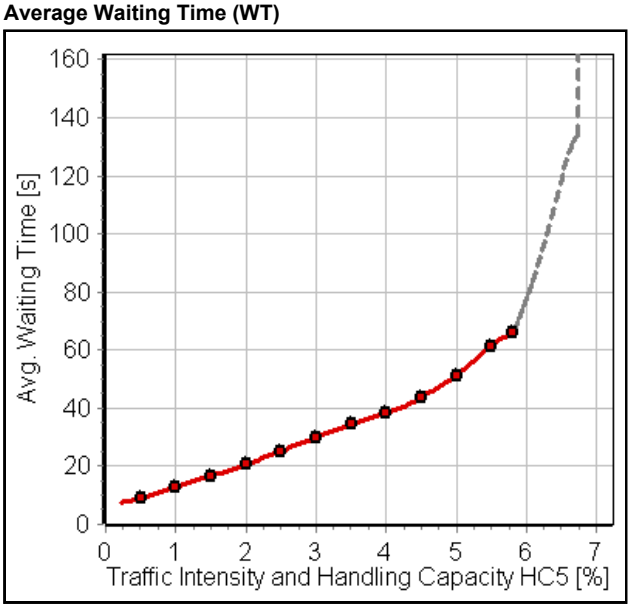
Population served by elevators: 862

Passenger Flows

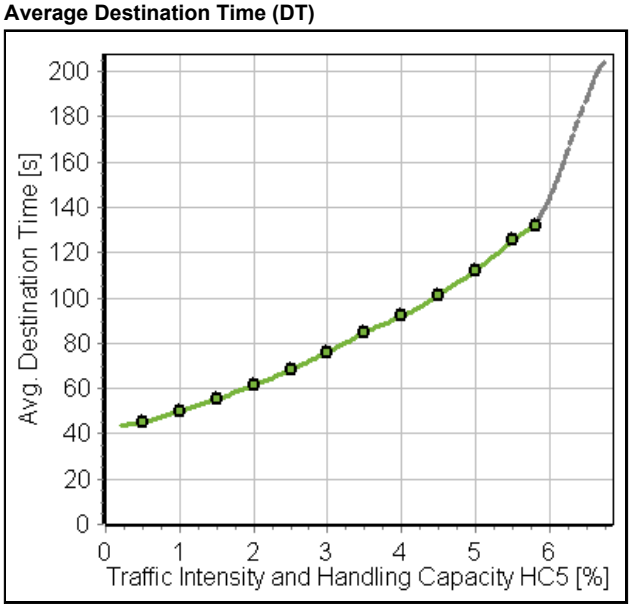
Floor	Description	Incoming 50 %		Outgoing 50 %	
34	Residential		2.9 %	2.9 %	
33	Residential		2.9 %	2.9 %	
32	Residential		2.9 %	2.9 %	
31	Residential		2.9 %	2.9 %	
30	Residential		2.9 %	2.9 %	
29	Residential		2.9 %	2.9 %	
28	Residential		2.9 %	2.9 %	
27	Residential		2.9 %	2.9 %	
26	Residential		2.9 %	2.9 %	
25	Residential		2.9 %	2.9 %	
24	Residential		2.9 %	2.9 %	
23	Residential		2.9 %	2.9 %	
22	Residential		2.9 %	2.9 %	
21	Residential		2.9 %	2.9 %	
20	Residential		2.9 %	2.9 %	
19	Residential		2.9 %	2.9 %	
18	Residential		2.9 %	2.9 %	
17	Residential		2.9 %	2.9 %	
16	Residential		2.9 %	2.9 %	
15	Residential		2.9 %	2.9 %	
14	Residential		2.9 %	2.9 %	
13	Residential		2.9 %	2.9 %	
12	Residential		2.9 %	2.9 %	
11	Residential		2.9 %	2.9 %	
10	Residential		2.9 %	2.9 %	
9	Residential		2.9 %	2.9 %	
8	Residential		2.9 %	2.9 %	
7	Residential		2.9 %	2.9 %	
6	Residential		2.9 %	2.9 %	
5	Residential		2.9 %	2.9 %	
4	Residential		2.9 %	2.9 %	
3	Residential		2.9 %	2.9 %	
2	Residential		2.9 %	2.9 %	
1	Residential		2.9 %	2.9 %	
P0	Residential		1.4 %	1.4 %	
P3	Residential				
P2	Residential				
P1	Residential				
G	Lobby	100.0 %			100.0 %
B1	Residential				
B2	Residential				

3.8.3.2 Performance

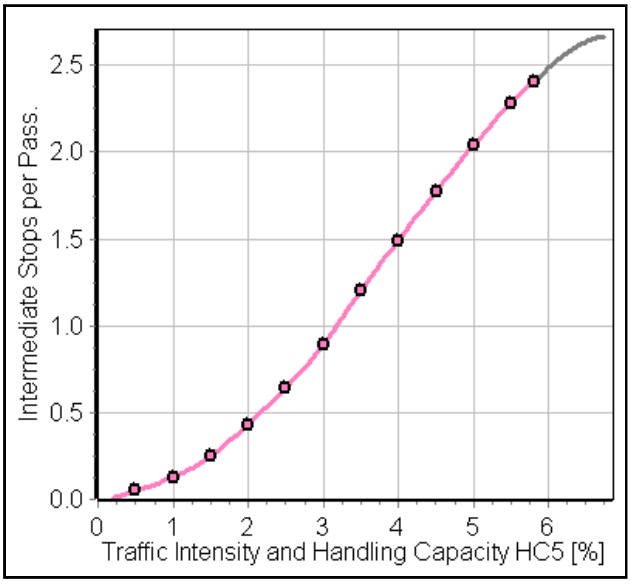
Average Waiting Time (WT)



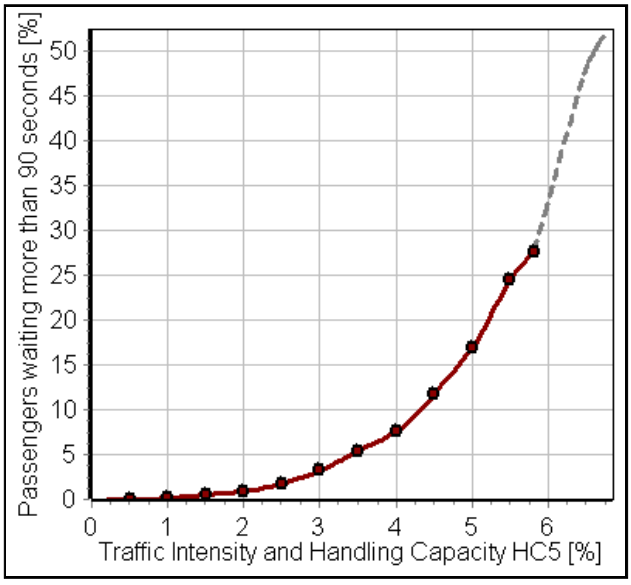
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	5.8
P5	4.3	8.6	12.9	17.2	21.6	25.9	30.2	34.5	38.8	43.1	47.4	50.1
WT [s]	9.2	12.8	16.7	20.6	25.2	29.9	34.5	38.1	43.9	51.2	61.4	66.2
DT [s]	45.1	49.9	55.3	61.3	68.2	76.0	84.5	91.8	101.2	111.9	125.3	131.7
IS	0.0	0.1	0.2	0.4	0.6	0.9	1.2	1.5	1.8	2.0	2.3	2.4
LW [%]	0.0	0.1	0.5	0.9	1.7	3.2	5.4	7.5	11.7	16.8	24.4	27.5

