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Lift Traffic Analysis Report

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1 Introduction

The scheme is a new build hotel development of a basement level/below ground design. We have analysed the evacuation of person/movement of the maximum people form the furthest floor to offer confirmation of maximum people in one hour period.

1.1 Report Objectives

The objectives of this report are to identify, through lift traffic analysis the optimal lift design that meets the movement of 82 persons (trips) in a 1-hour period, as this was the peak demand for one-way trips identified by TPP in Table 4 of the accompanying Transport Note.

1.2 Building Design Data

The study is based on information provided by Centro Planning Consultancy.

2 Lift Population

The individual floor populations lift travel, floor to floor and building entrance levels are needed in the lift traffic analysis program to determine the lift service levels. The population for each floor level is calculated from the area schedules which indicate the number and type of apartment per floor.

The following diagram is a representation of the floor levels served by the lifts and the total population of each floor. The total lift population can be used in the lift traffic analysis program to determine lift service levels. The lift serves ground to -4 and -5 and the traffic study has been based on this layout provided to us. The floor numbers below are indicative only - the travel of the lift is correct (as provided to us) which is the length of time to travel the full distance.

Floor	Population	Entry floor
Exit	82	No
-4	0	No
-5	0	Yes

Table 1 – Building Population Block 11a

3 Design Criteria

3.1 Definitions

The criteria recommended for service assumes an understanding of several lift design terms and concepts. The adequacy of lift service is related to the length of time passengers wait for service and the ability of the lift system to handle people and as they require service.

Standards for the comparison and evaluation of these two basic measures of lift service have been developed. They are termed *Average Waiting Times [AWT]* and *Handling Capacity [HC].*

The Average Waiting Time is a "quality" measure of the lift service and is defined as the average waiting of all waiting times of all passengers across all floors. The waiting time is the time from a passenger registering a call at a landing, until the time that a lift arrives at the floor and begins to open the doors.

The Handling Capacity is a "quantitative" measure of the lift service. It is defined as the number of passengers transported in each time. The time used for lift traffic analysis is usually broken down into 5-minute intervals and the HC is usually expressed as a percentage of a building population that can be transported in the period.

This section is standard text to explain terminology - this report however is designed to review the specific criteria of 82 persons in one hour.

3.2 Traffic Patterns

Traffic patterns have been derived from the accompanying Transport Note by TPP.

4 Traffic Analysis Results

4.1 Methodology

To evaluate various lift configurations against the specified criteria, the Elevate, lift traffic analysis and simulation software is used to find the optimum number, size, and speed of lifts. The number of floors and floor-to-floor distances are combined with the building populations and simulations/analysis are run to find the AWT for each tower. Based on 82 persons from the worst case (lowest floor) to travel to an exit point.

- A single run of one person allowing 5 seconds to enter and 5 seconds to leave =22.4 seconds
- The round trip of this lift to return to collect another person adds a further 16 .2 seconds= 38.6 seconds
- 38.6 x 82 persons = 55.7 minutes

As this is an improvement from previous reports but still approaching the upper limit to the hour limit, we can apply some logic, as we have calculated this as a worse case, we would be comfortable confirming that the 82 persons would be cleared within the hour as required

We have offered the Comparison for information based on CIBSE guidance in the table below. This is to show that the systems when working under normal conditions will operate within designated design standard for hotels.

4.2 Results- Passenger Lifts

AWT = Average Waiting Time = Target 35 – 60 seconds. (CIBSE guidance)

Green indicates the target criteria is met.

In line with CIBSE guidance, the third column in the table below presents the scenario in which the lift car is 80% full. Since the lift has a capacity of 13, this would correspond to 10 passengers in the lift. In this scenario, 82 people would be cleared in less than 8 minutes, with an average waiting time of 39 seconds. This is within the recommended range of the CIBSE guidance of 35-60 seconds and demonstrates that the proposed lift provision has sufficient capacity to allow guests to conveniently access the hotel.

Lift	Total time to remove 82 persons single person (evac worse case) in car	Total time to remove 82 persons 3 people in car	Total time to remove 82 persons 10 people in car
1 x13 person m/s lift	52.7 minutes	17.5 minutes	5.2 minutes Average waiting time 39 seconds

Table 2 – Lift traffic analysis results

5 Further Design Points

5.1 Fire Fighting

There is a requirement that a Fire Fighting lift is provided in buildings where the highest level is 18m or greater above the ground, which is the case here.

The minimum size requirement for Firefighting lifts is 8 person/630 kg with a car of 1100 mm wide and 1400 mm deep.

The relevant Fire Code for the building which also includes requirements relating to the Fire Fighting lifts is BS 9999.

Fire Fighting lifts require a back-up supply.

The lift meets this requirement and could therefore be used as firefighting lift. This is explained in more detail in the enclosed Fire Statement.

5.2 Goods Use – Hotel

The proposed development utilises a ramp for the purpose of transporting goods between floors. Therefore, the lift would solely be used for transporting guests in and out of the hotel.

5.3 Accessibility

Accessibility for lifts is defined in BS EN 81-70:2018. The lifts will meet all the requirements of this Standard such as but not limited to, induction loop, buttons at correct height, voice announcements, audible registration of calls etc.

This Standard defines five different sizes of lift car and indicates how accessible each of them are in terms of manual and electric wheelchairs. The passenger lift proposed on this building meets the Type 3 requirement and the car will accommodate persons using a manual wheelchair as described in EN 12183:2014 or an electrically powered wheelchair of class A or B or C as described in EN 12184:2014.

This type also provides accessibility for persons using walking aids (e.g. walking sticks, crutches, or rollators). Passengers with wheelchairs or walking aids are unlikely to be able to turn around in this type of car and will have to leave the car backwards.

The enclosed Accessibility Note confirms that the lift meets these requirements.

5.4 Plant Replacement Strategy

Plant would be replaced via the ramps, so the lift would not need to rely on for this function.

6 Recommendations/Conclusions

The lift will operate to the clients required level in terms of traffic handling as can be seen by the results above. The other documents submitted confirm that the lift would meet the required specifications for fire safety and accessibility.