3.9 Tower F - Option 2 - 2 Units, 10 Pax, 3mps

3.9.1 Building and Population

Number of Floors: 41
Building Population: 862

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	25.0 persons	1.0 *	25 persons +
33	3.05 m	98.00 m	Residential	25.0 persons	1.0 *	25 persons +
32	3.05 m	94.95 m	Residential	25.0 persons	1.0 *	25 persons +
31	3.05 m	91.90 m	Residential	25.0 persons	1.0 *	25 persons +
30	3.05 m	88.85 m	Residential	25.0 persons	1.0 *	25 persons +
29	3.05 m	85.80 m	Residential	25.0 persons	1.0 *	25 persons +
28	3.05 m	82.75 m	Residential	25.0 persons	1.0 *	25 persons +
27	3.05 m	79.70 m	Residential	25.0 persons	1.0 *	25 persons +
26	3.05 m	76.65 m	Residential	25.0 persons	1.0 *	25 persons +
25	3.05 m	73.60 m	Residential	25.0 persons	1.0 *	25 persons +
24	3.05 m	70.55 m	Residential	25.0 persons	1.0 *	25 persons +
23	3.05 m	67.50 m	Residential	25.0 persons	1.0 *	25 persons +
22	3.05 m	64.45 m	Residential	25.0 persons	1.0 *	25 persons +
21	3.05 m	61.40 m	Residential	25.0 persons	1.0 *	25 persons +
20	3.05 m	58.35 m	Residential	25.0 persons	1.0 *	25 persons +
19	3.05 m	55.30 m	Residential	25.0 persons	1.0 *	25 persons +
18	3.05 m	52.25 m	Residential	25.0 persons	1.0 *	25 persons +
17	3.05 m	49.20 m	Residential	25.0 persons	1.0 *	25 persons +
16	3.05 m	46.15 m	Residential	25.0 persons	1.0 *	25 persons +
15	3.05 m	43.10 m	Residential	25.0 persons	1.0 *	25 persons +
14	3.05 m	40.05 m	Residential	25.0 persons	1.0 *	25 persons +
13	3.05 m	37.00 m	Residential	25.0 persons	1.0 *	25 persons +
12	3.05 m	33.95 m	Residential	25.0 persons	1.0 *	25 persons +
11	3.05 m	30.90 m	Residential	25.0 persons	1.0 *	25 persons +
10	3.05 m	27.85 m	Residential	25.0 persons	1.0 *	25 persons +
9	3.05 m	24.80 m	Residential	25.0 persons	1.0 *	25 persons +
8	3.05 m	21.75 m	Residential	25.0 persons	1.0 *	25 persons +
7	3.05 m	18.70 m	Residential	25.0 persons	1.0 *	25 persons +
6	3.05 m	15.65 m	Residential	25.0 persons	1.0 *	25 persons +
5	3.05 m	12.60 m	Residential	25.0 persons	1.0 *	25 persons +
4	3.05 m	9.55 m	Residential	25.0 persons	1.0 *	25 persons +
3	3.05 m	6.50 m	Residential	25.0 persons	1.0 *	25 persons +
2	3.05 m	3.45 m	Residential	25.0 persons	1.0 *	25 persons +
1	3.05 m	0.40 m	Residential	25.0 persons	1.0 *	25 persons +
P0	3.40 m	-3.00 m	Residential	12.0 persons	1.0 *	12 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.9.2 Elevators

Control: Conventional

		1	2
Elevator		A	B
Rated Load	[kg]	680	680
Weight per Person	[kg]	68	68
Pass./Deck gross		10	10
Max. Car Filling		80 %	80 %
Pass./Deck net		8	8
Drive Type			
Max. Speed	[m/s]	3.00	3.00
Max. Acceleration	[m/s2]	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00
Door Type			
Door Width	[mm]	800	800
Opening Time	[s]	2.3	2.3
Closing Time	[s]	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0
Number of Decks		1	1
Travel Height	[m]	121.65	121.65
34 Residential			
33 Residential			
32 Residential			
31 Residential			
30 Residential			
29 Residential			
28 Residential			
27 Residential			
26 Residential			
25 Residential			
24 Residential			
23 Residential			
22 Residential			
21 Residential			
20 Residential			
19 Residential			
18 Residential			
17 Residential			
16 Residential			
15 Residential			
14 Residential			
13 Residential			
12 Residential			
11 Residential			
10 Residential			
9 Residential			
8 Residential			
7 Residential			
6 Residential			
5 Residential			
4 Residential			
3 Residential			
2 Residential			
1 Residential			
P0 Residential			
P3 Residential			
P2 Residential			
P1 Residential			
G Lobby			
B1 Residential			
B2 Residential			

3.9.3 Two-Way Residential

3.9.3.1 Traffic Definition

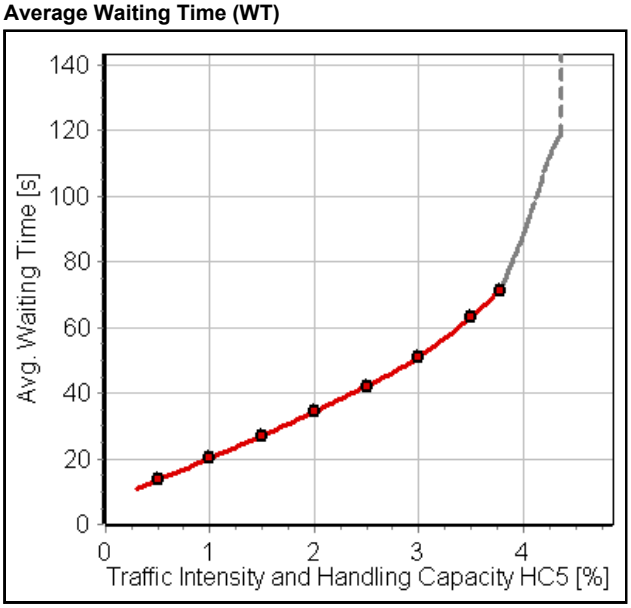
Population served by elevators: 862

Passenger Flows

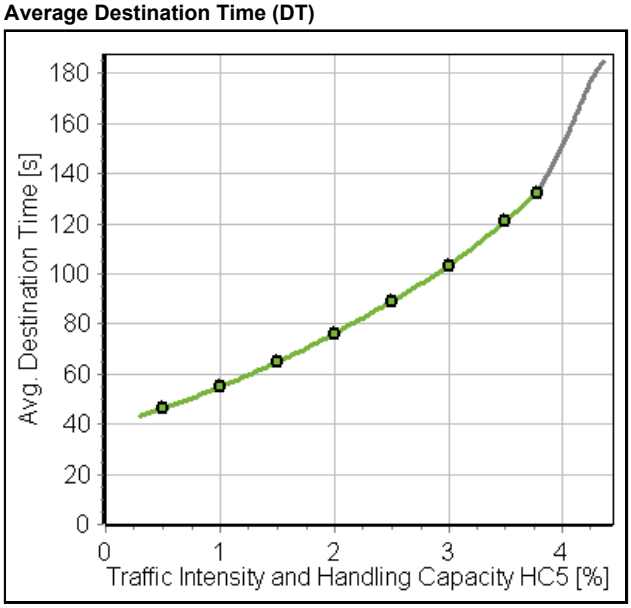
Floor	Description	Incoming 50 %		Outgoing 50 %	
34	Residential		2.9 %	2.9 %	
33	Residential		2.9 %	2.9 %	
32	Residential		2.9 %	2.9 %	
31	Residential		2.9 %	2.9 %	
30	Residential		2.9 %	2.9 %	
29	Residential		2.9 %	2.9 %	
28	Residential		2.9 %	2.9 %	
27	Residential		2.9 %	2.9 %	
26	Residential		2.9 %	2.9 %	
25	Residential		2.9 %	2.9 %	
24	Residential		2.9 %	2.9 %	
23	Residential		2.9 %	2.9 %	
22	Residential		2.9 %	2.9 %	
21	Residential		2.9 %	2.9 %	
20	Residential		2.9 %	2.9 %	
19	Residential		2.9 %	2.9 %	
18	Residential		2.9 %	2.9 %	
17	Residential		2.9 %	2.9 %	
16	Residential		2.9 %	2.9 %	
15	Residential		2.9 %	2.9 %	
14	Residential		2.9 %	2.9 %	
13	Residential		2.9 %	2.9 %	
12	Residential		2.9 %	2.9 %	
11	Residential		2.9 %	2.9 %	
10	Residential		2.9 %	2.9 %	
9	Residential		2.9 %	2.9 %	
8	Residential		2.9 %	2.9 %	
7	Residential		2.9 %	2.9 %	
6	Residential		2.9 %	2.9 %	
5	Residential		2.9 %	2.9 %	
4	Residential		2.9 %	2.9 %	
3	Residential		2.9 %	2.9 %	
2	Residential		2.9 %	2.9 %	
1	Residential		2.9 %	2.9 %	
P0	Residential		1.4 %	1.4 %	
P3	Residential				
P2	Residential				
P1	Residential				
G	Lobby	100.0 %			100.0 %
B1	Residential				
B2	Residential				

3.9.3.2 Performance

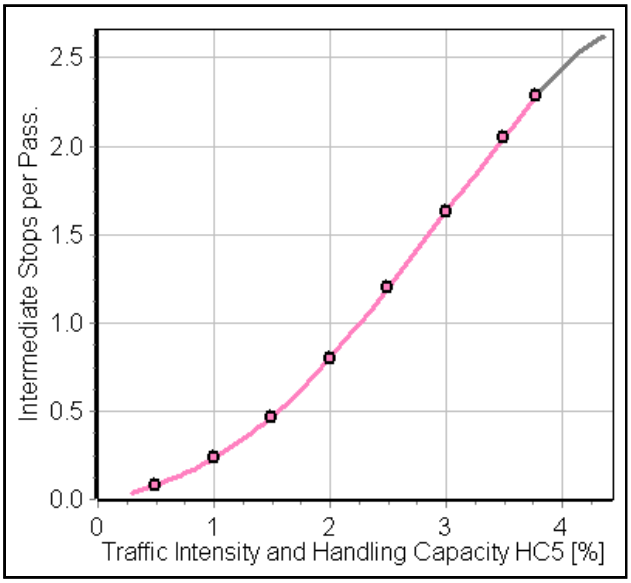
Average Waiting Time (WT)



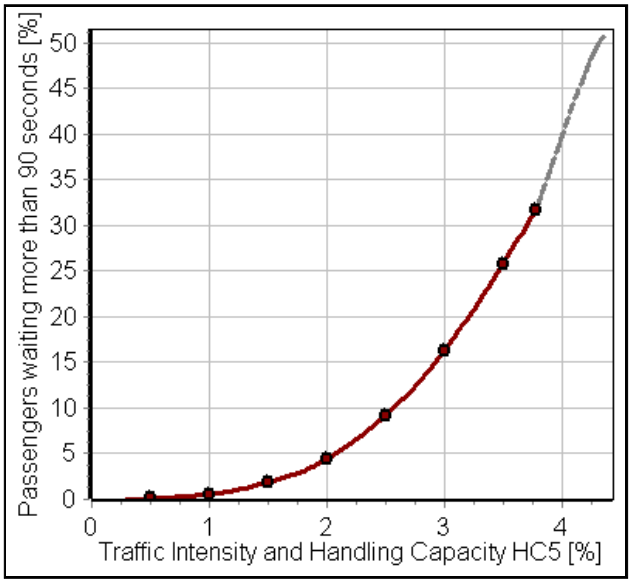
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.8
P5	4.3	8.6	12.9	17.2	21.6	25.9	30.2	32.5
WT [s]	13.4	20.1	27.0	34.3	42.1	50.9	63.0	71.2
DT [s]	46.3	54.8	64.8	76.2	89.0	103.3	121.0	132.4
IS	0.1	0.2	0.5	0.8	1.2	1.6	2.0	2.3
LW [%]	0.1	0.6	1.8	4.4	9.1	16.2	25.7	31.7

3.10 Tower F - Option 2 - 3 Units, 10 Pax, 3mps

3.10.1 Building and Population

Number of Floors: 41
Building Population: 862

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	25.0 persons	1.0 *	25 persons +
33	3.05 m	98.00 m	Residential	25.0 persons	1.0 *	25 persons +
32	3.05 m	94.95 m	Residential	25.0 persons	1.0 *	25 persons +
31	3.05 m	91.90 m	Residential	25.0 persons	1.0 *	25 persons +
30	3.05 m	88.85 m	Residential	25.0 persons	1.0 *	25 persons +
29	3.05 m	85.80 m	Residential	25.0 persons	1.0 *	25 persons +
28	3.05 m	82.75 m	Residential	25.0 persons	1.0 *	25 persons +
27	3.05 m	79.70 m	Residential	25.0 persons	1.0 *	25 persons +
26	3.05 m	76.65 m	Residential	25.0 persons	1.0 *	25 persons +
25	3.05 m	73.60 m	Residential	25.0 persons	1.0 *	25 persons +
24	3.05 m	70.55 m	Residential	25.0 persons	1.0 *	25 persons +
23	3.05 m	67.50 m	Residential	25.0 persons	1.0 *	25 persons +
22	3.05 m	64.45 m	Residential	25.0 persons	1.0 *	25 persons +
21	3.05 m	61.40 m	Residential	25.0 persons	1.0 *	25 persons +
20	3.05 m	58.35 m	Residential	25.0 persons	1.0 *	25 persons +
19	3.05 m	55.30 m	Residential	25.0 persons	1.0 *	25 persons +
18	3.05 m	52.25 m	Residential	25.0 persons	1.0 *	25 persons +
17	3.05 m	49.20 m	Residential	25.0 persons	1.0 *	25 persons +
16	3.05 m	46.15 m	Residential	25.0 persons	1.0 *	25 persons +
15	3.05 m	43.10 m	Residential	25.0 persons	1.0 *	25 persons +
14	3.05 m	40.05 m	Residential	25.0 persons	1.0 *	25 persons +
13	3.05 m	37.00 m	Residential	25.0 persons	1.0 *	25 persons +
12	3.05 m	33.95 m	Residential	25.0 persons	1.0 *	25 persons +
11	3.05 m	30.90 m	Residential	25.0 persons	1.0 *	25 persons +
10	3.05 m	27.85 m	Residential	25.0 persons	1.0 *	25 persons +
9	3.05 m	24.80 m	Residential	25.0 persons	1.0 *	25 persons +
8	3.05 m	21.75 m	Residential	25.0 persons	1.0 *	25 persons +
7	3.05 m	18.70 m	Residential	25.0 persons	1.0 *	25 persons +
6	3.05 m	15.65 m	Residential	25.0 persons	1.0 *	25 persons +
5	3.05 m	12.60 m	Residential	25.0 persons	1.0 *	25 persons +
4	3.05 m	9.55 m	Residential	25.0 persons	1.0 *	25 persons +
3	3.05 m	6.50 m	Residential	25.0 persons	1.0 *	25 persons +
2	3.05 m	3.45 m	Residential	25.0 persons	1.0 *	25 persons +
1	3.05 m	0.40 m	Residential	25.0 persons	1.0 *	25 persons +
P0	3.40 m	-3.00 m	Residential	12.0 persons	1.0 *	12 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.10.2 Elevators

Control: Conventional

		1	2	3
Elevator		A	B	C
Rated Load	[kg]	680	680	680
Weight per Person	[kg]	68	68	68
Pass./Deck gross		10	10	10
Max. Car Filling		80 %	80 %	80 %
Pass./Deck net		8	8	8
Drive Type				
Max. Speed	[m/s]	3.00	3.00	3.00
Max. Acceleration	[m/s2]	1.00	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00	1.00
Door Type				
Door Width	[mm]	800	800	800
Opening Time	[s]	2.3	2.3	2.3
Closing Time	[s]	2.5	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0	1.0
Number of Decks		1	1	1
Travel Height	[m]	121.65	121.65	121.65
34 Residential				
33 Residential				
32 Residential				
31 Residential				
30 Residential				
29 Residential				
28 Residential				
27 Residential				
26 Residential				
25 Residential				
24 Residential				
23 Residential				
22 Residential				
21 Residential				
20 Residential				
19 Residential				
18 Residential				
17 Residential				
16 Residential				
15 Residential				
14 Residential				
13 Residential				
12 Residential				
11 Residential				
10 Residential				
9 Residential				
8 Residential				
7 Residential				
6 Residential				
5 Residential				
4 Residential				
3 Residential				
2 Residential				
1 Residential				
P0 Residential				
P3 Residential				
P2 Residential				
P1 Residential				
G Lobby				
B1 Residential				
B2 Residential				

3.10.3 Two-Way Residential

3.10.3.1 Traffic Definition

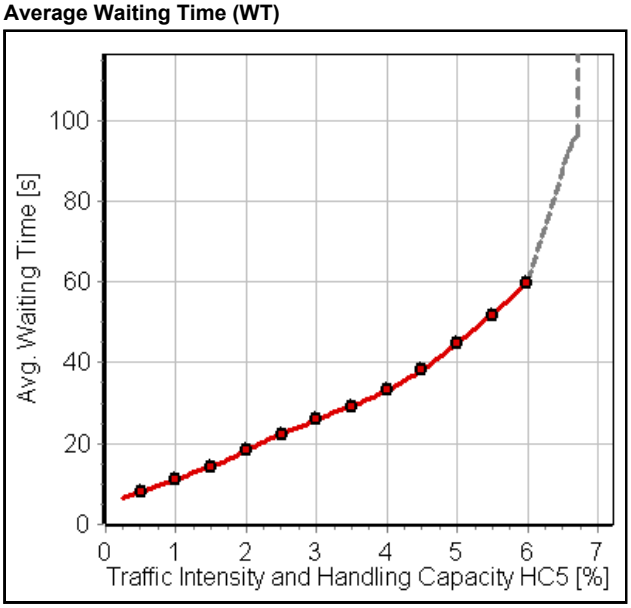
Population served by elevators: 862

Passenger Flows

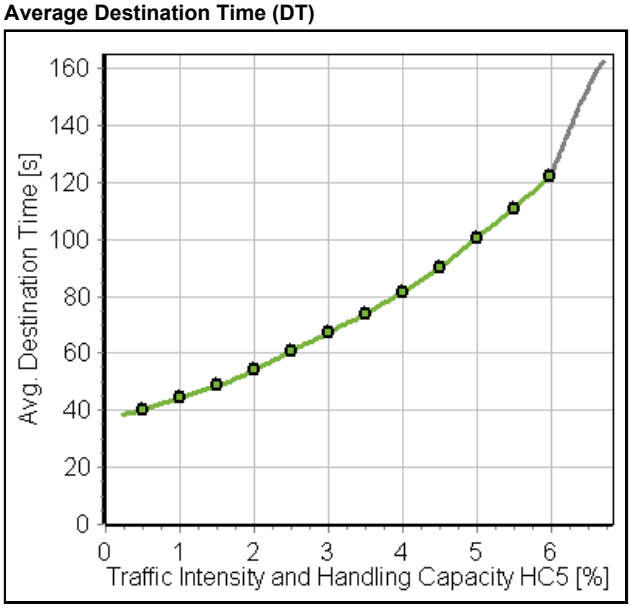
Floor	Description	Incoming 50 %	Outgoing 50 %
34	Residential	2.9 %	2.9 %
33	Residential	2.9 %	2.9 %
32	Residential	2.9 %	2.9 %
31	Residential	2.9 %	2.9 %
30	Residential	2.9 %	2.9 %
29	Residential	2.9 %	2.9 %
28	Residential	2.9 %	2.9 %
27	Residential	2.9 %	2.9 %
26	Residential	2.9 %	2.9 %
25	Residential	2.9 %	2.9 %
24	Residential	2.9 %	2.9 %
23	Residential	2.9 %	2.9 %
22	Residential	2.9 %	2.9 %
21	Residential	2.9 %	2.9 %
20	Residential	2.9 %	2.9 %
19	Residential	2.9 %	2.9 %
18	Residential	2.9 %	2.9 %
17	Residential	2.9 %	2.9 %
16	Residential	2.9 %	2.9 %
15	Residential	2.9 %	2.9 %
14	Residential	2.9 %	2.9 %
13	Residential	2.9 %	2.9 %
12	Residential	2.9 %	2.9 %
11	Residential	2.9 %	2.9 %
10	Residential	2.9 %	2.9 %
9	Residential	2.9 %	2.9 %
8	Residential	2.9 %	2.9 %
7	Residential	2.9 %	2.9 %
6	Residential	2.9 %	2.9 %
5	Residential	2.9 %	2.9 %
4	Residential	2.9 %	2.9 %
3	Residential	2.9 %	2.9 %
2	Residential	2.9 %	2.9 %
1	Residential	2.9 %	2.9 %
P0	Residential	1.4 %	1.4 %
P3	Residential		
P2	Residential		
P1	Residential		
G	Lobby	100.0 %	100.0 %
B1	Residential		
B2	Residential		

3.10.3.2 Performance

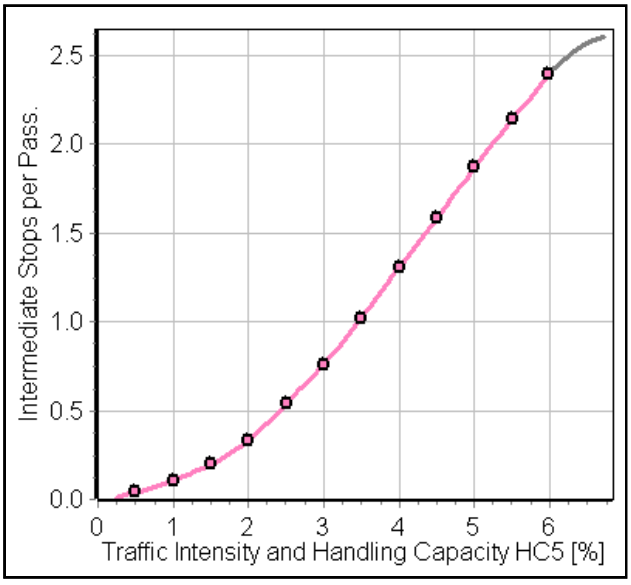
Average Waiting Time (WT)



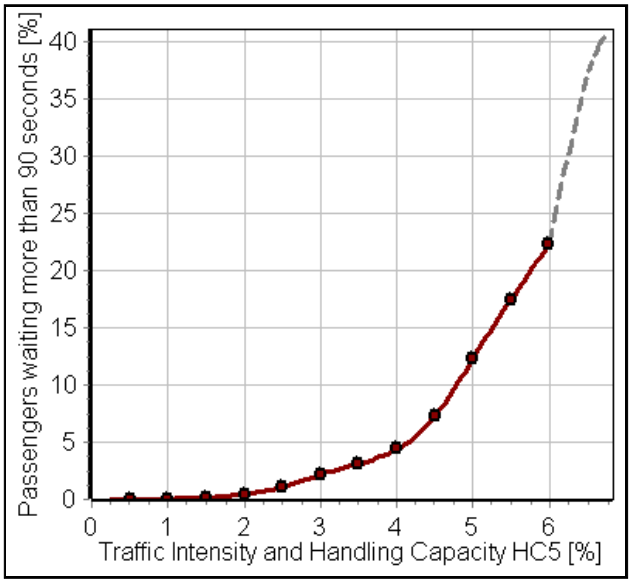
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
P5	4.3	8.6	12.9	17.2	21.6	25.9	30.2	34.5	38.8	43.1	47.4	51.6
WT [s]	8.0	11.1	14.3	18.2	22.3	25.9	29.2	33.2	38.1	44.8	51.8	59.6
DT [s]	40.3	44.4	48.6	54.1	60.7	67.2	73.8	81.5	90.0	100.4	110.9	122.0
IS	0.0	0.1	0.2	0.3	0.5	0.8	1.0	1.3	1.6	1.9	2.1	2.4
LW [%]	0.0	0.1	0.1	0.5	1.0	2.2	3.1	4.4	7.2	12.3	17.5	22.3

3.11 Tower F - Option 2 - 2 Units, 10 Pax, 3.5mps

3.11.1 Building and Population

Number of Floors: 41
Building Population: 862

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	25.0 persons	1.0 *	25 persons +
33	3.05 m	98.00 m	Residential	25.0 persons	1.0 *	25 persons +
32	3.05 m	94.95 m	Residential	25.0 persons	1.0 *	25 persons +
31	3.05 m	91.90 m	Residential	25.0 persons	1.0 *	25 persons +
30	3.05 m	88.85 m	Residential	25.0 persons	1.0 *	25 persons +
29	3.05 m	85.80 m	Residential	25.0 persons	1.0 *	25 persons +
28	3.05 m	82.75 m	Residential	25.0 persons	1.0 *	25 persons +
27	3.05 m	79.70 m	Residential	25.0 persons	1.0 *	25 persons +
26	3.05 m	76.65 m	Residential	25.0 persons	1.0 *	25 persons +
25	3.05 m	73.60 m	Residential	25.0 persons	1.0 *	25 persons +
24	3.05 m	70.55 m	Residential	25.0 persons	1.0 *	25 persons +
23	3.05 m	67.50 m	Residential	25.0 persons	1.0 *	25 persons +
22	3.05 m	64.45 m	Residential	25.0 persons	1.0 *	25 persons +
21	3.05 m	61.40 m	Residential	25.0 persons	1.0 *	25 persons +
20	3.05 m	58.35 m	Residential	25.0 persons	1.0 *	25 persons +
19	3.05 m	55.30 m	Residential	25.0 persons	1.0 *	25 persons +
18	3.05 m	52.25 m	Residential	25.0 persons	1.0 *	25 persons +
17	3.05 m	49.20 m	Residential	25.0 persons	1.0 *	25 persons +
16	3.05 m	46.15 m	Residential	25.0 persons	1.0 *	25 persons +
15	3.05 m	43.10 m	Residential	25.0 persons	1.0 *	25 persons +
14	3.05 m	40.05 m	Residential	25.0 persons	1.0 *	25 persons +
13	3.05 m	37.00 m	Residential	25.0 persons	1.0 *	25 persons +
12	3.05 m	33.95 m	Residential	25.0 persons	1.0 *	25 persons +
11	3.05 m	30.90 m	Residential	25.0 persons	1.0 *	25 persons +
10	3.05 m	27.85 m	Residential	25.0 persons	1.0 *	25 persons +
9	3.05 m	24.80 m	Residential	25.0 persons	1.0 *	25 persons +
8	3.05 m	21.75 m	Residential	25.0 persons	1.0 *	25 persons +
7	3.05 m	18.70 m	Residential	25.0 persons	1.0 *	25 persons +
6	3.05 m	15.65 m	Residential	25.0 persons	1.0 *	25 persons +
5	3.05 m	12.60 m	Residential	25.0 persons	1.0 *	25 persons +
4	3.05 m	9.55 m	Residential	25.0 persons	1.0 *	25 persons +
3	3.05 m	6.50 m	Residential	25.0 persons	1.0 *	25 persons +
2	3.05 m	3.45 m	Residential	25.0 persons	1.0 *	25 persons +
1	3.05 m	0.40 m	Residential	25.0 persons	1.0 *	25 persons +
P0	3.40 m	-3.00 m	Residential	12.0 persons	1.0 *	12 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.11.2 Elevators

Control: Conventional

		1	2
Elevator		A	B
Rated Load	[kg]	680	680
Weight per Person	[kg]	68	68
Pass./Deck gross		10	10
Max. Car Filling		80 %	80 %
Pass./Deck net		8	8
Drive Type			
Max. Speed	[m/s]	3.50	3.50
Max. Acceleration	[m/s2]	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00
Door Type			
Door Width	[mm]	800	800
Opening Time	[s]	2.3	2.3
Closing Time	[s]	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0
Number of Decks		1	1
Travel Height	[m]	121.65	121.65
34 Residential			
33 Residential			
32 Residential			
31 Residential			
30 Residential			
29 Residential			
28 Residential			
27 Residential			
26 Residential			
25 Residential			
24 Residential			
23 Residential			
22 Residential			
21 Residential			
20 Residential			
19 Residential			
18 Residential			
17 Residential			
16 Residential			
15 Residential			
14 Residential			
13 Residential			
12 Residential			
11 Residential			
10 Residential			
9 Residential			
8 Residential			
7 Residential			
6 Residential			
5 Residential			
4 Residential			
3 Residential			
2 Residential			
1 Residential			
P0 Residential			
P3 Residential			
P2 Residential			
P1 Residential			
G Lobby			
B1 Residential			
B2 Residential			

3.11.3 Two-Way Residential

3.11.3.1 Traffic Definition

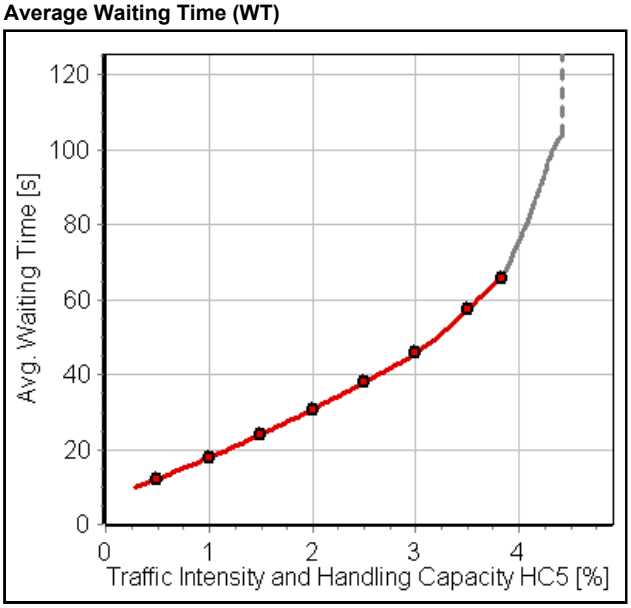
Population served by elevators: 862

Passenger Flows

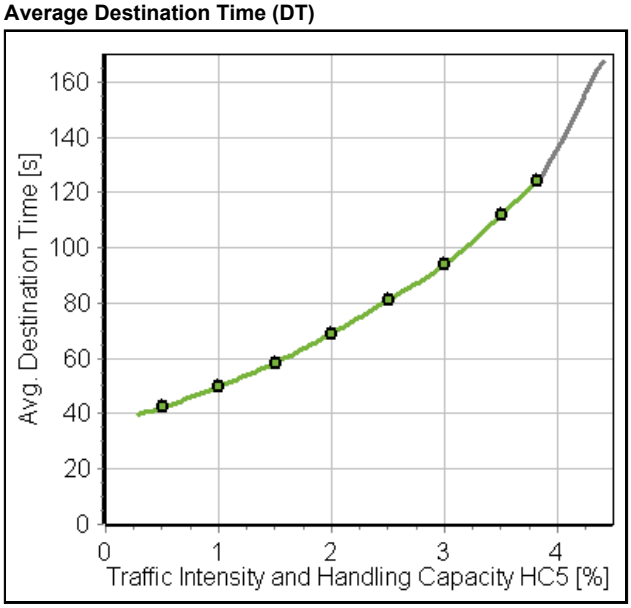
Floor	Description	Incoming 50 %		Outgoing 50 %	
34	Residential		2.9 %	2.9 %	
33	Residential		2.9 %	2.9 %	
32	Residential		2.9 %	2.9 %	
31	Residential		2.9 %	2.9 %	
30	Residential		2.9 %	2.9 %	
29	Residential		2.9 %	2.9 %	
28	Residential		2.9 %	2.9 %	
27	Residential		2.9 %	2.9 %	
26	Residential		2.9 %	2.9 %	
25	Residential		2.9 %	2.9 %	
24	Residential		2.9 %	2.9 %	
23	Residential		2.9 %	2.9 %	
22	Residential		2.9 %	2.9 %	
21	Residential		2.9 %	2.9 %	
20	Residential		2.9 %	2.9 %	
19	Residential		2.9 %	2.9 %	
18	Residential		2.9 %	2.9 %	
17	Residential		2.9 %	2.9 %	
16	Residential		2.9 %	2.9 %	
15	Residential		2.9 %	2.9 %	
14	Residential		2.9 %	2.9 %	
13	Residential		2.9 %	2.9 %	
12	Residential		2.9 %	2.9 %	
11	Residential		2.9 %	2.9 %	
10	Residential		2.9 %	2.9 %	
9	Residential		2.9 %	2.9 %	
8	Residential		2.9 %	2.9 %	
7	Residential		2.9 %	2.9 %	
6	Residential		2.9 %	2.9 %	
5	Residential		2.9 %	2.9 %	
4	Residential		2.9 %	2.9 %	
3	Residential		2.9 %	2.9 %	
2	Residential		2.9 %	2.9 %	
1	Residential		2.9 %	2.9 %	
P0	Residential		1.4 %	1.4 %	
P3	Residential				
P2	Residential				
P1	Residential				
G	Lobby	100.0 %			100.0 %
B1	Residential				
B2	Residential				

3.11.3.2 Performance

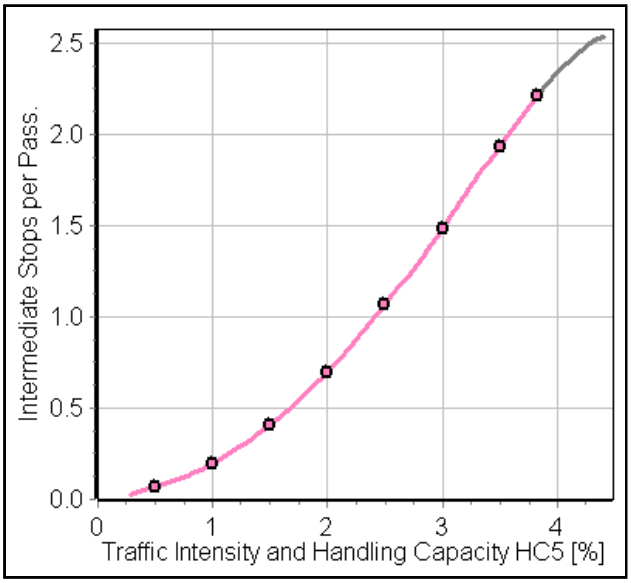
Average Waiting Time (WT)



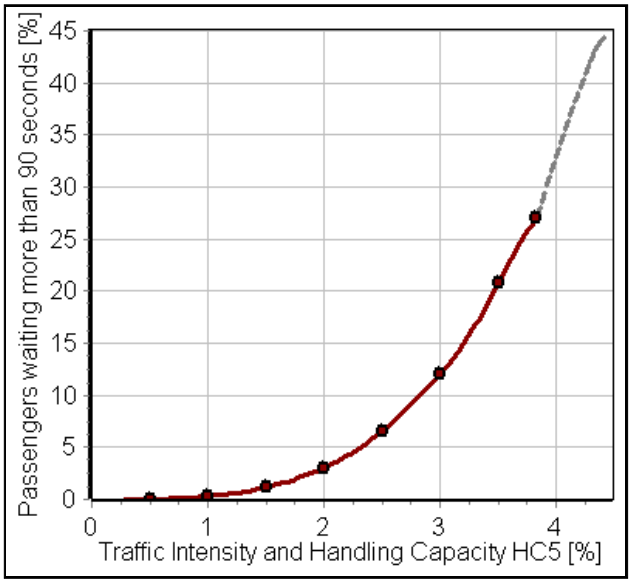
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.8
P5	4.3	8.6	12.9	17.2	21.6	25.9	30.2	33.0
WT [s]	12.1	17.8	23.9	30.7	37.9	45.7	57.3	65.7
DT [s]	42.3	49.6	58.3	68.9	80.9	94.2	111.8	124.1
IS	0.1	0.2	0.4	0.7	1.1	1.5	1.9	2.2
LW [%]	0.0	0.3	1.1	3.0	6.5	12.0	20.8	27.1

3.12 Tower F - Option 2 - 3 Units, 10 Pax, 3.5mps

3.12.1 Building and Population

Number of Floors: 41
Building Population: 862

Floor Name	Floor Height	Floor Level	Description	Quantity	Density	Net Population ∑
34	3.05 m	101.05 m	Residential	25.0 persons	1.0 *	25 persons +
33	3.05 m	98.00 m	Residential	25.0 persons	1.0 *	25 persons +
32	3.05 m	94.95 m	Residential	25.0 persons	1.0 *	25 persons +
31	3.05 m	91.90 m	Residential	25.0 persons	1.0 *	25 persons +
30	3.05 m	88.85 m	Residential	25.0 persons	1.0 *	25 persons +
29	3.05 m	85.80 m	Residential	25.0 persons	1.0 *	25 persons +
28	3.05 m	82.75 m	Residential	25.0 persons	1.0 *	25 persons +
27	3.05 m	79.70 m	Residential	25.0 persons	1.0 *	25 persons +
26	3.05 m	76.65 m	Residential	25.0 persons	1.0 *	25 persons +
25	3.05 m	73.60 m	Residential	25.0 persons	1.0 *	25 persons +
24	3.05 m	70.55 m	Residential	25.0 persons	1.0 *	25 persons +
23	3.05 m	67.50 m	Residential	25.0 persons	1.0 *	25 persons +
22	3.05 m	64.45 m	Residential	25.0 persons	1.0 *	25 persons +
21	3.05 m	61.40 m	Residential	25.0 persons	1.0 *	25 persons +
20	3.05 m	58.35 m	Residential	25.0 persons	1.0 *	25 persons +
19	3.05 m	55.30 m	Residential	25.0 persons	1.0 *	25 persons +
18	3.05 m	52.25 m	Residential	25.0 persons	1.0 *	25 persons +
17	3.05 m	49.20 m	Residential	25.0 persons	1.0 *	25 persons +
16	3.05 m	46.15 m	Residential	25.0 persons	1.0 *	25 persons +
15	3.05 m	43.10 m	Residential	25.0 persons	1.0 *	25 persons +
14	3.05 m	40.05 m	Residential	25.0 persons	1.0 *	25 persons +
13	3.05 m	37.00 m	Residential	25.0 persons	1.0 *	25 persons +
12	3.05 m	33.95 m	Residential	25.0 persons	1.0 *	25 persons +
11	3.05 m	30.90 m	Residential	25.0 persons	1.0 *	25 persons +
10	3.05 m	27.85 m	Residential	25.0 persons	1.0 *	25 persons +
9	3.05 m	24.80 m	Residential	25.0 persons	1.0 *	25 persons +
8	3.05 m	21.75 m	Residential	25.0 persons	1.0 *	25 persons +
7	3.05 m	18.70 m	Residential	25.0 persons	1.0 *	25 persons +
6	3.05 m	15.65 m	Residential	25.0 persons	1.0 *	25 persons +
5	3.05 m	12.60 m	Residential	25.0 persons	1.0 *	25 persons +
4	3.05 m	9.55 m	Residential	25.0 persons	1.0 *	25 persons +
3	3.05 m	6.50 m	Residential	25.0 persons	1.0 *	25 persons +
2	3.05 m	3.45 m	Residential	25.0 persons	1.0 *	25 persons +
1	3.05 m	0.40 m	Residential	25.0 persons	1.0 *	25 persons +
P0	3.40 m	-3.00 m	Residential	12.0 persons	1.0 *	12 persons +
P3	3.30 m	-6.30 m	Residential			+
P2	2.80 m	-9.10 m	Residential			+
P1	2.80 m	-11.90 m	Residential			+
G	3.00 m	-14.90 m	Lobby			
B1	2.85 m	-17.75 m	Residential			+
B2	2.85 m	-20.60 m	Residential			+

3.12.2 Elevators

Control: Conventional

		1	2	3
Elevator		A	B	C
Rated Load	[kg]	680	680	680
Weight per Person	[kg]	68	68	68
Pass./Deck gross		10	10	10
Max. Car Filling		80 %	80 %	80 %
Pass./Deck net		8	8	8
Drive Type				
Max. Speed	[m/s]	3.50	3.50	3.50
Max. Acceleration	[m/s2]	1.00	1.00	1.00
Drive Jerk	[m/s3]	1.00	1.00	1.00
Door Type				
Door Width	[mm]	800	800	800
Opening Time	[s]	2.3	2.3	2.3
Closing Time	[s]	2.5	2.5	2.5
Door and Drive Delays	[s]	0.5	0.5	0.5
Transfer Time per Person	[s]	1.0	1.0	1.0
Min. Transfer Time	[s]	1.0	1.0	1.0
Number of Decks		1	1	1
Travel Height	[m]	121.65	121.65	121.65
34 Residential				
33 Residential				
32 Residential				
31 Residential				
30 Residential				
29 Residential				
28 Residential				
27 Residential				
26 Residential				
25 Residential				
24 Residential				
23 Residential				
22 Residential				
21 Residential				
20 Residential				
19 Residential				
18 Residential				
17 Residential				
16 Residential				
15 Residential				
14 Residential				
13 Residential				
12 Residential				
11 Residential				
10 Residential				
9 Residential				
8 Residential				
7 Residential				
6 Residential				
5 Residential				
4 Residential				
3 Residential				
2 Residential				
1 Residential				
P0 Residential				
P3 Residential				
P2 Residential				
P1 Residential				
G Lobby				
B1 Residential				
B2 Residential				

3.12.3 Two-Way Residential

3.12.3.1 Traffic Definition

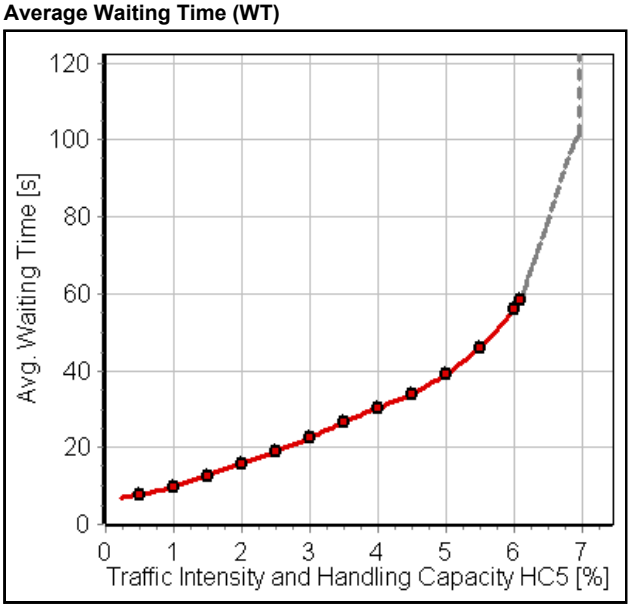
Population served by elevators: 862

Passenger Flows

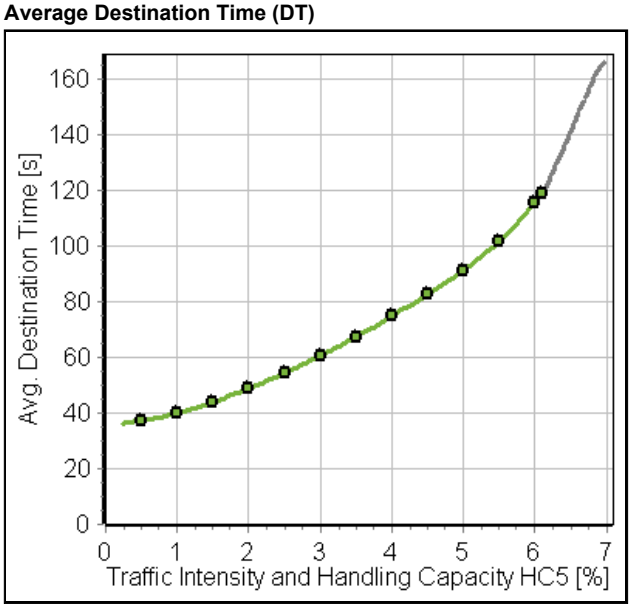
Floor	Description	Incoming 50 %		Outgoing 50 %	
34	Residential		2.9 %	2.9 %	
33	Residential		2.9 %	2.9 %	
32	Residential		2.9 %	2.9 %	
31	Residential		2.9 %	2.9 %	
30	Residential		2.9 %	2.9 %	
29	Residential		2.9 %	2.9 %	
28	Residential		2.9 %	2.9 %	
27	Residential		2.9 %	2.9 %	
26	Residential		2.9 %	2.9 %	
25	Residential		2.9 %	2.9 %	
24	Residential		2.9 %	2.9 %	
23	Residential		2.9 %	2.9 %	
22	Residential		2.9 %	2.9 %	
21	Residential		2.9 %	2.9 %	
20	Residential		2.9 %	2.9 %	
19	Residential		2.9 %	2.9 %	
18	Residential		2.9 %	2.9 %	
17	Residential		2.9 %	2.9 %	
16	Residential		2.9 %	2.9 %	
15	Residential		2.9 %	2.9 %	
14	Residential		2.9 %	2.9 %	
13	Residential		2.9 %	2.9 %	
12	Residential		2.9 %	2.9 %	
11	Residential		2.9 %	2.9 %	
10	Residential		2.9 %	2.9 %	
9	Residential		2.9 %	2.9 %	
8	Residential		2.9 %	2.9 %	
7	Residential		2.9 %	2.9 %	
6	Residential		2.9 %	2.9 %	
5	Residential		2.9 %	2.9 %	
4	Residential		2.9 %	2.9 %	
3	Residential		2.9 %	2.9 %	
2	Residential		2.9 %	2.9 %	
1	Residential		2.9 %	2.9 %	
P0	Residential		1.4 %	1.4 %	
P3	Residential				
P2	Residential				
P1	Residential				
G	Lobby	100.0 %			100.0 %
B1	Residential				
B2	Residential				

3.12.3.2 Performance

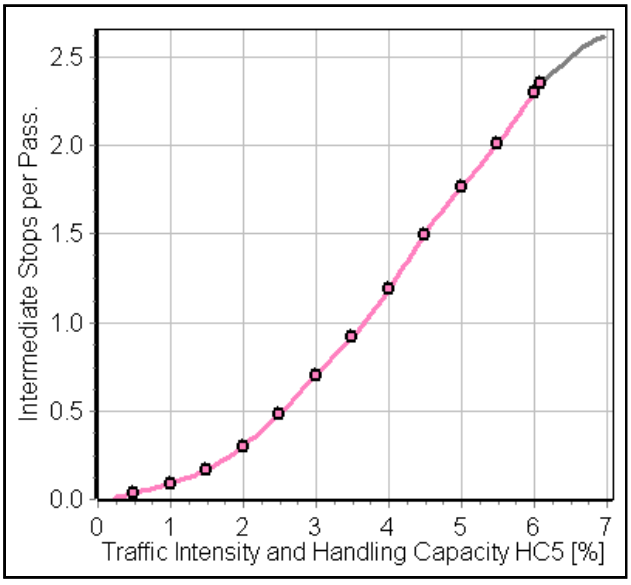
Average Waiting Time (WT)



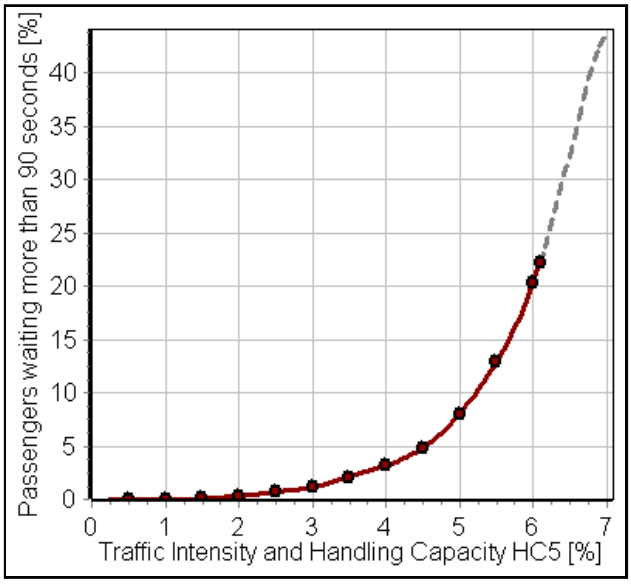
Average Destination Time (DT)



Average Number of Intermediate Stops per Passenger (IS)



Long Waits (LW)



HC5 [%]	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.1
P5	4.3	8.6	12.9	17.2	21.6	25.9	30.2	34.5	38.8	43.1	47.4	51.7	52.5
WT [s]	7.7	9.8	12.7	15.8	19.0	22.5	26.4	30.3	33.9	39.0	46.0	56.0	58.3
DT [s]	37.2	40.0	43.9	48.7	54.2	60.6	67.3	74.8	82.6	91.2	101.6	115.5	118.6
IS	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.2	1.5	1.8	2.0	2.3	2.4
LW [%]	0.0	0.0	0.1	0.3	0.7	1.2	2.1	3.2	4.8	8.0	12.9	20.3	22.2

How Schindler Undertakes Traffic Analyses

4.1 Introduction

A traffic analysis studies the performance of a group of elevators, based on assumptions about the expected traffic situation. The main performance measurements are handling capacity and waiting time. Reliable and comparable performance results are found by means of benchmark simulations which reflect the expected real behavior of a group of elevators under a wide range of traffic situations.

4.2 ISO 8100-32:2020

In June 2020, the International Organization for Standardization (ISO) has published the new standard ISO 8100-32:2020. It is the first modern global standard for planning and selecting of passenger elevators in buildings that was approved by many national standard organizations. Schindler played a decisive role within ISO in setting this standard. The simulation method in ISO 8100-32:2020 follows the principles as introduced and used by Schindler since 2007:

- Run a separate simulation for each traffic mix and passenger demand.
- Use constant traffic demand for each simulation.
- Make long simulations to reduce variation of results. ISO requires at least 2 hours; Schindler outperforms this with at least 8 hours duration.

Furthermore, also the design criteria of Schindler are now endorsed by the global norm, i.e. the requirements in terms of traffic mix, HC5 and WT. This ISO norm underlines Schindler's leading role in reliable traffic planning. As a trusted partner in the building industry, we are proud to be a front runner enabling a common planning base for selecting elevators. This will simplify the process for architects and building planners, who will benefit from more security when planning elevator installations.

For more information on ISO 8100-32:2020, see https://www.iso.org/standard/73084.html.

4.3 Measures and Definitions

The elevators' main task is to manage the traffic, i.e., the transportation needs of passengers and goods, in such a way that the highest possible density of arriving passengers and goods can be transported in the building at the highest possible perceived service quality.

4.3.1 Passenger Demand and Handling Capacity (P5, HC5)

For a specific elevator group, passenger demand is the rate of transportation requests, typically stated together with a specific mix of incoming, outgoing and inter-floor traffic. Handling capacity is the highest passenger demand that can be transported sustainably under specified conditions, such as loading constraints. Passenger demand and handling capacity are usually expressed by P5 and HC5:

- P5 is the number of persons that is transported on average within 5 minutes.
- HC5 is the percentage of the population on the floors served by the elevator group that is transported on average within 5 minutes:
  HC5 = P5 / (population on floors served by elevator group).

Example: Consider an elevator group which serves floors with a population of 1000 people. By observation, there are 600 passengers transported within 30 minutes, therefore:

- P5 = 600 persons * (5 minutes / 30 minutes) = 100 persons,
- HC5 = 100 persons / 1000 persons = 10.0 %.

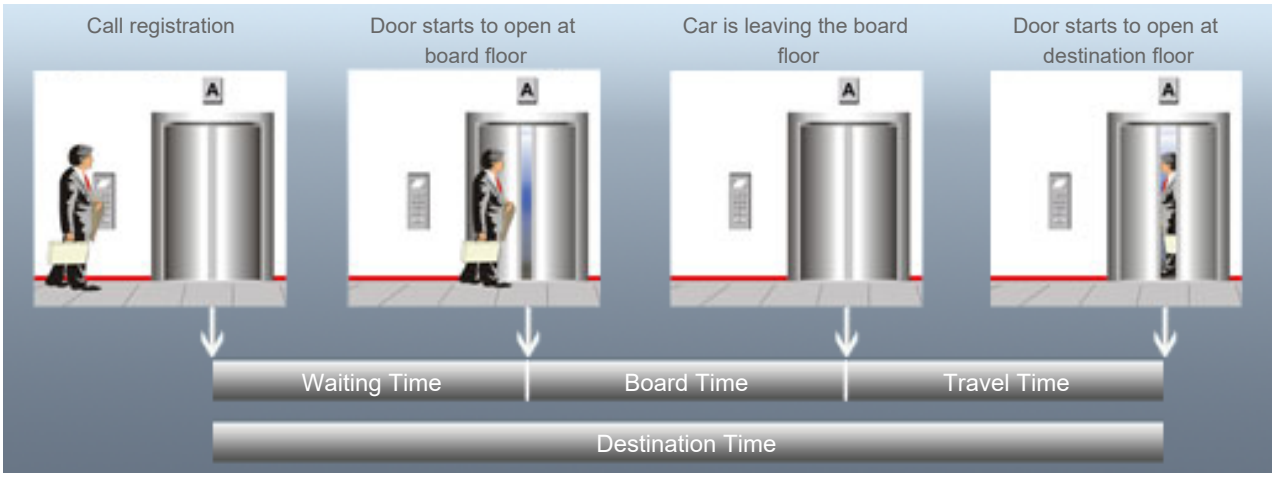
For passenger demand exceeding handling capacity, waiting queues will occur and grow over the duration of the excess demand. Furthermore, for passenger demand near (but below) handling capacity traffic jams may occur temporarily. Both conditions are unsatisfactory for passengers and will be marked as excess demand in Schindler traffic analysis reports. The unsatisfactory characteristics of traffic jam are:

- some passengers cannot board a serving elevator due to lack of space in the cabin;
- some passengers cannot register an elevator call due to a queue of other waiting passengers or, with destination control, because the elevator system rejects the call.

4.3.2 Waiting Time (WT) and Destination Time (DT)

Waiting time and destination time for an individual passenger are defined as follows:

- waiting time: time from when the passenger registers a landing call (or joins a queue) until the door of the serving elevator begins to open on the boarding floor (zero if the door is not closed when the passenger arrives)
- destination time: time from when the passenger registers a landing call (or joins a queue) until the door of the serving elevator begins to open on the destination floor



For a number of served passengers in an observed period of time, the average waiting time WT and the average destination time DT are defined in the usual way as mean values of the passengers' individual waiting time and destination time, respectively.

4.3.3 Number of Intermediate Stops (IS)

The number of intermediate stops for an individual passenger is the number of times an elevator stops with the passenger between boarding floor and destination floor. For example, for a passenger with a direct (non-stop) trip from boarding floor to destination floor the number of intermediate stops is zero.

For a number of served passengers in an observed period of time, the average number of intermediate stops IS is defined in the usual way as mean value of the passengers' individual number of intermediate stops.

4.3.4 Long Waits (LW)

We define the amount of long waits LW as the percentage of passengers with a waiting time longer than 90 seconds.

4.4 Methods of Traffic Analysis

A traffic analysis should cover a variety of important traffic situations, especially when planning new buildings. Reported values should be as reliable and comparable as possible. However, performance values depend on the methods of the traffic analysis and the basic traffic assumptions.

4.4.1 Simulation vs. calculation methods

In *simulation methods,* a real passenger flow is being replaced by a virtual one, which was created with the help of a random generator and loaded into the same control algorithm as used in a real elevator controller. Thus the results can be measured under different traffic conditions and reflect the expected reality to a very large extent.

In contrast, *calculation methods* are based on formulas which only cover a very limited range of traffic situations (usually, only up-peak traffic). The formulas reflect theoretical assumptions rather than a realistic behavior of elevator groups, and results are usually too optimistic. Therefore, calculation results should not be compared with simulation results.

Schindler Traffic Analysis Reports are based on simulations in order that the reported results are the most reliable and realistic achievable. Schindler simulations keep the traffic intensity constant over an extended period of time.

4.4.2 Wide Range of Traffic Assumptions

The traffic flow in a building keeps changing all the time; no two days are the same. As a rule, traffic depends on many factors (such as location of building, tenant structure, etc.) and may vary considerably

during operation of the building. A traffic analysis should take such factors into consideration and try as far as possible to cover future traffic situations.

In a complex building, a single traffic assumption is not sufficient. E.g., it is not sufficient to apply a traffic pattern measured in some other existing building for the design of a new building. In particular, the limits of the handling capacity of the elevators cannot be found by such "spot light" examinations.

Predictions about the range of handling capacity of an elevator group can only be made by actually simulating a wide range of traffic situations. A benchmark method applies a reference traffic situation from low to very high traffic intensity; by this, the limits of the elevators' handling capacity can be detected. Schindler uses a benchmark method which gives a neutral system assessment.

Schindler Traffic Analysis Reports are based on different traffic situations (see Section 2) tested by benchmark methods. This ensures that the traffic analysis covers a full range of applications and reports reliable and comparable performance predictions.